

Kista is under severe pressure from companies wanting to relocate to this IT-intensive suburb, which contains 600 different companies and a technical college with 3,000 students.

Photo: Lars Åström

Sweden's Silicon Valley

The Stockholm suburb of Kista is one of the world's foremost centers of IT research. It is also by far Ericsson's largest individual workplace, with 12,000 employees. The area also has a distinctly international character. Ericsson Radio Systems alone has employees of 75 different nationalities.

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New mobile IP products

Ericsson is developing a completely new generation of products in which mobility is combined with Internet features.

Articles in Contact's Technology supplement cover such areas as GPRS packet-switched technology, new network architecture for 3G and research into mobile voice transmission via the Internet. You can also read about an exciting new AXE development.

NEWS

Unit for surplus personnel

Ericsson and staffing company Manpower have jointly formed a new unit to find solutions for the approximately 1,000 employees who are surplus to the needs of network operators in Stockholm.

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New wireless LAN solution

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Mobile telephony and the Internet

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VCOs

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Networking



Wireless

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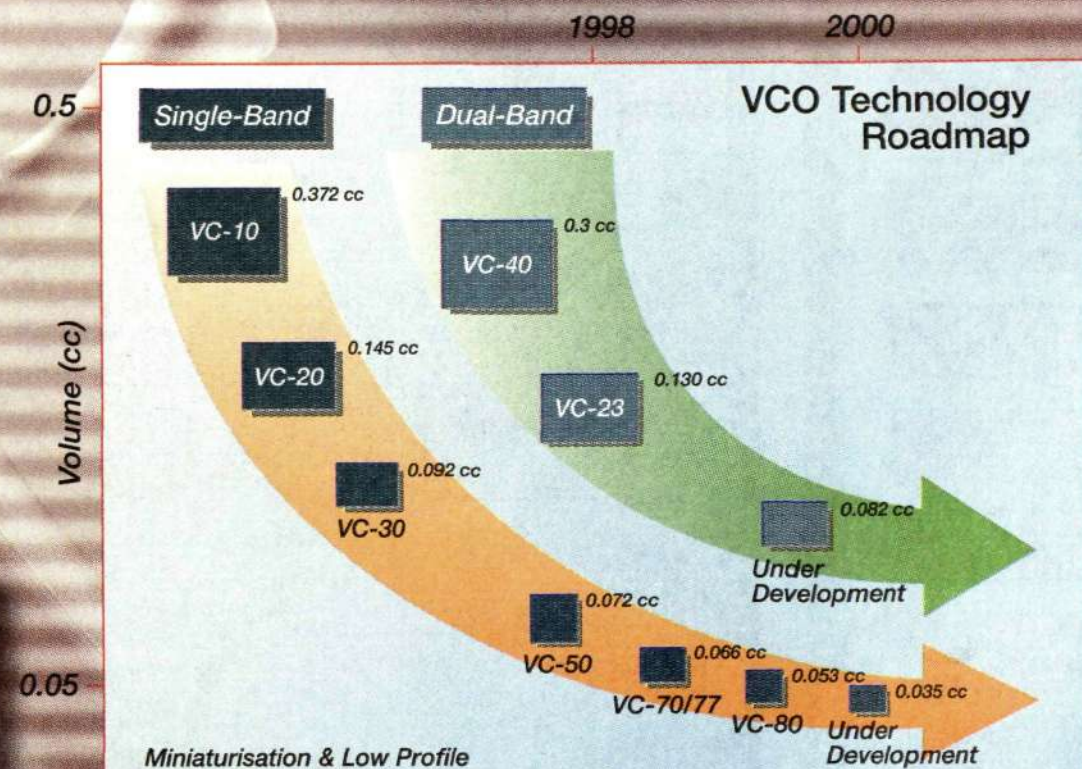
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FramtidsForum formed to resolve personnel surplus

Ericsson, in cooperation with staffing company Manpower, has decided to form a new unit called FramtidsForum (FutureForum). The unit's role will be to find employment solutions for the approximately 1,000 employees who are surplus to the current needs of the Network Operators and Service Providers business segment in the Stockholm region.

"The changes that are now occurring are part of an earlier announced restructuring program that affects the whole of Ericsson," says Ann-Charlotte Dahlström, director Human Resources at Network Operators.

"We're continuously changing our operations in various ways – for example, by rationalizing the flow of production, changing the chain of supply, adding administrative functions, or selling or closing down operations, while simultaneously building up new ones in other areas."

Possible synergies

"This is a prerequisite for our long-term survival, but it also unavoidably affects individual employees. That's why I'm happy about our collaboration with Manpower, which will make it possible to find good solutions for most of those affected," she says.

When the segment was formed in conjunction with Ericsson's reorganization, many new synergies were created between the units for-



Today about 1,000 employees are surplus to the needs of the Network Operators and Service Providers business segment in the Stockholm region.
Photo: Lars Åström

merly known as Public Telecom and Mobile Systems.

The segment has now identified the customers, markets and products that it will work with in the future. This work led to the identification of a surplus of up to 1,000 employees in the Stockholm region.

They are currently employed at Ericsson Radio Systems (ERA) and Ericsson Telecom (ETX). Changes are being made within the Wireline Systems and GSM Systems business units among others, which will lead to a reduced number of market units. At the same time, new work methods result in the need for new expertise in various areas.

"It's difficult to implement a 'last hired, first fired' rule in a situation like this. Ericsson needs expertise within new areas and that expertise is often found among the most recently hired employees," says Ann-Charlotte Dahlström.

"In order to deal with this personnel surplus in the best possible manner, we have negotiated with the trade unions concerned and put to-

gether a program that will allow us to avoid having to serve notice to employees."

Ericsson is forming a new unit, named FramtidsForum, together with the staffing agency Manpower. Employees who, after negotiations, no longer have a place in the new organizations being formed within the segment will be offered a position in this unit. In addition to participating in this program, the company will also offer employees the option of severance pay or negotiated pensions, depending on their age.

The operations of FramtidsForum, which will have its own offices, will be headed by an Ericsson manager. Those who choose to participate in FramtidsForum will be allowed to retain their Ericsson employment during their period with the unit and will also continue to receive an unchanged salary from Ericsson.

Temporary organization

FramtidsForum is a temporary organization, in which employees will have access to specialized support for a maximum of one year through Ericsson and Manpower.

The goal of the operation is to find new jobs outside Ericsson for those who are affected by operational changes. When FramtidsForum is wound down in about a year's time, those employees who have yet to find a new job, will be offered a permanent position within Manpower.

"Using a solution such as FramtidsForum

has not been tried before at Ericsson, but we believe that it's a good way to quickly locate new jobs. Currently, Manpower can offer approximately 3,000 positions," says Ann-Charlotte Dahlström.

"In addition to the fact that Manpower has many contacts with other companies, it is also good at career planning and will, together with us, develop individualized development programs," she says.

Best route for each person

"Our goal is to find an appropriate career path for every person. It's also important to emphasize that there's nothing wrong with the individuals who are being forced to leave Ericsson. Quite the contrary, many of them are highly skilled. The problem is that as the shape of its business changes, Ericsson sometimes finds itself unable to offer jobs that are appropriate for an employee's particular skills," says Ann-Charlotte Dahlström.

Despite the fact that the overall number of employees has to be reduced, Ericsson currently has no total hiring freeze in place.

"In order to keep up with developments and assert ourselves in the marketplace, we need expertise within certain strategic markets, and we're continuing to recruit within those fields," explains Ann-Charlotte Dahlström.

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"The changes that are now occurring are part of an earlier announced restructuring program that affects the whole of Ericsson," says Ann-Charlotte Dahlström, personnel director at Network Operators.

Photo: Lena Widegren

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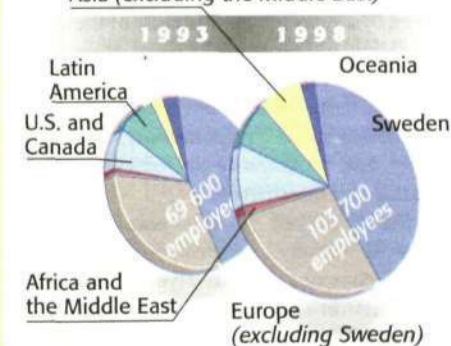
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IN BRIEF

Canada building 3G network

► Canada is about to build its first third generation mobile telephony network. At the end of September, Ericsson and the Canadian telephone operator Rogers Cantel signed a three-year agreement with a value of USD 340 million.

"We've already built Canada's largest digital, wireless network together. Construction of the 3G network will further strengthen our cooperation," says Bob Berner, vice president of Rogers Cantel.

Ericsson and Rogers Cantel have had cooperation for 15 years.

GSM contract in Thailand

► Ericsson has won two contracts for the expansion of Thailand's GSM network.

Thai operator AIS (Advanced Info Service Public Company Limited) has hired Ericsson to expand its network in an order with a value of USD 55 million.

"The contract strengthens our position as the largest supplier of mobile systems to Thailand," says Jan Kemvall, head of Ericsson in Thailand.

When the network is completed, during the first quarter of 2000, it will be able to accommodate 775,000 customers.

Emergency aid to Taiwan

► Ericsson is contributing economic aid to Taiwan following the catastrophic earthquake there at the end of September. More than 2,000 people have been found dead so far and another 3,000 are still missing. None of Ericsson's 300 employees in the country were injured.

Polish GSM network expansion

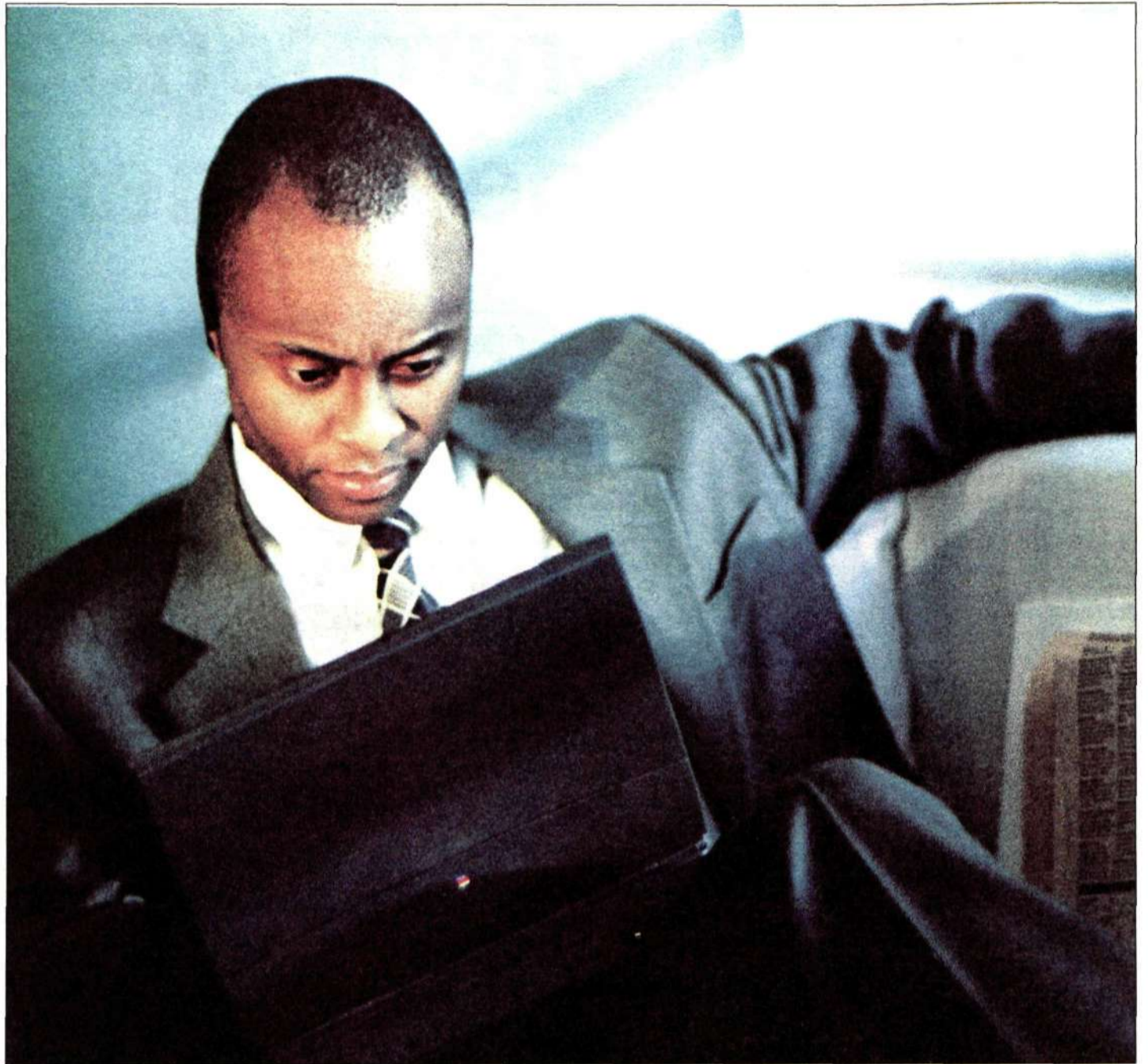
► Ericsson has signed a contract with operator Polska Telefonia Cyfrowa (PTC) for expansion of their GSM network in Poland. The contract, valued at more than USD 80 million, includes delivery of base stations, MINI-LINK radio links and services as well as mobile switching centers and home location registers. When fully implemented, during the first quarter of 2000, total network capacity will be increased to more than 2 million GSM users.

Image in Norway improves

► Ericsson's image in Norway continues to improve, according to an annual opinion poll conducted by MMI 4 Fakta together with *Aftenposten*, a newspaper in Oslo.

The study shows how 115 large and medium sized companies in Norway are viewed by a representative sample of the population. Interviewees gave their overall opinions about the various companies in terms of their environmental awareness, social responsibility, finances, and profitability as well as advertising and information.

Ericsson ranked 37 this year, just ahead of Norway's largest, most well known company, Norsk Hydro. Last year, Ericsson ranked 40 and the year before 50.



Ericsson's solution for wireless LAN means new opportunities for a flexible working environment. Using a computer network interface card for wireless access to the LAN, users are able to make secure intranet connections from the middle of an airport, for example.

Photo: Cappuccino Advertising Agency

Enhanced flexibility with wireless LAN

Ericsson has launched a new solution for the portable office. Its new selection of wireless LAN products enables computer users to establish secure remote high-speed datacom access to their company intranet from airports and other public areas.

Ericsson's WLAN Hot Spot solution was presented at the Net-World+Interop exhibition in Atlanta in the middle of September. The solution, which operates in the license-free 2.4 GHz band, currently allows data transmission speeds of up to 3 Megabits per second.

"The solution provides users with increased flexibility in their work. It makes it easy to move a wireless computer between various rooms within an office and still be connected to the network. The technique also works well in highly trafficked areas, so-called hot spots, such as airports and

conference centers, enabling users to connect with their company networks," says Martin Johnsson, product manager at Wireless LAN Systems.

Service and quality

For companies such as hotel chains, airport businesses and Internet operators, the solution is a competitive tool that signals service and quality. Compared with traditional dial-up connections via modem, they also offer much faster connection speeds.

"Companies that wish to take advantage of the ability to gain remote access to their intranets have, of course, exacting security requirements for access. What is unique to Ericsson's solution is that it integrates several standard protocols for secure transmissions to another entity," says Martin Johnsson.

The connection over the air interface is protected by an encrypted IP-sec tunnel, while transmission via the Internet uses Point to

Point Protocol (PPP), with Layer 2 Tunneling Protocol (L2TP).

Users need to have a network interface card installed in their computer in order to gain wireless access to LAN (Local Area Network). Connection is made from the wireless LAN to Ericsson's AXI510 access router, which connects the call into the intranet via the internet. The user then simply enters their regular user name and a password to log on.

Ericsson holds forum

There are numerous different solutions for wireless LAN currently available on the market, none of which are compatible with each other. Consequently, Ericsson has taken the initiative for industry-wide cooperation, forming the HiperLAN/2 Global Forum, in order to work on making products from various manufacturers operate together. In addition to Ericsson, Bosch, Dell, Nokia, Telia and Texas Instruments have joined in the cooperation. A number of oth-

er companies are in the process of joining.

"The work of the forum is important in order to increase confidence in wireless LAN and to increase market opportunities for the solution," says Martin Johnsson, who chairs the forum.

Based on new standard

New products for wireless LAN will be based on a new standard. Ericsson is overseeing the standardization work on HiperLAN/2 (High Performance Local Area Network) within ETSI, the European standardization organization.

The new technique will enable data transmission speeds of up to 54 Megabits per second, operating in the unlicensed 5 MHz band – a spectrum that has been allocated for this purpose in all the major markets. Ericsson plans to introduce products based on the new standard by the end of 2001.

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Successful GSM 400 demo

GSM technology can now also be used on the 400 MHz band. In Budapest two weeks ago, Ericsson and Nokia jointly demonstrated a GSM 400 system. This technology will create new business opportunities for GSM and NMT operators.

Ericsson began working with Nokia in the spring to establish the new GSM 400 standard. For the demonstration in Budapest, Ericsson used a prototype for the new base station, while Nokia exhibited a prototype for GSM 400 terminals.

Considerable interest

The demonstration generated considerable interest among the invited operators.

Today the 450 MHz band is used for the analog mobile telephone system NMT. Currently, there are some 2.5 million NMT 450 users in 20 countries.

"By 2004, we expect between 10 and 20 million GSM 400 subscribers," says Bo Langemark, responsible for the GSM 400 project at Ericsson.

Because the laws of physics dictate that lower frequencies have a longer range, the 400 MHz band is ideal for sparsely populated areas. The system thus provides extensive coverage with few base stations.

The field tests of the new system were conducted by Ericsson and Nokia in cooperation with the Hungarian NMT operator Westel 450.

NMT operators' efforts to introduce digital technology on the 450 MHz band are primarily motivated by the price trend for GSM phones. Compared with GSM, the production of analog NMT phones is not competitive over the long term.

"GSM is the world's leading mobile standard, which means that GSM 400 provides many benefits



In just six months, Ericsson Radio Access and the Base Transceiver Stations business unit developed a radio base station for GSM 400. Kent Larsson, overall project manager for Ericsson test systems, shows a prototype of the new transceivers to be included in the system.

Photo: Lars Åström

for NMT operators. For example, they can take advantage of all the functions, services and development opportunities provided by the GSM standard. They can also provide the same coverage, boost capacity and reuse base station sites," notes Bo Langemark.



Bo Langemark

Worldwide roaming

At the same time, the new technology will enable NMT operators to offer worldwide roaming using new multi-band phones that support GSM systems on the 400, 900, 1800 and 1900 MHz bands.

For GSM operators who have a license for the 400 MHz band, the

new technology offers completely new coverage opportunities.

"400 MHz is very competitive when combined with other GSM frequencies. GSM 400's base-station requirement is only one-fifth of that needed for GSM 1800, for example, so GSM 1800 could be used to provide capacity in densely populated areas, while GSM 400 is used to provide coverage in rural areas," notes Bo Langemark.

Considerable interest

GSM 400 also offers opportunities in new markets. In Africa and South America, for example, discussions are under way to open the 400 MHz band for mobile telephony. Investors too have become interested in frequencies in the 400 MHz range, which are considered undervalued today.

Standardization work on GSM 400 is currently in progress in the

European standards organization ETSI. An important role will also be played by the NMT operators' organization NMT MoU, which will meet in St Petersburg in October to decide on which 400 MHz-based digital system or systems should be recommended.

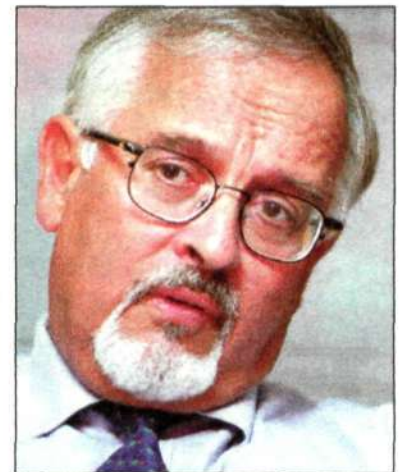
Tetra solution

In addition to GSM 400, there is D-NMT, a digital proposal developed by the Swedish company Radio Design. Earlier this summer, however, this proposal was changed to a Tetra solution, which is a PMR (private mobile radio) standard not suitable for public mobile telephony. Yet another proposal has been launched by the U.S. suppliers Qualcomm and Lucent, which have developed CDMA 450.

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HELLO THERE



Gunnar M Eriksson

... previously president of Ericsson Utvecklings AB, was recently named operational development manager for the corporate core function Technology. His task is to develop a consolidation strategy for Ericsson's development resources.

► What are you doing right now?

I'm conducting a survey of what development resources Ericsson has. So far, I have identified development units in some 60 local companies on three continents. This means our organization is far too widely distributed to be able to develop products effectively. We have to work with greater resources in fewer locations.

► When will the survey be completed?

It will be finished by year-end. By then, we should also have a plan for how to proceed. Our work, which will be completed within two years, will mean a dramatic change in the work methods for development operations.

The consolidation strategy will not involve a concentration of all development to Stockholm. Quite the contrary. Operational work and responsibility will be decentralized, but the strategy also includes centralization with respect to determining what products are important.

► What are the reasons for these changes?

Today, a relatively simple technical project can involve 30 development units in 15 countries. This becomes a major administrative challenge. The advantage of today's distributed organization is that we obtain a broad overview of development activities around the world. The disadvantage, however, is that it is no longer cost-effective to conduct such operations. We need more design engineers and fewer coordinators if our aim is to deliver complete system solutions.

► How will technological advances affect these efforts?

The need for systems integration has increased. Today's development organization took shape when we were opening the first AXE export markets in the early 1980s. As a part of our contracts with traditional telecom operators, local development units were established to make the system modifications required for the local market. Now we are entering a packet-oriented world, where IP and ATM are the main features and which is based on standards in a completely different way.

Nils Sundström

Strategic order goes to the Netherlands

Ericsson has won the contract to upgrade the telephone network of Dutch operator, KPN International Network Services, so that it can also handle data traffic. Ericsson will both deliver and install products for the Next Generation Network solution.

"This is one of Ericsson's most important orders ever," says Ulf Hall, information manager at Wireline Systems.

Ericsson has agreed to deliver and install products for a Next Generation Network solution (NGN). Old switches will be replaced and the network prepared for ATM traffic, a broadband

transmission technique capable of handling voice, data and video traffic.

"This is a strategically important order that shows Ericsson is now properly positioned," says Ulf Hall.

The order includes Ericsson's ATM switches (AXD 301) and a Telephony Server. New services

will be offered in the upgraded multi-service network, which will extend across France, Germany, Italy and Switzerland.

British Telecom and Telia Denmark have previously opted for Ericsson's NGN solution.

Ulrika Nybäck

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Ericsson's new CD-ROM portrays the company over 75 years.

Ericsson Review turns 75

► Ericsson has produced a new CD-ROM that portrays the company and world events over the past 75 years.

The CD, which has been produced to celebrate the 75th anniversary of Ericsson Review, the company's technical journal, is filled with an interactive cavalcade of articles, facts, pic-

tures and film clips. The anniversary CD is primarily intended as a gift for customers. It can be ordered from the website:

xbs.ericsson.se

The new CD will also be available to customers on request at Telecom 99 in Geneva.



Networked appliances will create a new market for various types of electronic services. With Electrolux' Screenfridge, for example, users can access various Internet services and leave electronic messages for other family members. Ericsson's e-box will provide the connection to the Internet. Per Grunewald, business development manager, Electrolux New and Future Business, demonstrates a prototype for Malte Lilliestr le from Ericsson Radio Systems.

Photo: Peter Nordahl

Tomorrow's Networked Homes

Ericsson and Electrolux, the Swedish home appliances manufacturer, are establishing a jointly owned company for the development and marketing of services for the Networked Home. The company will deliver turnkey solutions that connect household appliances with service and content providers on the Internet.

The new joint venture reflects Ericsson and Electrolux's ambition to develop the Networked Home of the future in which household appliances can communicate with each other and access various Internet services.

"We want to make people's lives more convenient and enjoyable by combining household appliances and the resources of the Internet," says Michael Treschow, President and CEO of Electrolux, who together with Ericsson's President Kurt Hellstr m, presented the new joint venture at a press conference in Stockholm last Thursday.

The new company will combine Ericsson's expertise in wireless Internet solutions with Electrolux's knowledge of consumer demands on user-friendliness in the kitchen. As the world's largest manufacturer of household ap-

pliances, Electrolux brings a broad network of retailers to the new company. Ericsson, on the other hand, contributes through its contacts with network operators and service providers.

New business opportunities

"The Networked Home creates a whole new range of opportunities for our telecom operator and service provider customers. Together, and with partners, we can shape this market," says Kurt Hellstr m.

When selling a new freezer, for example, the retailer can offer the consumer a package that includes automatic temperature monitoring and preventative maintenance. The user will also be able to order groceries from a convenient touch screen in the kitchen, which is connected to the Internet via a gateway serving the entire home.

Electrolux has produced a prototype called Screenfridge based on this concept. A screen on the refrigerator door is connected to the Internet and functions as an electronic bulletin board for the entire family that allows users to order groceries, obtain recipes and retrieve information about local weather or traffic conditions, for example.

The connection between the home's intelli-



Ericsson's e-box provides a connection between the home's intelligent appliances and the Internet. It is a gateway that is also used by energy companies to deliver various intelligent services to the home.

gent appliances and the Internet is provided by Ericsson's e-box, which is a gateway that is also used by energy companies to deliver various intelligent services to the home.

"Another important part of the Networked Home concept is wireless communications between various intelligent appliances and

the e-box. Here we can use Bluetooth or some other radio technology, depending on the distance and type of application," notes Malte Lilliestr le at Ericsson Radio Systems, who will be a member of the new joint venture's executive management.

As a first step, Ericsson and Electrolux will jointly contribute SEK 70 million to the new company. The joint venture will work for an open standard for communication between products from different appliance manufacturers and play an active role in standardization of the Networked Home.

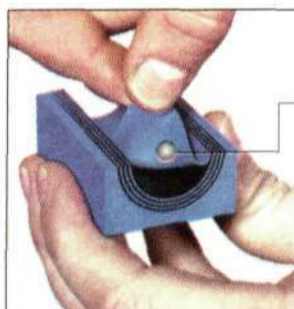
Field testing this spring

Field testing of new concepts will be started this spring in collaboration with TeleDanmark. The first commercial products are expected within one year. The new company is primarily targeting the Scandinavian and Northern European markets.

"By 2005, we expect that there will be 20 million households with this type of intelligent appliances. Our goal is that four million will be our customers," concludes Malte Lilliestr le.

Nils Sundstr m

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Rox System cable entry seal

— with MultiDiameter technology

The Rox System cable entry seals protect telecom installations against water, dust, rodents and insects. Thanks to its MultiDiameter technology, the seal is adaptable in the field and handles a variety of different wires and antenna feeders. Installation is fast and preterminated cables can easily be routed through the seal.

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The lightweight KFO cable entry seal is easy to install, even around existing cables.



Telecom 99 in full swing

On October 10, the doors were opened for the Telecom 99 industry exhibition in Geneva. Around 3,000 journalists and 250,000 visitors jostled to see the stands and to find places at the various forums. The exhibition is a gathering point for all of the major operators, customers, politicians, decision-makers and telecom and datacom journalists.

Ericsson's acknowledgement of the exhibition's importance is apparent with the presence throughout the week of the entire Corporate Executive Team and 170 Ericsson employees – as many as were present at the major CeBIT exhibition. In contrast to CeBIT in Germany and the Comdex exhibition in the U.S., the focus at Telecom 99 is on messages and visions rather than products.

"This exhibition shows who has the best visions for the future. It is a unique opportunity to strengthen the Ericsson image," says Mats Rönne, Senior Vice President, Market Communications.

Ericsson's principle message at the exhibition is "The Power of Mobility," which focuses on the user. It is all about communications on the user's conditions, wherever and whenever they are needed. The Ericsson stand is divided into two overall areas: the users, how they will make use of the new network with the help of a series



During the Telecom 99-exhibition Ericsson has focused on the users and conveying the company's vision of the future.

Foto: Lars Åström

of new applications; and evolution – Ericsson will describe how the networks of today will become those of the future. Circuit switched networks will become the next generation's combined networks, and contain both circuit switched data and packet data.

The opening ceremony and press conferences were held on Saturday.

Kofi Annan, the General Secretary of the United Nations, held one of several opening addresses.

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Follow the daily news updates and other activities from Telecom 99 on these websites:

www.ericsson.se/infocenter

www.ericsson.se/telecom99

inside.ericsson.se/telecom99

Telecommunications can unite the world

On Saturday, the International Telecommunications Union and the principal sponsor Ericsson, marked the opening of the eighth telecommunications exhibition in Geneva with a major ceremony.

The theme was Join the World, urging the entire industry to work to unite the world, not to divide it into one world which has access to telecommunications and one which does not.

"The main task of the United Nations is to bring people closer together. There is a tremendous force in telecommunications. Tyrans and governments who commit violations of human rights have fewer hiding

places," said Kofi Annan, the Secretary-General of the United Nations, at the opening ceremony.

Strong power

Telecommunications has the power to unite the world. But, currently, far from everyone has access to basic telecommunications.

"In three days' time, there will be six billion people in the world. Five billion of these live in developing countries and many have no job, education, health care or food. And they lack basic telecommunications, something which can be just as acute a need as anything else," said Kofi Annan.

"Half of the world's population has never received or made a telephone call. The world is no longer divided into rich and poor, but into those who have information and those who do not."

Goal not achieved

Fifteen years ago, the ITU set the goal that all people in the world should have access to a telephone within reasonable distance. That goal has not yet been achieved.

"However, the goal has never been more realistic than now. Mobile telephony not only gives us a more convenient form of communication, but a less expensive one, too. In many developing countries there are more mobile telephones than fixed lines," said Yoshio Utsumi, the General Secretary of the ITU.

Mia Widell Örnung



Kurt Hellström stressed the need to make communications available to everyone during his speech at the opening ceremony at Telecom '99.

Hopes and fears in opening address

During the opening ceremony of Telecom 99 on Saturday, Kurt Hellström, the President of Ericsson, spoke about visions of the future – both the hopes and the fears.

"Among the children, we can see the corporate managers, researchers and teachers of the future. They must be able to communicate and have access to the tools which make this possible, in order to be able to change the world," Hellström said.

Hellström was the only person from the business world to speak during the ceremony as the representative of the company selected as principal sponsor of the opening ceremony.

Responsibility urged

Kurt Hellström urged company managers and decision-makers to take responsibility for making these tools available to all people in the future, including those in developing countries.

Ulrika Nybäck

WAP phone for betting on horses

Ericsson is presenting an array of exciting phone applications during Telecom 99.

One of these is a WAP application which enables betting on Swedish horse-races from a WAP phone. This service will be launched next year in cooperation with the Swedish betting company ATG and the Telia phone company.

In order to play, it is necessary to own a WAP phone, such as Ericsson's R320, and to have access to the betting software, which will be available on the Internet and at every ATG agency.

WAP site on the net

Via the WAP site on the Internet, customers can select what they want to bet on and place bets by transferring money from their bank accounts to an ATG account.

If any unauthorized person happens to access the Net, he/she will only be able to play for the money that has been placed as a bet – any winnings are paid directly into the player's personal account.

This method of betting is currently being tested by 100 people and the pilot test will decide which, if any, updates are required.

Men are the target group

"Our primary target group is those who already bet using the Internet today, mainly men aged 20–35," says Martin Swenne of the Media and Entertainment unit at Ericsson Radio Systems in Stockholm.

Ericsson Wireless Internet has developed the betting concept in cooperation with the customer, ATG.

The entire concept is based on cooperation between three parties, in which Ericsson supplies the WAP interface, the phones and WAP gateways, ATG is responsible for the betting accounts, the WAP application and system integration, and Telia is responsible for the GSM network, subscriptions and support for the WAP gateways.

"If betting using WAP phones becomes a success, it will mean increased sales of Ericsson's systems and products in the long term," Martin Swenne continues.

Ericsson owns concept

Ericsson owns the total concept and ATG has full rights of use. Launches in countries other than Sweden are included in the plans, but were still being evaluated at the time of writing. ATG currently has provisional authorization for betting on the Internet.

Legislation for the regulation of this is currently being prepared.

Ulrika Nybäck



170 employees of Ericsson are present at the Ericsson stand at the trade-fair Telecom 99. All members of the Corporate Executive Team are also present throughout the week.

There is still a greater destiny to fulfil



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Nokia's ownership model eases acquisitions

An upwardly trending NOK adorns the cover of Nokia's 1998 annual report. NOK is the abbreviation for Nokia shares, whose price has moved upwards. In fact, Nokia shares have experienced almost unbelievable success in recent years.

There are many explanations for Nokia's success among investors, other than the obvious business reasons. Nokia has adopted the American ownership model of issuing a single class of shares, with every share carrying a single vote. Ericsson's system, on the other hand, consists of two share classes: Series A shares, which are strong in terms of voting rights, and B shares, which are weak. The one-share system is believed to encourage liquidity in shares; that is, the volume of trading.

One share – one vote

The disadvantage of the one-share, one-vote model is that the company is more likely to become the target of a takeover. Moreover, Nokia's board has been authorized to acquire other companies using the company's shares as payment. This facilitates its acquisition efforts, since it simplifies financing matters.

The conclusion is that Nokia is strongly positioned in its efforts to acquire other companies, due to the company's favorable share price trends. A high degree of capitalization makes it

advantageous for the company to offer its own shares as payment for acquisitions.

Recently, Jorma Ollila resigned as CEO of Nokia to instead become an active chairman of the board. Pekka Ala-Pietilä was appointed the company's new CEO. He was previously the CEO of Nokia Mobile Phones, a position in which he also succeeded Jorma Ollila.

This management reshuffle has been viewed favorably by shareholders, as yet another way to emphasize Nokia's continued focus on the successful consumer sector.



Jorma Ollila

Board approved

The composition of Nokia's new board has also been received well. The board includes Paul J. Collins, board member of the U.S. bank Citibank, and Bengt Holmström, economist and professor at Massachusetts Institute of Technology, specializing in bonus systems. Finland's former minister of finance, Iiro Viinainen, currently CEO of Finland's largest insurance company, is also a member of Nokia's board.

This composition means Nokia has very good contacts, both in the North American fi-



Nokia shares have experienced almost unbelievable growth in recent years, mainly due to mobile phone sales. Here is Nokia's new 7110 WAP telephone.

nancial market, through Citigroup, and in Finland's political arena.

The Finnish contacts also work on an operational level, since Nokia's new partners are the same banks and insurance company that are represented on

the board. The company uses its domestic market as a test market prior to exporting a concept overseas.

Ira Stening, LMF
Ericsson, Finland
Edited by Patrik Lindén

Mannesmann sheds telecom unit

As part of its ambition to become Europe's leading telecom provider, the German company Mannesmann plans to divide into two separate operations. Klaus Esser, current CEO of the Mannesmann group, has appointed himself president of the new telecom division.

Germany's leading mobile phone operator, Mannesmann, announced at the end of September that the company would be split up into two separate entities in 2001 – a telecom division and a manufacturing division. Klaus Esser, CEO of the Mannesmann group, an-

nounced in an interview that he intends to assume leadership of the new telecom company himself. Lars Berg, formerly head of Telia and at one time business area manager at Ericsson, was named president of the current Mannesmann Telekom unit in May this year and is also a candidate for the new CEO position.

As a separate stock exchange listed compa-



Lars Berg

ny, Mannesmann Telekom has great opportunities to become part of an international alliance or raise capital for acquisitions of other companies. The telecom side of the company accounts for approximately 90 percent of Mannesmann's earnings and is valued 20 times higher than the manufacturing division.

Mannesmann is Germany's largest mobile phone operator, with 6 million customers. The company is also the biggest operator in Italy, through its subsidiaries Infostrada and Omnitel.

Ulrika Nybäck

INDUSTRY NEWS

Telia and Telenor reach agreement

► The final ownership agreement regarding the merger between Telia and Telenor has now been signed. The deal conforms to the letter of intent that the owners signed in January this year.

In addition to the merger of Telenor and Telia, the agreement also states that the new company will be listed on the stock exchange. Initially, the Swedish government will own 60 percent and the Norwegian government 40 percent of the shares. The parties will eventually have to reduce their ownership to 33.4 percent each. In order for the

merger to become effective, two approvals are required, one from the Swedish and Norwegian parliaments, the other from the EU Commission, to which a formal application will be submitted shortly.

For the EU to approve the merger, both Telia and Telenor have been forced to make a number of concessions. Among other concessions, the Swedish and Norwegian governments have agreed to sell their cable TV networks. Jan Stenberg will be chairman of the new company's board, Tormod Hermansen will be CEO and Jan-Åke Kark will be deputy CEO.

www.telia.se
www.telenor.no

Joint venture to be called Concert

► Concert is the new name for the joint venture between American AT&T and British BT. The Concert name had previously been used for BT's international operations aimed at business customers. The "old" Concert will become part of the new Concert along with AT&T. BT and AT&T agreed upon the name Concert, which has received a new logo, with the "n" in Concert highlighted to emphasize Concert's motto: "Global Communications simplified to the nth degree."

www.concert.com

COLUMN



Bobby Chang

Strong comeback from Alcatel

Alcatel withdrew from the North American telephone-switch market more than 10 years ago to focus on the transmission area. In the past few years, Alcatel's strategy has been to integrate System 12 and E10 switches into a new broadband switch, the Alcatel 1000, with ATM and SDH functionality. In relation to the products of the two dominant players, Lucent and Nortel, Alcatel's switch has not been successful. A restructuring program is currently under way at Alcatel, with the aim of staging a comeback characterized by better and stronger products.

ALCATEL IS HEADED BY president and CEO Krish Prabhu in the U.S., who is also to hold the top position of chief operating officer of the company's USD 17 billion global telecommunications unit, Alcatel Telecom. Alcatel will cut 12,000 jobs worldwide over the next two years. To respond to the heavy growth of Internet, Alcatel is to create a new Internet division, including Assured Access and Packet Engines, to enable the offering of complete access and edge data solutions for carriers.

In order to expand into emerging markets, Alcatel is actively involved in acquiring companies and forming strategic alliances. The first major acquisition was of Rockwell's transmission unit in 1991. Alcatel purchased DSC Communications for USD 4.4 billion in June 1998, to gain a foothold in the U.S. access-switches market. The company subsequently acquired Packet Engines in October 1998 for USD 315 million to obtain Layer 3 and Gigabit Ethernet switches.

In March 1999, Alcatel purchased Assured Access, which focuses on remote IP access gear, for USD 350 million, and Xylan for USD 2 billion, to provide itself with a full range of LAN switching equipment. In June 1999, it acquired Internet Devices for USD 180 million to obtain a policy-router product. All these acquisitions will complement Alcatel's existing DSL, DWDM, Sonet and other telecommunications product lines.

Alcatel has also engaged in the following alliances and strategic partnerships.

THE COMPANY HAS FORMED a joint venture with Thomson for the development of phones and high-speed modems, which will be sold under GE and RCA brands in the U.S. market.

Alcatel entered into a strategic alliance with Cisco in June 1997 to integrate Cisco's tag-switching technology into Alcatel's ATM switch products.

Alcatel has also formed a strategic partnership with Loral Space & Communications for the joint development of high-speed global multimedia satellite networks.

Alcatel has teamed up with Efficient Networks to develop universal serial bus ADSL modems that are compatible with G.Lite specifications.

In addition, Alcatel has signed a worldwide cooperation agreement with Motorola for CDMA infrastructure solutions and 3G MSC-based UMTS development.

Alcatel is also to integrate Hewlett-Packard's Smart Internet usage technology into some of its call-data collection applications.

Recently, Alcatel has noted a few successes in the U.S. market. Time Warner signed an agreement in May regarding the use of Alcatel equipment. On August 9, Bell Atlantic signed a five-year agreement with Alcatel on the deployment of the DEXCSIVL narrowband digital cross-connect system. So far Bell Atlantic has installed more than 40 DEXCS systems throughout its networks. On August 17, Global Crossing chose Alcatel to build a South American portion of its fiber network for voice, video and Internet transmissions as part of a USD 700 million deal.

Bobby Chang, Business
Intelligence Manager, U.S.

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Mobile Telephony and the Internet

User Service Center (USC) will change the real world of mobile operators. New opportunities will be created for completely different types of subscribers and WAP services when today's complicated mobile systems, with one component for every individual service, are replaced by a common platform. USC will stretch today's limitations on mobile operators. The convergence of mobile systems and Internet access will enhance the relevance of wireless Internet operators.

When today's mobile systems were designed in the early 1990s, the objectives of mobile operators focused on voice telecommunications, the most critical factor in system configurations.

Gradually, however, competition intensified in the mobile market. When prices fell, voice was no longer adequate as the sole source of sustained profitability. Mobile operators were forced to find new services to make money and attract new subscribers.

Operators started by purchasing short messaging systems (SMS), followed by systems purchased from other suppliers, which enabled them to offer voice mail services to subscribers. Today, systems are available for e-mail, and other systems are waiting in the wings, ready to pave the way for the future of mobile communications, which is spelled WAP.

Complicated network of components

Today's operators have gradually expanded their mobile systems, building complicated weave of components from a large number of suppliers. Substantial resources are invested in maintenance and efforts to help different sections of their systems speak the same language.

So the rhetorical questions arose: why not create a system that would bring order to this chaos once and for all, a common platform with standardized interface that would simplify installations of functions that operators want to offer their subscribers?

The question was raised at Ericsson Wireless Internet Integration (WII) in Linköping. The answer was USC, the User Service Center.

"By incorporating all services in one system, we hope to solve the problems that today's operators are facing and prevent new operators from falling into the same trap," says Hans-Göran Puke of WII.

In a purely physical sense, USC consists of two large cabinets, each about two meters high, that contain a broad variety of servers for all the different functions and a large number of hard disks for information storage. Ericsson's WAP-server, a core component that supports new services, is sold separately and/or as a constituent part of USC.

USC has two sections

In a more figurative sense, USC may be said to comprise two sections: a base system in all User Service Centers and application models designed to meet specific customer requirements.

ERICSSON WIRELESS INTERNET INTEGRATION

Ericsson Wireless Internet Integration (WII) has a speckled past. The activities were started by Saab in Linköping in 1978 to supply Saab aircraft with computer systems.

Computer systems development has been the focal point of activities ever since, but ownership affiliations of the activities have changed.

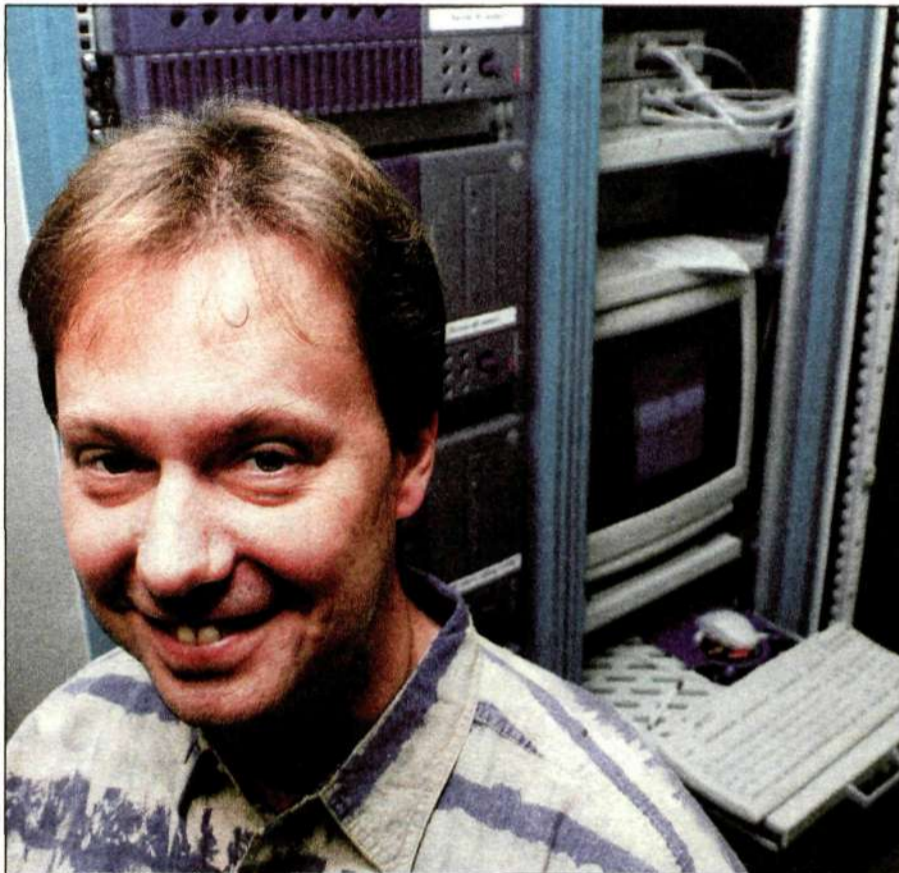
The activities were part of Ericsson for a few years during the 1980s, before they were eventually sold to Nokia.

After five years under Fujitsu ownership, the activities were acquired again by Ericsson in April 1988.

WII employs about 170 persons today and functions

as "a development center for wireless communications with Internet as the carrier," as emphasized by Anders Lindström, Manager of WII.

In addition to USC, Ericsson Wireless Internet Integration serves as a development center for e-box and participates in the development of GSM on the net.



USC will provide Internet access for mobile users. Ericsson's WAP-server is part of the solution which eliminates the need for operators to manage complicated and difficult systems. Hans-Göran Puke of Ericsson Wireless Internet Integration talks about a completely new role for mobile operators.

Photo: Niclas Henningsson

The base system is the spider in the web, a sophisticated connector, or universal translator, which makes other components in the mobile system agree with each other and speak the same language. The operator's control and call metering systems, for example, are connected to the base system, which also contains the USC interface with the Internet, GSM network and other systems managed by mobile operators.

The base system also contains a notification component – an option for subscribers to receive SMS or electronic voice messages to their mobile phones when they receive mail – and a control function that keeps track of which services are included in every user's subscription.

Users can choose from a large variety of different applications. The operators decide which services their USC will process and select applications for WAP, mobile e-mail, mobile surfing, e-commerce and positioning systems, among other options.

The mobile surfing application is available for users who connect their mobile telephones to portable computers to access the Internet while they are "on the go." The function filters out information from conventional home pages and accelerates download speeds. Users perceive transmission speeds as three times faster than conventional surfing via mobile telephones.

"The mobile e-mail application enables

users to read their mail from any terminal. All e-mail is stored in a common mailbox, and subscribers can retrieve their mail using a conventional GSM telephone, WAP telephone or via the Internet with the help of a PC. The User Service Center's e-mail application functions at three levels," says Hans-Göran Puke.

"Operators already have e-mail systems at the lowest level, which allows them to employ USC for notification, whereby subscribers can access SMS messages as soon as they receive mail. At the next level, USC's e-mail application is used to provide subscribers with opportunities to choose which e-mail messages they wish to retrieve. Subscribers who use mobile telephones to read their e-mail might choose not to download mail with heavy attachments.

Unified messaging

"At the highest level, USC offers so-called unified messaging. All messages, e-mail, SMS and voice mail can be read using whatever system subscribers choose. For example, users may choose to have long e-mail letters read aloud by an electronic voice, while voice messages from PCs can be retrieved with attached sound files."

USC functions are changing the conditions of activities conducted by mobile operators. The mode of communications chosen by subscriber, and the type of terminals they use, are no longer relevant. The role of mobile operators is going beyond their former capacity as administrators of mobile communications. Hans-Göran Puke refers to "wireless Internet operators."

"USC is rendering today's Internet Service Providers (ISP) obsolete. In the future, users will not have different subscriptions to access the Internet via PCs and mobile phones. The emergence of Wireless ISP will broaden the role of today's mobile operators."

Niclas Henningsson

COLUMN



Ingemar Söderlind

Minimal changes prior to Y2K

Ericsson has one of the most complicated corporate networks in the world. More than one hundred countries, both large and small, are connected. A large number of specially adapted systems, as well as standardized applications, are in use. Traffic is constant, day in and day out, every hour of every day, in all time zones.

It was therefore quite a challenge when, over three years ago, Ericsson IT Services started checking equipment, programs and routines in preparation for the millennium change. When you read this, all of the systems for which we are responsible will have been secured. This means that:

- the global corporate network extending out to the handover point at every local company is ready.
- our main centers in Dallas, Texas (U.S.), Kuala Lumpur (Malaysia) and Stockholm (Sweden) have been thoroughly reviewed and have also been secured.

MOREOVER, WE HAVE managed to install over 55,000 ESOE workstations and more than 98,000 e-mail accounts (Outlook) as well as upgrade the capacity at 55 of our regional connections and connections between our three main centers prior to the deadline for modifications.

Cut-off points for modifications have been set as of October 1 for the IT infrastructure and November 1 for local applications, which normally are scheduled for maintenance and annual upgrades around Christmas and New Year.

That is a necessity so that we can focus on Y2K problems. We know that 90 percent of any problems we fix can normally be traced to previous changes that we have made. Ericsson is a large company and many changes are therefore made, although the number of changes that generate errors is small.


This does not mean that all changes to infrastructure after October 1 are completely banned, but that it will be more difficult to get them authorized. Björn Boström, Senior Vice President, Supply and IT, and I can – after special preparations – make decisions regarding upgrades, expansions, etc.

THE SAME PROCEDURE goes into effect on November 1 for local applications, with the difference being that it is the president of the local company who makes the decisions. The Y2K work of IT Services is not finished once we have reached our stated goals. Local companies now need to secure their communications from the handover point and confirm to Ericsson IT Services that this has been done. Our efforts are coordinated and synchronized through the Millennium Program Office, which also has all the information which we and those formally responsible in the local companies have provided.

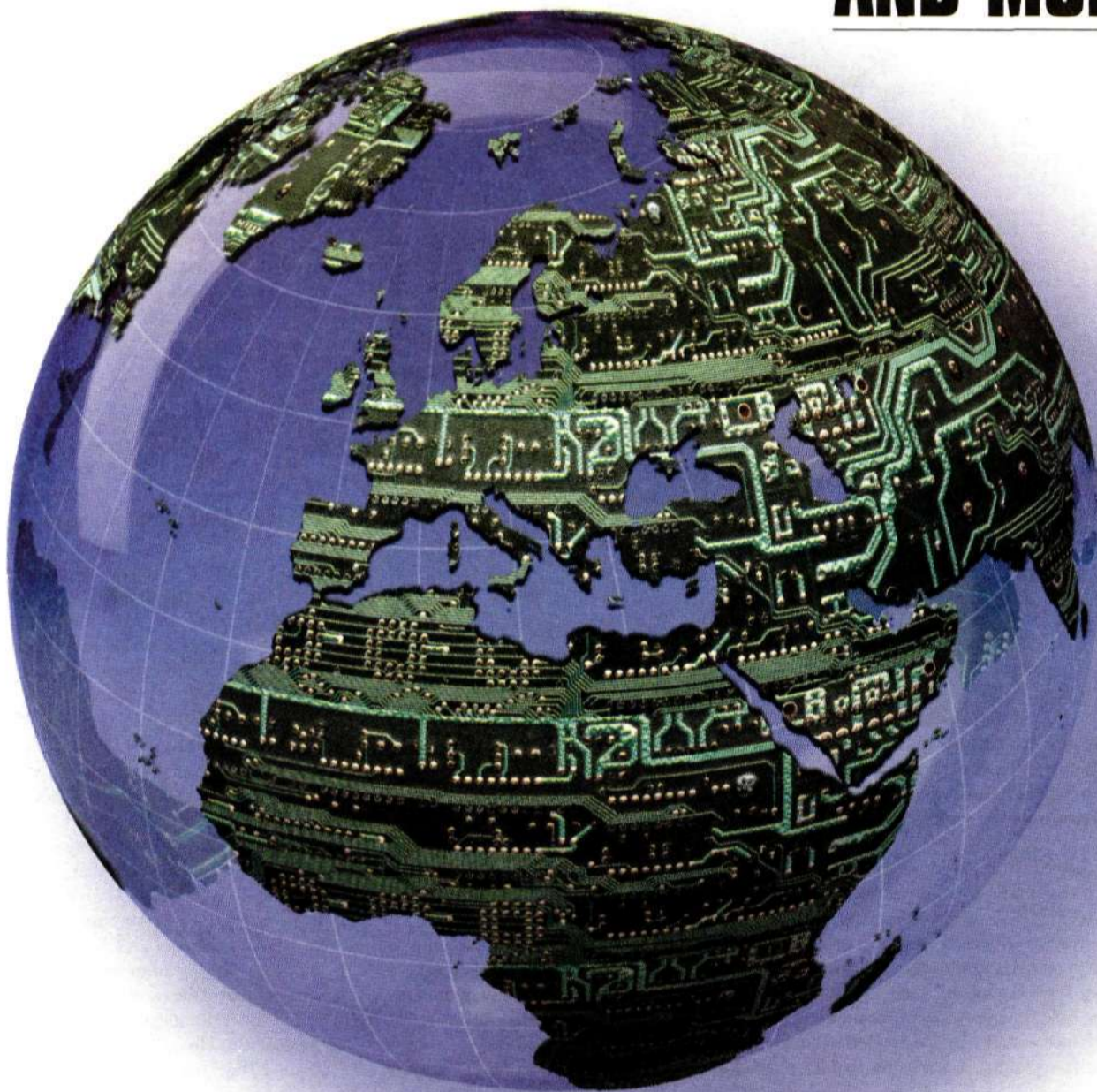
I would like to express my confidence as we approach the millennium change and hope that we will continue the efficient and effective cooperation that has been achieved during the Millennium Program.

I want to direct a challenge to everyone to pay close attention to what your local company is doing. That way, you will be able to contribute towards minimizing changes and to be extra alert, so that we can catch any eventual oversights together.

Ingemar Söderlind,
Manager of Ericsson IT Services

 <http://support-syst.millennium.ericsson.se>

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Kista - Sweden's Silicon Valley

The district of Kista, in suburban Stockholm, is the home of 600 different companies employing 23,000 people, including almost 12,000 at Ericsson, more than in any city in the 140 countries that Ericsson operates in. Contact has visited several sites within this IT center, looking at everything from architecture in the area to visions of the future.

There is a huge demand from companies wanting to locate in the Kista IT center. Currently, several hundred thousand square meters of construction projects are being planned, overseen by the city planning office, which bring various interests in line with each other. An open architectural style reflects the basic planning ideals that were established for the Kista area. Residential and work environments are closely linked, making it easy to get from one area to the other. Another aspect of this openness is that buildings can be approached from any side, there is no back side or back alley.



Lena Steffner

"The architecture is overwhelmingly modern in its design, with the most recent buildings being constructed with double glass facades. The design of the Kista Science Tower is intended to make the tall structure a landmark. An area that contains so much research and modern technology should have a modern landmark," says Lena Steffner, planning architect at the city planning office in Stockholm.

Close to airport

Several factors led companies to initially locate in Kista. They included its proximity to the Stockholm Arlanda airport and the E4 expressway, along with the relative ease of obtaining a building permit. Once the first telecom and datacom companies settled in Kista in the mid-1970s, other companies within the same industries soon followed. Over the past two decades, Kista has developed into a renowned IT center. According to Lena Steffner, Kista is considered Sweden's equivalent of Silicon Valley in the U.S.

With 600 different companies and a 3,000-student technology institute, one can speculate as to whether there is a limit as to how much can be built in the area. Has that limit already been reached?

"Ericsson, IBM, Drott, Peab along with other companies have unutilized building rights to over 150,000 square meters of additional land. Ericsson will be selling its building rights now in conjunction with the sale of its facilities, so of course more will be built," says Lena Steffner.

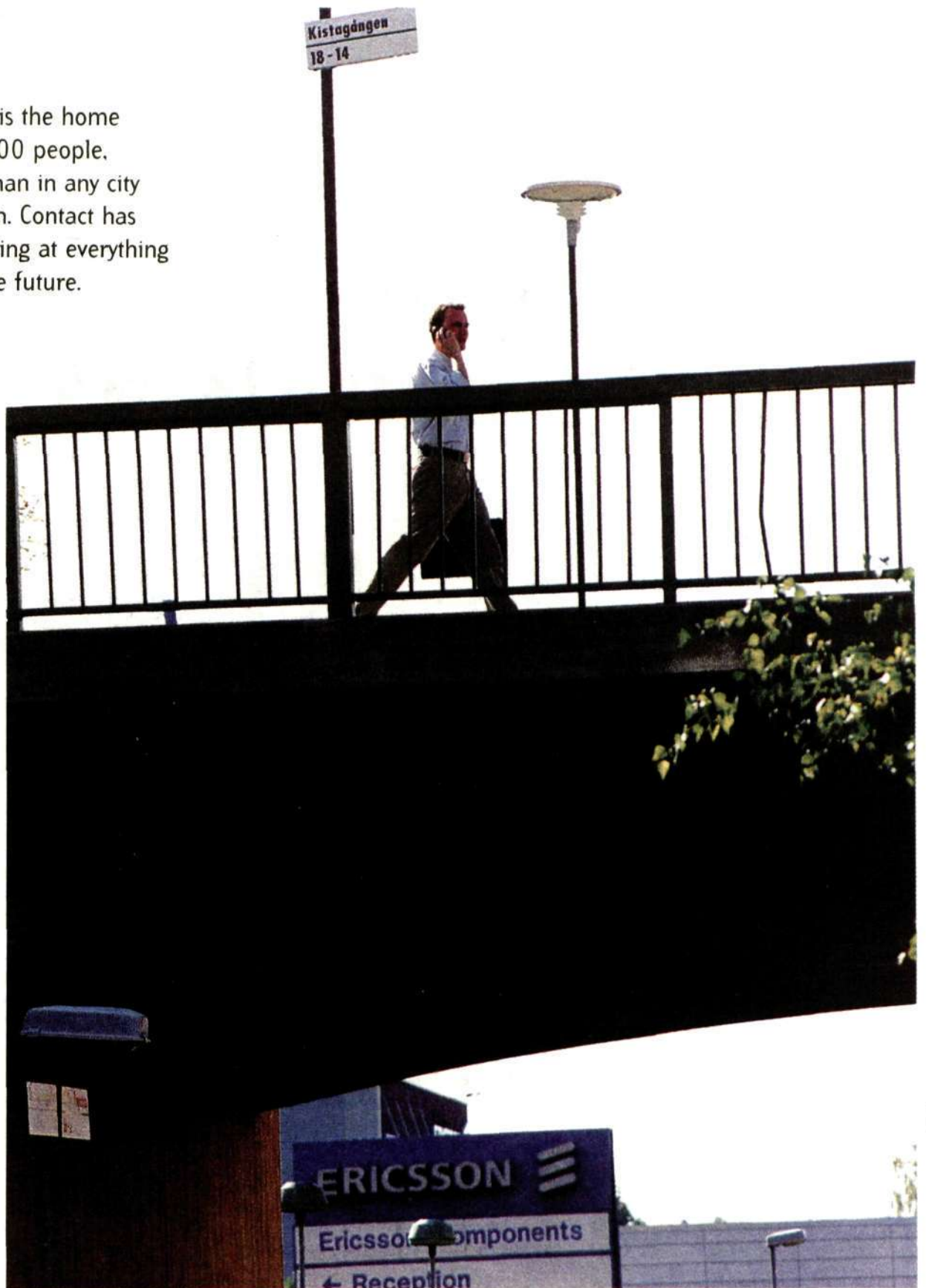
Creating a balance

The city planning office evaluates proposed building plans. They have to take the wishes of other companies, housing management companies and environmental protection associations into consideration. Moreover, they have to follow existing planning and building laws.

"We try and make sure that a balance is created when new construction is carried out. Areas where companies build also require housing, daycare, schools and places for recreation and experiencing nature," says Lena Steffner.

Ulrika Nybäck

ulrika.nybäck@lme.ericsson.se



Over 23,000 people go to work in Kista each day. Among them are 12,000 Ericsson employees. Kista is also the home of an institute of technology, hotels and residential housing. Photo: Lars Åström

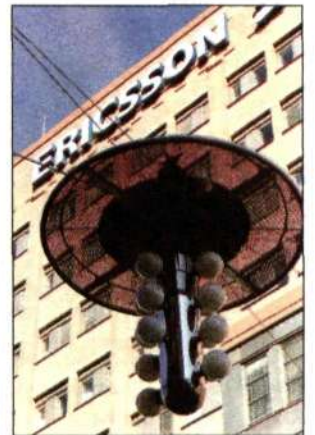
KISTA - SWEDEN'S IT CENTER

Kista is the home of:

- 23,000 workers
- 600 companies, most with fewer than 10 employees
- almost 12,000 Ericsson employees

- 8,000 workers and 75 different nationalities at Ericsson Radio Systems
- Ericsson, IBM, Nokia and Enator, to name the largest companies

- the fifth most important IT center in the world, according to rankings by the American magazine Wired
- Electrum, which was inaugurated in March 1988



SICS, the Swedish Institute of Computer Science, is a research institute in Kista that assists other companies, including Ericsson, in solving problems.

All kinds of ideas are developed there, including everything from social navigation of cyberspace to programs that make base stations more intelligent.

Kista connects Sweden with the outside world

The Swedish Institute of Computer Science (SICS), which has been located in Kista for ten years, currently employs 100 and also has an office in Uppsala, Sweden.

SICS conducts research based on the needs of its customers. Its two largest clients are Ericsson and Telia. Other clients – who have invested money in routine SICS operations as well as special contract projects – include IBM, Swedish State Railways, Celsius Tech Systems and Sweden's Defense Material Administration.

What does the money buy?

SEK 28 million of the institute's annual SEK 70 million budget, comes from the above mentioned companies, while the remainder comes from various government entities including IRECO (Institute for Research and Competence Holding) and NUTEK (Swedish National Board for Industrial and Technical Development).

So, what do taxpayers and companies get for their money?

The research institute's operations can be summarized using three terms: distributive, interactive, real time systems. Janusz Launberg, business and marketing manager at SICS explains what that involves.

"In principle, it means that you could be anywhere and still be able to send and receive information in real time. You could participate in a conference in Australia via a wireless connection on your boat in the middle of a lake in Sweden, and be able to see and hear the other participants and exchange documents with them. As more intuitive methods and technologies are developed for communications, the boundaries between reality and the electronic world will become increasingly erased."



Janusz Launberg

Intelligent software for Ericsson

The software program Freplan is one example of what SICS has developed for Ericsson, in this case for Ericsson Radios Systems in Kista. The program has been in use since 1994 and analyzes the information that exists around a network, automatically assigning frequencies to base stations, so that they can transmit with the least amount of interference.

Another area of research that Ericsson has invested money in is the development of a user interface between humans and machines. One of the SICS projects focused on finding out how engineers search for information using hypermedia (linked text and images). The study showed that some engineers found required information twenty times faster than did their colleagues, a skill, which was associ-

ated with their well-developed spatial ability, enabling them to think in three dimensions.

Information in context

"People who have lesser spatial abilities have a greater need of social navigation. They want to be able to see what people have searched for and read, who has read it, and prefer to discuss the information with others.

Far too many people view information as an object and overlook the fact that humans have a great need to put that information in context," explains Kristina Höök, a researcher at SICS.

Social navigation in an abstract realm of information is made easier by using counters that display how often a document has been read and who has read it, along with the ability to have discussions over the network with those who have read it or those who wrote the text.

"Most, if not all, companies would benefit enormously by developing this area. It is an outstanding way to revitalize dead informational realms – the Intranet, for example," says Kristina Höök.

Continued research

SICS believes in continued research within the areas they are now working in: network architecture, protocols, support for developing a distributive system, and agent technology and methods for solving complex problems such as planning systems.

"Creating methods for solving planning problems is an important area that has limited



For many Ericsson employees, Kista is both their workplace and their home.

Photo: Lars Åström

development potential. These can be used to coordinate various parts within technology, finance or logistics, or to jointly plan all these areas," says Janusz Launberg.

SICS is leading the way in Internet research in Sweden.

The institute is an active participant in standardization work within the IETF, the organ that oversees standardization within the Internet world, and has conducted a number of pilot implementations of Internet Protocol, version 6.

fairly broadly held view. There are good connections between the university and companies, which makes for a creative and motivating environment."

In conjunction with the establishment of the new university, the number of professors needed will expand by 10-15 percent. In order to create an environment that is also attractive after working hours, a campus with a technology park, housing and other services is being built adjacent to the university. The idea behind a campus area is to create meeting places for students, researchers and company employees.

College engineering training

Currently, there are already over one thousand students at the engineering university college in Kista.

They study introductory technical courses or college engineering training such as me-

FIVE VOICES

How do you like working in Kista?

Contact queried five people who work in Kista. What do you think about the work environment in Kista? Is there a special Kista spirit?

► Sara Hansson, works for IT support at Mobile Communications in Kista.



Sara Hansson

"Yes, I think so. People are open and it's easy to make contact with people you don't know. I've never felt as though it is a highly competitive atmosphere, rather just the opposite."

Of course, people work a lot – there are always lights on, no matter what time of day you come here.

► Joel Borell, works in the technical security unit at Ericsson's internal real estate company, REM.



Joel Borell

"What a tough question. It feels as though people always want to be one step ahead in technical development. People work hard and seem to enjoy it. One Christmas Eve, when I was working as a watchman here, I ran into ten people."

► Magnus Fyrö, product manager for a product unit at Ericsson Radio Systems.



Magnus Fyrö

"Yes, there is a positive work environment here. People are enthusiastic and things are always happening. You can tell that those people who work here enjoy being involved in developing the latest technology."

► Vesa Pyykkönen, works as a consultant for Ericsson, servicing door locks.



Vesa Pyykkönen

"It's easy to make contact with other people, they are open and cooperative. When I hear people talking in the corridors, it really feels as though I'm in the middle of a multi-cultural IT center. I can actually tell which people work with computers."

► Sami Boutros, works as an operator at Ericsson Radio Access.



Sami Boutros

"Yes, there is. People are very involved in their work."



One of the 12,000 employees at Ericsson Radio Systems in Kista.

Major investment in IT university at

The Royal Institute of Technology in Stockholm (KTH) sponsors many projects in the Kista area. Now, in conjunction with the new IT university, a whole new campus is being built, with a technology park, housing and other services, large sections of which will be completed by 2003.

"This is a regional, comprehensive IT effort that covers numerous areas, including a new civil engineering program, new student housing, a technology park, new professorships and primary school education for students in areas with large numbers of immigrants," explains Cenita Rodehed, administrative head of the IT university at the Royal Institute of Technology in Stockholm.

Areas of specialization

Already by autumn 2000, 150 future civil engineers will begin a new information technology program. Once the IT university is complete, students will be able to choose between four different areas of specialization: microelec-

tronics, circuit electronics, communications systems and distributive information systems. Over the long term, it is hoped that the school will have the capacity for 300 new students per year.

Cenita Rodehed explains why Kista in particular was chosen as the location for the university.

"Its proximity to IT companies is, of course, important, since there are many synergies to take advantage of there."

Cenita Rodehed agrees that Kista has become Sweden's answer to Silicon Valley in the U.S. That is how the area is viewed in university circles both within Sweden and abroad.

"Certainly, Kista is similar, I think that is a

Kista

chanics, computer technology or electronics.

KTH is also collaborating with the local government body in an educational project to integrate immigrants into business and industry.

"Right now in Kista we have a number of mentors for technology students with immigrant backgrounds, who are participating in the project. We need to get better at integrating immigrant youth in schools and industry and this is one way to do so," concludes Cenita Rodehed.

Ulrika Nybäck

RESEARCH CENTER

Kista is one of the world's largest research centers. There are 6,000 active researchers working for Ericsson in Kista, corresponding to one fourth of the total number of researchers at Ericsson.

"Minifabben" not for sale



The building where Ericsson Components manufactures microchips cannot be sold since the entire building is adapted to production.

Ericsson owns land and buildings with a book value of SEK 7.7 billion. But now everything will be sold over the next 17 months, freeing up capital for Ericsson and allowing it to focus on its core operations.

Everything is for sale – buildings, the land they stand on and building rights. There are some exceptions, however, Ericsson Components manufactures microchips at a building in Kista known to most as "Minifabben". The plant stands on rubber poles in order that vibrations will not damage production.

"Minifabben will remain within the company, it has no value for anyone other than Ericsson itself. The entire plant is basically one large machine," says Ulf Nyberg, property manager for Ericsson's real estate and service company, REM.

The company or companies who buy Ericsson's properties must pledge to complete construction projects that have already begun.

"We will be selling to a company that has construction as its core operation, so the pace of construction may even be accelerated once the sale is completed," says Ulf Nyberg.

Ulrika Nybäck

DID YOU KNOW THAT...

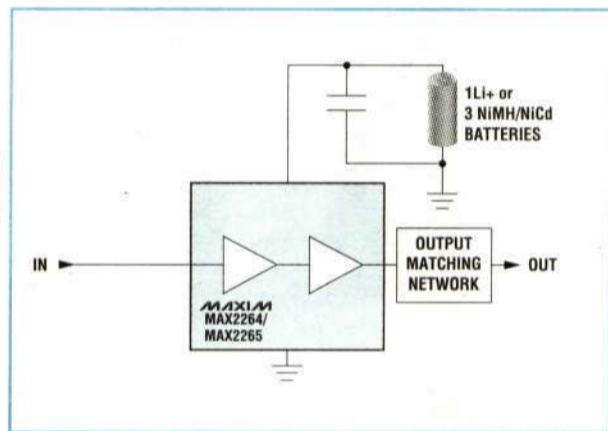
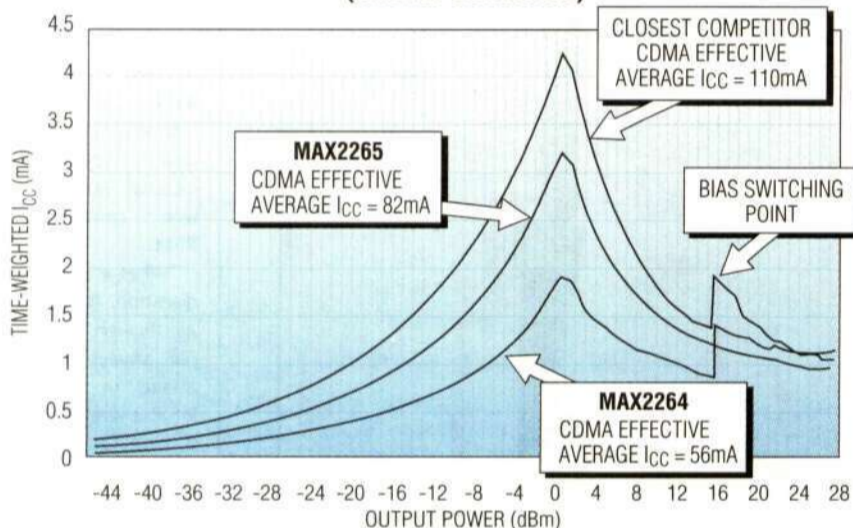
- Ericsson owns 139,716 square meters of land in Kista along with land rights for an additional 23,019 square meters.
- In Kista, 5 of Ericsson's facilities will be sold – including land, building rights and 30 buildings.
- Ericsson will be renting back its facilities from the company that buys them.

SINGLE-SUPPLY, DUAL-MODE LINEAR PAs REDUCE CDMA CURRENT DRAW 50%!

World's Best Efficiency at Medium- to Low-Power Output

The MAX2264/MAX2265 are true, single 2.7V to 5.0V supply power amplifiers designed for IS-98-based CDMA, PDC, and IS-136-based TDMA cellular phones operating in the 900MHz range. The MAX2264's 12% efficiency at +16dBm output is unprecedented in the industry and beats even the most sophisticated dynamic biasing scheme. Since CDMA PAs output less than +16dBm more than 90% of the time, this efficiency improves phone talk time dramatically. These devices require no drain switch, no externally applied negative or positive bias voltages, and the logic inputs—including the shutdown pin—can be driven directly from CMOS logic, making the devices very easy to use.

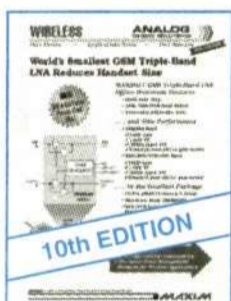
**CDMA TIME-WEIGHTED CURRENT DRAW vs. OUTPUT POWER
(URBAN SCENARIO)**



The MAX2264/MAX2265 are optimized for highest efficiency at medium output power. This improves talk time in CDMA phones by up to 30%. Both devices are housed in a 16-pin TSSOP with exposed paddle. For module or DCA applications, the devices are also available in die form.



PART	CDMA AVERAGE I_{CC} (mA)	EFFICIENCY @ +28dBm (CDMA)	EFFICIENCY @ +16dBm (CDMA)	EFFICIENCY @ 29.5dBm (TDMA)
MAX2264	56	32%	12%	N/A
MAX2265	82	37%	7%	42%



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The cover of the first issue of "ON - The New World of Communications".

Customer magazine ready for launch

Distribution of Ericsson's new customer magazine, "ON - The New World of Communications," is under way. A total of 200,000 copies of the first issue have been printed for worldwide distribution.

The plan, initially, is for Ericsson's local companies to distribute the magazine to both existing and previous, future and potential customers, as well as others interested in the company. Recipients can then register for a free subscription to the magazine, which will be printed six times a year.

The first issue contains 60 pages of exciting reading about topics of current interest within the telecommunications industry as well as at Ericsson. "ON" is a different kind of customer magazine, developed to appeal to people living in the 21st century. The design firm Magazine is in charge of layout, while Appelberg Publications, together with

the company's editorial staff, is responsible for the editorial content.

The magazine is mainly aimed at external readers, but it is also the intention that Ericsson employees working with customers or requiring updates on the company's marketing communications should be able to register for a subscription. This can be done most easily by visiting the web site www.ericsson.se/on. An on-line version of the magazine can be found there, as well as a subscription form that is simple to complete. If you have your own customer contacts and want to have magazines to send to your customers or other outside contacts, you can re-

quest Inger Bergman Willix, of the company's editorial staff, to make the necessary arrangements.

"We'll be distributing the first two issues of the magazine through Ericsson's local companies and customer relations personnel, and we've started a central database based on the subscription orders we're receiving. It's web-based so that address changes can be entered and new subscribers added by those responsible in the local companies," explains Lars-Göran Hedin, executive editor of the new magazine.

"The idea behind the database is that local companies will also be able to extract addresses from it for their own needs."

Patrik Lindén

patrik.linden@lme.ericsson.se

ERIC & SON



Postcards go electronic at Inside

► Ericsson's intranet site, Inside, has introduced a new feature. A collection of electronic postcards, known as E-cards, is available for different occasions. They can be used as an alternative way to communicate, which is still quick and environmentally friendly. For instance, invite someone to a meeting, congratulate your colleagues on a recent achievement, or tell someone about an informative or interesting web-page at Inside or the Info Centre news site. The E-cards can be accessed at <http://inside.ericsson.se/e-cards/>



Send a colleague an electronic postcard.

SPONSORSHIP AROUND THE WORLD

Here is a list of a some of the sponsorship and Corporate Citizenship activities being undertaken by Ericsson companies around the world over the next few months. Tips regarding events can be sent to: ulrika.nyback@lme.ericsson.se

September 1 - November 30, Ericsson Mobile Communications in Sweden is sponsoring Göran Kropp's lecture series. In 1996, Göran Kropp climbed Mount Everest without oxygen.

October 2-3, a motor race takes place in Barcelona, Spain. Ericsson in Spain (EEM) is sponsoring a Formula 3000 car.

October 11, the start of the "Copa Ericsson" tennis tournament in Latin America. Ericsson in the U.S. (EUS) is the sponsor.

October 18, the start of the America's Cup yacht race off the coast of New Zealand. Ericsson is one of five main sponsors.

November 11, MTV Europe Music Awards in Dublin, Ireland. Ericsson's headquarters and Mobile Phones in Sweden are the sponsors.

February 10-13, Ericsson in Australia (EPA) is sponsoring the Ericsson Masters golf tournament in Melbourne.

Ongoing projects:

Ericsson in Brazil (EDB) donates money to the World Childhood Foundation. The money is used to help vulnerable or abused children around the world. Sweden's Queen Silvia Bernadotte established the foundation.

Ericsson in Canada (EMC) supports a project which helps people who suffer from domestic violence.

Ericsson in Canada is the sponsor of the BCTel Open golf tournament, a contract that lasts one year and started on January 1 this year.

Ericsson in Canada (EMC) is a regular sponsor of the Mont Tremblant World Cup Freestyle Skiing competition.

Ericsson in Switzerland (ERS) is sponsoring the Züri Tüf horse-race.

Ericsson's head office in Sweden supports the Folkoperan opera house in Stockholm.

Ericsson in Germany (EDD) is sponsoring the FNL Europe soccer tournament series, a contract that extends over two years.

Ericsson in Taiwan (ERT) is sponsoring the "Ericsson Classic of APGA Tour" golf tournament in Taiwan.

vacancies

AT ERICSSON

■ This is a selection of vacancies within the Ericsson corporation. They are published in the electronic News system, which is being updated once a week.

For further information about advertising here, send an email to Imejobs@ericsson.se

Contact No. 16 1999

Updated October 4

ERICSSON VENEZUELA, CARACAS

AXE Troubleshooter

● Position Description: The AXE Trouble Shooter is responsible of the CSR analysis, TR Handling, Emergency Support, and Help Desk

Education and Experience required: Degree in Engineering. Experience in the field of Telecommunication 4 years. Excellent knowledge about software fault finding, and either local, Transgrate or TDMA applications. The candidate must be able to work under pressure and long hours if required. Spanish knowledge is a plus.

Skills and Abilities: The successful candidate shall be one of our main technical experts, and shall be willing to transfer knowledge to the local engineers.

Additional Comments: Are you looking for a better way of life? Ericsson, Venezuela is looking for highly skilled individuals like you. Come to Ericsson, in Caracas, Venezuela, and work on the leading edge of technology, and enjoy an affordable way of life. Venezuela is a country of striking natural beauty and dramatic contrasts: the snow-capped peaks of The Andes in the west, and steamy Amazonian Jungles in the south; the hauntingly beautiful Gran Sabana plateau, with its strange flat topped mountains, in the east, and 3000km of white sand beaches fringed with coconut palms line the Caribbean coast.

Caracas. Situated in a picturesque valley on the north coast, Venezuela's capital is a bustling metropolis of nearly 3.5 million inhabitants. Fast, progressive and cosmopolitan, the city is now "yankeefied, retaining little of the character of its colonial roots. While it boasts some of the most impressive modern architecture in South America

Contact: Hiring Manager Franco Cretone, +58 2 273 0270.

ERICSSON CANADA

Technical Assistance Specialist

● Job requirements: Degree in engineering, engineering technology or science or equivalent work experience. Several years related experience in telecommunications. Working knowledge and understanding of cellular systems. Five years experience with Ericsson or equivalent cellular experience. Trained in CMS 8800 switching and cell site operations and maintenance (experience an asset). Trained in AXE Software (i.e. PLEX) with ability to troubleshoot on software level. Excellent oral and written communication skills.

Job Description: 24 hour "First Line" technical/emergency support for CMS88 networks. Preparations of procedure and verification of functionality of functions/corrections regardless of complexity. Responsibility to define/verify a new AS. Communicate and assist customer/field personnel in technical and operational questions. Assist in emergency situations to resolve equipment and/or procedure errors. Planning, control and direction of a CNA implementation. Reporting and follow through of customer problems via various software tools.

Customer Interface Manager, Telesystems

● Job Requirements: Degree in engineering, engineering technology or science or equivalent work exp. Several years related experience in telecommunications. Working knowledge and understanding of relevant product lines. Three years experience within Ericsson or equivalent experience. Excellent oral and written communication skills. Demonstrated leadership/supervisory abilities. Basic ISO training on 9002 standard.

Job Description: Primary customer interface for all technical support issues for respective customer. Accountable for ISP, and Customer Service Requests (CSR) turnaround time for respective customer as per contract. First line technical support coordination towards the customer. Utilize

assigned staff to analyze and resolve major problems in their respective areas. Generate work processes for interface with customers and with second line support. Assist the customer in problem analysis and resolution either independently or utilizing assigned Ericsson resources. Monitor the flow of Customer Service Requests (CSR). Top ten issues coordination. 24 hour responsibility for crisis management. Assemble/maintain customer performance statistics and disturbance reporting. Primary involvement with First Market Introduction of software, features, etc. develop technical presentations. Help contract managers negotiate Service and Working level agreements. Develop and maintain a positive customer relationship.

Contact: Tim Danks, Manager Customer Support, tim.danks@emc.ericsson.se

ERICSSON SYSTEMS EXPERTISE LTD., IRELAND

Software/Systems Engineers

● You are an individual. You set ambitious targets for yourself. Network Operator Solutions Centre (NOSC) can help you surpass them.

We see your potential as a person and professional who will meet and exceed our mutual goals. Network Operator Solutions Centre (NOSC) based in Athlone, Ireland currently has vacancies for Software/Systems Engineers.

As a creative Software / System engineer, you will make key contributions to our design teams. You will be innovative and use dynamic new techniques, which you will develop to their maximum potential.

We will give you the freedom to progress in your chosen direction while you can continue to enjoy an exclusive lifestyle. We not only recognise and reward your competence within your work but also your personality and contribution to our company.

If you would like to realise your ambitions with a company that is rapidly establishing a leading position in Datacom, you should have an interest in C++, Java, GUI, Building ATM.

Our Athlone research and development centre has a significant global responsibility to develop products and systems for Network Operators and Service Providers.

If you are energetic and enjoy pushing your talents to the limit while continuing to lead an exclusive lifestyle then this is the career for you.

Application latest 991105: Michael McGann, Human Resource Manager, Ericsson Systems Expertise Ltd., Ericsson Software Campus, Athlone, Co. Westmeath, Michael.McGann@ericsson.com

COMPANIA ANONIMA ERICSSON, VENEZUELA

Manager Installation Engineering RBS at RIC, Regional Implementation Center, Venezuela

● We are looking for a Manger for our RBS Installation Engineering department in RIC. The RIC, Regional Implementation Center is a resource center to supply region Americas with competent resources within the areas of engineering, installation and test. RIC mainly works with TDMA system customer projects.

You are responsible for RBS engineering activities and that required processes and methods are followed. Also of your groups competence development, hiring new staff, and plan resources for customer projects in the region. You need to be committed to transfer knowledge and train local engineers. You will report to RIC manger. Your work will lead you into daily contacts with MU's in the region.

This requires good skills in written and spoken English. Spanish knowledge is an advantage.

Good knowledge, at least 3 5 years experience, of RBS engineering as well as experience of managing staff. You will be what we call "a working manager" which means that you will work in some of our projects when needed and to train new staff. You need to be able to take the initiative and meet our common goals. Your colleagues will be a few other expatriates and venezuelan engineers. We are ready to offer a 1 2 year contract to the right person and starting date beginning of November.

Contact: Helena Kvist, +58 2 273 0395, helena.kvist@cev.ericsson.se. Application: Luis Gonzalez CEV/OTC +58 2 273 0146, fax +58 2 273 0116, luis.gonzalez@cev.ericsson.se, Regional Implementation Center, Compania Anonima Ericsson, Centro Empresarial Parque del Este, Av. Francisco de Miranda, La Carlota, Apartado 70516, Caracas 1071, VENEZUELA

ERICSSON SPOL. S R O. ECZ

GSM CHEZH REPUBLIC

Ericsson is in a good position for supplying the network infrastructure for the 3rd operator in Czech Republic. ECZ plans for TURN KEY contract which involves all activities from network design, acquisition, construction to Operation & Maintenance.

For all the positions it's basic requirements with: University/college degree. Good command of English. Able to work in a team. Well organised. Ability to work under pressure.

Regional Project Manager

● As the regional Project Manager you will be responsible for the execution of the project in your region including all activities, Site acquisition, Civil Work, Installation, Test and integration. You report direct to the Project Manager (Total Project Manager).

Further responsibilities: To hold a budget for the execution of the, regional project, Customer presentations and progress reporting. Scheduling of all activities in the region. Manage a portfolio of regional sub projects and sub contractors.

Requirements for this position: Besides an experience Project Manager with all common experiences needed in such a position we also want you to have Ability to work under pressure, independent and well organised and excellent management skills.

Team Leader

● As a Team Leader you will be responsible for a number of Radio Base Station sites from search order all the way to integration. You are responsible for the progress and quality of the sites. To your help you will have Build Controllers, Site Acquisition Controllers and Installation Teams. You will report to Regional Project Manager.

Responsibilities: Ensure that all selected sites are within acceptable build tolerance, rent levels, access and RND levels. Ensure that the sites are constructed in accordance with design documentation, agreed schedules, budgets and standard of quality and health & safety. Ensure that the sites are installed within agreed time schedule, budget and quality standards.

Requirements: Ability to be proven Track record of participating GSM projects. Ability to work under pressure, independent and wellorganised and excellent management skills.

Radio Network Design - Cell Planner

● As a RND Engineer for the regional offices you will be working with nominal cell plans, radio coverage predictions, frequency planning, site surveys, site nominations, RF measurements, BSS parameter settings and initial tuning.

Requirements: University degree or technical college in the field of Electrical engineering.

Knowledge within the field of radio communication systems.

Transmission Planner

● As a Transmission Manager you will be working in one of the regions. Your main tasks will be engineering services, frequency planning, site surveys and interface external suppliers of equipment.

Requirements: University degree or technical college in the field of Electrical engineering. Knowledge within the field of radio communication systems.

Health and Safety Coordinator

● The Health and Safety Co ordinators' main responsibilities will be in regards to Health and Safety matters. The role covers all safety issues arising under the Regulations and includes: Health and Safety obligations arising under the contract. Checking Planning and Design drawings for Health and Safety risks. Keeping Management fully informed and advised on all matters with Health and Safety implications. Maintenance of Health and Safety documentation including updating all records as the work proceeds. Regularly audit Site Acquisition, Site Design and Civil Contractors over issues relating to Health and Safety.

Requirements: Proven track record of similar work. University degree is an advantage.

Project Logistics

● As a project logistics your main tasks will be to initiate logistics routines, order registration and updates, delivery planning, order acknowledgement, purchase of material for customer from external companies.

Requirements: Well organised and good coordination skills. Experience with similar tasks.

Logistics Manager

● As Logistics Manager you will be responsible for Logistics processes, systems, resources, ordering, forecast, International and National Transportation.

Requirements: Management experience, Logistics experience and worked in international environment.

Project Reporting

● You will be responsible for collecting information from Regional Project offices and prepare reports for project progress against project time plan and budget. Reports will be prepared for Ericsson Management and for customer.

Requirements: Experience in Windows 95, MS Excel, Word and at least one database, ideally MS Access. Preferable is experience with similar tasks and ability to understand basic technical and accounting concepts.

Project Scheduling

● Responsible for scheduling the Project of site activities under the direction of the Regional Project Managers and Project Manager. Within the areas of acquisition, design, construction, installation, test and acceptance you will schedule progress, resources and cost.

Requirements: Experience in Windows 95, MS Excel, Word and at least one database, ideally MS Access. Preferable is experience with similar tasks and ability to understand basic technical and accounting concepts.

Project Coordinator

● As a Project Co Ordinator you will report to the Project Manager. You will be line manager for 5 10 people and be responsible for the project scheduling, reporting, database, and document control.

Requirements: Experience within equal areas is an advantage. As a person you must be very well organised and experienced with managing people.

Finance Manager

● As a Finance Manager you will be responsible for Financial processes and resources, in and outgoing invoices (internal and external), keeping track of the financial status of the project, set up project budget together with Project Manager and follow up budget.

Requirements: University degree in economics, experience with similar job and computer skills.

RBS Field Tester

● As an RBS Field Tester, you will work with test and commissioning of Ericsson's GSM Macro and

Micro radio base stations, both in the band of 900 and 1800 MHz. You will ensure that the equipment installed at radio site is working properly, according to Ericsson's quality standards.

Requirements: CME 20/CMS 40 experience with a minimum of 2 years working with test and commissioning of Ericsson radio base stations in customer projects; Good initiative and trouble shooting capability; Easy co operation with other members of the team; Good communication skills in English.

Contact: Bertil Winzenburg, +420 602 596 160, Olof Wassvik +420 2 611 94 394, Stefan Hedelius +420 606 601 573, Ludmila Seidlova, Human Resource ludmila.seidlova@ecz.ericsson.se. Application: Ericsson Spol. s. r. o. GSM 1800, Att. Solveig Valentin, U Michelske skoly 10/39814000 Prague 4, Czech Republic, ludmila.seidlova@ecz.ericsson.se

ERICSSON GMBH, DÜSSELDORF, GERMANY

The German IP market is booming. Wanna join the ride?

The German IP market is already Europe's largest and it is estimated to grow enormously. In Germany, Ericsson has established a Customer Unit focused on ISP's and IP Carriers. The unit consists of account teams for both NAM and KAM. We need highly skilled enforcement to attack the market. Face the challenge and get into the IP space.

Key Account Manager

● The key account manager has the responsibility to: Handle all existing business with the customer in Germany and abroad. Continuously investigate new investment areas. Be the commercial interface to the customer. Optimize the margin on the business with the customer. Plan the short and long term business with the customer. Manage the team working with the customer

The KAM has the responsibility for one large account. The business covered stretches from pure IP related solutions to full multi service network scenarios where UMTS is a natural ingredient. You have a background from account management, business management or have the experience of working in an ISP/IP carrier organization. You have abroad knowledge of telecom and/or datacom solutions and a good understanding of how the customers generate their business. You have a team oriented personality and very good communication skills. German language skills is an advantage.

Contact: Magnus Rosenblad, Magnus.Rosenblad@edd.ericsson.se, +49 211 534 4720 or Hans Jürgen Vratz, Hans.Juergen.Vratz@edd.ericsson.se, +49 211 534 1441, Ericsson GmbH, Fritz Vomfelde Str. 2640547 Düsseldorf, Germany

ERICSSON EUROLAB (EED) AACHEN, GERMANY CSS SWITCHING TEST SUPPORT SECTION EED/X/SO IS LOOKING FOR A

TCM Project Manager GSM R9/UMTS R1 Core Network Verification

● The GSM Switching Verification and Customer Service Center (EED/X/S) within the CSS system house is responsible for system test, industrialization, and support of the GSM MSC Server Product line at EED. It includes system test, industrialization, and test support for the GSM MSC Server releases, as well as product line maintenance and customer support for the product line. Test Support includes overall Test Configuration Management (TCM) responsibility for GSM MSC Server development projects from TG1 up to GA.

Our GSM Switching Test Support Section (EED/X/SO) is presently seeking candidates to fill the position of: We are presently seeking a qualified candidate to take the TCM Project Management role for the GSM R9/UMTS Industrialization Project. The R9/UMTS project is the first step in the evolution of GSM to third generation systems. The project consists of elements from CSS (MSC/VLR/MGW), CAPC, APZ, and GDB (AUC, EIR, FNR, and HLR).

You will work in a leading position within the GSM Switching Test Support Section. A motivated and experienced team of 51 people responsible for all activities required to execute TCM projects. Your main tasks will be the planning, alignment, execution, and control of TCM activities in the CSS project.

You will be responsible for the integration of products from CAPC, CSS, and VAS in the test environment, and also coordination and alignment of the R9/UMTS TCM activities with those of the WRN (Wideband Radio Networks) and PSS (Packet Switching Systems) development projects.

A good candidate is an Ericsson employee with AXE or wideband competence in the area of design, testing or TCM. Previous experience in project or line management and a good understanding of TCM and verification/INDUS processes is desirable. As project manager you will work closely with the INDUS project management.

You will need strong organization, planning, coordination, and communication skills. A good understanding of PROPS methodology is a plus. You will have to be flexible and have the ability to work under time pressure. Frequent travel is likely.

Contact: Human Resources, Simon Seebass, +49 2407 575 163, Simon.Seebass@eed.ericsson.se or Section Manager, Charles D. Grinstead, +49 2407 575 341, Dan.Grinstead@eed.ericsson.se

ERICSSON EUROLAB (EED) AACHEN, GERMANY CSS SYSTEM TEST & INDUSTRIALIZATION EED/X/ST LOOKING FOR A

UMTS Network Tester

The System Test & Support Department EED/X/S within our CSS System House is responsible for the central Product Line Maintenance of the GSM SS, GPRS and UMTS software releases and solutions. The departments activities include verification of UMTS Network Solutions, CME20 SS Maintenance and Customer Support, Industrialization of CME20 SS releases, Test Configuration Management and Methods & Tools development.

● In the development phase of the 3rd. generation UMTS we are looking for a Data and Telecom Network Expert to support our local network test activities. You are mainly responsible for planning, implementing and executing tests needed to integrate and verify the new functionality on node level as well as on GSM and UMTS network level. This includes as well

Comprehend extremely complexed systems. Perform analyses on some of the OSI protocol layers for mainly fault finding. Plan, implement and support Industrialization test and solutions activities. Issue and follow up requirements for test configuration and simulation tools.

As a suitable candidate you are an Ericsson employee with a strong software development background and experience. You are familiar with the Network structure and feel that this is a challenging project where almost everything is new new technology, new interfaces, new tools etc. Data communication background and GSM experience are essential.

The start would be at your earliest convenience.

Contact: Human Resources, Simon Seebass, +49 2407 575 163, Simon.Seebass@eed.ericsson.se or EED/X/STEC, Jan Klinte, +49 2407 575 7852, Jan.Klinte@eed.ericsson.se

ERICSSON RESEARCH, LMC/NI/D, CANADA

Project Coordinator

● The Project coordinator primary role is to analyze and manage ALL node and traffic simulation (NTS) project activities and requirements. He will handle all assignments towards LMC/NI/D. He will report to the section Manager and support the NI/D team leaders.

The responsibilities of the Project Coordinator are: Analysis and handling of all project activity NTS requirements. (All feature groups, Product Test and Market System Test CLE). Responsible to receive the NTS Assignments and Requirement Specification and to deliver the Implementation Proposal, Development Plan and Project Report. Ensure phase alignment and strategy realization for NTS within the projects domains. Provide technical support and act as a focal point for NTS issues at all forums. Negotiation with internal/external contacts over development options, content and schedules. Identification of potential risks and pitfalls within the NTS strategy for the ongoing projects. Assume responsibility for the deployment of new NTS initiatives within the project. Establish and handle training and support "contracts/agreements" for the NTS area. Including service level agreements, frame agreements, acceptance reviews and tests. Define and coordinate the NTS teams for the projects duration reporting to the NTS line manager. Planning and distribution of assignments to team members/leaders. Feedback to the line Manager on the resource situation and provide recommendation when necessary. Ensure Requirements for NTS infrastructure have been placed by the appropriate responsible person ie. Line IS/IT or testplant support. Promote and communicate the LMC/NI/D commitment to the evolution of NTS in PU_MSC and other Product Units.

The authority of the Project coordinator are: The NTS leader with the team leaders manage all NI/D activity teams for ongoing developments and support project. The NTS leader will actively participate in the pre meetings for major project milestones and toll gates. The NTS will feedback team performance to the appropriate line manager. Responsible to receive the NTS Assignments and Requirement Specification and to deliver the Implementation Proposal, Development Plan and Project Report.

The activities of the Project coordinator are: Manage the collection of NTS requirements from the various stakeholders. Continuously monitor and report on the Development and Support execution to the section Manager and the team leaders. NTS Report, Active participation in ALL coordination meetings. Support and Advise the NTS team leaders/members. Periodic Internal Team meetings. Manage the NTS Support Call and Internal Trouble list. Glass box management of Support handling through project user forums and info groups. Actively participate in the NTS strategic team ensuring the project interests are suitably communicated.

The ideal candidate should have: A university level education in computer science or engineering degree. 2 years of relevant job experience in a similar position. Good documentation skills (technical writing). Good inter personal, negotiations, and leadership skills. Knowledge of SW design/test processes. Good project coordination experience. CMS 88, SS7, Air interface, TCP/IP, Unix, NT knowledge (good assets). Knowledge of traffic simulators: MGTS, STE, TSS (very good assets).

Software Developer

(2 positions)

● The software developers primary role is to provide wireless provisioning (PDC, TDMA, GSM, CDMA 2000, W CDMA, ...) with technology based solutions (to simulate and/or emulate platform and applications).

The responsibilities of the Software Developer are: Analysis of NTS requirements. (All feature groups, Product Test and Market System Test CLE). Responsible to receive NTS Assignments and Requirement Specification and to participate in the Implementation Proposal, Development Plan and Project Report. Provide technical support and be on call when necessary. Provide development options, content and schedules to the project coordinator and/or team leader. Identification of potential risks and pitfalls within the NTS strategy for the ongoing and future projects. Participate in the deployment of new NTS initiatives within the project. Provide training and support for the NTS area including script acceptance and tools introduction. Feedback to the team leader and/or line Manager on development issues and potential risks. Provide recommendation when necessary. Ensure Requirements for NTS infrastructure have been delivered on time. Promote and communicate the LMC/NI/D commitment to the evolution of NTS in PU_MSC and other Product Units. Develop software and script supporting ongoing projects. Maintain existing software and script databases. Support other team members by providing coaching and information. Upgrade software development skill and knowledge when required. Follow and promote the processes in use by NI/D and provide feedback to the process owners.

The Software developer has the following authority: The Software developer will actively participate in the design inspection and project approving code/script implementation. Responsible to receive the NTS Requirement Specification and to deliver the Implementation Proposal, Node simulation and Traffic Implementation.

The activities are: Manage the collection of NTS requirements from the various stakeholders. Gather and document end user requirements. Design, code, comment and maintain node and traffic simulation software. Support and Advise the NTS team leaders/members. Periodic Internal Team meetings. Be part the NTS Support Call and Internal Trouble list. Glass box management of Support handling through project user forums and info groups.

Actively participate in the NTS strategic team ensuring the project interests are suitably communicated. Work with technical writers and trainers to provide software documentation and training material. Maintain and enhance the software/script development environment. Participate in the different reference user group, tools initiatives, EVE domains promoting NI/D tools and following on NI/D requirements. Continuously updated on new tools and methods in the market feeding the line Manager and/or team leader when necessary triggering new initiatives or new tools trials.

The ideal candidate should have: A university level education in computer science or engineering degree. 2 to 5 years of relevant job experience in a similar position. Good documentation

skills (technical writing). Good knowledge of different platforms (NT, UNIX ...). Good programming skill (C++, Corba, ...). Good inter personal and leadership skills. Knowledge of SW design/test processes. CMS 88, SS7, Air interface, TCP/IP, Unix, NT knowledge (good assets). Knowledge of traffic simulators: MGTS, STE, TSS (very good assets).

Contact: Samir Douik, samir.douik@lmc.ericsson.se.

NIPPON ERICSSON K.K. - NRJ

Senior O&M Engineer

● We are looking for two Senior O&M Engineers to work in Japan at our support office outside Tokyo supporting one of the fastest growing wireless markets in the world.

As a senior O&M engineer your main responsibilities will be to assist regional O&M engineers working in customer network centers with technical advice and support. Provide procedures, descriptions and methods for implemented O&M functions and tools. You will also be involved in assisting SW implementations.

As an applicant you should have a solid AXE O&M background and experience within the O&M customer support area. Preferably working with mobile systems. OSS experiences and execution of the SRR service is a plus.

We presume that you are fluent in English, open minded, a good communicator, have good knowledge of Ericsson processes and procedures and that you have the ability to transfer knowledge to our local staff.

Contact: NRJ/ST/MC Johan Myhrman, O&M manager, +81 45 477 5582 johan.myhrman@nrj.ericsson.se or HR Thomas Ahberg, +81 45 477 5503, thomas.ahberg@nrj.ericsson.se

ERICSSON EUROLAB (EED), AACHEN/GERMANY, CORE PRODUCT UNIT APPLICATION CORE (CAPC)

Strategic Product Manager, ATM and ISUP, CSS 7 Signalling, Lawful Intercept

● Your task will be product planning for one or more CAPC product area(s), defining the direction of the development of CAPC products based on assessment of competitiveness and economical performance for the life cycle of the products. You inspect requirement specifications and approve function specifications and FeDs. You order and monitor the development and maintenance work of CAPC products, review financial agreements proposed by other business units and you will do Business Opportunity Tracing.

You need a BS in EE/CE/CS or equivalent, more than 3 years in system design or project management and a strong interest in strategic product management. Besides a broad knowledge in switching systems you need competence in either ATM, CSS7, Data Communications or Lawful Intercept.

Contact: Product Management Department, Ulf Henell, eedugh@eed.ericsson.se, +49 2407 575 256, Martin Hatas, Martin.Hatas@eed.ericsson.se, +49 2407 575 9849, Human Resources, Simon Seebass, eedsims@eed.ericsson.se, +49 2407 575 163

ERICSSON RESEARCH CANADA, MONTREAL (LMC)

Product Introduction Project Manager

The PU Mobile Switching Centre (PU MSC) is a Product Unit within the Ericsson Business Segment Network Operators. The Product Unit is responsible for the Ericsson MSC and AP/IO nodes used in TDMA and CDMA networks world wide.

● We are looking for a Product Introduction Project Manager who will work within a development project to ensure that the products under his/her responsibility are 100% ready to be handled in the Time to Customer (TTC) process. More specifically he or she will make sure that the products under his/her responsibility are 100% ready to be marketed, sold, ordered, supplied, installed, supported and phased out.

This project management position provides great exposure opportunities and excellent possibilities for career development. In effect, the project manager who will collaborate on a daily basis with the Business Units and the Market Units will have many opportunities to travel and to develop business relations with Ericsson personnel all over the world.

The candidates should have a degree in Engineering, Business or equivalent. They should have a good knowledge of Ericsson organisation and work methodology (incl. TTM and TTC). Experience with one or more of the following fields would be a great asset: marketing, sales, supply, customer project management or support. Good leadership, influence, people and communication skills are also expected.

Application: Product Introduction Manager, marie.josee.leblond@lmc.ericsson.se.

ERICSSON EUROLAB (EED) AACHEN, GERMANY

The Project Office & Development Operations Group EED/X/R within the System House CSS/GSM is looking for a

Configuration Manager for CSS/GSM R9/UMTS project

● The CSS/GSM Operations has the overall responsibility for the Circuit Switching System (CSS) in all GSM based applications. This covers all classical GSM implementations for the different frequency bands: GSM900, DCS 1800 and PCS 1900. In addition CSS will play a key role in introducing the 3rd generation systems, UMTS, on the world market.

The main tasks and objectives will be: Development of necessary CM process updates. Responsible for Clearcase implementation. Chair CCB meetings.

In this position you will gain a lot of insight on how CSS plans, organizes and runs projects. You will learn which organizations are involved in decision making and how their roles and interfaces are defined. Thus acquiring valuable competence and knowledge for future career opportunities.

As a configuration manager you will need strong initiative, good planning, coordination and communication skills and the nature to never give up. Depending on your individual expertise we may consider an expatriate contract.

Contact: Human Resources, EED/H/R Simon Seebass, +49 2407 575 163, eedsims@eed.ericsson.se or CSS/GSM Project Office, EED/X/RJC, Jan Owe Johnsson, eedjoj@eed.ericsson.se

ERICSSON SPAIN S.A.

System Test Engineer GSM/UMTS

Our department EEM/TD/M is responsible for the development of GSM and UMTS Global Data Base nodes within the CSS Product Unit.

● We are looking for System Test Engineers to join our young and dynamic INDUS Project team here in Madrid.

Your main tasks will be to design and execute System Test of the GSM/UMTS nodes: HLR, FNR and AUC. Our test environment is AXE 10 and TelOrb (open platforms).

You should be familiar with GSM, AXE O&M and Trouble Shooting.

Previous experience in System Test is desirable. Knowledge of UNIX, C++, TCM and MGTS, is a merit. Applicants should speak and write English with ease.

Contact: Manuel Vallejo, +34 91 339 2810, Unit Manager (EEM/TD/MVI), Mobile Telephony R&D Centre, Spain

ERICSSON LTD, UK

Commercial Analyst

● Key responsibilities: The Commercial Analyst will be involved in the following areas of work: pricing, business cases, market analysis, channel performance, marketing strategy initiatives.

The main responsibilities will be: Development of and ownership of comprehensive pricing schedules. Development of pricing tools. Production of and maintenance of business case models. Recording of actual results and analysis against business cases. Development and maintenance of process to define project commercial viability. Ownership of key commercial performance data which forms the base case for building the ESP, and work closely with ESP Champions to develop strategic scenarios around this base case which reflect realistic, yet challenging goals. Respond to requests for information from external market and industry analysts. Preparation and presentation of report as required.

Qualifications / Experience: A degree or equivalent qualification in a business related subject. A background in business or financial planning. Experience in a large matrix multi national company. Telecomms experience desirable.

Skills / Competencies: First rate analytical skills. Ability to work under pressure and to demanding timescales. Ability to communicate effectively at all levels of the business, including presentations to senior management. Flexible approach and teamworker.

Contact: Recruiting Manager, Geoff Payne, +44 1403 277 205, geoff.payne@etl.ericsson.se, HR Contact, Llynor Rathbone, +44 1403 277 557, llynor.rathbone@etl.ericsson.se

ERICSSON LTD, UK

Product Manager

● The Product Manager is responsible for developing product plans (medium term) and product programmes (current development activities) for the applicable SDH product areas, in order to maintain Ericsson's competitiveness in the market place. He or she provides the business sector with technical support for tenders and other marketing activities and interfaces with development groups throughout Ericsson. The product manager furthermore monitors the profitability of the product, as well as handle the product life cycle.

The Product Manager is responsible and accountable for decisions regarding the technical direction of the products and for agreeing the technical and commercial elements of business development opportunities together with other organisations within Ericsson.

The product manager in particular has the following responsibilities: Develop product strategies and plans for specific product lines based on market requirements and trends. Maintain knowledge of developments in Transmission Systems and the market place including competitor information. Identify technical business opportunities and investigate required product evolution. Together with market and solutions organisations assess business opportunities, market values, and create business cases where appropriate. Actively support marketing of the product with general product features, unique selling points and business cases. Document product requirements in accordance with customer requirements and Ericsson's product evolution strategies. Provide support to the market and operations organisations in their business activities. Take part in regular technical review meetings with customers. Present technical information to the customer as appropriate. Act as prime technical interface towards supplier for product development, product characteristics and product financial issues.

Qualifications: Minimum Electronic Engineering Degree OR Combined Engineering/Business Administration Degree. At least 3 years in Product Management/related function

Skills / Competencies: In depth knowledge of SDH and/or associated products or technologies. Experience of marketing activities and customer relations. Understand specific products in the context of their market and competitors. Ability to focus on both internal and external customers and develop understanding of the issues they face in order to identify and meet their needs. Demonstrate confidence in persuading others to see the benefits of and agree to proposed ideas. Successful networker by proactively co operating with colleagues across the organisation and in the industry.

Senior Solutions Engineer

● Working within a team of engineers specialising in Solutions for Transport Network Systems, the Senior Solutions Engineer provides technical and engineering support within his/her specific technical areas of Transport Network Systems and provides a technical interface to projects and the customer.

The Senior Solutions Engineer possesses specific expertise in one transmission area. S/he has a customer focused approach to the development of total solutions for telecommunications operators globally.

S/he is closely involved with a variety of people from marketing, projects and product management as well as third party suppliers. Responsibility is taken for activities within the tender process requiring technical skills.

Customer contact is found at a number of points prior to the tender stage, where technical solutions are being discussed with customers, including making presentations and involvement in the project itself. The Senior Solutions Engineer takes a technical lead in customer meetings.

Key Responsibilities: Take responsibility for parts of a technical tender or bid. Take responsibility for providing the highest level of technical expertise on Network Issues. Actively contribute to business development by providing leading edge technical solutions. Provide expert support to contract management. Technically assess potential products and make appropriate recommendations. Participate in pre studies and feasibility, when required. Monitor and capture mar-

ket requirements keep an updated picture of market commitments. Monitor future development and trends of transport systems. Keep the Manager informed of potential future projects and help to plan and manage resource requirements in terms of skills, tools and equipment. Actively contribute to the development of technical competence within the Transport Network System in line with the changing needs of the business: eg through the transfer/secondment of personnel, use of expertise to provide on the job training. Actively contribute to the continuous improvement process and the ongoing development of a quality culture by, for example, changing behaviour and identifying and implementing improvements to processes and activities and encourage others to do the same.

Qualifications, Essential: Degree or equivalent in engineering related discipline. Minimum 2 years experience in telecommunications environment. Experience of implementing software and/or hardware systems. Experience in one or more of the following areas: Transmission Networks. Data Communication and Computer Networks. Telecommunication Management. Synchronisation. System evaluation and inter working tests. Emerging technologies eg ATM/IP

Desirable: Degree in Telecommunications or Computer Science. Experience from specifying and/or designing optical networks

NMS Solutions Engineers

Product Unit Transport and Transport Access (PT-TA/TPS/M)

● Reports to: NMS Solutions Manager (PTTA/TPS/M) The NMS Solutions Engineer has expertise in particular product areas. He/she is responsible for providing technical expertise to Marketing, Product Management and customer solutions on management solutions, management systems and associated data communication networks. The engineer has responsibility for ensuring that the customers' needs are met by providing profitable, high quality solutions to meet time and cost objectives. The job also carries responsibility for keeping him/herself and colleagues within the Solutions and Marketing teams up to date on the relevant Ericsson portfolio of products.

Key responsibilities: Understand fully the customers' business requirements in order to provide cost effective, high quality management solutions. Explain to the customer Ericsson's portfolio of products/systems, e.g. ETNA NEM and ETNA IMA. Provide technical input to current and future bids and tender preparation, with the aim of securing future business and meet customer requirements. Give demonstrations and presentations to customers on management solutions and answer any technical queries arising out of these meetings. Explain to the customer how different products interact with each other and recommend the best solution that meets their needs. Help identify improved working practices in terms of competence and expedient delivery of solutions in response to tenders; e.g. development of templates. Maintain awareness of industry standards and regulatory issues. Understand the contractual implications of interactions with the customer. Help drive business development by providing strategic technical input at solutions level. Work with marketing, product management and the customer to evaluate and plan for prospective projects. Keep people informed at all levels

Qualifications: Essential: Educated to degree level in computer studies/electronics or other relevant subject. At least 1 years' experience within the telecoms industry. Able to perform, support and review system investigations. Knowledge of Transmission systems (SDH/PDH/DWDM), associated management systems and datacommunications networks. Desirable: Basic knowledge of other telecommunications systems. (IP, ATM, PSTN, Data). Able to travel both within the UK and Overseas.

Skills and Competencies: Adapts to meet new challenges to meet present and future customer requirements. Ability to analyse complex issues and identify the most appropriate solutions. Generates and develops innovative ideas or improvements to achieve objectives. Communicates in a clear, concise and open manner. Ability to listens to others and adapt in a team environment

Contact: chris.vaughan@etl.ericsson.se

ERICSSON CANADA

Strategic Development Wireless Internet

● Job Requirements: Five six years experience developing marketing strategies and plans. Two three years experience completing business analysis and developing business plans. An MBA or other business degree, or equivalent experi-

ence. Strong background in Wireless Data/IP/Cellular Systems is required. A history of product management and/or product development would be key. Expert skills in managing complex, multi functional processes. Strong initiative able to proactively manage long cycle processes through roadblocks. Strong business sense and analytical ability

Job Description: The purpose of the function is to initially perform an in depth market analysis from Wireless Internet in Canada, to define and communicate strategic product messages to external and internal customers. The function will be responsible for defining and planning strategic business development opportunities and for bringing the identified opportunity to an execution phase.

This individual will ultimately manage the marketing mix for existing products, additions to a product portfolio, the marketplace performance of a product portfolio through the product life cycle, from market assessment and strategy development to product and marketing plan execution and the monitoring of financial results. This function orchestrates the product processes through one or more customer account groups.

Contact: Mark Henderson, General Manager Business Strategy, 5255 Satellite Drive, Mississauga, Ontario, Canada, L4W 5E3

ERICSSON RADIO SYSTEMS AB, KISTA

Product Marketing Managers In Malaysia

ERA GSM Systems Product Units BTS, BSS, CSS and PSS will locate part of our Marketing and Sales Support for China and Asia Pacific in Kuala Lumpur, Malaysia. Our goal is to enhance sales by giving expertise support to the Market Units in the same time zone and region.

● The positions, which are long term (1 year) contracts, are open for individuals fulfilling the following qualifications: Vast experience from products and solutions and extensive contact network within the concerned Product Unit. Vast experience from customer meetings and presentations through Sales and/or Marketing of GSM products University degree or corresponding education/training acquired through job experience. Communication skills and fluency in English Self motivated and driving with good co operation skills

The job includes on site support to our Market Units in China & Asia Pacific. Thus, extensive travelling within the region is required.

Contact: All positions: Per Arvidsson+46 70 514 0872 or +46 8 404 8115, per.arvidsson@era.ericsson.se. BTS: Mona Benlaib, +46 070 577 2529 or +46 8 404 7621, mona.benlaib@era.ericsson.se. BSS: Per Arvidsson. CSS: Johan Dahlström, +46 70 340 31 50 or +46 8 757 24 21 johan.dahlstrom@era.ericsson.se. PSS: Kjell Arvidsson, +46 70 561 3346 or +46 8 757 0999, kjell.arvidsson@era.ericsson.se. Application: Product Marketing Managers In Malaysia, Ericsson Radio Systems AB, LV/MS, Monica Wänseth, 164 80 STOCKHOLM, monica.wanseth@era.ericsson.se.

ERICSSON RADIO SYSTEMS AB, STOCKHOLM

Senior Support Engineer, PSTN to Ukraina

Ericsson Ukraine (UKR) is a young company with business in the Ukrainian market covering a wide range of Ericsson products. The head office is located in Kiev, the capital, which is a very green city with turn of the century architecture and pleasant atmosphere. We are now offering the following possibilities in our Field Support Organisation, located in Kiev:

● Objectives: To ensure customer satisfaction by delivery of quality products & services, and adherence to the Ericsson values of perseverance, respect & professionalism.

Main responsibilities: Take care of 2 private operators (TIK, Optima), 1 AXE each and Ukrainian Railway (UZ), 2 AXEs. Negotiations with Optima and UZ are underway for additional AXEs.

Responsibilities: To act as mentor for less experienced staff. To participate in emergency duty. To be able to carry out all activities without supervision. To be fully conversant with the procedures and processes required to carry out the task. To lead investigations of system problems. To understand the importance of customer relations. To participate in technical meetings and lead them if required. To be able to solve complex faults. To further develop a network of contacts within Ericsson. To actively promote and assist in compe-

We are curious – Who are you?

Ericsson Infotech has recently been assigned the total responsibility of Signalling System No. 7 on open platforms within Ericsson. This means that we will be responsible for the signalling system on all new Ericsson platforms for the telecom market. We will also take an active part in standardisation concerning future signalling within telecom network. We are really proud of this responsibility, and we need a lot more resources to fulfil our obligations.

The Signalling System No. 7 protocol is the most commonly used protocol for data interconnection in telecommunications networks. Ericsson Infotech's Portable Signalling System No. 7 comprises a wide range of software, communication boards and services. Our new responsibility means that we will also procure Software and Hardware from external vendors in order to offer our customers the best possible solutions for each application.

Signalling System No.7 is developed for standards adopted in Europe ITU, USA ANSI and Japan TTC with application protocols for voice, mobile data and intelligent networks. It is intended for Computer Vendors, System Integrators, Network Operators and Equipment Manufacturers, who need to interconnect with telecom networks.

Typical solution areas are:

- Voice mail
- Voice processing
- Text messaging
- GSM (SMSC, HLR, AUC, EIR...)
- IN (SDP, SCP...)

Examples of the open platforms within Ericsson that we are working with are:

- WPP (GPRS)
- Cello (WCDMA)
- TelORB (Service node platform)

To strengthen our organisation we are looking for people to fill the following positions:

Project Manager

As a Project manager you will work with our product management and our development organisation to ensure that our development projects reach their predetermined goals. The job includes tasks such as project planning, cost estimation, and project management in projects of varying scale, often including contacts with international customers and suppliers.

You have an academic degree in computer sciences or electronics as well as a few years experience in system development or project management.

Contact persons: Lars Ragnarsson, phone 054-29 48 71, e-mail: lars.ragnarsson@ks.ericsson.se and Thomas Wernerheim, phone 054-29 46 19, e-mail: thomas.wernerheim@ks.ericsson.se

Technical Product Manager

We are looking for a person who can take on the product responsibility for the SS7 solution for one of the major system platforms used within Ericsson.

As a technical product manager you will work with product strategies, control and follow up of product decisions over the whole product life cycle, from business opportunity tracing, product provisioning until product phase out. You will work in close contact with suppliers, product development groups, with marketing and sales groups, and with the operations group. The work entails customer presentations, domestic and international contacts and travelling.

You have an academic degree and at least 5 years working experience. A good knowledge in signalling and/or data communication and experience design in open systems is preferred. You are interested in working with product issues from both a technical and business perspective. We will pay high attention to your personal

abilities and your interest in personal development in an informal and non-bureaucratic environment.

Contact person: Nils Böjeryd, phone 054-29 43 77, e-mail: nils.bojeryd@ks.ericsson.se

System Designer

As a System Designer you will formulate and analyse requirements as well as present solutions to them, both for your colleagues and international customers. You will also work with prototyping for testing ideas as well as verification of our products.

You are interested in tomorrow's technology, prepared to defend your ideas, and have an eye for trends that we can use in our own developmental work.

Because our solutions are a combination of computer platforms, communication cards, protocols, and related Network Management Support, it is of value if you have experience from working with these in the computer industry. SS7, ISDN, TCP/IP, SNMP, GUI, routing, you know what we are talking about. If not, you want to learn.

We expect you to have an academic degree as well as a few years experience from a similar type of work.

Contact persons: Lars Ragnarsson, phone 054-29 48 71, e-mail: lars.ragnarsson@ks.ericsson.se and Thomas Wernerheim, phone 054-29 46 19, e-mail: thomas.wernerheim@ks.ericsson.se

Software Designers

As a Software Designer you will be working with analyse, design implementation, as well as test and verification of software in different projects.

You require no explanations when we say that we use modern platforms and environments like UNIX, Windows NT, Java, C, C++, SDL/SDT, and GUI tools, and technical areas like SS7, ISDN, TCP/IP, and SNMP sound very interesting.

We expect you to have an academic degree in computer sciences.

Contact persons: Lars Ragnarsson, phone 054-29 48 71, e-mail: lars.ragnarsson@ks.ericsson.se and Thomas Wernerheim, phone 054-29 46 19, e-mail: thomas.wernerheim@ks.ericsson.se

Quality Assurance

You will be a part of our project groups where you will be responsible for quality control during the development of our products.

As the QA you participate in project planning, inspect and follow up to ensure that policies, strategies, and plans are followed, and report deficiencies.

We expect you to have a MSc or Bachelor degree in Engineering and some experience from quality work or software development.

As an individual you are responsible, have a good sense of order, and like precision. You are hard driving, self-starting, and service-minded.

Contact persons: Lars Ragnarsson, phone 054-29 48 71, e-mail: lars.ragnarsson@ks.ericsson.se and Thomas Wernerheim, phone 054-29 46 19, e-mail: thomas.wernerheim@ks.ericsson.se

Test Leader

As Test Leader you will be responsible for scheduling testing and verification early to ensure the highest quality result to our projects. You participate in developing the department's test environments, strategies, and philosophies. During the Execution Phase, it is you who leads testing and verification, and in many cases integration. Our projects are becoming more and more incremental, which means that test activities start early and are ongoing during much of the project lifecycle.

We expect you to have an academic degree as well as a few years experience from a similar type of work.

Knowledge of SS7, ISDN, TCP/IP, routing, data communications, or experience of test are a plus. You will soon build up a highly technical competence of the platforms and applications we use and become one of the people with the best system overview.

As an individual you are orderly, hard driving, and self-starting. The ability to plan and to lead others is also an important quality.

Contact persons: Lars Ragnarsson, phone 054-29 48 71, e-mail: lars.ragnarsson@ks.ericsson.se and Thomas Wernerheim, phone 054-29 46 19, e-mail: thomas.wernerheim@ks.ericsson.se

Configuration Manager

Configuration management is a key function in our organisation and you will be responsible for the configuration management for some of our products and projects.

You should have a technical background with experience from software design as well as a burning interest in configuration management.

It is important that you see teamwork as natural, have a sense for order, like to take the initiative, and see possibilities, not problems. You are enthusiastic and have a strong desire to development yourself and learn new skills. Your English skills are of course very good.

Contact person: Ulf Söderberg, phone 054-29 44 08, e-mail: ulf.soderberg@ks.ericsson.se

Experienced Electronic/ FPGA Designer

You will work with prestudies, electronic- and FPGA design, as well as verification for development of product for SS7. FPGA design is accomplished using VHDL. We use Mentors development environment for FPGA and the Cadence development environment for electronic design. Verification takes place in advanced computer-simulated environments. The work is performed in close cooperation with system management and subcontractors.

We expect you to have an academic degree as well as a few years experience of VHDL design. It is a plus if you have UNIX experience.

As an individual you are flexible, enterprising, responsible, and enjoy working with others. You can easily express yourself verbally or in writing.

Contact person: Jan-Erik Wallin, phone 054-29 48 41, e-mail: jan-erik.wallin@ks.ericsson.se and Hans Melcher, phone 054-29 42 25, e-mail: hans.melcher@ks.ericsson.se

Please send your application not later than 05.11.99 to:

Ericsson Infotech
Anne-Charlotte Runqvist
Box 1038, 651 15 Karlstad
or Anne-Charlotte.Runqvist@ks.ericsson.se



Make yourself heard.

ERICSSON 

tence development of less experienced staff.

Requirements for the Job: Technical degree or equivalent experience. Requirements for senior system engineer must be fulfilled. Minimum two years in Ericsson as senior system engineer. Ability to work in a team and lead it if necessary. Level 7 in oral and written English (scale 1-10). Willingness to travel as required by the job. Practical knowledge of tools and instrument currently used as required by job.

Authorities: To write emergency corrections. To approve software solutions written by less experienced staff. To reject TR/CSR answers without consultation. To approve the release of documents and upgrade/update packages. To contact external (eg.GRC) help desks when necessary.

We are now offering the following possibilities in our Field Support Organisation, located in Kiev:

Senior Support Engineer, TDMA to Ukraine

- Main responsibilities: Take care of 1 private TDMA operator (DCC) with 6 MSCs and 30 000

subs. Negotiations with DCC regarding service contract are underway.

Requirements for the Job: Technical degree or equivalent experience. Requirements for senior system engineer must be fulfilled. Minimum two years in Ericsson as senior system engineer. Ability to work in a team and lead it if necessary. Level 7 in oral and written English (scale 1-10). Willingness to travel as required by the job. Practical knowledge of tools and instrument currently used as required by job. Authority To write emergency corrections. To approve software solutions written by less experienced staff. To reject TR/CSR answers without consultation. To approve the release of documents and upgrade/update packages. To contact external (eg.GRC) help desks when necessary.

FSO Manager to Ukraine

- UKR FSO is a multisystem FSO (TDMA, GSM, PSTN) with wide range of customers from private Joint Venture operators with international ownership to Soviet style state companies.

Responsibilities: To manage the unit on a day to day basis. To report the activities of the unit to the head of the department. To approve agreements with other parties within the own area of responsibility. To ensure that the FSO Office Binder with technical procedures and guidelines is maintained at the latest level. To participate in staffing the unit with competent personnel through internal and external recruitment, in line with the budget. To participate in setting up the objectives for the unit. To conduct regular unit meetings. To ensure that all activities within the unit meet the Ericsson quality standards. To handle personnel issues such as competence development, resource planning and to run PD talks for unit staff. To motivate staff, build a unit spirit and encourage the Ericsson values to ensure an enthusiastic overall climate within the unit. To ensure that performance criteria as outlined in any Service Agreements are adhered to. To be a role model for unit staff. To maintain good customer relations. To be prepared to act for department manager as required.

Job Requirements: Minimum a technical degree or equivalent experience. At least 6 years experi-

ence of working in the Telecommunication Industry of which at least four years in Ericsson. Level 8 in oral and written English (scale 1-10). Good knowledge of documentation control. Good knowledge of ISO 9001 standards. Willingness to travel as required by job. Authority To approve over time. To sign travel orders within the country. To roll out of released packages. To allocate resources. To approve expenses in line with guidelines from Finance department.

Contact: Anders Briandt, Operation Manager, +380 67 220 3414. ukr.ukranbr@memo.ericsson.se

ERICSSON RADIO SYSTEMS AB, STOCKHOLM

Ericsson Telecommunications Romania SRL was established in 1994 and has today over 200 employees working with all Ericsson products. In 1997 ETR signed a contract with Mobifon, one of the mobile operators. This year we have signed another contract with Cosmorom. The tempo is very high and our customers are in a tough competitive situation. The tempo is very high and our customers are in a tough competitive situation. We are now looking for professionals for the following positions:

APZ/IOG Support Engineer to Romania

- We are now looking for an APZ/IO Support Engineer within our Support group. The objective of the job is to provide technical support in one or more of the system nodes that are operational in the customer network such as HLR, MSC/VLR, AUC/EIR, SMS, MIN and BSC. The current APZ/IO types are APZ 212 11, APZ 212 20, APZ 212 25, IOG 11 and IOG 20. You will also play an active role in providing support and advice to the local engineers and build up the local competence. This requires close relationship and interaction with the customer, strong technical background that enables the APZ/IO engineer to conduct fault analysis, trouble shooting and program correction handling in an efficient manner.

Requirements: You have experience of working within Customer Support, a good knowledge of support activities, providing emergency and day to day support, trouble report handling, troubleshooting on/off sites, system upgrade. You have good command of written and spoken English.

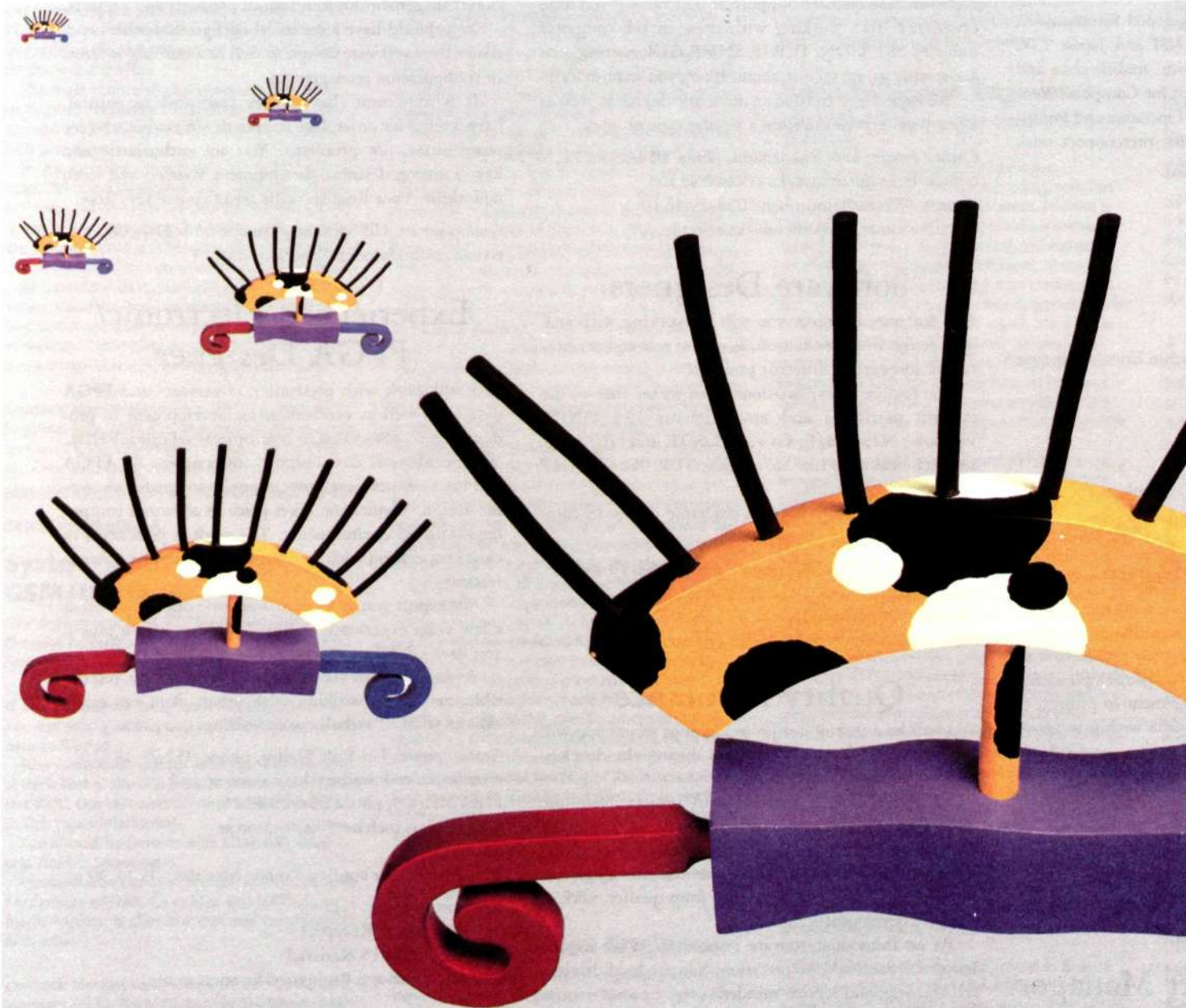
BSS/SS Support Engineer to Romania

- We are now looking for a new member to our BSS and SS teams. The objective of the job is to provide technical support in one or more of the system nodes that are operational in the customer network such as HLR, MSC/VLR, AUC/EIR, SMS, MIN, BSC and BTS. You will also play an active role in providing support and advice to the local engineers and build up the local competence. This requires close relationship and interaction with the customer, strong technical background that enables you to conduct fault analysis, trouble shooting and program correction handling in an efficient manner.

Requirements: You have experience of working within Customer Support, a good knowledge of support activities such as; troubleshooting, writing PLEX/ASA, APZ/IO recovery, trouble report handling (MSS and MHS) and system upgrades. You have good command of written and spoken English.

Network Support Group Manager

- The Network Support Group is mainly responsible for the 24 hour emergency support, the CSR and TR handling and correction package rollouts. There are 13 support engineers in the group working mainly with GSM, but also with NMT and fixed networks. We are now looking for a new member to run the NSG. The person we are looking for is open minded and has the ability to put in the extra effort when it is needed. You will play an active role in providing support and advice to the local engineers and build up the local competence. You will also be involved in tuning our processes to make the NSG more efficient. This requires close relationship and interaction with the customer,



UMUX 1500 bridges the gap in your access network

UMUX 1500 is increasingly being used by network operators and private enterprises to close the gap between the transport network and the end customer. In particular, the direct connection of telephony and data services to an SDH ring has proven to be an effective and economic solution. Thanks to the enhancement of the UMUX platform with the UMUX 1500, our customers can now also profit from the cross-connect function and the V5.x interface. If you would like to know more about how UMUX can bridge the gap in your network, please contact us right away. Ascom Transmission Ltd, Belpstrasse 37, CH-3000 Berne 14, Phone +41 31 999 13 03, Fax +41 31 999 18 74, Internet www.ascom.ch/transmission.

Ascom Transmission Ltd is a partner of Ericsson in the field of carrier access.

Ascom is an internationally active Swiss telecommunications and service automation group, with more than 10,000 employees worldwide.



ascom *thinks ahead*

strong technical background that enables you to conduct fault analysis, trouble shooting and program correction handling in an efficient manner.

Requirements: You have experience of working within Customer Support, a good knowledge of support activities such as troubleshooting, PLEX/ASA, APZ/IOG recovery, trouble report handling (MSS and MHS) and system updates/upgrades. You have good command of written and spoken English.

Contact: Joakim Karlsson, NSG Manager, Joakim.Karlsson@etr.ericsson.se
Simona Serban, Human Resource Manager, Simona.Serban@etr.ericsson.se.

ERICSSON RADIO SYSTEMS AB, KISTA

GSM Operation & Maintenance

Product Unit BSS is responsible for the global development and profitability of the GSM Base Station System and GSM Operation and Maintenance. We at Strategic Product Management GSM O&M have the full live cycle responsibility of GSM OSS, Ericsson's network element management system for the GSM network sold to over 100 customers in 50 countries. Our next generation system will combine the management of the GSM as well as the UTRAN WCDMA network elements. Due to the nature of our mission we work highly cross organisationally to align strategies with other Product Units and to improve our understanding of future opportunities.

● We are now looking for an additional person to join our team of 10 product managers. In this challenging position you will deal with: Product strategies Requirements on products Customer business cases Product plans and programs Early marketing towards our local companies

To be able to take on this responsibility, you should have several years of background of O&M and network management preferably from earlier assignments in design and as a market representative (LPM). Your sound knowledge of modern software architectures, protocols and IT trends gives you the base to drive technology deployment for our new O&M framework. Your understanding of our customer needs in the area of network management lets you take the right strategy decisions and helps you to communicate to the markets. If you are a highly motivated, driving person with excellent interpersonal and communication skills, this is your career opportunity to have an impact on the future!

Contact: Stefan Spaar, +46 8 757 1875, Benita Nilsson, +46 8 757 1914. Application: Kerstin Almbad, Ericsson Radio Systems AB, LV/HS, 164 80 STOCKHOLM, kerstin.almbad@era.ericsson.se.

ERICSSON RADIO SYSTEMS AB, SUNDBYBERG

Project Controller

● We now have interesting challenges for you within our new GSM contracts in Africa.

You will participate in the projects having the controlling responsibility during the implementation. This means implementing correct invoicing procedures, budgets and cost follow ups, internal administrative routines and tools and in general represent the financial competence needed within the project management team.

As this is a demanding position you must be flexible and sensitive in your relation towards the customer and the project team. You should also be familiar with the ERICSSON way of working and have a strong personal drive and be creative in finding solutions.

You are a CAN DO person. The formal background is B.Sc. in Business Administration and some years of experience from ERICSSON. The language is French and English. If you send your application by E mail, please send a copy to Bengt Franzén and Fredrik Westman.

Contact: Bengt Franzén, +46 8 404 7943, bengt.franzen@era.ericsson.se, Fredrik Westman, +46 8 585 34623, fredrik.westman@era.ericsson.se, Anita Malmström Wallner, Human Resources, +46 8 404 2429. Application: PROJECT-CONTROLLER, Ericsson Radio Systems AB, SG/ERA/LP/H Anita Malmström Wallner, 164 80 STOCKHOLM, anita.malmstrom.wallner@era.ericsson.se.

ERICSSON RADIO SYSTEMS AB, KISTA

ESA is currently staffing the organization to handle the 3:rd mobile license business opportunity. We are now offering major opportunities for qualified candidates: Customer Project manager,

Mobile Network Design Engineer and Radio Network Designer.

Customer Project Manager

● As a Project manager you will plan and run implementation projects. You will be responsible for planning, follow up and finishing all activities to fulfill the contracted budget in accordance with the customer and our own expectations. The project management will include relations with many internal and external subcontractors. You should possess qualifications that make it easy for you to motivate, inspire and guide the project team members. You are an experienced and recognized leader as well as an active member of the project team and a 5 year experience in managing mobile system projects.

Radio Network Designer

● As an RND Engineer at ESA you will be working with nominal cell plans, radio coverage predictions, frequency planning, site surveys, site nominations, RF measurements, BSS parameter settings and initial tuning. We want you to have minimum 3 years of relevant experience. Mobile Network Design Engineer You have the knowledge of input and output data for a mobile network design department, features in different releases and their connection and impact on HW in different nodes, how to interpret RFQ's. You also have experience from computer based tool and measurement instruments in this area and a good sense of customer orientation.

Relevant to all positions: You will be based in Johannesburg, South Africa, and the assignment is for 6 months to start with. After a successful full time period the assignment could be extended. We are looking for persons that are independent, self motivated with strong communication skills. You should have a university degree, preferably a MSc, fluency in written and spoken English and extensive experience from international assignments of this type. We would like to receive your application not later than last of October 1999.

Contact: Jaan Warnhoff, +27 83 212 3007, mobile: +27 83 212 4552, jaan.warnhoff@etx.ericsson.se, Mats Storsten, +46 8 757 39 05, mats.storsten@era.ericsson.se. Application: Ericsson South Africa (Pty) Ltd (ESA), Ericsson Radio Systems AB, KI/ERA/LI/HA Lise Lotte Ramneby, 164 80 Stockholm, lise.lotte.ramneby@era.ericsson.se.

ERICSSON BUSINESS NETWORKS AB, SUNDBYBERG

Design Engineer Saudi Arabia

● For a Dedicated Networks Project in Saudi Arabia we are seeking a Design Engineer on a long term basis to be responsible for performance of general design activities. The project involves the construction of integrated oil and petrochemical facilities at multiple sites in the Kingdom of Saudi Arabia. This means installation of base product services for oil and refined products, including storage plants, refineries, pipelines, distribution terminals, bulk plants and receiving stations. Ericsson's involvement is to provide an integrated telecom solution including voice, data and video technologies.

For this position you should have a solid experience from design and implementation of one or more of the following: PABX, Power Systems, Cable Systems (including Fibre Optics). You should also possess good communication skills in both written and verbal English and have the flexibility to work both independently and as a team member in a multi task environment.

Contact: Eva Kling Eldselius, +46 8 764 0774, eva.kling.eldselius@ebc.ericsson.se, Per Svahn, +46 8 764 0420, per.svahn@ebc.ericsson.se. Application: DESIGN ENGINEER SAUDI ARABIA, Ericsson Business Networks AB, SL/EBC/PEBD/H Eva Kling Eldselius, S 172 87 SUNDBYBERG Sweden, eva.kling.eldselius@ebc.ericsson.se.

ERICSSON RADIO SYSTEMS AB, KISTA

Operation & Maintenance Specialists in Fixed Net to work in Austria

● Take the opportunity to get experience from working as a contractor on one year assignment for Ericsson customer in Austria! Established in June 1999, Ericsson Services is the new name for service excellence within Ericsson, a Business Unit in the Network Operators & Service Providers (SO) segment. Ericsson Services combines the best elements of SO's service unit net-

work to create a single focused organization. The result a dynamic resource which aims to build on our impressive sales growth and maximize business opportunities well into the new millennium. Product unit Managed Services at Ericsson Services provide "Advice, Solutions and Services" to network operators around the world. We provide expertise in both the commercial and technical aspects of network operations and work in partnership with Market Units, Regional Offices and Local Companies.

Managed Services 'Resource Office' is now looking for Ericsson employees who are interested to join our project organisation on one year contract job, starting on November, 1st. We are looking for several categories:

Network Surveillance Technician

● The candidate should have a long experience working with AXE Ericsson fixed network, implementing, commissioning and maintaining switches. He/she will work in a Network Operation Center and handle: all types of alarms coming from the AXE&SCP switches, SDH and MINILINK transmission equipment. handle these alarms through the X MATE and ETNA unix operative systems.

System Engineer Switching

● In addition to the above, this position needs a previous experience as a troubleshooter on the network level. Familiar with implementing CNA's and doing Application system changes. Being able to perform Data Transcripts for changes to the network. He/she should also be familiar with Ericsson IN solutions, being able to locate faults in this functionality as well. The position includes local travelling and on call duty.

System Engineer Transmission

● The candidate should have very good experience in the SDH, MINILINK transmission equipment. He/she should have been working with ETNA. The position includes local travelling and on call duty.

System Administrator

● As a system administrator, you will be responsible to operate and maintain the management system which are: X Mate, ETNA NEM and SMAS, you should be capable of manipulating data and adapt form and printing reports, you should be capable of answering questions related with the IT.

Field Maintenance Technician

● The candidate should have very good experience in network maintenance and AXE at functional level. Good experience in the SDH, MINILINK transmission equipment. As a field maintenance technician, you will receive and analyse trouble ticket information, corrective action to the network. Make routine maintenance in the network, spare part handling and inventories, site security. The position includes local travelling and on call duty.

Please, apply in writing with full Curriculum Vitae, containing details of your education, experience and two references including name of your current manager.

Contact: Rolf Jangenby, +46 8 4042605, Rolf.Jangenby@era.ericsson.se. Application: O&M Specialists in Fixed Net, Ericsson Radio Systems AB, Resource Office, ERA/GP/OZO, 164 80 STOCKHOLM, Rolf.Jangenby@era.ericsson.se.

ERICSSON MOBILE COMMUNICATIONS AB, KISTA

Manager, Market Analysis, PU Accessories

Accessories is a Product Unit within the Ericsson Business Segment Consumer Products. The Product Unit markets accessories products for Ericsson mobile phones and terminals worldwide.

● PU Accessories is seeking a Market Analysis Manager to be based in Kista, reporting to the General Manager of Accessories. This position will involve supporting the Accessories Management Team with qualitative and quantitative market information collected and analysed individually and in co-operation with other parts of the organisation. Examples of areas to focus on are pricing, competitor strategy, as well as market development in terms of customer segments, geographical regions, and product areas. Both domestic and international travel will be required frequently.

Candidates interested in this position must have at least two-three years of relevant work ex-

perience, a university degree, and an analytical mindset. They must also be comfortable managing meetings and performing presentations. English will be spoken on a daily basis and used in all documentation and correspondence, why strong skills are required. Any work experience from a consumer products business, sales or market research is considered a plus.

Contact: Per Aspemar, General Manager Accessories, +46 8 404 3678, Maria Lindén, Human Resources, +46 8 404 3804. Application: MANAGER, MARKET ANALYSIS, PU ACCESSORIES, Ericsson Mobile Communications AB, KI/ECS/HKA Gunn Sahlberg, 164 80 Stockholm, gunn.sahlberg@qcs.ericsson.se.

ERICSSON RADIO SYSTEMS AB, SUNDBYBERG

Business Manager, Australia and Taiwan

Ericsson Radio Systems AB, Sundbyberg - SG/ERA/LO Business Management Middle East and Asia-Pacific (ERA/LO) is responsible for business operations for products based on GSM, NMT and TACS standards. We are now looking for a Business Manager responsible for one or several accounts in Australia and Taiwan.

● As a Business Manager (BM) you are the BMOG ambassador with the overall responsibility to supervise and support the Local Company (KAM) in achieving the goals and objectives as set up by BMOG Mgmt. The BM should also represent the Local Company towards other Ericsson units to give good attention and priority for the market. Major tasks are: Develop and follow-up business strategies and Account plans together with the Local Company (KAM). Support and Coordinate the local company Marketing and Sales activities. Promote BMOG's applications, services and products. Build relations in the local company and establish good awareness for the market in other units within Ericsson.

We are looking for a Business oriented person with wide experiences in market & operations of GSM infrastructure projects. You should be flexible and able to prioritize on a very wide range of high level tasks, which are related to this role.

Contact: Khalid Qureshi, +46 8 585 305 25, khalid.queshi@era.ericsson.se, Eva Fransson, Human Resources, +46 8 757 57 38, eva.fransson@era.ericsson.se. Application: BUSINESS MANAGER AUSTRALIA AND TAIWAN, Ericsson Radio Systems AB, SG/ERA/LOHS Helga Holmkvist, helga.holmkvist@ericsson.se.

ERICSSON RADIO SYSTEMS AB, SUNDBYBERG

Join the Italian Astrolink Team

Satellite Systems a new and challenging business for Ericsson. Satellite systems will play an important role in providing communication services to subscribers in remote areas within the next coming years. Satellite operators will offer the market competitive dual mode s, roaming possibilities and now also broadband multi media services for voice, data and video.

In April 1999 we signed our first broadband satellite system contract with the Italian Ground Segment integrator, Telespazio. The system will offer multimedia services for voice, data and video to the global enterprise market. The project is at the moment in the pre study phase looking into the challenge to finalise the system architecture. Ericsson develops the satellite functionality based on our experience in GSM/GPRS/UMTS/ATM/IN and Billing. Close interaction with a number of external companies is needed.

Program Director

● As the Program Director you will be responsible for planning, follow up and finishing all activities to fulfil the contract and budget in accordance with the customers and our own expectations. It is a complex multi project environment with several internal and external subcontractors.

You should possess qualifications that make it easy for you to motivate, inspire and guide the project and to create synergism in the team. You have a broad international Ericsson network and have managed complex TTM and TTC projects. You are recognised as leader but would not hesitate to take active part wherever needed. It's a plus to have worked with design and system testing.

We need a person who is: outgoing, independent, self motivated and has strong interpersonal and communication skills. You should have a university degree, preferably M.Sc. (or similar) and good English written and oral skills.

Contact: Lars Bergström, +46 8 404 6705, lars.bergstrom@era.ericsson.se. Application: Program Director, Ericsson Radio Systems AB, SG/ERA/KD/HS Mari Skoglöf, 164 80 STOCKHOLM, mari.skoglof@era.ericsson.se.

Cool gadgets attract generation Y

Here they come: the products that many have been waiting for and which are intended to attract young people - generations X and Y: so-called "Wow!" products. The first two of these are an FM radio and the Chatboard, a mini-keyboard for SMS messages and e-mail.



The FM radio for GSM phones, an Ericsson first, will be available in parts of Western Europe and Asia and should be in the stores at the beginning of January.

Photo Lars Åström

It's a lot of fun to launch real "Wow!" products, as Christer Wassborn, global marketing director for mobile accessories, likes to call them. Cool accessories that are both fun and practical.

These are entirely new kinds of products - accessories that make mobile phones multifunctional and appeal to a younger target audience.

Ericsson is the first company to launch an FM radio that can be connected directly to a mobile phone and which automatically mutes the sound when a call is received.

With the FM radio, you no longer have to hesitate about whether to take a radio or your mobile phone with you when you go jogging.

Brand new product

Ericsson's Chatboard is also an entirely new product that has no equal on the market today.

"We're seeing explosive growth in text messaging in several countries. Young consumers have been driving the SMS market and chat the most. We wanted to develop a small, inexpensive product that would fill

their needs," says Stefan Persson, product manager for Chatboard.

People in the 16-24 year age category are sending three times as many SMS messages as 35-44 year-olds, in those countries where the service is commonplace.

Chatboard is small and doesn't cost much more than a few CDs. It snaps on to most Ericsson mobile phones, allowing users to compose simple SMS messages, e-mail, chat or even edit their own web page on the Internet. There is also a special Chatboard Internet community, a site where Chatboard users can meet on the net.

Added value

"These products add value to our telephones, and we think that many people will choose Ericsson phones because of them. This will be Ericsson's breakthrough in marketing fun mobile phone accessories, and we hope to be able to launch a number of similar new products every year," says Christer Wassborn.

The FM radio comes in light blue and black. The headphones work both for the radio and the phone, and have a microphone built into the cord for phone calls. The radio can be attached to all Ericsson mobile phones in the 600, 700 and 800 series as well as the A1018, T-18, T-10 and R250 Pro.

Phone compatibility

Chatboard operates together with GF788e, S868, SH888, I888 World, A1018s/sc, R250s, T10s/sc and the T18s/sc. Both products were developed in Emmen, in the Netherlands, and will be presented at Telecom99 in Geneva in October, as well as during the MTV European Music Awards in November.

Ulrika Nybäck

ulrika.nybäck@lme.ericsson.se

Mia Widell

mia.widell@lme.ericsson.se



Chatboard is a mini snap-on keyboard that can send SMS messages and e-mail. It will be available in stores in the next few weeks in Scandinavia, the U.K., France, Germany, Singapore, Australia and Hong Kong.

UPCOMING

October 10-17: Telecom99 and Interactive 99 in Geneva, Switzerland. The International Telecommunication Union's trade show, which is held every fourth year. Contact will be there. For daily news updates go to Infocenter at <http://www.ericsson.se/infocenter> and <http://inside.ericsson.se/telecom99>

October 22: Ericsson will present its third-quarter report. The full-year results will be presented on January 28, 2000.

November 2-3: A GPRS user group meeting will be held in Rome, Italy. The meeting is being organized by IBC Global Conferences and Ericsson is the main sponsor.

November 15-18: WAP conference in Barcelona, Spain.

UPDATES

September 15: Ericsson released its new solution for wireless LAN. Users can remotely access their company's intranet, from an airport for example.

September 30: Ericsson and Nokia demonstrated the world's first call using a GSM 400 system.

September 27: Release of the first issue of Ericsson's new customer magazine, "ON - The New World of Communication."

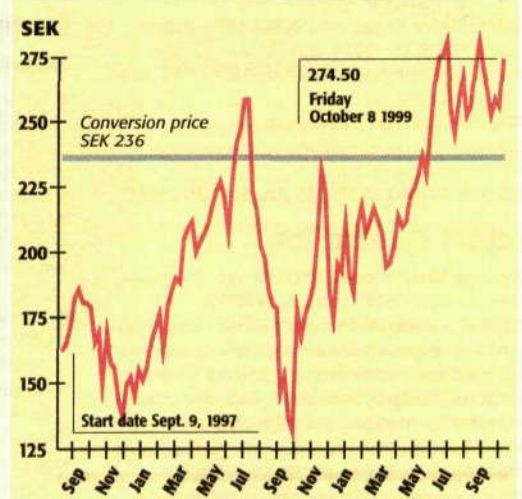
NEW ASSIGNMENTS

Robert Eteborn who most recently worked at Ericsson Microwave Systems, has been named the new president of Ericsson Telecommunications Inc. and Philnet Ericsson Inc. in the Philippines. He will start November 1.

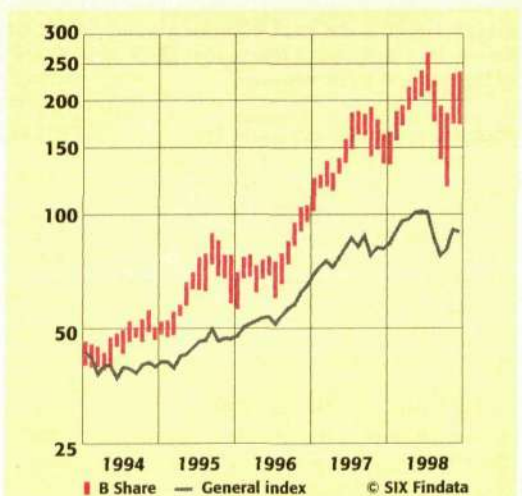
Stefan M. Johansson has been appointed head of the Europe, Africa and Middle East market area within Ericsson's Business Consulting business unit.

Eric Jelmhag has been named vice president of Enterprise Solutions at Ericsson in Russia.

THE ERICSSON B SHARE



An Extraordinary General Meeting of shareholders on September 9, 1997, approved a proposed convertible debenture program. The conversion period extends through May 30, 2003. For additional information, access the web site: <http://inside.ericsson.se/convertibles>



contact technology

OCTOBER 1999

In a single stroke, the new generation of cellphones has become considerably slimmer than previous models.

The T28, the T28 World and the R320 are just 15 millimeters thick. The secret lies in a completely new battery technology and the new 3-volt platform

The battery's the secret...

The cellphone trend is undeniable. Smaller, lighter and slimmer with each new model. However, development has been fundamentally limited by two factors – the battery and the 4-volt platform. The old nickel-metal hydride batteries demanded a certain size. The components of the 4-volt platform are larger and consume more energy. However, a breakthrough on the battery front and the new 3-volt platform have created a completely new situation.

New batteries

The new battery technology – lithium polymer – has existed in the research world for the past twenty years, but not much has happened – not before now. With the launch of the T28, Ericsson is first on the market with volumes of lithium-polymer batteries for mobile phones.

"It has been fun and exciting to help make such an important technological breakthrough. The Japanese companies that developed the battery cell did a large part of the job, but I don't believe they would have taken this major step if we had not pressed for it," says Per Kroon, project manager at Ericsson in Lund, Sweden.

Simplified, you might say a battery cell is based on two electrodes – an anode and a cathode – whose purpose it is to store the energy-conducting substance. It also includes a transport-conducting substance, the electrolyte, which moves the charged particles between the positive and negative areas of the battery.

The technological breakthrough is the use of the polymer substance as electrolyte. Combined with lithium as energy-conductor, this creates whole new possibilities.

Lithium polymer is better in several ways than the old nickel-metal hydride batteries. The basic substance, lithium, is a more efficient conductor than hydrogen ions, which are the conductors in the nickel-metal hydride batteries. The lithium gives more milliamperes-hours than hydrogen for the same volume. The weight of the battery can be halved and the size reduced by 10 to 20 percent, while still giving the same amount of energy.

Any form with moldable gel

The great thing about the polymer is that it is a moldable gel, not a fluid like the electrolyte in the old nickel-metal hydride batteries. The moldable gel permits the battery to have any form. It can fill out previously unutilized space and it is even theoretically conceivable to have a thin filament rolled flat, as in a printing press, and cut into a suitable shape.



The T28 is the world's slimmest cellphone – just 15 millimeters thick – due largely to new battery technology, which Ericsson is the first to present, and the new 3-volt platform.

Moreover, unlike a fluid, the gel does not require a container, which would require space and weighs a certain amount. For the lithium-polymer battery, only a 0.1 mm thick plastic foil is needed as a housing for the actual battery.

Using lithium as a conductor is not new. Ericsson has not used it in its batteries, but some of its competitors have. However, the combination involving a polymer electrolyte has not



The battery in the T28 is only 4.4 mm thick, a third of the thickness of the battery of the 768.

been used previously. And it is primarily this aspect that allows the battery to be extremely slim.

"Ericsson is alone in having larger volumes in the market. Other players are beginning to advertise plans to introduce this type of battery, but we have been the driving force," says Mats Wolf, specialist in battery technology.

However, again, it is not only the battery that makes the T28, the T28 World and the R320 so slim. The new 3-volt platform is part of the explanation. The components of the new platform are smaller and help keep overall size down.

In addition, reducing the voltage from over 4 volts to three volts has resulted in a more energy-efficient phone. Put simply, the energy consumption of the digital parts of the telephone decreases exponentially when the voltage is reduced. Consequently, even if the energy consumption of the analog parts increases somewhat, according to the laws of nature, the telephone is still less energy-consuming overall.

Technological development has resulted in extremely small phones, without sacrificing talk or standby time.

Mia Widell Örnung
mia.widell@lme.ericsson.se

CONTENTS



Per-Arne Sandström, head of business unit GSM systems, undertook the first roaming between GSM and UMTS, with Kenneth Karlberg, president of Telia Mobile. Photo: Peter Nordahl

First call between UMTS and GSM

Ericsson and Telia have for the first time demonstrated live roaming between a GSM system in commercial operation and a UMTS system, that is, a third-generation mobile system.

"The demonstration shows a smooth development from the second to the third generation of mobile services and shows how the two types of systems can work together, says Mikael Halén, manager of product marketing in Ericsson's WCDMA unit."

The roaming demonstration was carried out at the end of September at Ericsson's WCDMA demo center in Stockholm. Visitors could receive calls to their usual GSM numbers in a wireless UMTS unit installed in a test bus.

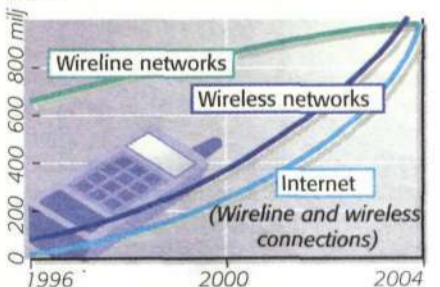
Ericsson on top

It is said that Ericsson is approaching a completely new datacom world, and that the company must concentrate heavily on IP expertise. However, Ericsson is already Number One. On a list of the 250 largest IT companies in the Nordic countries, recently published by Swedish business journal Veckans Affärer, Ericsson is at the top.

Veckans Affärer also took the opportunity to assert that the Nordic region is the "Wireless Valley" of the IT world.

DID YOU KNOW...

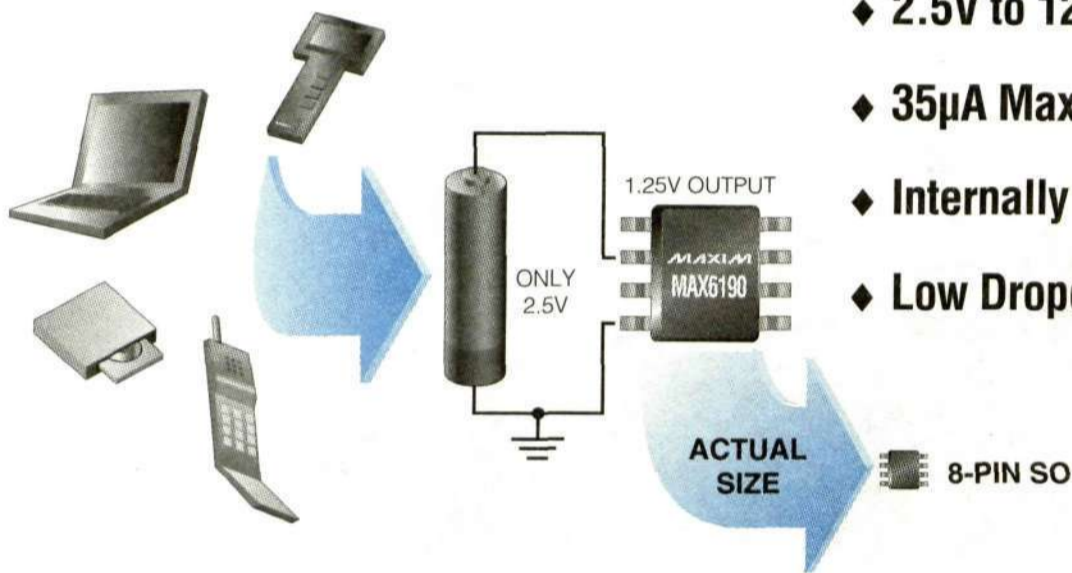
there will soon be a billion mobile-phone users.



Ericsson estimates that by the year 2004, there will be a billion wireline subscribers, a billion mobile-phone subscribers and a billion people with Internet access.

BEST 1.25V REFERENCE GUARANTEES 2.5V OPERATION

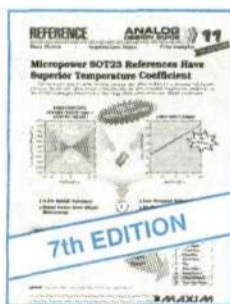
Ideal Solution for Precision Battery-Powered Equipment



- ◆ 5ppm/°C Max Tempco
- ◆ 2.5V to 12.6V Supply Voltage
- ◆ 35µA Max Supply Current
- ◆ Internally Compensated
- ◆ Low Dropout: <200mV

Choose from 7 Voltage Options: 1.25V ■ 2.048V ■ 2.5V ■ 3.0V ■ 4.096V ■ 4.5V ■ 5V

PART	OUTPUT VOLTAGE (V)	OPERATING VOLTAGE RANGE (V)	DROPOUT VOLTAGE (V)	MAXIMUM TEMPCO (ppm/°C)			OPERATING TEMPERATURE RANGE (°C)
				A GRADE	B GRADE	C GRADE	
MAX6190	1.25	2.5 to 12.6	—	5	10	25	-40 to +85
MAX6191	2.048	2.5 to 12.6	—	5	10	25	-40 to +85
MAX6192	2.5	2.7 to 12.6	0.2	5	10	25	-40 to +85
MAX6193	3	3.2 to 12.6	0.2	5	10	25	-40 to +85
MAX6198	4.096	4.3 to 12.6	0.2	5	10	25	-40 to +85
MAX6194	4.5	4.7 to 12.6	0.2	5	10	25	-40 to +85
MAX6195	5	5.2 to 12.6	0.2	5	10	25	-40 to +85



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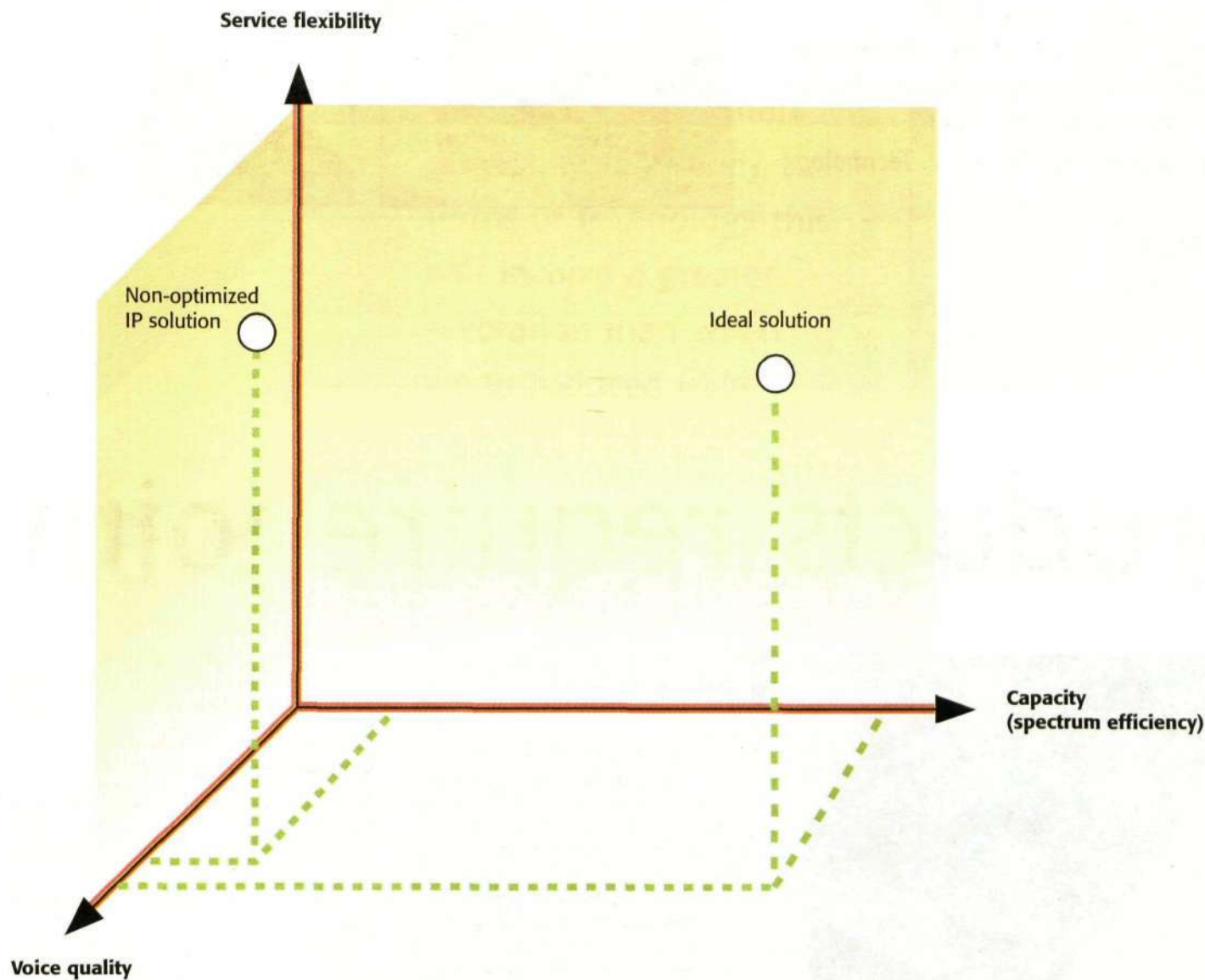
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**VOICE OVER THE INTERNET**

Ideally, the same capacity and quality as has been attained in today's mobile systems should be retained over the Internet. In the coordinate system to the left, this would correspond to a straight line up from the point labeled GSM. This is not easily achieved using current technology, however.

Either capacity is reduced or quality deteriorates when flexibility increases. This is in part a result of trying to compress the header information in the data packets, which contains address and other information according to the IP standard. Voice, however, contains very little information, compared with video, for example, meaning that the data packets contain unnecessary overhead. The alternative would be lost data packets.

Ericsson's new Rocco algorithm is extremely robust and can look into the data packets to see what type of information they contain. This allows coding to be optimized and the headers of the data packets to be compressed.

Rocco improves Voice over IP

Efficiently transmitting wireless voice calls over the Internet has been a difficult task. Now, however, with Ericsson's new algorithm Rocco for encoding voice calls it is possible to achieve nearly the same levels of capacity and quality as in the normal GSM network.

Because radio spectrum is a scarce resource, mobile telephony has always involved a trade-off between capacity and quality. Higher quality means less capacity in the network and vice versa. In the GSM system, for example, great efforts have been made to optimize speech coders to achieve both high quality and capacity. Every detail has been customized to optimize voice.

Today, when people want to send wireless voice calls over the Internet using IP (Internet Protocol), there is a new dimension. Flexibility. Transmissions over the Internet involve different kinds of data, including images, data files, video and speech. The problem is that speech contains very little information as measured in bits, compared with moving pictures, for example. This means that when speech is being transmitted, every data packet will contain a large header for the address and other information mandated by the IP standard and a smaller payload with speech information. The difference is about 40 octets to 33.

"There is simply too much overhead for each packet," says Håkan Eriksson, manager for Ericsson Research. "The overhead is acceptable in a fixed network, but not in a wireless network."

Real-time voice

Trying to solve the problem by waiting for more information works for e-mail but not for voice, since speech must be processed in real time and the delays would be unacceptably long. One alternative would be to compress the header so that it takes less space, thus eliminating the redundancy in the header information.

"In fixed networks, algorithms have been de-

veloped that compress the header from 40 to about two octets," relates Håkan Eriksson. "The basic principle is that only certain packets have a complete header, while all the ones in between contain much less information. In order for this to work, however, all packets must be delivered correctly. That is possible in a fixed network where the connection is never broken, but in a wireless network, you have to expect interruptions and lost packets, meaning that all data would be lost until the next complete header arrives. That could mean as much as five seconds of silence in a voice call."

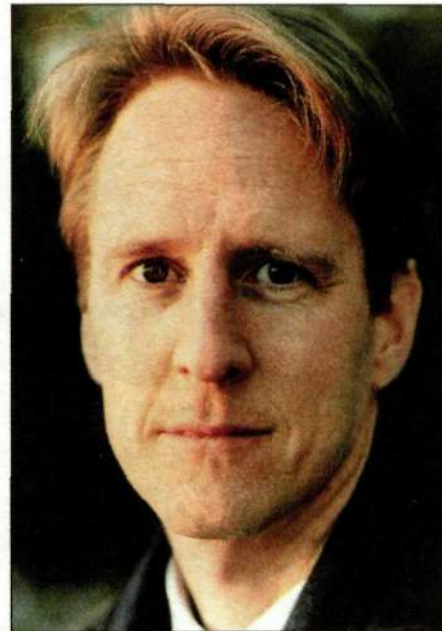
The problem in the Internet world is to use flexible packets, while retaining the GSM system's optimally high capacity and quality. As indicated in the figure, it is impossible to go straight up, since either the capacity or quality would decline.

Peeking in the packets

The new Rocco algorithm (RObust Checksum-based header COmpression) was developed by Ericsson Research solves 95 percent of the problem. The Ericsson Research team has succeeded in producing a compressed header that is extremely robust, meaning that it is insensitive to interruptions and lost packets.

A few months ago, Ericsson also submitted the Rocco algorithm to the Internet standards body IETF for approval as a standard.

"What makes Rocco such a good algorithm is not only the built-in safety coding, but also that it can peek into the packets to see what kind of data they are carrying," says Håkan Eriksson. "We can see if they contain voice, for example. This makes it possible to compress the headers in the most efficient manner."



"Ericsson Research has developed a new algorithm called Rocco that increases efficiency for Voice over IP to 95 percent. Visitors who have listened to a demonstration of Rocco are impressed," says Håkan Eriksson, who heads the research department. Photo: Mats Hallgren

Knowing that the packets contain voice is of course necessary for another reason. On the Internet, everything is sent as data packets, making it essential to code optimally and to reduce the overhead for each packet. In GSM, on the other hand, there are special voice channels, meaning that it is self-evident that all information is voice.

In Rocco this technique, called unequal error protection, is used to produce a result just 0.5 dB from standard GSM, meaning that the efficiency is approximately 95 percent, which is

completely acceptable, when compared with standard compression which only gives 50 percent.

Ericsson Research has also developed a test bed for demonstrating voice quality for visitors and customers.

Impressive demonstration

"Thus far, we have only tested the algorithm over a simulated radio channel, but the visitors who have listened to the demonstration have been very impressed," says Håkan Eriksson. "They have listened to three alternatives, one with traditional headers (too much overhead), one with the current CRTP compression algorithm (too poor quality) and then Rocco."

The code now being used is an AMR (Adaptive Multi-Rate) code, which will now replace the original GSM coder and its successor, the EFR (Enhanced Full-Rate) code. Ericsson is now trying to establish AMR as the standard for the Internet world.

A number of problems remain in transmitting voice over IP, however. Håkan Eriksson relates that his team is conducting further studies on how to best optimize the trade-off between capacity and quality.

There are also a number of other problems to be solved, including handover between base stations.

Customer demands are now becoming evident. AT&T, for example, is promoting a standard body called 3G.IP in which several operators and manufacturers, including Ericsson, are active.

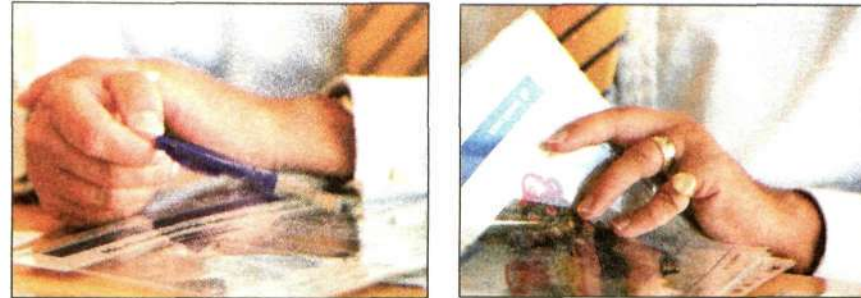
"We are at the forefront of development in our research and developed Rocco before customer demand was strong. Our results are now being turned over to standards groups within IETF and 3GPP," concludes Håkan Eriksson.

Lars Cederquist

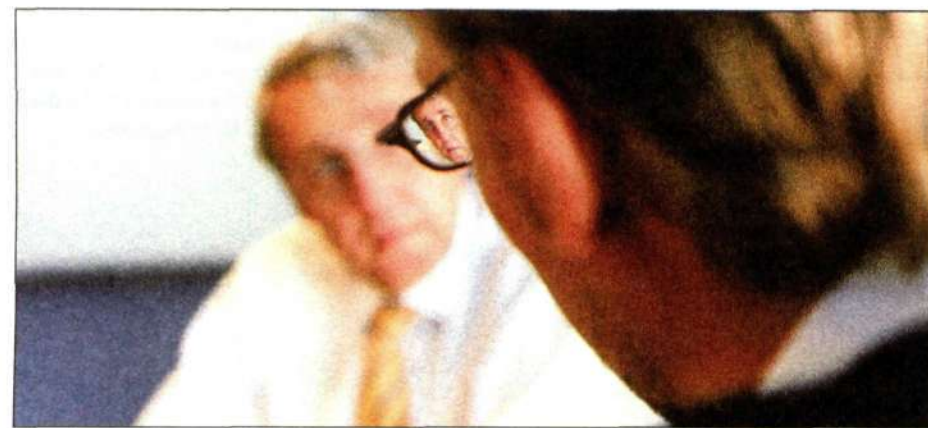
lars.cederquist@lme.ericsson.se

Ericsson is on the threshold of a whole new generation of products, both within fixed and mobile systems. Its challenge will be to combine mobility with the Internet and become a leader in the field.

"We will build on our strengths within wireless communication so we can enter the IP world and develop a good Internet architecture," says Jan Uddenfeldt, Senior Vice President, Technology.



New products require joint



The convergence of telecom and datacom is placing significant demands on Ericsson's strategic planning within the technology area.

Now that the company is moving into an IP world, it is imperative that the company meld products from the wireless side with the backbone that is required for high-speed transmission of datacom. In order to do this, Ericsson has developed a new IP-based core network for third generation mobile systems (3G).

"We're now developing products for the new network architecture. Most of it is based on new, open platforms. This is an effort that requires the assistance of all employees. It in-

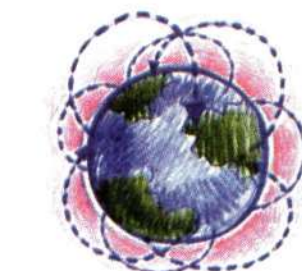
volves an incremental migration away from GSM, TDMA and other wireless networks as we move into the future," says Jan Uddenfeldt.

New radio network

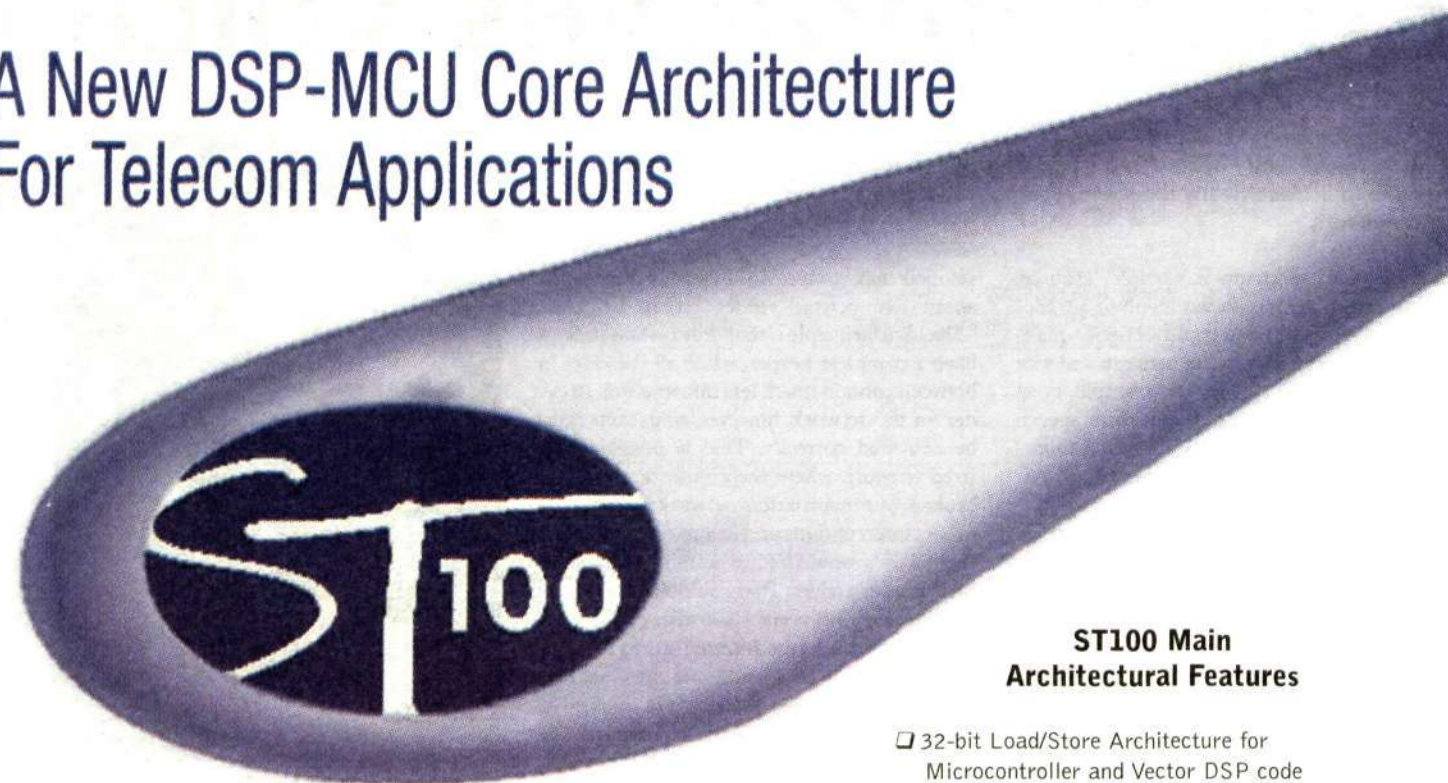
An entirely new radio network controller is being developed for the new network architecture, based on so-called Cello technology. The same technique is also being used in the core network for traffic handling in media gateways.

"We'll still need AXE in the future in order to achieve a smooth migration to all the services the network has to offer. Ericsson is starting to

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"We're now entering a whole new generation of mobile telephony. In terms of technology, this will involve a greater revolution than when we introduced GSM



development resources

acquire a good backbone portfolio through our acquisition of ACC and Torrent," says Jan Uddenfeldt.

These developments mean that datacom and IP will be an integral part, even for mobile operators, in future IP networks. Ericsson needs to have total systems and solutions, which operate all the way from the access network to the backbone switches and routers and on to other networks.

"This is an undertaking which will cost money. We have a lot of new technology, but at the same time we need to realize that quite a bit of the software on our system side has been around for some time. As a result, the development environment and methodology used need to become more efficient and modern. This will also free up resources for the new products," says Jan Uddenfeldt.

A company-wide strategy

Consequently, Ericsson is formulating a company-wide strategy for its development operations. Gunnar M. Eriksson, who left his position as head of Ericsson Utvecklings AB has, as part of his duties within the Technology corporate function, the task of overseeing this development work.

"We need a more streamlined development organization. Currently, we have a very decentralized development operation. One project can involve fifteen different design centers. That is not cost-efficient considering current technological developments and our strategic emphasis. We need, quite simply, to choose what we should be focusing on, as well as deciding what we should not be involved in," says Jan Uddenfeldt.

In the efforts to develop new mobile products, WAP, Bluetooth, the Epc operating system and GPRS packet data technology are all key concepts.

"We're now entering a whole new generation of mobile telephony. In terms of technology, this will involve a greater revolution than when we introduced GSM," says Jan Uddenfeldt.

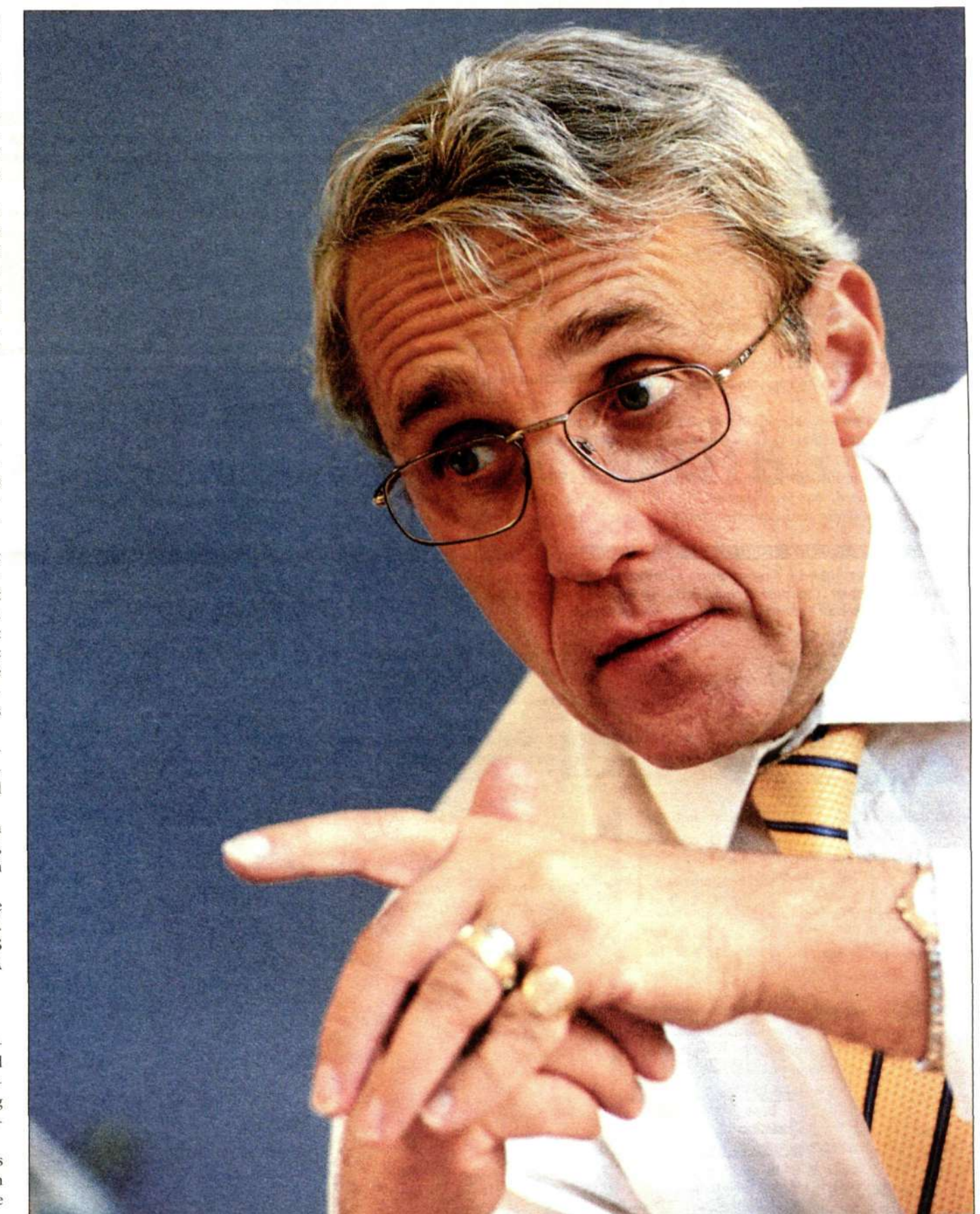
"The political dimension of developing the third generation mobile system has subsided. What is important now is to release GPRS products this year, and products for WCDMA and Edge by the year 2001."

Reworking radio standard

Along with the work to develop new IP products, work is going on to redo the IP standard for radio, that is, mobile speech over the Internet. Ericsson has submitted a new voice coding algorithm to the Internet standardization organization IETF.

Ericsson is also developing new products such as real-time routers and is participating in the 3GIP industry forum in order to create specifications for the new IP-based core network.

Nils Sundström
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"Mobile telephony and the Internet are the fastest growing areas within the telecom and datacom fields. That makes the combination of mobility and IP incredibly important. Our strategy is to be a leader within this area," says Jan Uddenfeldt, Ericsson's Senior Vice President, Technology.
Photo: Lars Åström

New architecture needed for third generation

The core network for Ericsson's third-generation (3G) mobile systems is based on a completely new architecture. A division between servers and media gateways provides flexibility and allows operators to use the core network more efficiently for different types of transport technologies, as well as circuit-switched and packet-switched services.

The first commercial 3G networks will be taken into operation in 2001. These systems will handle both circuit-switched services, such as voice and video transmissions, as well as packet-based IP services, including e-mail and various Web services.

To accommodate these services, Ericsson has not only designed a new radio network, but also a core network based on GSM.

"With the new network architecture, the same backbone will be able to handle different transport technologies, as well as circuit-switched and packet-switched services. Operators will be able to use the network more efficiently," says Sven Åkesson, manager for UMTS system management at the Circuit Switching Systems product unit.

Open interfaces

Operators can choose between IP (Internet Protocol), ATM (Asynchronous Transfer Mode) or today's STM (Synchronous Transfer Mode) technology for transport in the backbone network. The transport technology can be changed as required.

"The new architecture also provides flexibility so that the network can be re-configured for various types of traffic. If the operator gets more packet-switched traffic, for example, the network can be changed," says Sven Åkesson.

There are several migration paths from today's



"With the new network architecture, it will be possible to use different transport technologies in the same network," says Sven Åkesson, who is responsible for UMTS system management at the Circuit Switching Systems product unit. Photo: Nils Sundström

GSM networks to the new 3G core network. The first step, which many GSM operators are currently taking, is to introduce the GPRS packet service. This results in a core network consisting of GSNs (GPRS Support Nodes) for packet-switched services plus the existing MSC (Mobile Switching Center) nodes for circuit-switched services.

Nodes function as servers

In the new core network for UMTS, it will be possible to re-configure nodes so that they function as servers.

"With the new structure, the operator can easily introduce ATM and IP technology in the network, while at the same time re-using the installed base of GSM equipment," notes Sven Åkesson.

"When existing mobile switches are converted to servers, the existing signaling system between nodes is retained, and the network gains the same services and level of functionality as a GSM network," adds Sven Åkesson.

The division between servers and media gateways is an important part of the new network architecture because it allows the transport functionality to be separated from the network's control functions and service logic.

The servers are located at what is called the control plane while media gateways are located at the user data plane.

This structure means that switching and routing functions in the new network are moved to the user data plane where media gateways have a central role.

MEDIA GATEWAYS

In the new network architecture for 3G, media gateways have a central role. This is termed a transmission-near node and is based on Ericsson's own Cello platform. The media gateway handles both circuit and packet-switched services transmitted using IP, ATM or today's STM technology. By placing media gateways at the edge of the core network, the flow of information through the network is enhanced, as is transfer to and from other networks.

Network resources can be used more efficiently, in part because modem pools, which handle a limited portion of the total traffic, can be located centrally.

Media gateways are responsible for the network's user functionality, which in today's GSM networks is located in the MSC (Mobile Switching Center). This means that echo cancellation, tone transmission and reception and the codec are moved to the media gateway.

The MSC will thus be transformed into a server, which like the GSN server (GPRS Support Node), will handle the network's control functions and service logic. MSC and GSN servers will also control the network's media gateways using a new gateway protocol (H.248), which is now being standardized.

A major effort is being made at various Ericsson units to restructure today's AXE 10-based MSC nodes as MSC servers. This means that AXE 10 will remain an important component even in tomorrow's mobile systems.

Media gateways contain equipment for such functions as echo cancellation, as well as codecs for handling user data. The gateways function as IP routers or ATM switches to route traffic to and from the correct destination in the network or to other networks.

In the GSM system, speech codecs are located in the radio network, while in UMTS they are located in the core network's media gateways.

"This provides major gains in transmission for the UMTS operators," notes Sven Åkesson. "Because the codecs can be kept in the core network, they take only one eighth of the bandwidth, compared with uncoded speech."

The new server/gateway architecture is based on open and standardized interfaces. The ITU (International Telecommunications Union) is now finalizing the H.248 protocol by which the servers will control the media gateways.

"Subsequent releases of the UMTS standard will also support multimedia over IP. This will require enhancements of the radio interface to handle real-time IP from terminal to terminal," concludes Sven Åkesson.

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Ericsson's new network architecture for 3G has a horizontal structure that seamlessly links different networks and in which all nodes use the same core network for transmission. This can be compared with today's data and telecommunication, which requires a large number of different networks, each specialized for a certain type of traffic, such as mobile telephony or pure data traffic. Existing networks operate side-by-side as vertical systems with varying functionality and services. This is no longer the most cost-effective way with the convergence of the data and telecom worlds, when the networks can be more closely linked.



"Interest in our platform is strong within the Company," says Thomas Ek, development manager for the new transport platform that is based on an ATM switch for packet-switched data.

Photo: Lars Åström

Cello: basis of future networks

An important component in the new mobile networks is the Cello transport platform for access products. Cello is basically a switching node for packet-switched data that is optimized for mobile telephony. Using this platform, various Ericsson products are now being built, including the future Media Gateways, IP routers, radio base stations and RNCs (Radio Network Controllers) for different mobile systems.

The first version of Cello - Cello 1 - is already incorporated in the experimental systems for Wideband CDMA now operating in several locations worldwide.

"We are now developing the next version, Cello 2 - for the UMTS radio network, for IP routers and Media Gateway," says Thomas Ek, development manager.

EWU, the former Qualcomm, is also investigating the possibility of using Cello for the CDMA2000 radio network.

"Interest in our platform is strong within the Company," says Thomas Ek. "We receive questions from all directions."

Powerful platform

Cello is thus a platform for access products, meaning that it is not a product in its own right but that it becomes a product when combined with an application.

Cello is an execution platform that can provide, for example, ATM-switching and support for operation and maintenance.

Cello can be used with both ATM and IP routers. ATM (Asynchronous Transfer Mode) is an efficient, economical method of transmitting and packaging different types of data. The technology uses cells (hence the name Cello) con-

sisting of 53 octets (8 bits), of which 48 are used for data and 5 provide address information. The great advantage of ATM is that data packets from different users can be combined, resulting in more efficient use of network capacity. By multiplexing data at AAL2 (ATM Adaptation Layer 2), cells are filled with information more quickly, thus reducing network delays. For the network operator, ATM offers optimal flexibility.

Another strength Thomas Ek wants to stress is that Cello uses the same development environment for its Main Processor, MP (corresponding

to the central processor of the AXE system), and its Board Processor, BP. This means that a designer can develop software for both processor types without having to learn new tools and that the software can be ported between the BP and the MP.

General design

Physically, Cello is a magazine with 27 card slots and a powerful cooling unit that diverts all heat. The two outer slots are reserved for switch cards (one or two depending of whether redundancy is required). The other 25 are general and may be

filled as needed with line cards, echo cancellers, codecs and other equipment depending on application requirements.

The backplane and the switch handle all communication between the cards. Total switching capacity for a magazine is 17 gigabits per second, and transmission between the cards and the switch is 622 megabytes per second. A central component is the switch chip, AMAX, developed by Ericsson Components. Cello also extends its reach into application-specific cards in the form of a DBM (Device Board Module), that are mounted on each card and contain interface circuits for processors and memory. The DBM handles communications, loading and upgrading of software and other tasks on behalf of the card on which it is mounted.

Cello is a scalable solution that can be built using one to 50 magazines. Normally, however, about ten magazines are used. Each node contains an optional number of processors, though not less than one MP. To make the node fault-tolerant, all the MPs work together in a cluster. If one MP fails, another takes over, so the other cards can continue with their tasks. To guarantee that no key functions are lost, the design phase included determining which components must survive a hardware failure.

Maintenance is simplified in a similar manner, since any node can access any other node in the network.

Cello is an open platform in that Ericsson purchases existing components or sets requirements on the suppliers to develop certain components, which are then integrated into the system.

"I consider Cello today to be state-of-the-art in access applications," says Thomas Ek.



Jan Wiman working with Cello development at Nacka Strand, Sweden.

Lars Cederquist

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NEW NETWORK ARCHITECTURE FOR THIRD GENERATION MOBILE SYSTEMS

Ericsson has developed a new network architecture that makes it possible to use a number of transport technologies, as well as both circuit-switched and packet-switched services in the same core network.

Applications

Servers with different kinds of information and services

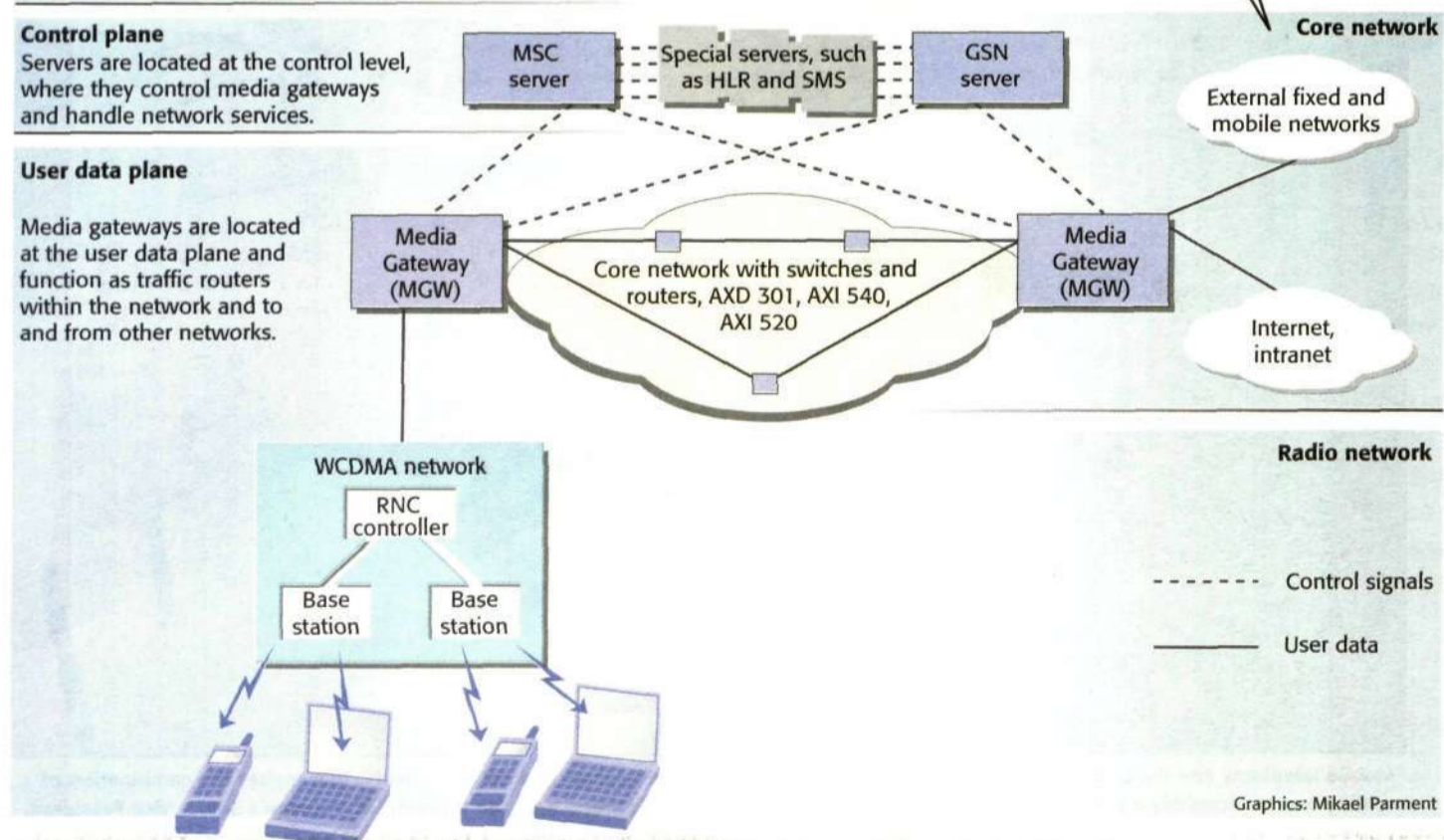
By dividing the core network into servers and media gateways, the operator can use the network more efficiently.

Control plane

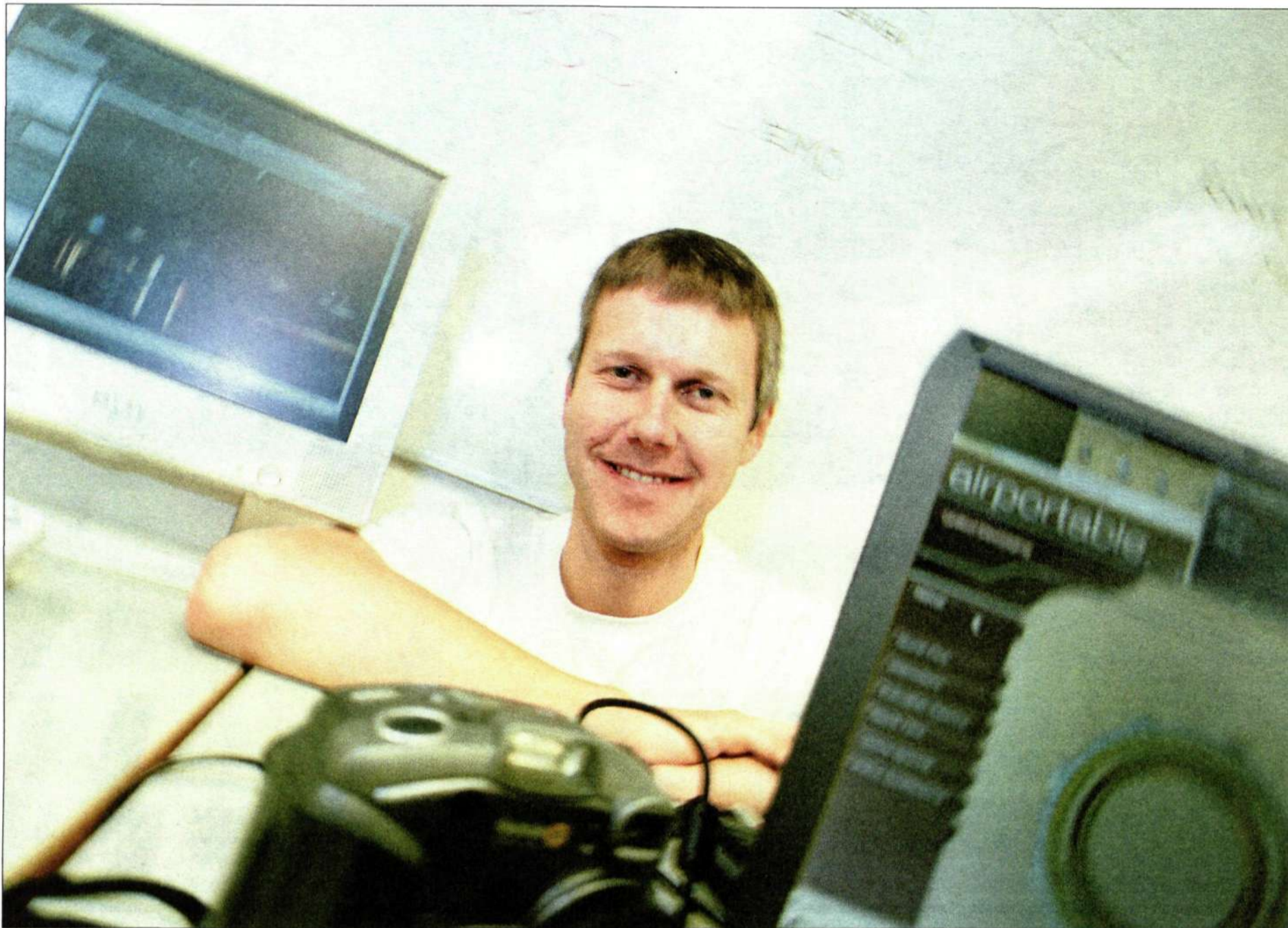
Servers are located at the control level, where they control media gateways and handle network services.

User data plane

Media gateways are located at the user data plane and function as traffic routers within the network and to and from other networks.



Graphics: Mikael Parment



"Ericsson's future lies in building a packet-oriented core network for mobile communication over the Internet," says Kjetil Rossavik, technical director for the new packet data nodes in GSM networks.

Photo: Kurt Johansson/Nyhetstjänst

Packet data is taking over

When the new packet data nodes for GPRS are installed in GSM networks, it will be the beginning of a trend that will affect all mobile data networks, from terminals all the way up to intranets and the Internet itself.

GPRS (General Packet Radio Service) is the name of a new standard for packet data now being introduced in GSM networks that is intended to let mobile phones access the Internet. In contrast to circuit switching, which dedicates a radio channel for the duration of the call, packet data divides data into small packets that are sent when network capacity is available. Packet switching is a much more efficient way to use network resources, and today, with Internet, and especially intranet growth exploding, packet data is the best choice.

"This is a fascinating trend that will affect all parts of the network," says Kjetil Rossavik, the manager who is responsible for GPRS Service Nodes (GSN) which will be added to today's GSM networks to allow them to transmit packet data in parallel with circuit-switched services.

In parallel with voice

Introducing GPRS in GSM networks is really a way of using the global reach of GSM networks to quickly deploy packet data services to users. GPRS uses existing frequencies, and no new licenses are required. Otherwise, GPRS is a parallel network to the existing GSM network in

which packet-data users sneak in their data packets in time slots that are not being used for voice.

That's the way it will work from the beginning, at least. Today, circuit-switched services account for the lion's share of revenues, but all signs indicate that packet data will grow strongly and require at least one dedicated channel to guarantee transmission.

"A few years ago, it was difficult to get operators interested in packet data," reveals Patrik Wiberg, project manager for the development of the new GPRS nodes. "Today, it's a different story. Now the operators are putting pressure on us, because they want to be the first ones out with the new service."

Small changes

Adding GPRS to a GSM network requires only small changes. The only new hardware required are the two new GPRS nodes plus an addition to the BSC (Base Station Controller), which is the unit that sets up connections and allocates channels between the base station and mobile units.

The only other requirement is new software for the base stations, which is important, since there are thousands of base stations, as well as for the MSC (Mobile Switching Center), the HLR (Home Location Register), and the SMS (Short Message Service) server. For users, there will be three types of terminal that support both voice and GPRS or only one of the two alternatives.

The first new node is the SGSN (Serving

GPRS Support Node), which in principle is the packet network's equivalent of the mobile voice switch. It uses the system's HLR but otherwise operates independently of the MSC. Where the MSC routes voice calls to the fixed telephone network, the SGSN will route packet data to the Internet. This will take place through an IP link (which must be installed) to the other new node, the GGSN (Gateway GPRS Support Node), which is connected through an IP or ATM network to external networks, meaning intranets and the Internet.

Spare capacity

Currently there is spare capacity available in GSM networks, particularly at certain times of the day. However, there are other reasons for investing in GPRS, one of which is to reduce the load on the circuit-switched network.

"The transmission of SMS short messages is the only service in today's GSM network that is similar to packet-switched mobile data," says Kjetil Rossavik. "SMS is experiencing rapid growth, which indicates that there is significant potential for GPRS, which initially will take over as the bearer for SMS and eventually replace it completely. Even WAP, which is now being carried over SMS, will move to IP over GPRS."

GPRS is a flexible technology. Where a circuit-switched call uses one time slot (of eight), GPRS can use as many as are available. In the same manner, several GPRS users can share one or more free slots.

It is difficult to predict what the actual transmission speed will be. The theoretical limit is 115 kbps, but the speed will more probably be about 64 kbps, a limitation inherent in the terminals, not in the network, which is still perfectly adequate for moving images.

High demands on the network

"GPRS will place extremely high demands on those who build the network," says Kjetil Rossavik. "The radio network is only one part of GPRS, which also entails building an advanced IP network capable of handling addressing, when the number of GSM users soon reaches one billion, as well as security."

Here there are no standards to fall back on. GPRS itself is standardized, but the network extending out to the Internet is not.

Will it be IP over ATM? Or IP over Frame Relay? Or perhaps directly over fiber?

"There are many proposals. Each operator has its own preferences, but we will be forced to solve a large number of problems. The core network for GPRS, or more correctly, the Packet-Switched Core Network, which will be used for GSM, TDMA, Edge, UMTS and other technologies, is Ericsson's future," concludes Kjetil Rossavik.

Lars Cederquist

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Footnote: Read more about GPRS in Ericsson Review no. 2/1999.

TRANSMITTING PACKET DATA IN THE GSM SYSTEM

Sending packet data with GPRS in the GSM system requires in principle a new network in parallel with the GSM voice network.

Although the two networks share radio resources up to the BSC (Base Station Controller), ordinary voice is then routed to the MSC (Mobile Switching Center) and onward to the fixed network, while data packets are routed to new packet data nodes and then out on to the Internet.

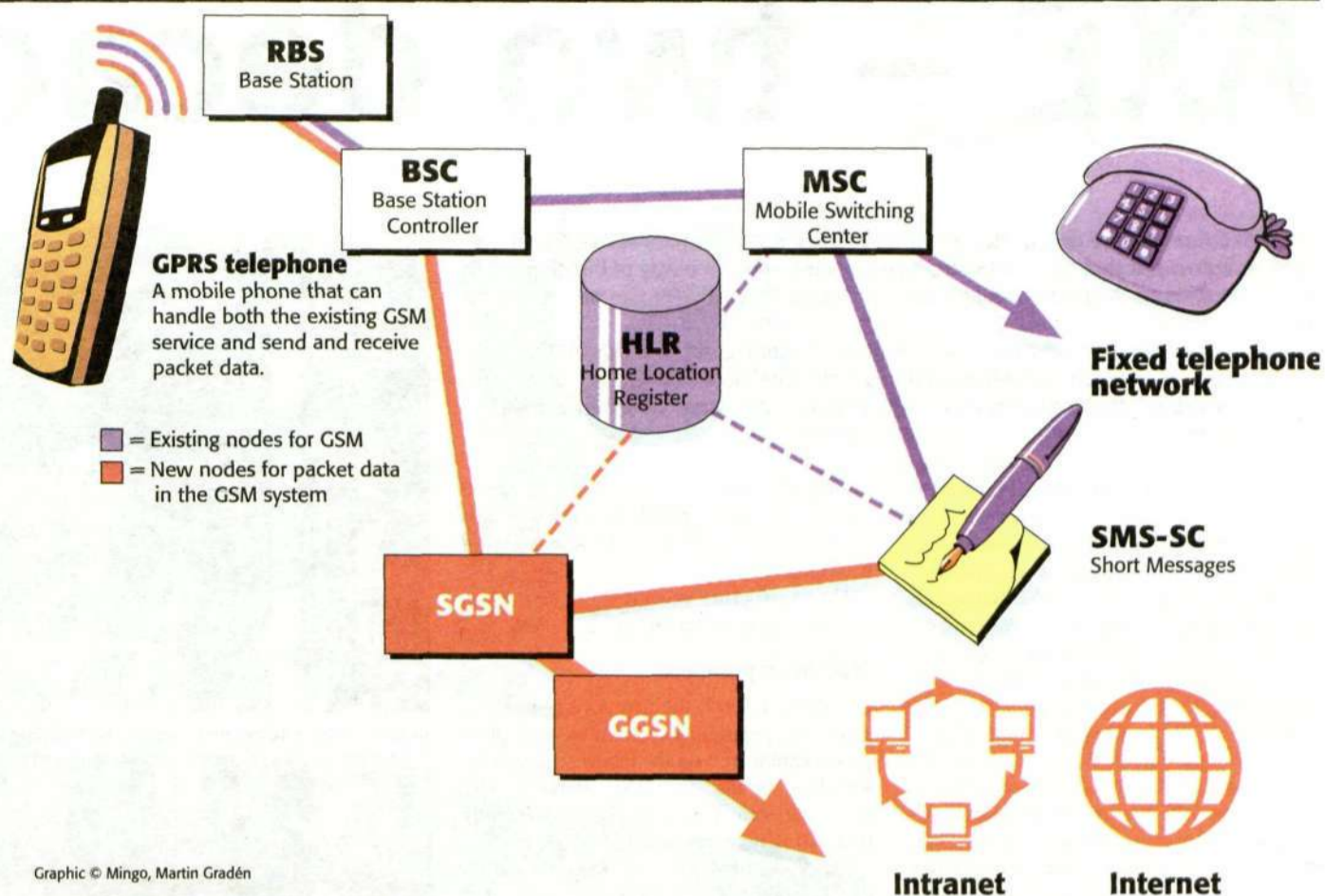
The new nodes are SGSN (Serving GPRS Support Node), which corresponds to the MSC but is a switch for packet data, and GGSN (Gateway GPRS Service Node), which provides a link to external data networks.

The user, however, perceives the two networks as one.

There is only one terminal and one subscription. The HLR (Home Location Register) is shared by the voice and data networks.

Apart from the new nodes, only minimal changes – new software – are required in the existing GSM network.

This will facilitate a fast roll out of the new GPRS service.



Graphic © Mingo, Martin Gradén

New applications to be launched

Together with operators and manufacturers, Ericsson has taken the initiative in making sure that there will be practical and well-tested applications when the new GPRS service is launched commercially.

"Experience shows that we are skilled in the technical development of products and in managing sales," says project manager Patrik Svensson. "However, when it comes to stimulating the use of our infrastructure products, there is room for improvement."

The situation today is that only about one percent of all subscribers use GSM for data communication. The task is therefore to seed the market with practical applications. The ini-

tiative, which is intended to be a catalyst to jump start the market, is called the GPRS Applications Alliance.

"This initiative will help to get GPRS sales started. Customers will be satisfied, and our image will be improved," says Patrik Svensson. "However, I don't believe in the concept of a killer application. Instead, I think that thousands of killer applications will be developed to support us both privately as individuals and in

our work and the specific tasks that we need to do. E-mail, as well as WAP, are of course the first applications, which are already working today."

There are a number of players interested in this sector. These include application developers who are producing e-mail software, browsers, etc., as well as hardware suppliers, developers of operating systems, consultants and systems integrators.

"We can offer help in the form of courses and technical support," says Patrik Svensson. "But we also have testing tools that simulate GPRS for application development that we

have developed in Aachen in Germany and in Kista in Sweden, where we can test how applications behave in a GPRS environment. The GPRS Applications Alliance is initially based in Kista and in Berkeley, USA, but over the coming year, we expect to add some 30 centers around the world."

A Web site, to be announced at Telecom 99, is also being put up where applications can be registered and the market can obtain information about the latest developments.

Lars Cederquist

www.gprsworld.com

Total commitment to GPRS project

The development work for the new GPRS packet data technology spans several product units and involves thousands of employees. Customers have been involved from the start, and Ericsson production plants have developed test beds. The entire marketing organization is gearing up to sell the new concept.

"Customers demand coordination and expect us to deliver all the component products at the same time. That has been the guiding principle for our work," notes Ulf Brömster, who is responsible for the total project, which involves ensuring that everything will work together.

GPRS is termed a total project because several different product units are involved and are responsible for developing the required components. General verification testing at the network level will ensure that everything works together in the whole GSM network. Customers were involved at an early stage, actually before development work started and are now participating in the testing before the product is finished. This is perceived as a major challenge.

Supply and support are important parts of the project, as is getting the local companies to appreciate the benefits of packet data, which is



Ulf Brömster

a paradigm shift from today's circuit-switched to tomorrow's more data-oriented world. Design work has been conducted with an eye to TTC (Time To Customer) and the objective of getting the products to the customer as quickly as possible.

Several contracts

"We have developed our new nodes by purchasing the appropriate technology, including processors, on the commercial market and then building it into the finished product, which consists of a platform and applications," says Ulf Brömster.

This effort has produced results. The project has progressed so far that several orders have now been signed, calling for both a large number of test systems and for putting systems into commercial operation.

In order to meet the considerable demand in the market and to speed up deliveries to customers, Ericsson has developed a self-contained module with a complete GSM network, which includes a BSC, today's circuit-switched



The plant in Katrineholm, Sweden, produces complete GSM systems which are shipped in containers to customers all over the world. Two containers have already been shipped to Ericsson Eurolab in Aachen. The idea is that the test results from Aachen will provide the foundation for testing in Katrineholm. The first deliveries to customers will take place in October. The Katrineholm plant is now taking greater and broader responsibility for its products. As part of this effort, the unit has established a Supply Unit and is following the global TTC program.

MSC, the new packet data nodes (mobile switches for data communications) and two radio base stations. This base configuration is duplicated as needed and assembled at the plant in Katrineholm.

"The idea is that the customer in this manner will learn what GPRS is," explains Ulf Brömster. "We see the container module as a first step towards GPRS. First the operator uses the test system independently with the data-com components and the new nodes. Then, when they have learned to use the system, they can put up GPRS on the whole network."

The reasoning behind GPRS is that the market is now ready for packet data. It is only now that customers have begun to understand what the technology can be used for.

"It is interesting to note that we tried implementing a similar project several years ago for the Japanese digital cellular system, but were unsuccessful," relates Patrik Wiberg, the project manager responsible for developing the new GPRS nodes. "The engineers understood the benefits, but the market simply wasn't

ready. They did not see the opportunities in services.

"As packet data for GSM has advanced, the Japanese market has also realized the value of these services. The Japanese project has been restarted, and commercial deliveries are contracted," says Patrik Wiberg.

Major step

Today, the Internet is paving the way for data communications. Not only do today's mobile phone users want to access the Internet, Internet users also want to become mobile. A successful launch of GPRS will undoubtedly also be facilitated by the fact that the technology has been standardized by the European standards body ETSI. Another factor is that GPRS is a major step towards UMTS, which is the third-generation mobile telephone technology with multimedia and other services. It is also possible that GPRS provides total coverage, while UMTS only covers urban areas.

Lars Cederquist

AXE – two decades of success

When AXE first saw the light of day in the mid-1970s, it was a minor revolution in the telecom industry at that time. AXE introduced a completely new way of building telephone systems. And time would show that Ellemtel's engineers had hit the nail on the head.

Based on a system architecture designed at the beginning of the 1970s, AXE is still a cornerstone of Ericsson's telephony systems, both wireline and wireless – in a telecom world that the engineers of the 1970s could hardly have imagined in their wildest dreams.

The AXE story begins with the story of another telephone system, one considerably less successful. At the end of the 1960s, Ericsson introduced AKE – the company's first computerized station system. The first AKE system was installed in Tumba, Sweden, in 1968, and offered to Australia in the same year.

However, the Australians rejected AKE. Instead, they chose the competing system, Metaconta, from U.S. company International Telegraph and Telephone, ITT. The setback in Australia caused Ericsson's engineers to reflect on the situation. AKE had obvious drawbacks despite its modern computerized operation – for example, the complicated computer-software code used at the time created several problems. They decided to phase AKE out and invest in something new.

In the opinion of John Meurling, whose 40-year career at Ericsson has been closely associated with AXE, it was a daring decision.

"The phasing out of AKE for a completely new system meant that for several years at the beginning of the 1970s Ericsson was without a modern telephone system. There was obviously a risk that the competition would grab the chance and take market share from Ericsson.

A few years' respite

Chance, however, was on Ericsson's side. The first of the oil crises of the 1970s came in 1973 and the customers in the telephone market – the large national PTs – took a "wait-and-see" attitude. This gave Ericsson a few years' respite before the market took off again. The development of the new telephone-station system was assigned to Ellemtel, a development company created in 1970 from Ericsson and the Swedish PTT. Ellemtel was directed to create a system that would be used by the Swedish PTT in the domestic market and marketed to Ericsson customers worldwide.

The system, dubbed AXE, was to be ready for operation in 1976. Once again, Australia was to play a key role. In 1975, the country launched a tender process for a new national telephone system. Actually AXE, being as yet

incomplete, did not qualify. Nevertheless, Ericsson marketing people made the journey "down under" to convince the Australians of AXE's merits.

The Australians bought Ericsson's arguments and AXE was in the game.

Stockholm première

On March 1, 1977, the first AXE system was placed in operation. The première took place in Stockholm, and on the following day, John Meurling recalls, the AXE stations were swarming with Australian engineers intently conducting system evaluations.

"They like what they saw. Some time after, the Australian Post Office sent word that Ericsson had won the contract for a national telephone system."

The sale to Australia marked the beginning of a long and successful product history. It would take several years before the competitors could produce anything close to AXE. Meanwhile, Ericsson could establish itself in a unique position in the international telephony market.

Technical revolution

But what was it that made, and continues to make, AXE so successful? The answer lies in the unique system architecture and the fact that early on AXE was supplied with digital switches, John Meurling believes.

"AXE was a technical revolution. The system was built on modules – well-defined blocks – in which similar functions were grouped. The telephone industry had not seen anything like it. With its modular design, it was easy to further develop parts of the AXE system without overhauling the entire system – for example, the architecture permitted stepwise digitization of the system. The digital revolution in telephone networks began with AXE."

With its modular construction, AXE has been successively modernized. Over the years, the system has been adapted to new situations and demands. Today, 20 years after its introduction, the system no less relevant.

"AXE is an important component of Ericsson's successful mobile systems," explains John Meurling, "which is rather fantastic, considering that the engineers who designed the AXE-system architecture in the beginning of the 1970s had hardly heard of mobile telephony."

Niclas Henningsson

Footnote:

John Meurling is the author of *A switch in time – An engineer's tale*, which describes the development of AXE. He is also involved in producing the book to be published in conjunction with Ericsson's 125th anniversary in 2001.



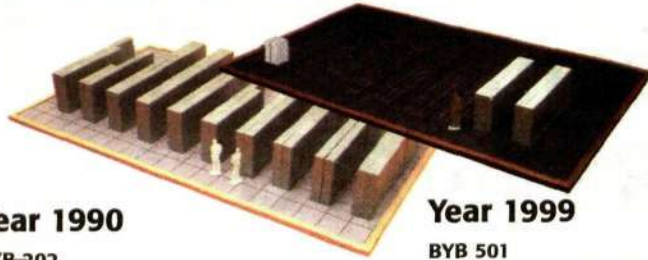
In the 1970s, AXE required an entire building – plus a ladder...



...while today's AXE for a complete telephone station is so small it can be transported by taxi. This development has made AXE central to Ericsson's success, even with today's circuit-switched telephony being replaced by packet-switched data.

Year 2001

220,000 subscriber X3 lines



Year 1990

BYB-202
55,000 subscriber X3 lines

Year 1999

BYB 501
110,000 subscriber X3 lines

In the past few years, AXE development toward a larger transit switch to connect several local stations has dramatically reduced the number of cabinets involved, while capacity has doubled. In the next development phase, to end year-end 2001, the size will again decrease greatly and the capacity be doubled.

Hardware platform

AXE is the only switch system in the world to use only one processor. Competitors' systems involve several processors connected in series.

Despite the single processor, AXE is considered one of the world's most potent real-time machines.

AXE could be described as a hardware platform – a system of processors, memory and other components, all with a specific task.

AXE has several areas of application, but the hardware does not differ particularly between the various applications. Systems leaving the Ericsson plants in Östersund and Katrineholm in Sweden are essentially identical. Adaptation

takes place later. Depending on the use to which the system will be put, the hardware is filled with various types of software. Wireless-system switches require certain functions, wireline network connections and transit stations require others.

Since various functions may be selected, AXE can be adapted not only to the particular appli-

AXE – one size fits all

AXE is the world's most widely used system for connecting telephone calls, but also one of the world's most modern systems, despite its age. In the mid-1980s, AXE took the significant step from fixed to mobile telephony. The system is now ready to enter the next phase in its development. As today's circuit-switched telephony is replaced by packet-switched data, AXE will be critical to Ericsson's success.

"AXE is like a sock without a heel – a tube sock flexible enough to fit all."

The simile was made by Hasse Johansson, who works in marketing support at Ericsson Utveckling AB – UAB – in Stockholm. He describes AXE as a platform, a fairly standard set of hardware, so ingeniously designed that it can be used for just about any purpose in data and telecommunications.



Hasse Johansson

AXE was developed in the mid-1970s as a system for connecting calls in the fixed telephone network. The first system was placed in operation in 1977, and AXE was an immediate success.

Obvious success in the 1980s

However, the true extent of the success was not obvious until the mid-1980s, when telephony let go of copper wire and became mobile. It turned out that the flexible AXE design made the system equally suitable for mobile telephony and fixed telephony.

Today, AXE connects calls in mobile systems for most wireless standards.

"The great charm of the AXE system," says Hasse Johansson, "is that a system developed for fixed telephony works just as well for mobile. AXE is an important factor in the success of Ericsson's mobile systems."

In a fixed-telephony system, AXE systems have two tasks, the first being to serve as connecting stations deployed in the network to handle the tens of thousands of subscribers in a sector of a city or community.

The second is to serve as transit stations. Transit stations relay calls between cities and regions. In a mobile system, AXE functions partly as a BSC – Base Station Controller – and partly as a MSC – Mobile Switching Center. The BSC is used in the GSM network to switch calls from the base stations on to the MSC. In the MSC, the calls are switched to the fixed network or to other parts of the mobile telephone network.

After the step from fixed to mobile telephony, AXE is now entering the next phase in its development.

Packet-switched data in the future

Today's telephone networks, both fixed and mobile, are used for circuit-switched calls. For every call, a connection is established with fixed capacity. However, for the data and telecommunications of the future, packet-switched data will be the norm. With packet-switched data, information from a call is digitized and packaged before being sent to the call receiver. By identifying data packets by means of codes, one connection can be used for several simultaneous calls.

The idea is that AXE will be an essential component of future Ericsson solutions for packet-switched data communications. Last spring, a functional hybrid system for circuit-switched calls and packet-switched data was presented. The system, ordered by British Telecom, was launched at CeBIT99.

Niclas Henningsson

Niclas Henningsson



Photo: Lars Åström

AXE never sleeps. The switch is designed to handle huge volumes of phone calls. One switching station in a wireline network connects tens of thousands of subscribers. Call density is greatest during the day, but AXE stations do not rest at night. That is when the telephone network is filled with data traffic from stores and businesses, as the day's credit-card transactions are sent to the banks for clearing. The banks tend to send the information during the night, when networks are less congested and call rates lower. AXE is currently used in a total of 135 countries, where 9,000 switches in commercial operation handle one million telephone lines in fixed networks and 130 million mobile subscribers.

with a mind and a heart

tion but also to customer preferences. The telephone operator simply selects which services the network is to contain.

The brain of AXE is the processor. All functions are administrated from the processor, which also steers the heart of the system – the switch where actual call connection takes place. AXE is the only switch system in the world that employs one processor. Competitors on the market have several processors connected in series. Despite the difference, the AXE system is considered one of the world's most potent real-time machines.

However, the fact of AXE's single processor must be qualified. Each system actually contains two parallel processors continuously engaged in the same operations, side by side. The duplication guarantees operating reliability. If one processor were to break down, the other would take over in a split second.

Contact with the outside world occurs via AXE's input/output system. It is here that the operator connects its own control and supervision systems and collects subscriber billing data.

In May 1998, the latest AXE hardware ver-

sion – the BYB 501 – was presented. The new, fifth generation differs from previous generations primarily in one area: the 501 uses 3-volt power combined with modern circuit technology, instead of the 5-volt technique of previous generations.

The lower voltage offers the major advantage of emitting less heat, which means the components can be more tightly packed together. The latest version of the hardware is 40 to 90 percent smaller than its predecessors.

With the launch of Ericsson's new T18A mobile phone, an exciting new feature becomes available to mobile phone users: Speech Recognition for mobile communications. The new technology was developed at Ericsson Eurolab in Nuremberg, Germany.



Several of Ericsson's latest mobile phone models feature voice control. The European television advertising that accompanied the launch of the T18 model this spring used humor to highlight the novel function. An attractive young woman leans toward her companion on the sofa and whispers "Darling" into his ear. The mobile phone at the far end of the room rings. He rushes to answer it - leaving her in sole possession of the television.

New phones listen to you

Compared with conventional mobile phone operation, speech recognition offers several advantages that could lead to the new technology becoming a standard feature of mobile phones in the future.

Today, only 5 to 10 percent of mobile phone owners use the built-in telephone book in their phone due to the complexity of the MMI (man-machine interface), with the result that they still have to key in the entire number, which is increasingly difficult due to the trend for mobile phones to become smaller and smaller. Drivers using their mobile phones while driving can represent a major hazard while they key in a telephone number on the tiny keypad. Voice control eliminates such problems, since the user need only press one button and speak the name of the person being called.

Two speech-controlled functions have been implemented in the new T18 phone: name dialing and call answering.

For name dialing, the phone offers the possibility to add a "voice tag" to up to ten names in

the telephone book. This is accomplished with a form of training through which the phone learns to recognize the user's voice.

After training, the user can call a person whose name is listed in the telephone book by pushing a button, waiting for a beep tone, and then speaking the name of the person being called. The telephone recognizes the name, responds with the stored voice tag associated with the name and automatically sets up the call.

The same algorithms are used to answer a call. The function allows an incoming call to be accepted or rejected by voice without touching the keypad. Two additional voice tags can be trained - one to reject and the other to accept a call.

Technical problems

Background noise is always present in mobile communications. It may consist of relatively stable noise - from a car running at constant speed for example - or it may consist of sudden noises, such as laughter, slamming doors, planes taking off, and so on.



Stefan Dobler, seen here in the center wearing a jacket, together with some of the developers of voice control at the Ericsson Eurolab in Nuremberg.

This meant that the algorithms used needed to be very robust against noise. But because mobile phones are very small devices, produced in high volumes and highly cost-optimized, there were considerable hardware restrictions on speech control algorithms. No

extra processor was allowed and existing resources had to be shared with other applications in the phone. Also the memory access speed was a problem, since the existing hardware was not prepared for the high demands of speech control. Ericsson Eurolab has found a solution which minimizes the additional memory required in order to store the voice tags and the voice prompts of the trained names. To avoid the need for extra hardware, the algorithms were also designed to cope with the existing memory access speed.

Many applications

However, these new algorithms are not restricted to mobile phones. Speech recognition technology is extensively used in man-machine interfaces. It can be used in network applications such as speech-controlled voice mail systems and also in a variety of products.

Stefan Dobler
Ericsson Eurolab, Nuremberg Germany