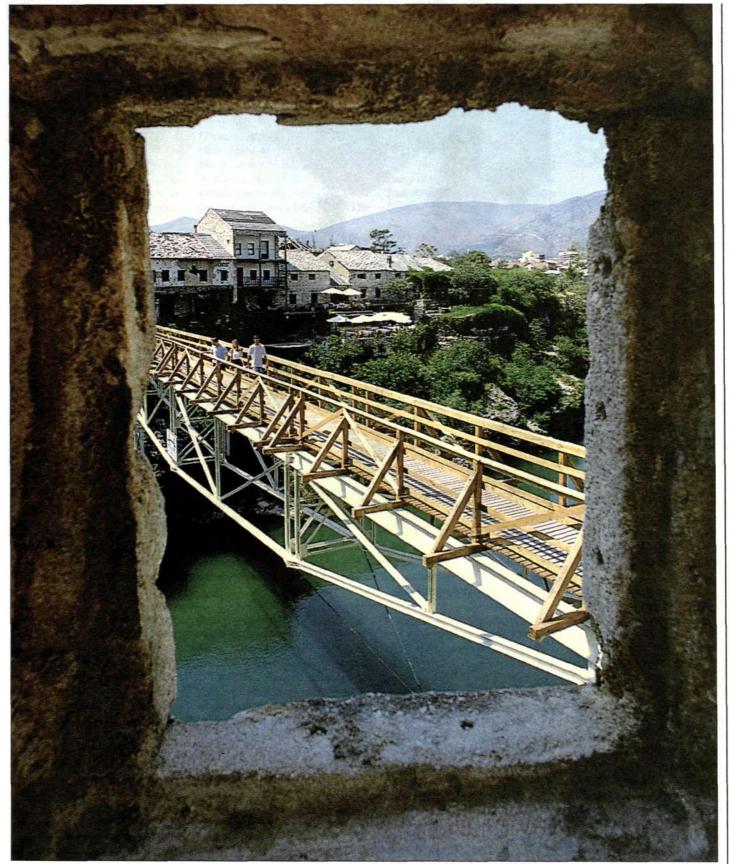


NO. 14 · OCTOBER 8 1998



The famous bridge in Mostar fell in 1993. The unique arch was built in 1566 and was on UNESCO's list of World Heritage sites. Exactly one year ago, reconstruction of a temporary bridge began. Photo: Lars Åström

# **Rebuilding Bosnia**

Roads, bridges and telecommunications systems are being rebuilt in Bosnia Herzegovina. Ericsson is one of the foreign companies that was present soon after the war ended. Photographer Lars Åström has documented Ericsson's work in reconstructing the country's fixed and mobile telecommunications. **137.00** Ericsson B share, Stockholm Oct. 2

# New structure is announced

Ericsson presented its new organization last week; an organization that will be more market- and customeroriented. Four new corporate offices will be established, each of which will accommodate members of the executive management. **3** 

# Johan Siberg

The Mobile Phones and Terminals business area is one of the most profitable businesses in the industry. Despite this, analysts were disappointed in the six-month figures for mobile phone sales. Johan Siberg explains how the business area will be even more competitive in the future. **2** 

### Repeaters boost coverage

The Irish mobile network operator, Eircell, needed to quickly improve the radio coverage of its network. Ericsson found a fast and inexpensive solution – repeaters. Repeaters provide a relatively inexpensive alternative for improving coverage in certain areas.

### Outsourcing not always best

Ericsson's property company has decided not to outsource its maintenance service operations. A study has shown that outsourcing would neither be better nor cheaper for the customer. 5

### **Start talking**

Dialog creates enthusiasm and enthusiasm facilitates change. Johan Ljungqvist, head of internal communications, relates his recipe for how Ericsson should change. 9

#### PORTRAIT

Meet Knut Trovaag, the newly appointed Commander of the Royal Order of the Polar Star.

#### CHRONICLE

Lucent is ready to go on a shopping spree, writes Bobby Chang. **7** 

ERICSSON 🔰

#### CORPORATE

CONTACT No. 14 1998

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Paues Media i Stockholm AB, phone + 46 8-665 80 72 kontakten@pauesmedia.se

Printed at Nerikes Allehanda Tryck Örebro 1998

Advertising Display AB, phone + 46 90-17 79 50

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# Johan Siberg poised for future challenges

The stock market's reaction to Ericsson's six-month report was harsh. Share prices fell sharply, and Ericsson's stock has since declined to about the same level it held at the beginning of 1998. Naturally, there are many reasons for the decline. One of the main reasons, however, according to market analysts, was the failure of Ericsson's mobile telephone sales to maintain their former rapid growth rate.

Contact reporters met recently with Johan Siberg, Senior Vice President of the Mobile Phones and Terminals business area, and asked him about Ericsson's potential to meet growing competition.

"Growth is never a straight-line phenomenon; it generally comes and goes in waves. We should also bear in mind that sales growth and market shares are not the same as profitability." Johan Siberg sees no reason for

his business area to deviate from its present course. "Naturally, we want to sell as

many telephones and make as much money as we possibly can, but we also have to assume a more longterm perspective than six months."

#### Multimedia is the next step

Johan Siberg mentioned several areas where Ericsson needs to improve if it hopes to remain one of the telecom industry's most profitable companies. "We still face a long and arduous

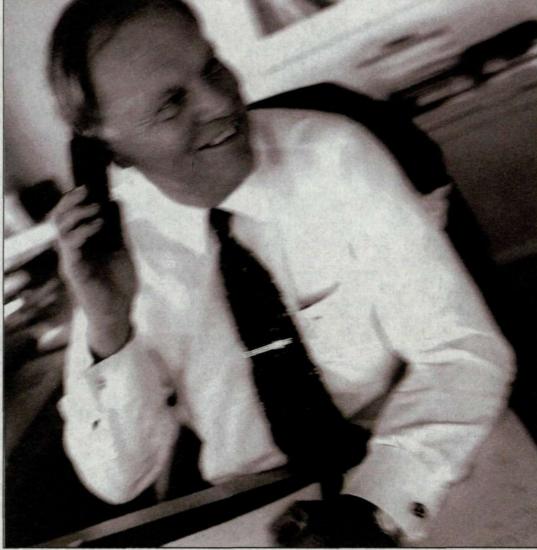
task in terms of new development in mobile telephony. Current development is moving toward a 'world telephone,' but design, a strong brand name and, perhaps most important, size and scope, are still key elements of success." In the future, so-called "smart

phones" with a host of built-in functions will be developed with greater intensity. The new SH888 is a good example, a new product equipped with a PC card and infrared technology.

"Next year, we will also introduce new products with larger display fields, enabling simpler transmission of more information. We shall also meet the competition by making our products easier to use in parallel with higher performance standards. We are now at a relatively early stage of development in this respect. The task of finding a simple way of connecting laptop computers with mobile telephones remains a rather daunting challenge. The industry has not reached the level of maturity required for this type of sophistication. The state of the game today might more accurately be termed 'plug and pray'

than 'plug and play.'" The market calls for a continuous flow of new telephones. Is this demand being answered by Ericsson?

"That's true, and we have responded. Several companies have launched new generations of mo-



"We don't talk about the profitability of our business area, Mobile Phones and Terminals, but I can assure you that we are one of the most profitable companies in the telecom industry," says Johan Siberg, Senior Vice President, Mobile Phones and Terminals, in his comments concerning the stock market's reaction to Ericsson's six-month report. Photo: Carl Hjelte

bile telephones this year. The same companies did not introduce any new products last year, when Ericsson launched two new models. The next generation of our telephones will not be introduced until 1999. It should also be noted, however, that we recently introduced the GC 25 and DI 27 products for the mobile office, in addition to breaking new ground with the launch of our GSM modules."

Nokia has always been bigger than Ericsson in terms of mobile telephone sales. According to Johan Siberg, however, there is a very significant difference between the two companies.

"We are one of the world's leading telecom companies, a company that offers a very broad range of sophisticated systems and products, and a company that also manufactures and markets mobile telephones."

Ericsson plans to intensify its business partnerships with other companies in the infocom industry. Johan Siberg believes cooperation is a basic necessity in today's dynamic business world. The shortrange radio concept called Bluetooth is one example of Ericsson's cooperation with Nokia, as both companies strive to develop a broad and voluntary standard.

Johan Siberg also cites Ericsson's participation in Symbian as anoth-

er example of business cooperation across traditionally competitive lines. Symbian is an independent company established by Ericsson, Nokia, Psion Software and Motorola to develop a common operating system. The philosophy behind the new EPOC operating system is to establish an industry standard for mobile communications equipment of the future.

#### Brand name is important

Nurturing and developing Ericsson's brand name is another important task at hand. Although the Ericsson name is very strong in most parts of the world, there is ample scope for improvement.

"We have different strengths in different parts of the world. In Southeast Asia, for example, we are a strong brand name in our product categories. In Europe, we also have a relatively strong brand name. Progress in the U.S. has been a little slower because we were not involved in the analog era, but we are definitely headed in the right direction, having strengthened our brand name considerably during the past few years."

The Mobile Phones and Terminals business area has experienced tremendous growth in recent years. "In the past five years, we have increased volumes by a factor of 20, with sales increasing tenfold during the same period and our labor force multiplying by a factor of five." Naturally, this sort of dynamic growth has applied certain pressures on the organization. Some problems have been experienced in recruiting qualified personnel. On the strength of Ericsson's global presence and cooperation with Mobile Systems and other operations, however, the business area has been able to strengthen its organization with surprising speed in many countries.

Today, research and development activities are conducted in nine different centers in various parts of the world, supported by production facilities in eight locations and sales in more than 80 countries.

Although current development is characterized by a growing shift toward more datacom products, Ericsson will never become a data company. The most important element of future business operations will always be products that offer communications supported by the human voice.

"The voice will remain a key element since it increases the quality of communications between people. We shall never abandon voice communications, despite development trends toward more data-oriented products," concludes Johan Siberg.

## **Getting closer to customers**

The information that many Ericsson employees have been awaiting since Sven-Christer Nilsson became CEO was announced last week, as Ericsson's new organization was presented.

The focus of the new structure is on the customer and markets. Three business segments are being formed in which each segment focuses on a specific customer group. Ericsson is also moving closer to the market by relocating elements of corporate management to regional offices in four different areas of the world

Not unexpectedly, customers and the markets are the focus of the new organization. The division into business areas, with a product orientation is being abandoned. Instead, Ericsson's operations are being divided into three business segments focusing on the customer categories consumer, net operators and companies.

The core of the Consumer Products business segment will be today's mobile telephony operations.

The Network Operators business segment will comprise operations from wireless and fixed solutions for telecom and datacom. Most of the current Mobile Systems business area and part of today's Infocom operations will be transferred to this unit.

The third business segment, Enterprise Solutions, is focused on comprehensive solutions for business communication requirements

ERICSSON'S NEW CORPORATE MANAGEMENT

Sven-Christer Nilsson, 54

Jan Wäreby, 42

**Executive Vice President**,

Europe, Africa and the Middle East market area.

Former manager of the

Chief Executive Officer and President.

and will include operations from the current Infocom Systems and Mobile Systems business areas.

#### **Corporate offices worldwide**

Another important element in the efforts to establish a presence closer to the markets and customers is the establishment of four new corporate offices worldwide. The offices are being assigned responsibility for Ericsson's customers in various regions and will also ensure that Ericsson applies its resources in each region as effectively as possible. A corporate office for Europe, Africa and the Middle East will be established in the newly acquired property in central London. The other offices are being assigned responsibility for the North America, Latin America and Asia/Oceania regions. Each region will be managed by an Executive Vice President who is a member of the new Corporate Executive team. This group will also include the managers of the three new business segments. Corporate Executive team will also include the six persons who will be responsible for the six areas which replace today's ten corporate staff units: Human Resources and Organization, Finance, Marketing and Strategic Business Development, Technology, Supply and Information.

#### New names presented

Sven-Christer Nilsson selected many of the new faces in Corporate Executive team from the Mobile Systems business area.

"These persons are some of those involved in Mobile System's exceptional success in recent years. It is only natural that they are now being promoted to corporate management," explained Ericsson's Chief Executive in an interview published in the Swedish daily Dagens Nyheter. A number of unanswered ques-

tions regarding Ericsson's strategies will be answered after the management meeting in San Diego. Other will be answered in conjunction with the formation of the new Ericsson. The new strategies and the new organizations will be presented in a special insert, with coverage from the meeting in San Diego, in the forthcoming issue of Contact.

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

#### Igel to leave Ericsson

IN BRIEF

> Anders Igel, President of the Infocom Systems Business Area, has decided to leave Ericsson. His decision arrived the day before executive management announced the new organization.

"I have made up my mind. This is the right time to leave the company. Otherwise, I would have worked for Ericsson until my retirement," says Anders Igel.

Anders Igel has worked at Ericsson for 20 years in such positions as president of Ericsson UK and technical director at the business area level. He became President of the Infocom Systems in 1995, with the mission of boosting the business area's profitability.

Anders Igel has implemented powerful measures to reverse the negative trend in Infocom's four business units. Three of these have attained the targets set. Considerable progress has been made in work to turn Public Networks around, through measures including a 15,000 reduction in the total number of employees covered by the action programs.

#### Ericsson more popular in Norway

> A survey conducted by Aftenposten, a leading Norwegian newspaper, shows that Ericsson is gaining greater popularity in Norway as a major corporation. The public's overall impression of Ericsson advanced the company's rating to 40th position, compared with No. 50 last year and No. 72 in 1995.

Ericsson Norway advanced its positions in all categories, which include environmental awareness, social responsibility and ethics, finance and profitability, as well as advertising and information.

#### Jambala cutting costs

► Ericsson is introducing an open platform that will make it easier for operators to offer differentiated services and reduce costs. The platform is called Jambala, a new concept that enables operators to introduce new services more quickly and focus new services on niche sectors of the telecom market.

#### **New telephone** for two bands

► A new telephone from Ericsson, the -S 868 model, will reduce pressure on today's overcrowded GSM networks. It operates on both GSM 900 and GSM 1800 networks, selecting the network based on available capacity. The S 868 is also equipped with the EFR speech encoding system that renders voice and reception quality comparable to wired network quality.

The new S 868 also offers improved international roaming and reduces the risk of call interruptions.

"Market demand for telephones that operate on two frequency bands will increase sharply as we approach the new millennium. GSM operators are already experiencing problems caused by overcrowded networks, and they are looking for a new solution. Ericsson's S 868 will enable operators to solve their capacity problems," says Jan Ahrenbring, marketing manager of the Mobile Phones and Terminals business area.

### Favorable reactions to new organization

Media reactions to Ericsson's reorganization have been overwhelmingly favorable. The new structure's increased focus on customers and markets is seen as a natural step as the company strives to become more efficient and competitive

Anders Sundström, Sweden's Minister for Industry and Trade, describes the decision to establish new, regional corporate offices as a reinforcement of Ericsson's global market. Comments by most financial analysts characterize the new organization as a necessary move to

become "more international in terms of managers".

"It was as expected. The organization is somewhat similar to Lucent and Nortel so comparison might be easier," commented Swedbank analyst Jan Ihrfelt to the **Reuters News Service.** 

Carl Wilhelm Ros, 57.

**Remains as Senior Executive Vice** 

President and Chief Financial Officer

Haijo Pietersma, 45

operations are based.

"The changes in Ericsson's organization appear good, but it's difficult to say anything before seeing the whole picture," says Nordbanken analyst Mattias Wellander.

Financial Times analysts noted that Ericsson still needs to be more aggressive in terms of product sales. Ericsson's reorganization is summarized as a "velvet revolution" characterized by the wisdom of greater business concentration on customers, rather than products.



Bo Dimert, 55 **Executive Vice President, North America** market area/corporate office. Former Vice President, Enterprise Networks business unit and recently appointed President of Ericsson's subsidiary in the U.S.

New in the Corporate Executive Team

> The new Executive team includes

more key persons than Ericsson's

previous structure. When Sven-

Christer Nilsson was appointed

CEO of Ericsson, four persons com-

Bengt Forssberg, 61 **Executive Vice President**, Latin America market area. Former Vice President of Corporate Markets function.



**Network Operators business** segment. Former Vice President, Mobile Systems, GSM, NMT



### Mats Dahlin, 44 **Executive Vice President**,

# and TACS business units.



Executive Vice President, Enterprise Solutions business segment. Former President of Ericsson's local company

in the Netherlands, where parts of Enterprise Networks

Johan Siberg, 54

and Terminals.

**Executive Vice President**,

President, Mobile Phones

**Consumer Products business** 

segment. Former Senior Vice

**Executive Vice** President, Asia and Oceania market area. Former Executive Vice President of Mobile Systems business area.

> Lars Stålberg, 58 **Remains** as Senior Vice President, Corporate Relations.

Uddenfeldt, 48 Senior Vice President, **Corporate Technology** Former Vice President, Mobile Systems, Technology.

Organization. Systems business area.

Britt

Jan

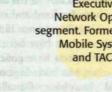
Resources and

Reigo, 55

Youth is also an obvious charac-

teristic of the new corporate management staff. Five of the eight new members are younger than 50.







ness Development. Former Vice President, Mobile Systems, Business Development.

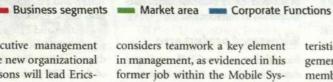
prised the executive management staff. Under the new organizational format, 14 persons will lead Ericsson. Sven-Christer Nilsson stated soon after his appointment that he

of new function,

Björn Boström, 51 Senior Vice President

Corporate Supply **Former Production** Manager of Mobile

tems business area.



Mia Widell Örnung

ERICSSON :

# Swedish local company gateway for customers

Ericsson is forming a new local company. This time it is not in some remote new market, but rather Sweden, which will be getting its own sales company. Ericsson Sverige AB will be the newest addition to the Ericsson family of companies.

4

By autumn, the organization will be in place and ready for launch at the new year.

"This isn't like starting up a new company in an untapped market. We will be off to a flying start here with a complete product line and over 400 employees from day one," says Ingemar Nilsson, president of the new company.

Today there are some thirty different Ericsson sales units active in the Swedish market. It is therefore easy to see the need to gather them into a single company. Much work still needs to be done. Future employees currently work at a dozen different places. The issue of centralization itself is important in order to maximize sales results. Business goals need to be worked out and strategies honed.

#### Many people affected

Many people will be affected by the new Swedish company. In the beginning, approximately 400 employees, but over the long term that number will be greater. Units which have been involved from the start include Ericsson Telecom Sweden, Mobile Systems units which collaborate with Telia and Europolitan, and the unit for the new operators at Public Networks. Units within Enterprise Networks and Mobile Telephones and Terminals will also be affected.

"Ericsson Sverige will be a comprehensive sales company in the Swedish market, but we will grow into the new organization successively."



Ingemar Nilsson

With more customers and increased regional cooperation in the Nordic region, it is a natural course of development for Ericsson to form a Swedish local company. The goal of presenting a unified image to customers in Sweden has been a distant one. Contact with Ericsson has not been simple for Ericsson's Swedish customers. Now, finally, that will change. Ericsson Sverige will be a natural gateway for customers. Ingemar Nilsson would like to see Ericsson Sverige get off to a flying start, taking advantage of the best of several

worlds. There is no doubt that several different Ericsson cultures exist among various Ericsson companies. Since this multicultural operation is working towards common goals, Ericsson will become even stronger in Sweden. Joséphine Edwall-Björklund, who will be the Communication manager for the new company, gives an example of the various business cultures that exist within Ericsson:

#### Internet World trade show

"In November of this year, the Internet World trade show will be held in Stockholm. For the first time, Ericsson will participate in this type of trade show in Sweden. The project group has participants from several different units, companies, business areas and so forth, and one quickly notices how many different business cultures there are just within the company."

"It is an exciting challenge to

bring these people together and form a unified Swedish company," she says.

The project group for the new company has been working since the beginning of summer. After a thorough study of the Swedish market and of Ericsson in Sweden, the group has now begun to establish goals and strategies.

The structure of the organization has been finalized and many of the most important posts in the organizational chart have been filled. The major aspects have gone according to plan, but both Ingemar Nilsson and Joséphine Edwall-Björklund emphasize that much remains to be done.

Everything under one roof. By the beginning of next year, 400 employees from various companies will be working at the new sales company Ericsson Sverige. As a result, Ericsson will become more visible to its customers in the Swedish market. Illustration: Syster Diesel

> "For example, we are now busy working out the details of the administrative system. Moving 400 employees over to a new payroll system and ensuring that e-mail addresses and so forth work properly from the start, has taken more time than any of us could have envisioned," says Joséphine Edwall-Björklund.

#### Patrik Lindén patrik.linden@lme.ericsson.se

Within the near future, the company's Web site will be up and running on the intranet.

http://ese.ericsson.se

### Focus on wireless communications at Intelcom 98

Intelcom 98, a new conference and exhibition focused on wireless communications, was held recently at Earls Court in London.

Ericsson was represented by guest speakers and an exhibition stand at which WCDMA and the GPRS special packaged data solution, as well as third- generation mobile systems, attracted considerable attention.

Compared with other large fairs

and exhibitions such as CeBIT in Hannover and PCS in the U.S., the new Intelcom exhibition and conference in London, which included exhibitions by more than 80 companies, was a relatively small event.

#### **Telecom industry**

Other major telecom companies at the show, in addition to Ericsson, included Lucent Technologies, Nortel, Alcatel, Siemens and Qualcomm.

"Intelcom is focused on telecom

industry representatives and highechelon decision-makers in the mobile communications sector, and visitors to the show were highly knowledgeable," says Töger Åström, who was responsible for the GSM, NMT and TACS business unit's participation at Intelcom 98.

#### Widespread product area

In addition to the GPRS packaged data solution and third-generation systems, Ericsson displayed a variety of mobile telephones, a product area that always attracts widespread interest at fairs and exhibitions.

#### Live demonstrations

The stand also included displays of products marketed by the D-AMPS/ AMPS and Fixed Radio Access business units. Ericsson's MXE messaging system and Ericsson Radio Messaging were also represented on the display stand. Live demonstrations of the GPRS packaged data solution provided a vivid presentation of high-speed data transmissions. "Visitors to our stand were impressed and showed considerable interest in our products," says Peter Goodman of Mobile Systems Solutions at Ericsson Ltd. in Burgess Hill.

"Demonstrating the GPRS solution first gave us a natural link to third-generation systems and an interactive presentation of Ericsson's hardware products," says Töger Åström. NEWS

# **Outsourcing plans cancelled**

Ericsson's property company will not divest its maintenance services operations.

This decision was taken by the company's management after a study showed that, in this case, outsourcing would be neither better nor cheaper.

"This decision felt definitely right. We were on the wrong track and we decided to change course. In the final analysis, we could not find any tangible advantage in having personnel migrate to our partners, and customers were reserved in their attitude to the outsourcing proposal," says Per Palmberg, president of Ericsson's property company.

Last spring, the management of Ericsson's property company



pany systematically ana-

lyzed which functions were essential, and invited external companies to submit tenders. At the same time, outsourcing was discussed with some 90 employees.

The aim was to increase the proportion of services purchased externally from the current 70 percent to 80 percent.

The study showed that providing better maintenance service at a lower

cost requires both a broad range of skills and specialization.

The companies that submitted tenders were to specialized, while the property company's own personnel proved they do possess the broader range of skills needed.

This insight, combined with customers' reserved attitude and the employee reaction, convinced management to rethink its position.

#### No good reason

"You must have contented personnel. When employees are unhappy, operations and customers are affected, this is particularly true for a company that is focused on service and that will eventually become more than a service company. Some of Ericsson's operations are doubtless suitable for outsourcing, but, after the study we realized that there was no good reason for it in this case," says Per Palmberg.

The focus on service will become even more apparent when the property company changes its name to Ericsson Real Estate and Services on October 20.

While the real estate company chose not to outsource maintenance services, the work of receiving and evaluating tenders was not in vain. It has given the company an excellent tool with which to assess its own performance, while at the same time improving its ability to assess its partners.

The decision to retain the sections of maintenance services operations that are currently conducted in-house does not imply that the real estate company is phasing out all of its ongoing study of possible ways to provide better, cheaper service. Changes will still be implemented.

#### Strengthen via training

The company must now strengthen its own organization via training, some new recruiting and personnel rotation among plants in the Greater Stockholm area.

Some personnel reduction may also be considered.

Per Palmberg believes that the work of continual change is important to build a stronger real estate company that can accompany Ericsson into the new millennium.

ERICSSON

Mia Widell Örnung

mia.widell@lme.ericsson.se

### Global campaign promotes future mobile systems

Ericsson recently launched the largest marketing campaign ever conducted by the company to support future mobile systems. A multimedia show featuring WCDMA and new developments in GSM and D-AMPS will be presented in Asia, Australia and New Zealand.

"Third Generation Global Symposium Wireless Next" is the name of a global tour that will present Ericsson's visions of future mobile systems to operators, analysts, media representatives and public authorities.

Facts about the evolution of technology are augmented by presentations of new business opportunities and customer opinions.

#### Strong support

"Operators in Asia have made considerable progress in introducing new services in their mobile networks. The objective of our multimedia tour is to demonstrate Ericsson's status as the world's leading development company in WCDMA, a standard with strong support in all parts of the world as the thirdgeneration mobile telephone system," says Åke Persson, marketing manager of the Mobile Systems business area.

#### Higher data speed

Broader bandwidths and higher data speeds are creating opportunities for completely new services in the mobile multimedia sector.

Within the next few years, realtime transmissions of large data files will be sent via mobile telephones, as demonstrated in Ericsson's threehour presentation, including video calls from private cars and vacation resorts.

"Operators will be able to choose between two options for new multimedia services: the WCDMA technology, which uses new frequencies on the 2-GHz band, or efficiency-enhancement through new developments of GSM and D-AMPS systems, which provide broadband services in the present frequency spectrum," says Åke Persson.

The global tour started in Sydney on September 24. It will continue

conditions in different countries. The tour group will be accompanied by a team of carpenters to build the various demonstration stages. Personnel from Ericsson's local companies scheduled to host the roadshow tour will also render some assistance. In addition to new developments in mobile telephone systems, the global tour also includes displays of concept telephones manufactured and marketed by the Mobile Phones

and Terminals business area.

Filip Lindell presented Ericsson's visions of future mobile telephone systems to customers and representatives

#### Nils Sundström nils.sundström@era.ericsson.se

http://www.ericsson.se/wcdma



With the latest developments in multimedia, Ericsson sheds new light on opportunities that will be created by future mobile telephone systems.



#### Less than three months left to EMU start

In less than three months, European Monetary Union, EMU, will begin, and it will have considerable repercussions for many Ericsson companies.

of the media in Sydney recently.

through 10 Asian countries before

its final stop in New Zealand in mid-

cused on our visions of wireless com-

munications, we also show real solu-

tions already available today, for ex-

ample the Bluetooth technology, GSM

on the Net and new applications that

will be available next year using the

GPRS packaged data technology,

which will accommodate data speeds

up to 115 kbps in GSM and D-AMPS

systems," says Marcel Zuberbühler,

A handful of people traveling with

the tour will make special multime-

dia presentations adapted to market

project manager of the global tour.

"In addition to presentations fo-

November.

Eleven countries will participate in EMU from the start.

Of the EU countries, Sweden and the UK will not participate. Denmark and Greece recently announced that they will be in from the start.

The Ericsson group will be affect-

ed by EMU, even though Sweden will not be joining initially. Many IT systems must be adapted and a number of current contracts must be reviewed. Ericsson's subsidiary in the Netherlands has served as a pilot in EMU adaptation.

That company's experience shows that it is highly advantageous to have the SAP R/3 administrative system installed before adapting the company to the common euro currency. Several Ericsson companies have researched whether customers prefer to deal in euros right from January 1. At the same time, many are demanding that suppliers invoice them in euros as of January.

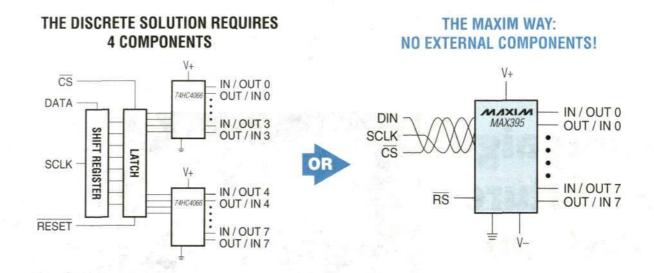
At several Ericsson companies, beginning in January, salary statements will be expressed in both the local currency and in euros.

http://inside.ericsson.se/ emu/index.htm



# WORLD'S FIRST 3V SERIALLY CONTROLLED SWITCH & MUXES

#### Guaranteed 500 $\Omega$ On-Resistance with Single +3V Supply



Maxim's new family of serially controlled ICs features three unique configurations that eliminate components and simplify design layouts. The MAX349 is an eight-channel to one multiplexer (mux), the MAX350 is a dual fourchannel to one mux, and the MAX395 is an octal single-pole/single-throw (SPST) switch. Each array has independent control for each input and output. These new devices are all compatible with SPI<sup>TM</sup>/QSPI<sup>TM</sup> and Microwire<sup>TM</sup>. They feature 100 $\Omega$  on-resistance (RON) and 5 $\Omega$  channel-to-channel RON matching with ±5V supplies. The devices conduct equally well in either direction and operate from a single supply of +2.7V to +16V or dual supplies of ±2.7V to ±8V. All are available in plastic DIP, wide SOIC, QSOP, and SSOP packages screened over commercial and extended temperature ranges.

PART	FUNCTION	PIN COUNT	CLOCK FREQUENCY (MHz max)	Ron (Ω max)	Ron MATCH (Ω max)	OFF LEAKAGE (pA max)	PRICE* (\$)
MAX349	8 to 1	18	2.1	100	5	100	2.22
MAX350	Dual 4 to 1	18	2.1	100	5	100	2.22
MAX395	Octal SPST	24	2.1	100	5	100	2.22

\*1000-up suggested resale, FOB USA.



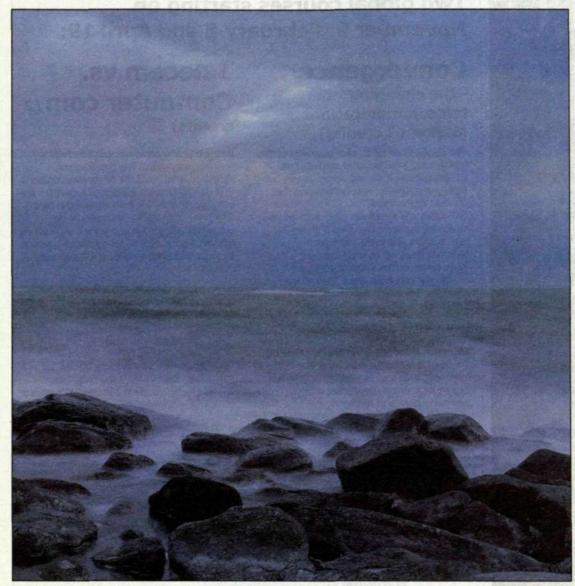
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#### WORLD WATCH

COLUMN



Installation of a new submarine telecom cable between Europe and the U.S. is now underway. Telia of Sweden is a major force in the transatlantic project. Photo: Lennart Hysén/Pressens Bild

### New telecom cable to U.S.

Fifty telecom companies in Europe and the U.S. are joining forces to invest in a new transatlantic submarine cable.

The new cable system, called TAT-14, will multiply the present telecom traffic capacity between Europe and the U.S. It will be placed in commercial operation toward year-end 2000.

TAT-14 consists of a cable ring between Europe and the U.S. covering a total distance of 15,000 kilometers. Costs for the new system are estimated at about SEK 12 billion. The cable ring will be equipped with four pairs of fiber-optical lines able to transmit 160 Gbit/s each, providing a total capacity of 640 Gbit/s.

Based on projected capacity, the cable will be able to transmit 7.7 million telephone calls simultaneously. The original TAT system's capacity was 10 Gbit/s. Telia of Sweden has been a major force behind TAT-14, and the Swedish operator will be one of the largest owners of the new system. Telia will also have its own cable station on the west coast of Jutland in Denmark, with a direct link to its Danish transmission network. AT&T, Sprint, France Telecom, Deutsche Telekom and KPN of the Netherlands will also establish their own cable stations.

# Lucent is ready to make acquisitions

**Bobby Chang** 

n the past two years, Lucent Technologies has acquired more than one dozen companies. In all these acquisitions, Lucent paid cash through the issue of shares and must subtract from its future earnings the premium of the purchase price over the book value of the acquired companies, with amortization over a 20-year period. This earnings penalty will be lifted on October 1 this year and Lucent is then free to use the 'pooling of interests' method to buy more companies.

Let's take a brief look at what Lucent can do that they couldn't do before October 1, and what impact this change may have. Essentially, the pooling of interests assumes that all of the acquired company's shares are acquired in exchange for the parent company's common shares. Now the acquired company's shareholders are shareholders of the parent company and a mutual pooling of interests has taken place.

Why can't Lucent take advantage of this low-tax acquisition method before October 1? When Lucent was spun off from AT&T in September 1996, the deal was tax-free for its shareholders in order to gain approval for the spin-off. Under U.S. accounting laws, this prevented Lucent from using pooling of interests to make deals for two years. If Lucent had pooled before October 1, 1998, it would have risked losing its tax-free status.

This crippling situation no longer applies after October 1. Once restrictions are lifted, Lucent will be encouraged to make larger acquisitions. Its share price has soared to about six times its initial value in 1996. With a market capitalization of over USD 120 billion (August 1998 value), Lucent can acquire companies by swapping shares at market price. The company plans to spend some USD 30 billion on mergers and acquisitions. Lucent's most immediate need is data networking, with companies such as Ascend, 3Com and Newbridge as possible targets in terms of IP routing and ATM technologies and products. The second priority is the global marketplace. The telecom equipment business units at Nokia, Alcatel or Siemens would give Lucent access to markets outside North America.

Lucent has been searching for major acquisition prospects for two years. We expect that they will announce several mergers and acquisitions after October 1. These will enhance the scale of and expertise behind Lucent's product portfolio in order to compete head-to-head with Cisco, Nortel and others.

Bobby Chang works for Ericsson's Business Intelligence unit, where he keeps an eye on developments in the North American market.

Find out more about Ericsson Business Intelligence Network, EBIN, on the BIC (Business Information Center) web site.

http://bic.ericsson.se

### Siemens taking sexier approach

Siemens, the German telecom company, is investing tens of millions of deutschmarks in an advertising campaign to introduce its new SL 10 digital mobile telephone, according to The Wall Street Journal.

"Siemens wants to project a new and sexier market image. Surveys conducted by the German company have shown that consumers choose their mobile telephones based on esthetics and brand image, rather than technical merit," says Henrik Geissler, marketing manager of the Siemens business unit working with terminals for private communications.

"Be inspired" is the theme of the campaign, in which such celebrities as noted violinist Vanessa Mae and French fashion designer Jean-Paul Gaultier feature prominently.

The first SL 10 model from Siemens, a black telephone with a full-color display, will be available in a low-cost version. A more expensive model will be aimed at more affluent customers, and a special business model will also be available.

Siemens hopes the campaign will strengthen its position in Europe, where the German company has low market shares for mobile telephones.



Twelve satellites went down in flames

➤ The management staff of Globalstar bet heavily on a single card when it launched 12 of its planned 48 communication satellites with one rocket. The company's unusual gamble ended in a fiasco, when the rocket turned back toward Earth and crashed.

Following an announcement of the disaster, Globalstar's stock prices began to plummet as fast as the rocket that carried its satellites.

#### Nortel serves notice to 3,500 employees

Following its recent acquisition of Bay Networks, Nortel of Canada has announced plans to reduce the labor forces of both companies, eliminating a total of 3,500 jobs.

The company is also assuming a new profile as it streamlines operations toward a more Internet-oriented company. Nortel has about 80,000 employees in all parts of the world.

#### Tellabs withdraws bid to acquire Ciena

➤ It all started when AT&T terminated its contract with Ciena. The news triggered a free fall in Ciena's share price on Wall Street, which prompted Tellabs to renegotiate the terms of its offer to acquire Ciena. The next setback came when Pirelli beat out Ciena to win a prestigious order from Digital Teleport, a European telecom operator. Analysts and investors started to doubt that Ciena and Tellabs would reach an agreement.

The rash of speculation culminated on September 15, when Ciena and Tellabs announced there would be no merger. Ciena's stock price fell from USD 90 in July to slightly more than USD 13 the day before Tellabs announced it was withdrawing its bid to acquire the company.

#### Cisco increasing focus on wireless

➤ Cisco seems to have a lot of money these days. The company recently announced plans to acquire all shares outstanding in Clarity Wireless Corp.

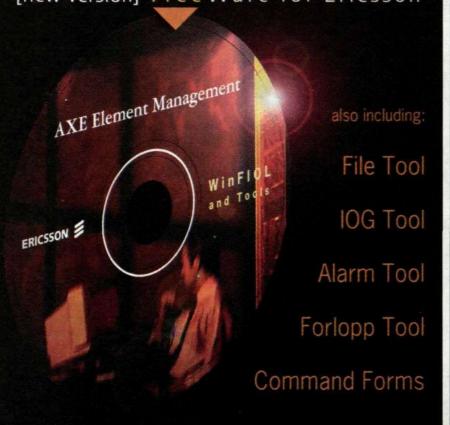
The acquisition carries a price tag of USD 157 million in Cisco shares. At the same time, Cisco announced plans to increase its labor force in Asia by 20 percent during the next 12-15 months.

#### News of Alcatel overshadowed

➤ Alcatel has entered a cooperation agreement with Ascend of the U.S. to develop new network products designed to meet increased demand for high-speed Internet communications. The news was completely overshadowed by warnings of lower earnings by Alcatel in the interim report released on September 17.

Following the report, the price of Alcatel shares immediately started to fall on stock markets around the world.

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#### Ericsson Utvecklings AB



#### Two global courses starting on November 9, February 8 and April 19:

#### Convergence - the changing telecommunications market (3 credits)

The course is an up-to-date overview of the rapidly changing telecoms market. Two trends, convergence and deregulation, are rapidly and simultaneously changing the game in the industry. Old structures are challenged, such as infrastructure, services, the roles and relationships within the markets. New players have entered the field.

Because telecommunications is also an enabler for other business, the changes affect the whole society.

A course by Professor Björn Pehrson. Duration: 6 weeks. Fee: 12.800 kr.

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In the ongoing convergence of technology, services, and industries, the different industrial cultures of the telecommunications and computer communications industries are colliding. In the new marketplace the best strategies from both worlds should be combined. We study central themes, such as quality of service, time to market, acquisition strategy and Silicon Valley entrepreneurial culture.

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ATTACT OF

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# wonders

The biggest threat towards a successful reorganization is that all communication becomes one-way communication. One-way communication does not engage people's attention and people who do not feel participatory show resistance to change," says Johan Ljungqvist, who oversees internal communication at the company's Corporate Relations unit. Illustration: Syster Diesel

# Dialog will form the new Ericsson

bla, bla, bla, bla,

A new Ericsson is in the works. The Ericsson Management Forum in San Diego, at which Sven-Christer Nilsson will present the new organization, is fast approaching. But in order to effect change, it is necessary that all employees feel empowered and that they are moving in the same direction. This presupposes good internal communication – that the company's employees understand and talk with each other.

"The biggest threat to a successful reorganization is that all communication becomes oneway communication. One-way communication does not engage people's attention and people who do not feel participatory show resistance to change," says Johan Ljungqvist, who oversees internal communication at the company's Corporate Relations unit.

Johan Ljungqvist is now making plans for one of the biggest internal communication efforts in many years at Ericsson. Its aim is to establish channels of information and to see that as much and as detailed information as possible is distributed. Managers play a key roll when it comes to spreading information and messages. They must be accessible and seek to establish dialog, even if all the answers are not available from the start.

#### Always some fear of change

"There is always a certain fear of change. People think: what will my place be in the new organization? Will I still have my job? These are questions that we shouldn't ignore. It is often enough to make room for questions, easing the pressure. One need not have all of the answers at once," he says. "In addition, one can often defuse rumors by talking about them."

"But we cannot just rely on communication through managers. Many managers are also affected by changes, which means that they will not always function as good communicators. It is therefore important that information channels exist which reach a broad audience within the organization.

Contact and the Internet are two of the channels used to reach

as broad an audience as possible with the most important messages. Contact will be publishing a special supplement and provide continuous reports. A web site has already been established and will be filled with information following the Management Forum in October. It can be found at: http://inside.ericsson.se/now.

"By spreading information as broadly as possible, we are also creating demand from below. Employees begin to ask questions, voice their opinions and suggestions, which the managers can then note and pass on to their managers. It can also be of use elsewhere within the organization."

It is also important to lend support to all communicators within the organization. The company's Corporate Relations unit is developing a number of communication aids to assist both communicators and managers, such as presentation materials that describe the new organization, and Ericsson's situation and strategies. Communicators should also realize it is appropriate to give reminders to a manager if needed and to create a communications plan.

11/

Recently, the company's Corporate Relations unit sent out a letter to all Communication managers and company managers, urging them to begin planning now. It is important that all people in different management groups understand their role as communicators. Personal contact with employees and the visibility of managers within the organization are important. Small group meetings are also more effective than large ones, when it comes to involving people.

"To get people to make changes, you need to get them to participate. It isn't possible to just say, 'This is the new way. Go to work in this square of the organizational chart."

#### Small meetings

"Even if large-scale meetings are held, one must be aware that such meetings involve oneway communication. It is in small meetings that people feel they can provide insights, it is there that dialog appears. Dialog leads to involvement and participation."

Given all the expectations that have been built up prior to the forum in October, there is a risk, according to Johan, that those who believe all of the answers will be provided, following the Management Forum, will probably be disappointed.

"That is when the process begins. It will take a long time before all of the new ideas are im-

#### HOW TO STAY INFORMED

- Monday, October 12
- Information on the Intranet http://inside.ericsson.se/now
- Contact will be publishing a special supplement with reports direct from the Management Forum in San Diego. The special supplement will also be included in Inside Ericsson.
- Presentation materials exist, detailing Ericsson's new organization, strategies and the market.
- A overhead package is available for use by managers during presentations, for example.
- Meetings will be held. Ask your manager or communicator.

plemented. In the meantime, the outside world continues to evolve and we must continue to do our job.

Communication and dialog will be the most important tools needed to create the new Ericsson.

"For me, internal communication is one way to improve the company's profits. I believe that there are very strong ties between our employees' loyalty to the company and our customers' loyalty. That is why internal communication is more about building relationships than it is, for example, about putting information on the Internet or printing it in internal newspapers," says Johan Ljungqvist.

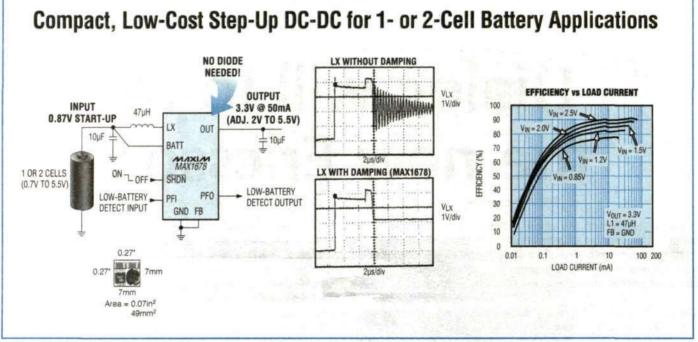


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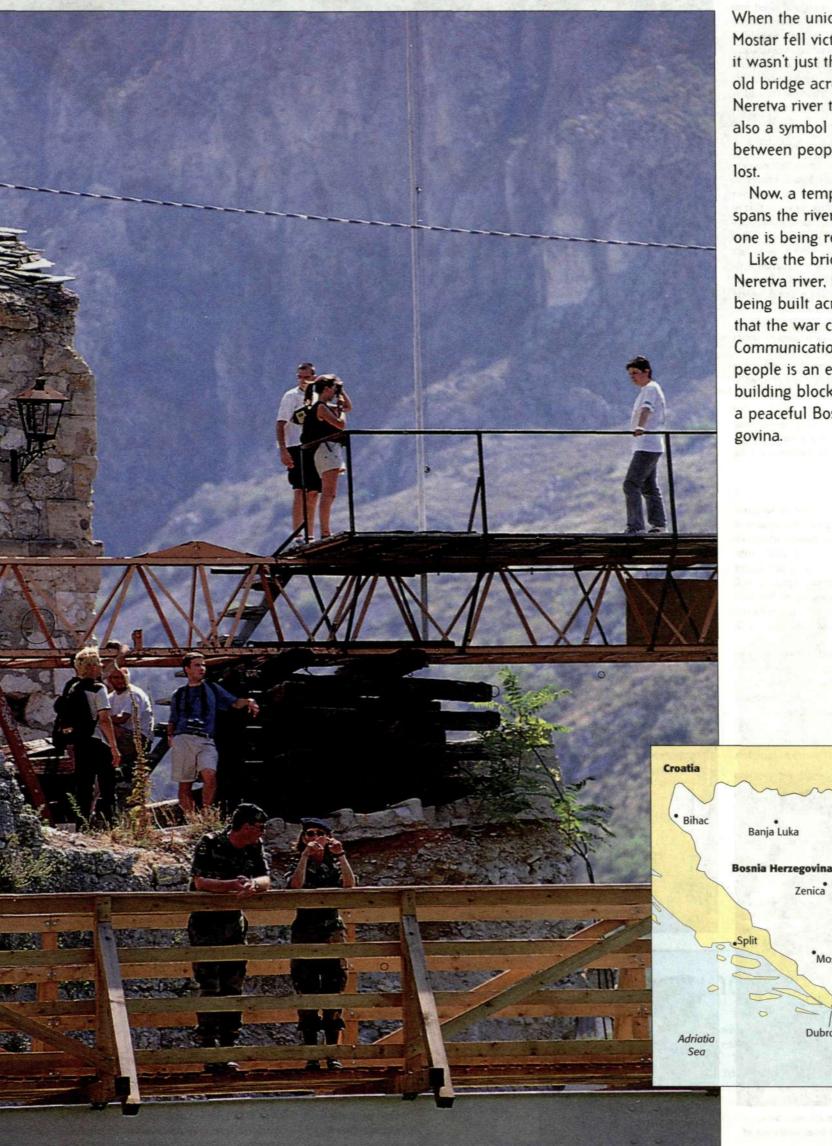


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# Building new bridges in divided Bosnia



When the unique arch in Mostar fell victim to the war it wasn't just the 427 year old bridge across the Neretva river that fell. It was also a symbol of the contact between people that was lost.

Now, a temporary bridge spans the river while the old one is being reconstructed.

Like the bridge across the Neretva river, bridges are being built across divides that the war created. Communication among people is an essential building block for restoring a peaceful Bosnia Herzegovina.

Brcko

7eni

Mosta

Dubrovnik

Tuzla •

Sarajevo

Montenegro

Serbia

CONTACT No. 14 1998

# Communication reunites a shattered country

he demand for telecommunications in Bosnia-Herzegovina is tremendous. This war-ravaged country is in the process of rebuilding both its fixed and mobile telecom systems.

Ericsson is one of the major suppliers to Bosnia. The country itself is divided into two entities, the Muslim-Croatian Federation and the Serb-dominated Republica Srpska. Ericsson is operating in both areas.

There are a total of three telecom operators, one in Republica Srpska, one in the Muslim-dominated portions of the Federation and one in the Croat-dominated areas.

#### **Communication across borders**

An international exchange and a transit exchange were recently put into operation in Banja Luka, the main city in Republica Srpska. The transit exchange is the first of six that Ericsson will deliver to the Republica Srpska operator. The exchange makes it possible for people in Serb areas to talk with people in the Muslim-Croatian Federation. Swedish international aid organization, SIDA, is one of the major financers of the project.

Ericsson began constructing a GSM network in the Muslim-dominated portions of the Federation at the end of 1996.

That, together with an AXE station in central Sarajevo, has greatly contributed to Sarajevo's communications infrastructure. SIDA, which financed the project, also funded a radio link between Bosnia and Hungary, relieving Bosnia from its dependence on Croatia for its contacts with the outside world.

#### **Doubling capacity**

The operator, headquartered in Sarajevo, has now more than doubled the capacity of its network. Today, the mobile telephone network is at full capacity with 20,000 subscribers and the operator cannot accept more customers. Ericsson's expansion will make room for an additional 30,000 subscribers. The order is part of a larger framework agreement from this summer worth DEM 107 million.

There is currently no GSM network operating in Republica Srpska. Soon, however, the telecom operator there will be deciding on a supplier for GSM equipment and Ericsson will be submitting a bid.

> Text: Mia Widell Örnung Photo: Lars Åström/Världsbilden



In Sniper's Alley, there are not man surfaces which do not bear evidence of fierce fighting.



voted for candidates that will safeguard their own best interests.

Demand for mobile telephones is great. Currently, 20,000 people have mobile hones in the network in the epublica Srpska

Bosnia Herzegovina is the land that doesn't forget. Yet despite this, reconstruction has begun. Elections held on September 12-13 show that

much work lies ahead in efforts to unite the three ethnic groups. Nationalistic sentiment has increased and Serbs, Croats and Muslims all



Muslim-dominated areas, and there is also a mobile Croat-dominated areas. So far, **GSM** network in

Haris of Ericsson, by the destroyed Romer bridge which once spanned the eretva river in



Office manager Srecko Mataic and sales manager Franc Stenek at Ericsson's office in Mostar. The Mostar office works primarily in the Croatian-dominated areas of the Muslim-Croatian Federation.



In the middle of the war-ravaged country, there are signs that reconstruction has

begun, A GSM base station and MINI-LINK

are pictured next to a cemetery in Sarajevo.



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Youths play basketball where snipers once hid. Life has been normalized, but remnants of the war remain. The remnants are many in Sniper's Alley; nothing is whole. The whole community must be completely rebuilt.



The telecom operator in the Muslim-dominated areas of the Muslim-Croatian Federation is in the process of installing new antennas for a GSM



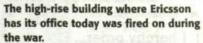


Adnan Halimic, sales manager at Ericsson in Sarajevo, talks with Amer Fazilic, of the telephone operator Public Telecom of Bosnia and Herzegovina in Sarajevo The operator, which is responsible for the Muslim-dominated areas of the Muslim- Croatian Federation, has recently placed an order worth **DEM 7.3 million to** Ericsson.

The last train to Sarajevo. being built up to reach all areas of the country



13



### New law yields common ground for telecom

A new, mutual telecommunications law has been proposed to take effect in Bosnia-Herzegovina by year-end.

The law will create a clear and mutual system of rules for developing telecommunications in all areas of the country.

The Council of Ministers has approved the proposal and is now waiting for parliament to approve the law. In anticipation of this, all three telecom operators have been approved in advance as operators.

Telecom operators in the country have clearly defined geographic areas. One headquartered in Sarajevo is responsible for the Muslimdominated portion of the Federation, another operator is responsible for the Croatian-dominated areas of the Federation, and a third is responsible for the Serb-dominated entity, Republica Srpska.

The law will help create a common authority which will have oversight responsibility and ensure that the new law is enforced.

The law was developed by the International Telecommunications Union, ITU, in conjunction with the European development bank, EBBD, and the various parties in Bosnia-Herzegovina.

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



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Ericsson has a range of products that covers all data and Internet communication needs. Users can now adapt their method of communication to where they find themselves, and to the resources available. All our products are of high quality, featuring state-ofthe-art technology.



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K56 CC/128 CC Ericsson K56 CC/128 CC is a combined data/fax modem and ISDN Terminal Adapter for portable computers. With the Ericsson K56 CC/128 CC you can easily switch between ISDN communication and the standard telephone network. The K56 CC/128 CC communicates via ISDN at a speed of up to 128 Kbps, and on ordinary telephone lines at a speed of up to 56 Kbps, V.90 standard. Special price SEK 2,495.

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# Repeaters an inexpensive and fast solution for Irish operator Eircell

Irish mobile telecom operator Eircell needed a way to rapidly improve coverage of certain portions of its GSM network in a cost-efficient manner. Ericsson proposed using repeaters, a solution which worked very well in this case.

The repeater project is a good example of the close cooperation that Ericsson in Ireland has with Eircell in helping the operator run its mobile telephone system in the most effective way.

Today, Eircell has 250,000 subscribers to its GSM system, which covers approximately 95 percent of Ireland. Improvements of coverage and capacity are continually ongoing.

Previously, there have been some problems with indoor coverage in places such as hotels and shopping centers, as well as along certain stretches of major highways. There was one heavily trafficked stretch of road in particular that subscribers complained about.

"Ericsson suggested that we use repeaters and they put together a demonstration for us here in Dublin. We thought it was an interesting idea and now that installation has been completed, we know that it was a very good and cost-effective solution, which also proved quick to install," says John Kavanagh, manager of Radio Networks at Eircell.

"Since the repeater is small and discreet, it is easy to situate, and no transmission equipment is required," adds Tom Lynam, manager of field installations at Eircell.

In order to blend in with the environment, the repeaters have been painted green and mounted on poles that look like power poles. In some places, the antennas have been made to look like TV antennas.

#### No transmitters needed

Unlike base stations, no transmitters are required in order to set up repeaters. This is an advantage since it often takes a very long time to secure permission for transmission links.

A large number of frequency-modifying repeaters were used on the stretch of motorway where coverage has now been improved.

"The repeaters are of a new type which is designed to provide coverage relatively far away from the base station, for example out in rural areas and along roads," explains Anna Guldstrand, who is responsible for European sales at Ericsson Radio Access, the company which sells the product.

In addition to being used along highways, repeaters have also been used to improve coverage inside certain hotels and shopping centers. Eircell utilizes frequency hopping within city centers so those installations have repeaters with extra channel modules.

"We have a program to improve coverage in places such as shopping centers and multistory car parks," says John Kavanagh.



Eircell, the Irish mobile operator, has 250,000 subscribers in its GSM network, which covers 95 percent of the country. Work is constantly Photo: Pressens Bild underway to improve both coverage and capacity.

The Tour de France, the major cycling race held every summer, began in Dublin this year.

In order to ensure mobile telephone coverage up in the mountains where the cyclists would pass, Eircell utilized a mobile repeater.

It consists of a trailer with a retractable antenna mast mounted on it, as well as the actual repeater unit and a battery pack consisting of ordinary car batteries able to provide 12 hours of operation.

**Cooperation between** Ericsson Radio Access, LM Ericsson Ltd in Ireland and the Irish operator Eircell quickly resulted in better coverage in certain areas of the GSM network. Seated are Anna Guldstrand of **Ericsson Radio Access** and Terry Walsh of LM Ericsson Ltd in Dublin. Standing are Tom Lynam and John Kavanagh of Eircell. Photo: Gunilla Tamm

"It is an outstanding way to quickly and easily provide temporary mobile telephone coverage in an area that normally does not require coverage," explains Terry Walsh, customer service manager at LM Ericsson Ltd in Dublin.

There are many events held in rural parts of Ireland where the mobile repeater unit can be used; one example is the world ploughing championships.

#### Monitoring is necessary

In order for the repeater to operate properly with the network, effective monitoring and control is necessary. Ericsson Radio Access has developed a repeater Operation and Maintenance Center (OMC) with Eircell as its first customer.

Contact's reporter visited Eircell on the day that a monthly meeting was being held regarding joint technical improvement projects between Eircell and Ericsson in Ireland. One of these involves the use of repeaters, another transmissions and yet another the TACS analog mobile telephone system.

"Cooperation on the projects is going well, and we are able to both provide and receive information," says Clive Edgington, project manager at Ericsson in Dublin.

> Gunilla Tamm gunilla.tamm@era.ericsson.se

By using these repeaters instead of radio base stations, no transmitter is needed. Repeaters provide a quick and relatively inexpensive alternative for improving coverage in certain areas, such as on motorways or in shopping centers.

#### BETTER COVERAGE

A repeater is used to improve mobile telephone coverage both indoors and outdoors.

The repeater amplifies the signals from the base station or mobile phone and sends them to the coverage area or back to the base station.

There are three basic types of repeaters: ordinary RF repeaters, frequency offset repeaters and fiberoptic repeaters.

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IJ

# Market value reflects only half the truth

The assets and earnings that companies present in their annual reports do not reflect their true value.

The market value, or market capitalization for publicly listed companies, is often much different from book value. The difference is generally regarded as the company's intellectual capital, which includes the skills and expertise of its employees, faithful customers, functional work methods and the organization's adaptability to change.

Intellectual capital is a hidden asset not reflected in the annual report.

"If companies calculated their intellectual capital as carefully as their financial assets, it would be much easier to make the right decisions."

That is the opinion of Krister Gavelius and Tomas Persson of Ericsson Data, who have taken part in the development of concepts and IT support that will facilitate calculations of intellectual capital.

Skandia, a leading Swedish insurance company, has made more progress than any other company in developing and understanding the concept of intellectual capital.

Skandia's Leif Edvinsson, a major force behind development of the concept, was presented with the prestigious "Brain of the Year" award recently by Braintrust of London.

#### Influenced by Skandia

Influenced by Skandia's methods, Ericsson Data was quick to recognize the need to bring forth and control the invisible assets that comprise a driving force in the compa-

"Financial indicators such as sales, earnings and other tangible values reflect the strength or weakness of a company's performance. Indicators for its intellectual capital provide a better picture of our current position and future potential."

"It's important, therefore, to develop a complete and accurate understanding and interpretation of these values to support long- and short-term decisions," says Krister Gavelius.

Aided by the Cockpit Communicator, an IT-support program, the control of Ericsson's intellectual capital will become more sophisticated and provide greater assistance for all decision-makers in the company.

"Ericsson Data started looking at methods and concepts that would help us control our intellectual capital as early as 1996," explains Tomas Persson, who completed his university degree working for Ericsson Data, where he conducted graduate studies focused on intellectual capital.

#### **Based on American method**

The methods applied in Ericsson Data's control philosophy are based on Skandia's work with intellectual capital and an American method called Balanced Scorecard.

The emergence of these methods in the 1990s has been supported by a trend characterized by continued growth in the number of service and knowledge-based companies in the private sector. As a result, the control indicators of traditional financial reporting have been rendered inadequate.

The challenge now is to find suitable control values for intellectual capital. It's a time-consuming process that must be adapted to the individual needs of every operational unit.

> Patrik Lindén patrik.linden@lme.ericsson.se

> > Organizational

capital

http://cockpit.ericsson.se/

Processes (work methods)

Photo: Patrik Lindén

### Intellectual capital – understanding intangibles

Structural

capital

A company's value includes more than financial statistics and figures presented in the annual report.

This is readily accepted and widely understood.

D

Efforts to define and dissect these values are a little more complicated, howev-

The reasoning behind intellectual capital, which is based on six different sections, or lev-





17

adaptability to change and its innovative

wealth, which may be calculated as the number

Based on the company's vision, strategic ob-

They include employees, innovative capaci-

ty, customers, processes and financial perspec-

jectives are established for the various perspec-

els, offers a means of greater understanding. Market value, or the market's valuation of shares in a publicly listed company, is defined as the company's financial capital, which includes reported assets, and intellectual capital, defined as invisible - or intangible - assets.

#### Human and structural capital

Intellectual capital is divided between human and structural capital, or resources. The human capital consists of a company's employees, the men and women who go home after work every day. Structural capital includes all other assets owned by the company.

Structural capital, in turn, is divided into two subsections: customer capital and organizational capital.

Customer capital is defined as the value of

the company's customer base and its potential customers. A well-established company, for example, has more customer capital than a new company. Organizational capital is divided in-

to processes and regenerative powers. Processes are defined as a company's work methods, infrastructure and culture.

A company's intellectual capital carries the same

Intellectual

capital

importance with regard to market value as the

reported financial results. It is much more

difficult to define, however. Supported by

a model developed by Skandia,

Ericsson is now trying to

illuminate and control its

invisible assets.

Regenerative powers include a company's

#### Attempts to gauge results

of registered patents, for example.

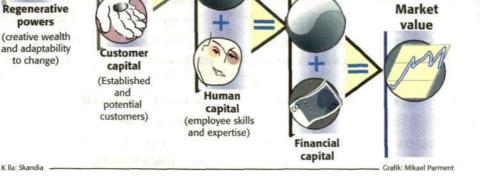
tives of its intellectual capital.

Efforts are then concentrated on finding methods that will accurately reflect a company's progress toward the achievement of its established goals, including measures that can be implemented to support the success of such efforts.

"It's essential to understand the interplay and flow between the different levels: human capital, structural capital, innovative powers, process capital and customer capital."

"The interplay between human and structural capital is a key element in creating the future value," conclude Tomas Persson and Krister Gavelius in agreement.

Patrik Lindén



#### Проверка, проверка. Есть ли кто-либо там?

[Testing, testing. Is there anyone out there?]



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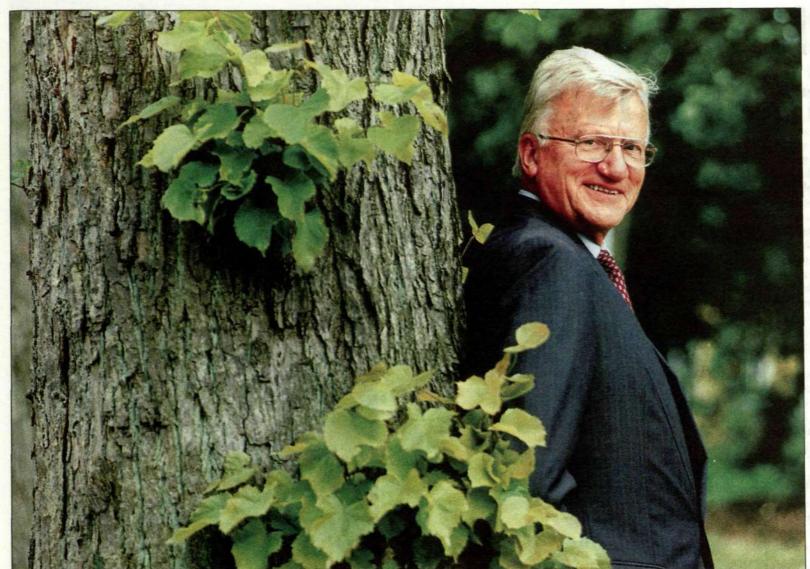
CLARA

[ Hi Boris. This is Bill. I hope you're not testing anything but the line. ]

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A ROYAL ORDER The Royal Order of the North Polar Star was established in 1748.

Until 1975, the order was awarded to people who distinguished themselves in the sciences, government, society and the arts. The order has been awarded to women since 1952. As of 1975, the order is awarded exclusively to foreign citizens in recognition and gratitude for their contributions to Sweden. The order carries four ranks, led by two orders of Commander and two orders of Knight.

"I enjoy working for Ericsson," says Knut Trovaag. "I'm also a family man, however, and my wife has always supported me in all my endeavors."

Photo: Marie Ullnert/ Kamerareportage

# "Without an interest in people, you can't manage a company"

An admirer of Ibsen who loves to hike and ski cross-country in the Norwegian mountains. Can you imagine a more Norwegian person? The man is Knut Trovaag, Chairman of Norwegian subsidiary Ericsson Radar A/S and recently named a commander of the Royal Order of the Polar Star, for supporting industrial cooperation between Sweden and Norway.

Knut Trovaag's interest in Sweden was aroused when he was a small boy in Oslo, during World War II. His entire family, especially his father, was active in the Norwegian resistance movement. Knut Trovaag remembers radio transmitters and weapons hidden in the walls of his home. Family members opened and closed windows to signal neighbors if the Germans were expected to conduct raids in the area. As a boy, he delivered resistance newsletters hidden in socks. His family tried to escape to Sweden, but they were stopped and his father was arrested for the second time.

"We lived those years in fear and angst. Friends of my family had fled to Sweden, and I used to receive mail from a country where

there was food on the table, ountry where people could walk safely on the streets. For me, Sweden became a land of dreams.'

When peace finally came to Norway and Knut Trovaag's family was re-

united, they went to Funäsdalen on vacation. "That was the first time I saw a Swedish smorgasbord. I thought I had arrived in heaven."

Knut Trovaag received his engineering degree in Hannover. He has furthered his education in the U.S. and worked in Sweden for a total of 13 years.

"I enjoy Sweden, but I always spend my vacations in the mountains of Norway. The weather is of minor importance. Jotunheimen is Jotunheimen, rain or shine. The mountains

provide serenity and a chance to think about life. I arrive at my best decisions in an aura of silence and beauty. Cross-country skiing through miles of wooded forest areas charges my batteries, both physically and mentally."

#### Studied in Germany

"My choice of Germany as the country for my studies was due mainly to a friend who was there and the high standards of German education. I was also able to learn another language as a sort of bonus. Despite my past experiences during the years of German occupation in my home country, I was smart enough to realize that Germans are human beings."

"Working hard and playing hard is part of the Norwegian character.

chewing gum and bananas; Working hard and Some of my fellow stuplaying hard is part constantly and never of the Norwegian character

dents in Germany partied studied. Others studied around the clock, never taking the time to relax and have a good time. The Norwegian method

yielded the best results for me," says Knut Trovaag. There is a twinkle in his eyes as he remem-

bers the student carnival days of his youth.

"I like to dress up, and I'm not afraid to show my true self or make a mistake. I love to play with my grandchildren today. We can all learn a great deal from children, how they react to various things and their ability to find pleasure in the simple aspects of life."

A brief review of Knut Trovaag's résumé

confirms his history of hard work. His job assignments have been demanding. The list of Boards of Directors on which he has served is truly impressive, including a long line of chairmanships in private companies, committees and research councils.

In the mid-1980s, he was appointed president of Ericsson Radar A/S, an Ericsson subsidiary in Norway. He resigned from the position 10 years later when he was named Chairman of the company's Board of Directors.

'There were only three or four of us when we started to develop the company. Although we often worked around the clock, the job provided a strong sense of enjoyment and satisfaction. Today, the company has about 100 employees. Cooperation within Ericsson Radar A/S and with

the parent company in Sweden has been extremely favorable through the years."

#### Philosophy and psychology

Knut Trovaag devotes some of his leisure time to studying philosophy and psychology.

"Without an interest in people, you can't manage a company. Psychology and philosophy teach us a great deal about the opportunities available to men and women, how we can stimulate individuals and groups of people to produce their best results. There is more to life than material assets. Certain values are also attached to human relations. We can all be rejuvenated and replenished by each other. People who are happy and content also tend to do their best."

Contact asked Knut Trovaag to describe the cultural differences between Sweden and Nor-

"Norway has a good leadership culture that attaches strong values to human behavior, how

people work under certain conditions. Swedes are more systematic, more organizational. Norwegians show greater individuality, a greater propensity to have fun and a more playful nature, which can be misunderstood at times. Sweden's ability to develop a major industrialized nation, a highly competitive force

"Norwegians are more like Ibsen's character, Peer Gynt; we're not very methodical. We need

I'm not afraid to show my true self or make a mistake

in the world, has been very impressive." to have fun in order to produce our best results." Knut Trovaag's favorite author is Henrik Ibsen. He

has read Peer Gynt many times, and he finds something new every time he reads the book.

He believes cooperation between Ericsson in Mölndal and the subsidiary in Norway is a good example

of the corporate cultures that cross-cultivate the two Scandinavian countries.

"Of course, there have been problems. The fact that Sweden is not a member of NATO has caused some concerns for those of us who work in the company's defense sector. I have also derived great pleasure through the years, however, when we have won contracts in tough competition with other companies, and the defense authorities have declared their satisfaction with our suppliers." What about the future?

"We have a solid base. I believe in the future of a small specialized company that supplies radar equipment to NATO. We should continue to operate as a small company, but also a highly efficient and formidable foe, like an ermine when it attacks," says Knut Trovaag, commander of the Royal Order of the Polar Star.

#### CONTACT No. 14 1998

# Mobile radio station for private networks

For the first time in eleven years, Ericsson is unveiling a new mobile radio station for private radio networks. The Aurora radio station combines advanced technology with simplicity, efficiency and significantly lower prices compared with older models.

"This radio station is mounted on vehicles and can be used both as a simple 'com radio' from car to car and as a very advanced system radio. Its flexibility lies in its software, which can be easily reprogrammed," explains Lars Hallström, mobile systems manager at Ericsson Mobile Communications' Swedish division, which developed the product.

Aurora is an analog radio station designed for two-way communication via speech or status updates. The station works with various makes of private radio systems including Ericsson's MRS 3000 and MRS 5000 systems.

#### Hope to beat out competitors

"There are numerous older mobile radio stations on the market that need to be replaced. We hope to be able to replace customers' older equipment while at the same time acquiring market share from our competitors," says Lars Hallström.

"To begin with, we are concentrating on the Nordic market, where we expect to sell approximately 20 000 units within two years. We will also be marketing to the rest of Europe and the Middle East, however."

Today, there are approximately 25 million private radio network users worldwide. In Europe alone, almost SEK 17 billion in equipment is sold annually.

Users include police, emergency services and municipalities as well as energy, trucking and forestry companies.

#### **Fast and inexpensive**

"Above all, mobile radio is very economical. Once the initial infrastructure investment has been made in the private radio network, there are no additional calling costs. Systems provide fast connections and direct contact between mobile units as well as the option of group messaging and alarms," says Bengt Fogelberg of the product management team at Ericsson Mobile Communications' Swedish division.

Aurora is based on Ericsson's P500 mobile radio station, which was unveiled three years ago and is currently in use by the Swedish rescue service, among others. Both the Aurora and the P500 are manufactured by the Danish company Niros Telecommunications, a firm with which Ericsson has cooperated for several years.

#### Name instead of number

The product is unusual in that it has its own name, Aurora, rather than a product number. Aurora is the pleasant sounding name for the Roman goddess of dawn.

"The reason for choosing that name is to show that it is a renewable, flexible product that can even be used for private radio networks far into the next millennium," emphasizes Bengt Fogelberg.

The first version of Aurora operates on the 80 MHz band. Future models, which will operate at 160 and 450 MHz, are also planned.

Advantages over Ericsson's older C700 station, unveiled in 1987, are many.

In addition to price, they include Aurora's improved range, its larger, easier to operate graphic character display, more channels and quickdial numbers, plus the fact that it is easier to install.

> Nils Sundström nils.sundstrom@era.ericsson.se



Ericsson continues to invest in mobile radio. Lars Hallström, right, is mobile systems manager at Ericsson Mobile Communications Swedish division, which is launching the new Aurora mobile radio station. Sören Skov Olsen, left, is marketing manager for the Danish firm Niros which manufactures the mobile radio stations.

### A new tool simplifies engineering of AXE

Ericsson has unveiled a new Windows tool that can radically simplify the engineering of AXE exchanges.

The tool, known as BAC, was designed to be used in conjunction with the expansion of networks using the BYB 202 building structure.

"The BAC tool offers two big advantages," says Ron Campbell, Manager, Switch Engineering Methods at Ericsson in Richardson, Texas, where BAC was developed.

"For one, it is much easier to learn quickly compared with the UNIX tool PLEASE which has been used up until now. For another, like other PC tools, it is portable, meaning technicians can take their laptops with them and do the job anywhere on site, at work, on the plane, at home, and so on."

Traditionally, engineering of AXE stations has been performed using PLEASE, a tool based on codes which require a significant degree of knowledge and experience in order to be used efficiently.

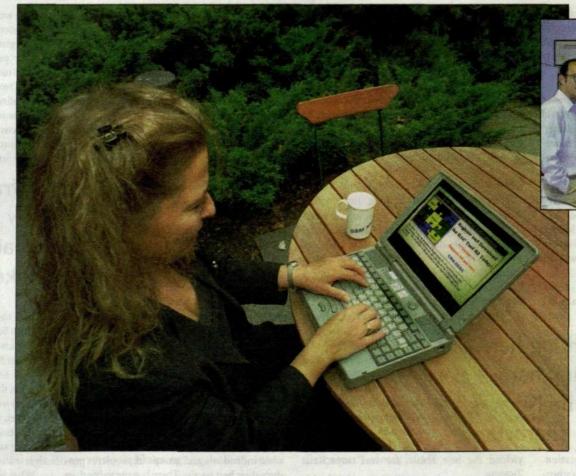
#### Easy to learn

1.40

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BAC, on the other hand, is straightforward and easy to learn. The user can click on icons, move cabinets on the screen, order cables from inventory, etc. These changes mean that a new employee can become productive much faster than before, in the matter of only a single week rather than several months.

"We believe that many older em-



ployees, who were trained using PLEASE, will continue to use that system. But our new employees, who are familiar with PCs and Windows, will use BAC," says Ulf Uddsten, who oversees development of AXE implementation tools within the Mobile Systems business area. It should perhaps be mentioned that BAC is not a replacement for PLEASE, but rather a supplement, since PLEASE remains the basic data administration system.

#### Supplement to PLEASE

PLEASE Administrators will not notice any difference in handling basic data. In other words, a prerequisite for loading BAC is that one already has PLEASE.

Nor is BAC an alternative to the new EESS tool (Equipment Engineering Support System), which is designed for the updated version of the AXE exchange, BYB 501, and represents a fundamentally new way of working with engineering. Several The new AXE installation tool, BAC, saves a lot of time. The development team at Ericsson in the U.S. includes (from left) Gary Roemmich, Eric Ardoin, Chuck Wunderlich, Greg Provin and Ron Campbell. Photo: Sergio Amezcua

The Windows-based installation tool is portable and easy to learn. It radically simplifies the expansion of mobile networks with AXE 10exchanges. Photo: Anders Anjou

hundred people are involved with Installation Engineering within Ericsson.

> Lars Cederquist lars.cederquist@era.ericsson.se

http://plantengr.exu.ericsson.se/ BACTool/ CONTACT No. 14 1998

# ACC at Swedish IT fair

One week after Ericsson's acquisition of the U.S. router manufacturer, ACC, the companies staged a joint exhibit at Networks Telecom in Älvsjö, Stockholm.

Networks Telecom is Sweden's largest trade fair for data communications and data network solutions. Ericsson and ACC demonstrated IP telephony, routers and Internet access solutions in a joint exhibit at the exhibition.

#### Ten-percent market share

ACC has a strong position in the Nordic countries with ten percent of the Swedish market for routers and access solutions. Its customers include Telia, AssiDomän, the National Road Administration, and some of the largest retail chains in Sweden.

Most of them were represented at Networks Telecom.

"Many people are curious to see what will happen with ACC now that it is part of Ericsson," says Ronny Svensson, ACC sales manager for the Nordic region.

#### **Extremely service-minded**

"ACC is known for being extremely service-minded and skilled in adapting quickly to the market," says Nicklas Björn, product area manager of Telia Multimedia, who has cooperated with ACC since as far back as 1987.

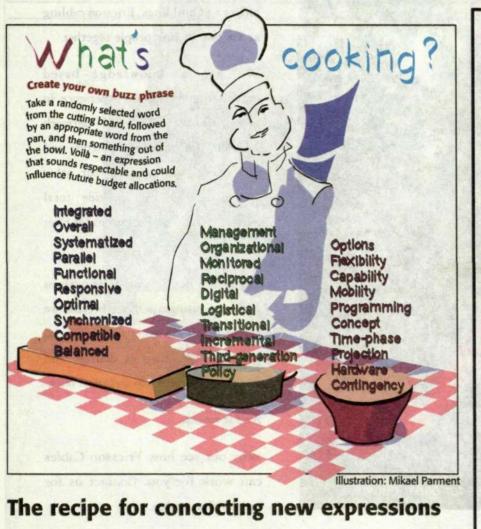
"Hopefully, our cooperation will continue to proceed as smoothly as previously. The transaction means one less supplier for us, and that is only good."

ACC routers permit maximal use of LAN bandwidths. Access router technology for LANs has considerable value for corporate customers with several offices at different locations such as retail chains and municipal government offices.

Visitors also showed great interest in Ericsson's Call Center systems and IP telephony solutions. Comments overheard in the crowd asserted that the sound quality of the Ericsson solutions was the best in the show.

> Lena Widegren lena.widegren@etx.ericsson.se

Four to five thousand visitors per day were counted at Networks Telecom – the largest IT exhibition in Sweden – in Älvsjö, Stockholm, on September 23–25. Ericsson and ACC exhibited jointly, sharing a stand. Photo: Lena Widegren



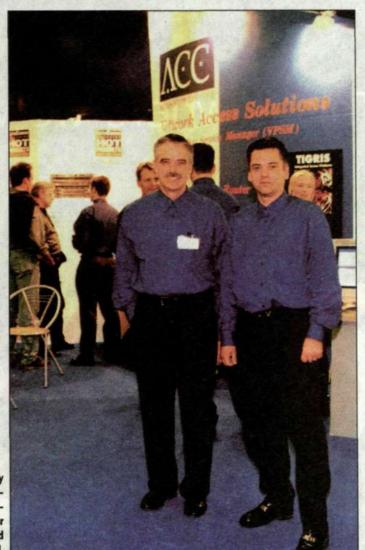
➤ When new products, services and methods are created at Ericsson, they often receive names that sound technically advanced. As a rule, names are in English, and often it is difficult to determine what things are by their name alone. Such expressions are called "buzz phrases". The "buzz phrase generator" above comes to us by way of the Canadian military.

#### **Ground-breaking in Aalborg**

➤ On September 14th, the ground was broken for Ericsson Denmark's new office building.

The 1,400 square meter building is situated in NOVI Park near Aalborg university. It is based on Ericsson's Office of the Future concept, providing enhanced opportunities to work as a group.

The office is expected to be ready for occupation by March/April 1999.



#### IN BRIEF Ericsson magazine on the Internet

➤ Recently, Ericsson Radio Systems' customer magazine, Wireless Now, was launched on the Internet. The magazine, published quarterly, covers the entire mobile telephony field, including systems and terminals as well as paging services.

When necessary, news articles will be posted on the Internet between regular issues.

In addition to back issues of the customer magazine, there is also a search function.

The web version of Wireless Now is produced by WEB Solutions, a subsidiary of Ericsson Data AB, and Appelberg Publication AB, which is responsible for the printed version.

http://www.ericsson.se/ wireless/now

#### Convertibles for new employees

> Now there is an Internet site where new employees can apply to purchase convertibles.

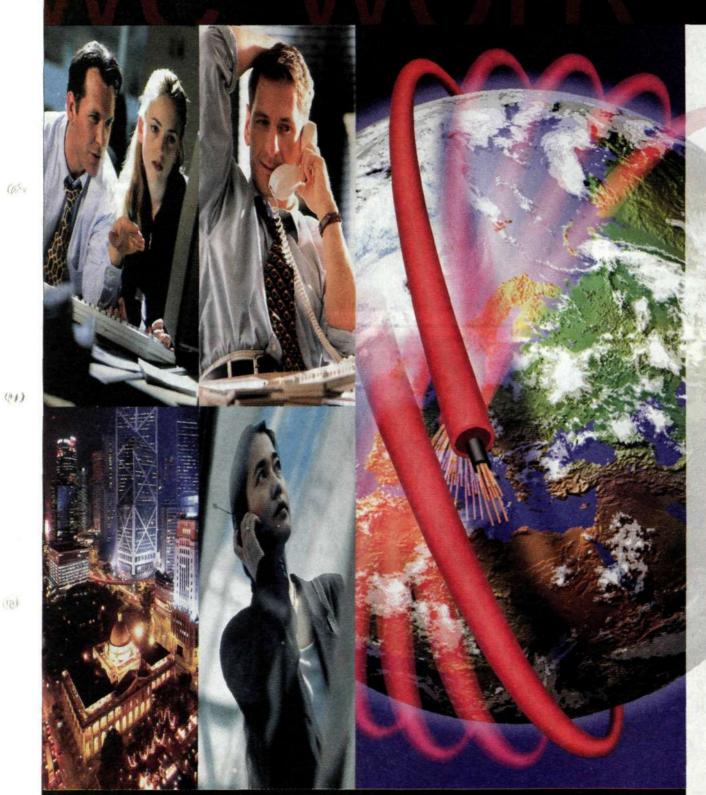
If you do not have your own computer you can seek out a computer in your vicinity or find a personnel manager who will help you print out and fill in documents from Ericsson's Web site.

http://inside.ericsson.se/aulis/ bg\_info.htm



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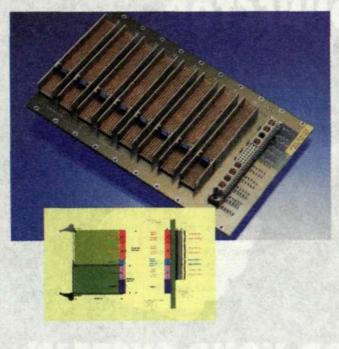
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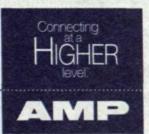
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Click from Teracom Components is a new connector with absolutely magical features.

Click comes ready assembled and automatically makes a perfect connection every time. All you have to do is push in the cable and tighten the connector. Abracadabra! The "Click" takes care of the rest.



If you don't believe in magic, we have a 10year guarantee on all our connectors. They are IP68-classified and water-pressure proof. Click is available in DIN 7/16 for EIA 7/8" cable. It is made from silver-plated brass and its technical performance is as magical as the connector itself!

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Teracom Components AB, S-242 91 Hörby, Sweden. Phone: +46 415 164 00. Fax: +46 415 166 01. E-mail: components@teracom.se\_http://www.teracom.se/components

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#### VACANCIES

# Vacancies At Ericsson

#### **Contact No. 14 1998**

### in sweden

#### Ericsson Radio Systems AB, Kista

#### **MANAGER - SW DESIGN**

ERA/LV/B is a new unit established for development of a GSM/BSS architecture based on IP principles. The new architecture will provide for more efficient transmission of voice and data, and will be built in state of the art SW development environments. We have a challenging time ahead of us introducing new technology as well as new methods of working.

• We are looking for a manager of a SW design section with a mix of designers experienced in AXE/BSC development and designers with experience of design in Erlang/OTP and Java/C environments.

You should have experience from development of complex telecom/datacom systems and experience and interest in leading, motivating and coaching your co-workers in personal development and working methods. You are interested in building organizations, flexible and with a pragmatic view on how to solve problems.

Contact: Gunnar Borg, tel: +46 070 552 1787 Ansökan: Kerstin Almblad, LV/HS Ericsson Radio Systems AB 164 80 Stockholm

#### **Ericsson Telecom AB**

The Internet Group - Setting the Pace in CyberSpace

The Internet Group, within Datacom Networks, will establish Ericsson as a leading vendor of IP-related products and services in the areas where Telecom meets Datacom.

We develop new products and work in new ways where creativity and speed are key words. The Internet Group is divided into a number of Product Companies (that own the products and drive the projects) and Competence Companies (that develop the competence of the staff). We are now looking for a

#### MANAGING DIRECTOR

 for the Product Company that develops products for combining and enhancing the means of communications available in the IP-world and the world of telephony, fixed and mobile.

Together with powerful tools for building online communities on the Internet, these products will add a new dimension to communication between people.

The company works in a tight partnership with Oz Interactive, an internet applications company based in San Francisco but with most of its design organisation in Reykjavik, Iceland.

Job description : The Managing Director is responsible for the company's profitability, based on the business plan. The company includes functions for; Product Marketing, Product

Management, Systems Management, Product Development Customer Support, Installation etc. The Managing Director is fully responsible for the company's operations. He/She reports to a board.

The job will initially require a focus on customer intimacy and product leadership. As the market matures the focus will drift towards operational execellence.

Today the comapny has a staff of about 15 people, most of them with a design background. Current plans show an increase to about 25 in 6 months.

Company description : The company's first objective is to integrate existing products from Ericsson and Oz into one powerful communication product. Examples are Ericsson's products for IP-telephony, conference servers, call centre solutions and Oz' multi user technology. It shall also provide the end-users with tools for building content in on-line Internet communities.

The company's customers can be found among

public operators. Both traditional Telcos, ISPs and also Next Generation Telcos. Qualifications : A strong vision of what you

want to do with this job. Management experience. Sound Technical knowledge about Telecom and Datacom. Business minded. Excellent communication skills. Entrepreneurship. A positive attitude to change is a must.

**Contact:** Fred Skogli fred.skogli@etx.ericsson.se +46 8 7191021 or Ann-Charlotte Sturesdotter-Francis Human resources Manager ann-charlotte.s.francis@etx.ericsson.se +46 8 7197186

Ericsson Radio Systems AB, Sundbyberg

SATELLITE COMMUNICATION – NEW OPPORTUNITIES

To be able to support and provide the satellite operators with a total satellite system we are working closely with several satellite companies. A satellite system can be global or regional. The satellite "footprint" for one of our regional projects , Thuraya, covers 49 countries. The first phase for Thuraya includes Apr. 6-7 gateways. The Implementation schedule for Thuraya is 36 mont-

hs. During this time we will support our partner in the US and of course the satellite operator in UAE, work on the development of new satellite features within CME 20 and co-ordinate this with our local companies. Ericsson's role is to provide MSC/VLR/HLR/AUC and the GSM product portfolio.

If you think this is a real challenge in the new and exciting field of GSM based cellular satellite communication, then we can offer you interesting positions as:

#### TECHNICAL MANAGER

• As Technical Manager you will provide our customer with technical competence. That includes technical discussions with the customer, product presentations, be responsible for preparation of technical specifications and production of technical documentation, all in close teamwork with our marketing and sales organisation.

For both positions we need persons who's profile shows that they are outgoing, independent and self-motivated with strong interpersonal and communication skills. They should have a university degree, preferably M. Sc. or similar. Good written and oral skills in English. It's a strong plus if they have experience in tender preparations.

**Contact:** Catharina Jedberger, tel +46 8 404 4464 Application: Ericsson Radio Systems AB SG/ERA/LP/HA Siw-Britt Johansson, 164 80 STOCKHOLM

#### Ericsson Radio Systems AB, Sundbyberg

SATELLITE COMMUNICATION -NEW OPPORTUNITIES

To be able to support and provide the satellite operators with a total satellite system we are working closely with several satellite companies. A satellite system can be global or regional. The satellite "footprint" for one of our regional projects , Thuraya, covers 49 countries. The first phase for Thuraya includes Apr. 6-7 gateways. The Implementation schedule for Thuraya is 36 months. During this time we will support our partner in the US and of course the satellite operator in UAE, work on the development of new satellite features within CME 20 and co-ordinate this with our local companies. Ericsson's role is to provide MSC/VLR/HLR/AUC and the GSM product portfolio.

If you think this is a real challenge in the new and exciting field of GSM based cellular satellite communication, then we can offer you interesting positions as:

#### CUSTOMER PROJECT MANAGER

 As a customer Project Manager you will define and run satellite projects. You will be responsible 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 a memo to LME.LMEJOB.

#### Updated September 28

for planning, follow-up and finishing all activities to fulfil the contract and budget in accordance with the customers and our own expectations.

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 are experienced and recognised as leader but would not hesitate to take active part wherever needed.

The job includes a large number of travel in the contact with the customers and suppliers.

**Contact:** Catharina Jedberger, tel +46 8 404 4464 Application: Ericsson Radio Systems AB SG/ERA/LP/HA Siw-Britt Johansson, 164 80 STOCKHOLM

#### Ericsson Radio Systems AB, Kista

#### KEY ACCOUNT TELIA

In an effort to strengthen our present organisation to improve co-ordination of customer-related activities the Marketing and Sales unit will also include Solution Managers from the previous Product management. The Product Management unit will be a Compet ence Centre with focus on a few areas of different products and applications. The new organisation is working from the 18th of May in 1998. We are now looking for new persons according to the following:

#### PRODUCT AND SOLUTION MANAGER

• We are searching a person for the area "Homeand Office communication" where solutions should be created and launched to Telia through the Marketing and Sales unit.

The solutions could be based on Ericsson products as well as products from other vendors in order to offer competitive solutions.

The person we are looking for should be good in creating networks, have good knowledge of the market needs, see possibilities putting together different concepts into solutions and last but not least be good in developing marketing concepts an launch the solutions together with the KAM unit.

We offer you a cross working environment close to our markets.

#### KAM, KEY ACCOUNT MANAGEMENT

• The Key Account Management is responsible for the Marketing and Sales activities towards the customer Telia. The unit is now looking for high caliber individuals who not only meet all the usual criteria for marketing and sales, but also have good knowledg e of datacom. Strong problem solving and leadership skills are essential as well as personal drive and entrepreneur spirit. You are able to discuss complex business and

datacom issues with confidence and credibility at the highest level.

**Contact:** KAM, Key Account Management: Mats Granryd, tel +46 8 585 314 87, mats.granryd@era.ericsson.se Product & Solution Manager: Anders Eriksson, tel +46 8 404 38 84, anders.s.eriksson@era.ericsson.se Application: Ericsson Radio Systems AB KI/ERA/LGHS Ingela Vikenfalk 164 80 STOCKHOLM

Ericsson Radio Systems AB, Kista

#### GSM SYSTEMS SENIOR MARKETING MANAGERS

The business unit Mobile Telephony Systems GSM, NMT, TACS (RMOG) is now strengthening its efforts to maintain the world Leader position within GSM.

In order to meet the increasing requirements on GSM system focus on our product/solutions offerings, the Product Units Packet Switching Systems (PSS), Circuit Switching Systems (CSS), Value Added Services (VAS), Base Station Systems (BSS) and Base Transceiver Stations (BTS) have created positions for GSM Systems Senior Marketing Managers. We are looking for individuals with an overall understanding of the GSM system and the GSM operators' business situation. Preferably you have worked e.g. as technical manager in a GSM Core Three team or aquired your GSM competence in other positions with direct customer contact.

These positions have the following responsibilities: Team leader for the common Products Unit tender/negotiation team. Together with account managers analyze the customer's strategies, identify the solutions/products/services combinations that will win contracts. Develop operator business cases highlighting our solutions in comparison with the competition. Create and maintain a contact network.

The job requires fluency in spoken and written English. If you can handle other languages it is a merit. Most of your job (at least 50 %) will be in close co-operation with our Business

Management and Local Companies around the world. Thus, you must be prepared to travel and stay out for periods of 2-3 weeks at a time. A substantial part of your time includes rotation between the Product Units in order to keep you updated on the full GSM System characteristics.

The positions, which all are located in Kista, are open for both local employment and international assignments.

**Contact:** Kjell.Arvidsson@era.ericsson.se, PSS Market/Sales Support +46 757 0999, ERAC.ER-AKJ Johan.Dahlström@era.ericsson.se, CSS Marketing and Sales Support. +46 8 757 2421 Mats.Hellman@era.ericsson.se, VAS Marketing Kurt.Sillén@era.ericsson.se, BTS Marketing, +46 8 757 22 20 memoid: ERAC.ERAKS, Per.Arvidsson@era.ericsson.se, BSS Market Support, +46 8 404 81 15

Kristina.Johnsson@era.ericsson.se, Human Resources +46 8 757 14 49, memoid ERA.ER-AKRJN Application: Ericsson Radio Systems AB KI/ERA/LV/HS Kerstin Almblad, 164 80 STOCK-HOLM

Ericsson Radio Systems AB, Sundbyberg

#### **PRICE MANAGER**

RMOG Business Management & Operations Direct Markets LP Eastern Europe, Middle East, Africa & South East Asia

Strategic pricing is becoming an increasingly important tool in order to win new business as well as to keep our existing customers. We are now looking for two Price Managers to strengthen our pricing team at LP.

• We are looking for the right persons to work with price strategies and business argumentation. You will be part of the pricing team at LP/M Business Support, and your main interfaces will be the Business Management Units for New Accounts and Key Accounts at LP, local compani-

es in the LP region, and the RMOG Price Network. The Price Manager will be expected to perform the following activities: Price comparisons using the latest developed tools. Packaging and pricing of new HW/SW-releases and services. Argumentation to justify the price towards customers. Maintain updated price information about the market. Support Business Management and local companies with price strategies and price

support. The right person should preferably have a Master's degree in Engineering and/or Economics. The position requires analytical skills, flexibility and fluency in spoken and written English. Other languages is a merit. It is an advantage to have a good understanding of the GSM system and a GSM operator's business situation. The position is located at Esplanaden 3c.

**Contact:** Camilla Koebe +46 8 757 5767 or Jaan Warnhoff, tel. +46 8 404 9285 Jaana Norén, Human Resources, tel +46 8 757 3018 Application: Ericsson Radio Systems AB SG/ERA/LP/HA Siw-Britt Johansson 164 80 STOCKHOLM siw-britt.johansson@era.ericsson.se

Ericsson Radio Systems AB, Kista

#### PRODUCT MARKETING MANAGER

Business Unit Cellular Systems - America Standards (RMOA) develops and markets complete wireless communication solutions based on the D-AMPS/AMPS standard. Presently nearly 50% of the world's wireless subscribers are connected to D-AMPS/AMPS systems. To further strengthen our Product Marketing department within Product Unit Wireless Networks we are looking for a competent product marketing manager.

• The position as product marketing manager requires both commercial and technical competence. The successful candidate will be able to translate the technical functionality of the products into clear, concise commercial arguments which highlight our customer needs and product value.

As a product marketing manager you will be responsible for the introduction of new products as well as for the longer term marketing messages and support. An extensive and successful product launch requires clear marketing messages, attractive packaging, good pricing strategies and a wellthought marketing campaign consisting of press releases, trade press articles and promotional material. The actual launch of the product will be carried out through internal as well as external product presentation events. After the actual launch the longer term marketing messages and co-ordination of arguments and strategies to support the sales of our products takes over. In order to accomplish this you should enjoy travelling, building relationships on a high level and working in an international environment.

This position requires co-ordination of different functions, both within the parent company and subsidiaries. It is therefore essential that you are outgoing, independent, creative and self motivated. Your interpersonal and communication skills will allow you to convey a very positive and professional image in this highly visible position. You should have several years experience working in an international business environment preferably in the telecom or computer industry. Fluency in English is required. For the right person the future is bright!

**Contact:** Martina Breitenstein, phone +46 8 404 4628 Gregory Rogers, phone +46 8 404 7208, Application: Ericsson Radio Systems AB, AH/H Anette Spångberg, 164 80 Stockholm. E-mail: anette.spangberg@era.ericsson.se

Ericsson Radio Systems AB

#### MANAGER ADVERTISING AND SALES PROMOTION

GSM is the leading digital mobile system worldwide, with more than 100 million users worldwide, increasing with 5 million every month. Ericsson is the clear global leader for GSM systems, with a market share of well over 40%. With its strong entrepreneurial spirit, the business unit for Mobile Systems GSM, NMT and TACS (RMOG) has established itself as a leader within the Ericsson group to meet the challenges of today and tomorrow in this exciting and rapidly changing market.

• Our manager for Advertising and Sales Promotion is moving on to an international contract assignment, and we are now searching for an experienced and dynamic successor. You will be part of the department for Marketing Communications in Kista, and be manager of a team of six highly skilled marketing communications specialists. You will be responsible for the business unit's international media and SP bud-

get. Your responsibility will include: Media, including advertising, advertisement features, press releases, press seminars and editorial coverage in trade and business press, internet and other suitable media including Ericsson customer magazines. Sales promotion materials and activities such as brochures, data-sheets, posters, audio-visuals plus product launch and SP-campaign project management.

Ideally you have education and experience from several of these areas and from 'business-to-business' marketing in telecommunications. Professional fluency in English is essential.

**Contact:** Greger Berg ERA/LM/MC, phone +46 8 7471917, e-mail greger.berg@ericsson.era.se Application: Birgitta Ahrebo KI/ERA/LH/S Ericsson Radio Systems AB 164 80 STOCKHOLM

Ericsson Telecom AB

#### PROJECT LEADER MARKETING COMMUNICATIONS PUBLIC NETWORKS

We are responsible for all above the line communications, establishing the external awareness on our offering to public operators. You will create and implement the content of our marketing messages and advise our various sales channels on the right tools and media.

This means analyzing business cases and formulating communications plans, follow up and tuning with other market communications activities in cooperation with local companies and other business units as well as external consultants.

• You will also be responsible for different international events regarding planning and execution. Together with our team you will create our market communications plan as well as objectives and be responsible for cost control of projects.

You should possess education in marketing and or marketing communication, including excellent practical knowledge of communication, processes, channels and media. You also have experience in assigning consultants. You should have good presentation and editorial skills in English. Personal drive and ability to work in team is essential. You have a strong customer focus and make use of your communications skills to drive change.

**Contact:** Ulf Hall, Director of Communications 719 1642 ETXT.ETXUHAL, or Barbro Södergren, Human Resources 719 5775 ETX.ETXBASO.

### international

#### Ericsson Australia, Melbourne, Australia -

Be a part of GSM in Asia Pacific

The EPA ASO is currently expanding its organisation to meet the demand of the most dynamic telecommunications market in the world, Asia Pacific GSM. We are currently offering a wide variety positions for people of varying backgrounds and interest but most of all the drive to reach our high targets.

The positions offered are both local or expatriate long term contracts.

Don't miss this opportunity to work as a part of the Regional Centre, one of the most exciting business ventures at Ericsson Australia!

#### SENIOR PROJECT MANAGERS (3 positions)

• Job Requirements: Minimum of 4 years experience in leading projects, preferably of SW nature. Familiar with SW development, Industrialisation and supply processes. Prepared to travel short term. Knowledge of RMOG's business area and global structure. Understand Project Management techniques and Ericsson commercial processes. Demonstrated leadership skills and ability to work in a team environment.

#### JUNIOR PROJECT MANAGER

(1 position)
 Job Requirements: No project management experience is required, however a strong desire to

#### **CONTACT No 14 1998**

progress in this career path is expected. Familiar with SW development and supply processes. Prepared to travel short term. Knowledge of RMOG's business area and global structure. Understand Project Management techniques and Ericsson commercial processes. Leadership potential and ability to work in a team environment.

#### PROJECT MANAGEMENT ASSISTANT (1 position)

• Job Requirements: You should have experience as a project management assistant or as an project administrator with demonstrated ability in Ericsson project, finance and quality systems. The Project Management Assistant should have the potential to develop into a Project Manager. Knowledge of Ericsson project management techniques. Ability to track project budget accuracy and other financial project reporting. Ability to plan and schedule resource Be prepared to act on the Project Managers behalf.

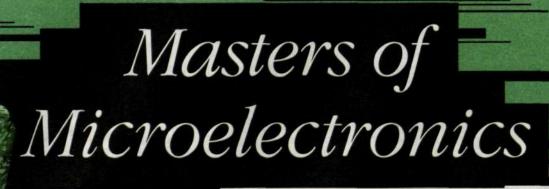
#### GSM SUPPORT

#### (10 positions)

 Job Requirements: You should have a minimum of 3 years experience in AXE Support, preferably in GSM systems. CSR / TR Handling and Trouble shooting experience. Ability to work in a team and interface towards external customers.
 Demonstrated ability to investigate complex network issues

#### VERIFICATION ENGINEERS

(12 positions)
 Job requirements: You should have a minimum experience of 3 - 5 years in AXE verification or Testing of SW, preferably in GSM systems. Verification Engineers will be required in the following nodes, MSC, HLR and BSS and exposure to these nodes would be desirable. Test lead market projects for the above nodes. Perform test planning and test analysis for market projects. Perform verification of nodes. Perform demonstration of functionality of nodes in customer networks. Support ASR Engineers during conversion of customer sites from SW perspective. Substantial travelling within the Asia Pacific Region



Microelectronics, as part of Ericsson Components, delivers the enabling technologies for solutions in wired, fiber and wireless applications. This division makes highly competitive, high performance SLICs, RF power transistors, RF ICs and modules, digital and mixed system ICs, and opto-electronic devices. Competitive advantage for your next design is on your doorstep. Just get in touch.

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#### VACANCIES

#### APPLICATION SYSTEM REPLACEMENT ENGINEER

(3 positions)
 Job requirements: You should have a minimum experience of 2 years in AXE with at least 1 year of conversion or upgrade. Outage recovery is an advantage for this position. Development of implementation (ASR) procedures. Perform conversion or upgrades. Outage recovery during conversion if required. Substantial travelling within the Asia Pacific Region.

Contact: Mari Ståhl, EPA.EPAMISL. Application latest 981016: Susan Zeimbekis, EPA.EPASUZ.

#### Ericsson Eurolab Deutschland GmbH, our young research & development centre in Herzogenrath-Aachen offers the following vacancy:

The AXE Mobile Network department, within our AMC System House, will reinforce our Test unit for the AXE Mobile Core (AMC). The AMC consists of the core subsystems that are common to the mobile applications CME20, CMS30, CMS40 and CMS88.

The Test unit will have as main responsibilities to perform verification of the AMC product components and have an active role in AMC customer support activities. The unit will furthermore also be responsible for verification project both on main (AMC) as well as subproject level. These projects perform in an international and intra-culture environment and is covering a vast range of development areas at the leading edge of technology, such as ISDN, IN and Internet accesses. To strengthen our activities we are looking for

#### SYSTEM TEST ENGINEERS

• Your main authorities and tasks are to perform System Integration Test of AMC products. This includes acivities like Load test, Stability test, Robustness test and Accuracy test. Main areas are today IN, Datacom and ISDN. You will work with the definition and execution of SIT aswell as trouble shooting on the faults found.

As a suitable candidate you have good knowledge of mobile telephone systems, you are flexible, show initiative and have good communication & cooperation skills. The ability to work under pressure is also an important personal quality. Furthermore, fluency in written and spoken English is required. Experiences from System Verification/Test are a clear advantage.

**Contact:** EED/H/R, Simon Seebass, Memo-Id:EED.EEDSIMS, Dial: +49 2407 575 163 or EED/U/TVC Mats Erlandsson, Memo-Id.:EED.EED-MERL, Dial: +49 2407 575 635 For more information see: http://www.eed.ericsson.se/international/amc.

Ericsson (China) Company Limited, Beijing, China

#### SYSTEM EXPERT

• Job Description: A vacancy exists for a senior trouble shooter to work on a long-term contract in what is probably Ericsson's most exciting market. The open position exists in the Customer Support Office in Beijing, where we work with the supply and second-line support of the fixed network in China. The installed base in China consists of 420 switches. First line support is performed by regional offices. We are currently upgrading the network to Local 12.3 and BM3.0. Local-6 will be introduced before the end of the year. We are looking for a team player with proven trouble shooting ability who can demonstrate initiative and determination in resolving complicated system problems.

Requirements: Familiarity with PN GASes eg Local 12.3, BM3.0. Proven trouble shooting ability. Good correction handling skills. Must be able to write software corrections. Knowledge of ISDN, BGS, IN an advantage. Willingness to travel. Able to lead and take responsibiliy for technical investigations. Knowledge of support and supply processes and procedures. Contact network within Ericsson. Good English.

Contact/Application: Brian Greaney, ETC.ETCB-NGY, CSO Manager

Ericsson Australia Pty Ltd

#### FSC MANAGER AUSTRALIAN SERVICES

• The Vodafone Field Support Centre is seeking the services of a new Manager. This role is to provide leadership for a team seeking to stretch the bounds of service delivery. The team works towards an extremely exciting and demanding customer and is expected to perform roles beyond those normal to an FSC. The new FSC manager being sought will be expected to help develop the team to meet new challenges and create new service opportunities towards our customer.

Key Skills: Ability to forge and manage strong customer relationships. Excellent ability to assess and manage team performance and track key performance indicators. Ability to develop and improve on plans, procedures and organisational structures for support and project activities. Ability to provide leadership to the team and assess and manage staff performance. Experience in supporting multi-element networks including AXE, IT and third party products. Experience in preparation and management of capital and expense budgets for the team. Awareness of the importance of and procedures to maintain quality systems in line with ISO9001. Desired Attributes: Previous management expe-

rience. High standard of self motivation and ability to motivate the team. Understanding of statistics and principles of performance measurement. Ability to participate in tender support and prepare quotes for new services.

The successful applicant can expect a challenging position working as part of a team towards a demanding and growing customer.

The positions are based in Melbourne (Broadmeadows), however there will be a requirement to travel to customer sites and interstate.

Contact: Sue Moorhen on +61 3 9243 5283 or EPA.EPASMM. Application latest 981010: Susan Zeimbekis, (EPASUZ)

#### TAKE THE CHALLENGES IN CHINA

Latest news: China becomes Ericsson's largest market in the world!

Guangdong Ericsson Telecom Engineering Co. Ltd (GUC) is a joint venture company based in Guangzhou and offers its professional service to Region South, the most dynamic part of our business in China.

Why not take the challenge to grow with us? Now at GUC we have the following openings for you:

#### **0 & M ENGINEER**

• Supervise and take care of daily helpdesk issues. at least 3-5 years AXE-10 experience in 0&M area of GSM network. experience from work with both MSC and BSC is required. have knowledge of Ericsson information system MSS and MHS. fluent English and good interpersonal skills.

#### **PSTN SENIOR ENGINEER**

• Provide AXE 10 system expertise to the customer. act as primary knowledge source in technical questions and transfer of knowledge within the division. minimum of 5 years relevant experience, with at least 3 years in Ericsson support organisation. high-level trouble shooting competence. good knowledge of switching, traffic concepts, telecom. network, interexchange signalling and product functional descends. must be familiar with Transgate-3 and local-6.

Contact/Application: GUC/H Tracy Gu (Memoid: ETC.GUCTRGU) Fax: +86 20 8553 6193 or 85536191 Tel: +86 20 85538868 ext. 20685

Ericsson Bosnia Company for Electronics, Sarajevo, Bosnia Herzegovina

#### **TURNKEY PROJECT MANAGER -**

Ericsson Bosnia Herzegovina (EBA) has, based on a competitive tender response and a successful Demo exercise, been invited to contractnegotiations by European Union (EU). The contract scope comprises the supply of local network (copper cable) for 21K-lines over 6 months with associated Engineering & Design, Civil Work, Customer Support Services and Training.

 In view of the above, Ericsson is now in the process of identifying possible candidates for the Turnkey Project Manager position.

The Turnkey Project Manager shall be responsible for establishing an efficient project organisation which will ensure timely deliveries of all equipment and services as stipulated in the contract. The responsibility also includes managing the commercial aspects of the project such as invoicing, cost budgets, project reports, etc.

The applicant must have experience from managing projects with various installation activities involved, using local partners and/or subcontractors. Good commercial and negotiating skills are required. A strong leadership with good communication and interpersonal abilities will also be necessary.

Furthermore we are looking for Regional Managers, Supervisors and Design Engineers with appropriate experience and education.

**Contact:** Rolf Samuelsson +46 31 747 3920, mobile +46 70 554 68 87 Memo: ETX.ETXRSAN Tommy Thörnfeldt +46 8 719 4289, mobile +46 70 531 24 52 Memo: ETX.ETXTYTT Application: Ericsson Telecom AB, Public Networks, Global Operations - Resource Management, Richard Tersander, S-125 26 STOCKHOLM, Sweden. Tel +46 8 719 42 71 Fax +46 8 681 22 60 Memo ETX.ETXTERS E-mail

richard.tersander@ericsson.com

Kuwait Ericsson Telephone Equipment and Services

#### HARDWARE AND SOFTWARE ENGINEERS

Kuwait Ericsson is supplying & installing a PABX system for the DGCA in Kuwait and are looking for a dedicated resident Hardware and a Software Engineer for on-site maintenance support during 24 month warranty period.

• Required education/skill is - Minimum 5 years relevant experience in hardware(for hardware engineer) and in software (for software engineer), involving MD 110 PABX's (ideally MD 110CA or MD110CS), Private Mobile Radio (Ericsson F800 radio repeaters and P500 portable radio handsets) associated local network cabling systems (structured building wiring and conventional telephone network).

Carry out all technical, operational and administration of on the job training required, prepare all necessary maintenance schedules, to direct and administer day to day maintenance of the PABX system, to perform urgent or routine maintenance as required and provide professional advice to the DGCA personnel.

The position is available on local terms and conditions.

Application/Contact: Gladys Roche - KET/HC Human Resources & Organization, KET.KETGLAD. Tel.+965 2465 465 ext.124 Fax.+965 244 5650

#### Ericsson Telecommunications Ltd, UK

Ericsson is a world leading telecommunications supplier. With over 100,000 employees applying their expertise in more than 130 countries, we are the world leader in digital mobile telephone systems and, together with mobile phones, these totalled more than 50% of our orders and sales last year. Our advanced products can be found at the heart of telecommunications networks worldwide.

At Ericsson's UK cellular design centre in Guildford the current focus is on the development and support of software for GSM, PCN, TACS and other cellular standards. As technological front runners for the rapidly developing global cellular market, we are constantly winning major new contracts. The continued growth in the market means have set up further Design Offices in Warrington and Burgess Hill. We have opportunities for the brightest, most talented Systems Specialists, Software Engineers and Testers who possess the skills and abilities to make a difference.

#### BSS SYSTEMS DESIGN: SENIOR DE-SIGNERS & TECHNICAL SPECIALISTS

#### Guildford, Surrey, UK.

• Career opportunities for Senior Designers and Technical Specialists exist in our BSS Systems Design Group in Guildford. All positions are at a senior level with a competitive salary. The BSS Systems Design Group works in two main areas:

#### **GSM PROJECT ACTIVITIES**

• Depending on experience, successful applicants will either be involved in the execution phase of a current project or will move directly into pre-study work of a future project. Candidates must have 5-10 years GSM knowledge with experience of the complete project life-cycle. Must have experience in real-time software development.

#### FUTURE TELECOMS PLATFORMS & APPLICATIONS DEVELOPMENT

• Successful applicants will be involved in the development of the next generation of advanced telecommunications platforms and applications. Candidates must have the ability to work at a conceptual level but also work with prototypes and simulations. They must have a broad telecoms knowledge including data and mobile systems. Candidates must also have 5 years+ relevant real-time software development experience. Experience of GSM is essential, IN would be an advantage. Experience of commercial issues would also be advantageous as some of the roles will involve liaisons with commercial functions or customers.

Please mark CVs "BSS SYSTEMS" and indicate which work area interests you most, if you have a preference.

#### EXPERIENCED & GRADUATE SOFT-WARE DESIGNERS & TESTERS

Guildford, Surrey, UK. Warrington, Cheshire, UK. Burgess Hill, West Sussex, UK.

 Career opportunities exist in Guildford, Warrington and Burgess Hill at all levels. Key areas of importance lie in the development of our GSM system, primarily in Mobile Intelligent



business.

people.

laughs.



Ericsson Project Management Institute

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Networks, the Base Station Controller and in the continued development and support of our TACS system. Knowledge of GSM, Intelligent Networks, ISUP or C7 signalling would be a distinct advantage.

A competitive salary and benefits package, together with the chance to work as a member of Ericsson's global product team, mean that these are important opportunities for people skilled in these fields.

Take this opportunity to make yourself heard as a member of our Software Design team.

Application: Ms Jo Howat, Human Resources Officer, Ericsson Ltd, Cellular Systems Division, Midleton Gate, Guildford Business Park, Guildford, Surrey, GU2 5SG. Telephone: +44 1483 305163 Fax: +44 1483 305090 Email: etl.etljobs@memo.ericsson.se

Ericsson Spain, Madrid,

#### SYSTEMS ENGINEERS AT ECE

At ECE Systems Management within RMOG we work with mobile applications for mobile telephony systems (GSM900, GSM1800, GSM1900, GSM1900/D-AMPS, etc.) in the CSS (Circuit Switching Systems) Product Unit.

• We are looking for new professionals to work in a number of interesting areas. The areas are Inter System Roaming, Numbering, AXE- platform (e.g. IO, platform evolution: CP-OPEN, etc.), Subscriber Management, GSM datacom and Universal Mobile Telephony Systems, UMTS (3rd generation mobile systems).

The working activities aim at leading and ensuring the evolution and competitiveness of the Ericsson GSM Sytems (GSM900, GSM1800, GSM1900, GSM1900/D\_AMPS, etc.) Some of the activities this work encompasses are listed below: System solutions and investigations. Early design project participation (scenario studies, pre-prestudies, prestudies.) SPM support. Network/node charateristics and dimensioning. System Management. Standardisation. Operative Product Management. Market Support. Other system-related activities.

For the Inter System Roaming area, comprehensive knowledge of IS41 signalling protocol, in any of its current versions, will be very much appreciated. ETP knowledge and/or experience with

Rox System allows the flexibility to install and replace cables, including preterminated ones.

Handling also IP ratings and EMC makes it a perfect product for telecom.

#### VACANCIES

3rd party products integration will be equally appreciated.

Applicants should have an engineering degree and at least 3-4 year proven working experience in telecommunications, preferably in the areas of interest. Experience in system level technical development or testing is preferred.

Desired personal abilities are: interest to work both in groups and independently, initiative-taking and self-confidence, being communicative, availability for short-time travels abroad and co-ordinating and leading skills.

Contact/Application: Jose Beny Lopez (+34 91 3392483, emepiro@madrid.ericsson.se, ECE.ECEPIRO) or Consuelo Gallo (+34 91 3392942, emegama@madrid.ericsson.se, ECE:ECEGAMA)

#### **Ericsson Telecom AB**

Network Intelligence Supply Unit (NISU) is located in Sweden and Finland. Together we handle worldwide deliveries of Network Intelligence platforms and services.

Network Intelligence NI is an area that is expected to grow 50% each year, both from a market and product range point of view. Both new and old customers now require NI solutions to be competitive in their business. Our ambition is to be able to take responsibility for complete NI deliveries. This means that we are working with many NI products i e services and platforms.

#### NI SERVICE SUPPLY & IMPLEMENTATION ENGINEERS

• The NI Service area is an area where many new applications are developed each year. Working with NI Services means working with complete solutions (i.e. the whole NI network). Our mission is to make sure that the NI Service is functioning in the customer's network.

You will be working in all different phases from order to final acceptance. Meeting our customers is part of your daily work.

We believe that you are a teamworker who likes challenges. We also think that you have worked with NI before and that it 's now time to learn all about it.

We offer you a good possibility to develop your technical and human competence as you continu-

ously take on new products and meeting new customers somewhere around the globe You are open-minded, and a good teamplayer and you communicate fluently in English.

You have a background in telecom business and have knowledge in programming and data processing.

Contact: Lennart Pihl (Manager-Stockholm) etx.etxlphl +46 8 719 8522, Mobile: +46 10 227 4302 or Kent Olsson (Manager-Karlstad) 46 54 193627, +46-70 533 5420 or Maria Palmskog Human Resources maria.palmskog@etx.ericsson.se memoid etx.etxmipp +46-87190794 mobile +46-70-5673334 Application marked NI SUPPLY IMLE-MENTATION ENGINEERS: Ericsson Telecom AB Slavica Cale HF/ETX/PN/OSH 126 25 Stockholm slavica.cale@etx.ericsson.se

#### Ericsson GmbH, Düsseldorf, Germany - EDD

The company is headquartered in Düsseldorf and employs about 1.000 people. Our Customer Unit MMO handles EDD's biggest customer in Germany: Mannesmann Mobilfunk which built up the first private mobile network in Germany known as D2 mobil. In order to strenghten our activities in the product management area within the above mentioned Customer Unit we are looking for a

#### SENIOR PRODUCT ENGINEER BASE STATION SYSTEMS

• It will be your responsibility to work with a mixture of all product management tasks including product planning, product maintanance, product substitution and customer co-ordination. In this role you will provide the vital link between the customer on the one hand and Strategic Product Management in Kista on the other.

This role will offer a challenging opportunity for somebody with a good technical background who may wish to enhance their business skills through having direct contact with the customer. Travelling will be required from time to time, on average one can expact to be away about once a month. The current BSS Product area consists of a young team of seven people.

You are an ideal candidate for this position if you have an engineer degree in telecommunication and at least four years experience in the GSM field. Fluency in English is a requirement and a

**CONTACT No 14 1998** 

command of German is desirable.

Contact: Area Responsible Pat Cunningham tel. +49 211 534 1332, edd.eddpacu or HR manager Hans-Jürgen Vratz tel. +49 211 534 1441, edd.eddhjv.

Within the Customer Unit Other Licenced Operators the Marketing and Sales Unit for International Operators is looking for new competences: The customers of the units have in common that they have international telecom/datacom networks and that they are new on the newly deregulated German telecom market.

The solutions they are looking for are switching networks, datacom networks, voice over IP, Internet, fixed-mobile convergences, telecom-datacom convergences, SDH etc.

The team handling the international operators constists of Account Managers, Customer Solution Managers, and Contract Management. Currently the team handles eight customers and the goal is to have further six before new year.

The team is young and dynamic and the work environment ist entrepreneurial and fast moving. Four open positions exist at the moment:

#### CUSTOMER SOLUTION MANAGER

The tasks of the Customer Solution Manager are: In cooperation with the customer to define optimal solutions to maximise the customers business. Together with the account managers to secure that the offers bring maximised profits to the company. To be the link towards different product management units. To secure that a german telecom/datacom portfolio is established.

The internet business is booming and the team needs reinforcement of a person who has: A general knowledge about Ericsson's telecom product portfolio. An understanding of how business is created with ATM, Voice over IP, internet solutions etc. A general knowledge about datacom/internet/ATM solutions. An understanding of how the customer makes business in the telecommunication field

You should have a background from either product management, account management, marketing or business management. You have an extrovert personality and love speed and quick results. You are a team player who makes things happen and has preferably experience of customer dialogue.

### Simple is smart

- MultiDiameter technology

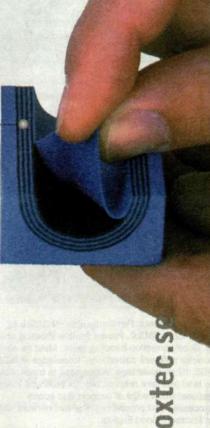
### The Module adaps to the size of the cable

The intensive development within cellular telecommunications and the computer area has resulted in a rapidly increasing demand for flexible cable penetration installation systems.

Rox System has proven itself to be a very attractive concept and many large telecom companies, globally, have chosen to replace conventional solutions with Multi-Diameter technology.

Rox System gives you

Engineering feasibility



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Installation flexibility

- Export suitability
- Customer adapted solutions
- Extensive support
- Cost-effective
  Try us next time!

Roxtec AB, Box 540, S-371 23 Karlskrona, SWEDEN Phone: +46-455366700, Fax: +46-45582012



Penetration seals with MultiDiameter technology

• The tasks of the account manager are: To handle all business with the customer. To be the commercial interface to the customer. To optimise the margin on the business with the customer. To plan the short and long term business with the customer.

The person applying has: A general knowledge about telecom solutions. An understanding of how the customer generates business

An account manager typically has got the responsibility for three/four accounts. Your background is either from account management or business management. You have a social personality and like working with other people. You are also good in expressing yourself both verbally and in writing. You like working in an environment where team work, result orientation and speed are buzz words. You have experience in customer discussions and negotiations.

#### TEAM LEADER ACCOUNT MANAGEMENT

• The tasks of the Team Leader for Account Management are: To handle own account (Account Manager role). to coach the less experienced account managers. To establish efficient ways of working with marketing and sales towards new operators

The person applying has on top of the requirements on account manager describes above, thorough experience of account management and customer negotiations. You are a leader who likes coaching other to even better results.

#### MAJOR ACCOUNT MANAGER / LOCAL BUSINESS MANAGER

• The Major Account Manager/Local Business Manager is account manager for one major customer. The MAM/LBM builds up a team around the account and is fully responsible for the results of the account in Germany.

The person applying has on top of the requirements on account manager (see above) thorough experience of account management and customer negotiations. You are a leader and have got a good understanding of how a major account is financially is controlled.

**Contact:** Magnus Rosenblad, phone: +49 211 534, memoid: edd.edd Hans-Jürgen Vratz, phone: +49 211 534 1441, memoid: edd.eddhjv Application: Ericsson GmbH Human Ressources, Hans-Jürgen Vratz Fritz-Vomfelde-Straße 14 - 18 40547 Düsseldorf

#### Ericsson Telecom Sdn Bhd

WE INVITE YOU TO BE PART OF OUR FUTURE

In Malaysia, Ericsson has more than 1,300 employees. Our continued commitment to the nation is supported by over 30 years of experience in building the country's telecommunications infrastructure. Malaysia serves as the gateway to the Asia Pacific region for our pool of specialists. Their expertise provides end-to-end solution in telecommunications and multimedia communications to our customers.

#### **BUSINESS DEVELOPMENT MANAGER**

• Requirement: Degree in Electronics Engineering/Business Administration. 3-5 years of experience in telecommunications industry. Excellent interpersonal skills.

The Job: To establish business opportunities within customer business units. To take lead in marketing activities including analysis of customer, market and competitors. Regular interface with customers and deliver presentations.

#### **BUSINESS CONTROLLER**

• Requirement: A qualified Accountant with Business Administration background. Minimum 5 years experience in Finance and Accounting. Good computer knowledge. Strong financial analysis skills. Excellent customer relation skills.

The Job: To prepare budget, quarterly estimate and annual business plan. To implement cost effective measures in improving financial status. To participate in profitability analysis of proposal/ tender and implementation services. To participate in sub-contractor committee in selection of services.

#### RF DESIGN ENGINEER

• Requirement: Minimum Diploma in Electrical/Electronic Engineering. Between 21-30 years of age. At least 5 years working experience in RF design works; exposure to indoor projects is an added advantage. Experience in engineering drawing aids and exposure to cell planning. Self motivated. Good interpersonal skills.

The Job: To be responsible for preliminary design proposals and coordinate with experts on technical issues. To take lead in technical proposals. To conduct RF survey works. To perform product identification for design and estimation of bill of quantity. To perform initial system tuning and monitor implemented systems. To prepare acceptance test documents and participate in the acceptance procedure. To perform coverage and interference predictions for sites.

#### MARKETING & SALES EXECUTIVE

• Requirement: Degree in Electronics Engineering/Computer Science or related qualifications. 2-3 years of experience in marketing in a telecommunications industry. Excellent interpersonal.

The Job:To prepare and administer technical tender documents. To handle before and after sales support and technical co-ordination with customers and principals. Make product presentations and attend negotiation meetings with customers. To report on market intelligence and information to strengthen sales forecasting.

#### SWITCH SYSTEM ENGINEER

• Requirement: Diploma/Degree in Electrical Engineering/Telecommunications. Minimum 3 years working experience in telecommunications industry in particular Switching System. Minimum 2 years experience in installation testing and commissioning of mobile exchanges and preferably with system support activities. Good technical knowledge of telephony signaling switching system architecture and functions. Good knowledge of Project Management.

The Job: To support in project management related to switch to ensure a timely roll-out of assigned project. To provide technical assistance and guidance in switch installation testing and commissioning as well as network integration testing. To support in resource activities to secure implementation resources. To prepare final acceptance test documentation on mobile exchanges.

#### SENIOR ENGINEER PRODUCT MAN-AGEMENT & NETWORK DESIGN

Requirement: Degree/Diploma in Electrical Engineering/Telecommunications. Minimum 3-5 years of experience in telecommunications industry. Experience in switching systems. Good written and spoken skills in English. Ability to work independently and to build up good customer relations. Good knowledge in Digital Cellular Radio/Radio Network Design/GSM BTS/TEMS or EET.

The Job: To participate in Product Management related activities such as product presentation to customers, preparation of tender documents, compilation of technical reference documents and collection of customer requirements focusing on Radio Base Stations and TEMS/EET.

To take lead in radio network design activities including traffic calculations, dimensioning and frequency planning, coverage estimations and representing Ericsson as technical experts in technical and commercial meetings related to network design.

#### MARKETING EXECUTIVE – MULTIMEDIA

Requirement: Degree in Information

Technology/Computer Science/Engineering. Between 25-32 years of age. At least 2 years of relevant working experience. Good understanding of issues relating to Multimedia. Excellent communications and presentation skills. Highly creative and entrepreneurial in approcahing business opportunities. Knowledge of system integration essential.

The Job: To assist the Marketing Manager to plan, seek, identify, develop and secure multimedia-related business

Application should include personal details, qualification, experience, a non-returnable photograph and current/expected salary to:

**Contact/Application:** Sugunah Verumandy, Human Resource Management Division, Ericsson Telecommunications Sdn Bhd, P.O. Box 8851, Pejabat Pos Kelana Jaya, 46799 Petaling Jaya, Selangor Darul Ehsan, Malaysia

Ericsson Telecommunications, Inc. (ENP) Manila, Philippines.

The TACS FSC in Philippines has a vacancy for a

#### MASTER SUPPORT ENGINEER

• The main responsibilities for this position are : Be able to work in a large live network consisting of seven MSC's and three stand-alone HLR's. Be able to perform trouble-shooting activities on/off site. Be able to perform HW/SW upgrades such as : APZ upgrades/AS changes/AC-A's/CN-A's/EC-A work. Participate in an "on call" rota, dealing with emergency situations. Trouble Report handling / CSR handling. Be able to provide a "Transfer Of Knowledge" to local staff. Be able to test/demo/implement new features/services if required. Be able to participate in regular Service Review meetings with the customer.

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The competence requirements are : Several years of Customer Support experience (minimum of two) working with TACS MSC's/HLR's. Strong knowledge of Test System and ability to troubleshoot software problems. Experience of APZ stoppage handling. Knowledge of MHS would be advantageous.

The applicant should be both flexible and be able to work under pressure that will be applied by a demanding customer. The successful applicant will be based in Manila although occasional travel to other locations within the Philippines will be occasionally demanded. Good knowledge of spoken and written English is essential. The contract offered will be for a period of six months or possibly for 1 year. Contract start date will be January 1999

#### Application: Michael Kelly at ENP.ENPMPK

#### Ericsson Australia Pty. Ltd

WANTED: ENGINEERS SUPPORT, DT, INSTALLA-TION

Services Australia would like to announce an exciting opportunity to be part of a Melbourne based team working on major regional mobile contracts. This Ericsson project makes available to you the opportunity to work with technology leaders and the latest mobile networks. Have you ever wanted to visit and work in

Australia? If so this is your chance.

This huge Services Australia project requires experienced staff for the following disciplines:

#### INSTALL TESTERS. INSTALLATION ENGINEERS. DATA TRANSCRIPT ENGINEERS. SUPPORT ENGINEERS.

• Contracts available exist for late 1998 and beyond.

Contact: Pauline Mooney, memo EPA.EPAPNM Application latest 981030: Pauline Mooney, EPA.EPAPNM.

#### Ericsson South Africa, Johannesburg, South Africa

#### ERLANG DEVELOPER

• Ericsson South Africa require a competent Erlang Developer for assignment in South Africa:

The job entails making modification to an existing design, meeting customers new requirements. The assignment will last for about Three months and can be extended for skills transfer to the local team.

Required for Job: Erlang and OTP knowledge, Some GSM knowledge, SS7/C7 knowledge, the ability to write to interfaces/API. Project management and documenting skills.

The applicant will be expected to show initiative and resourcefulness and will be required to direct a team of Junior developers in this proeject.

Contact: Shahin Cassim ( Manager - Application Development Center) MEMOID: ESA.ESASC Email: shahin@esa.ericsson.se Tel: +27 11 283 2262 ECN: 820 2262 Mobile: +27 832542074

#### Ericsson Data Malaysia

#### **SAP R/3 CONSULTANTS ASIA PACIFIC**

• Ericsson Data in Malaysia looks for experienced SAP R/3 Consultants to be the key players in building the Ericsson SAP Competence Centre in the Asia Pacific region.

We believe that you have worked as a Business Consultant, Project Manager or Applications Consultant in the SAP R/3 area for a few years and feel it is time for a true challenge (probably) far away from your current workplace. With your background we expect you to have a broad and deep knowledge about R/3 and that you have the ability to share your knowledge with others.

We also expect that you are a person that, get things done, work very well with other people (as well as on your own) and enjoy working in a demanding but positive environment. That you are fluent in English and prepared to travel.

You will be working in three main areas : SAP R/3 implementation projects. Competence development of others. Establishment of the Ericsson SAP Competence Centre in Asia Pacific.

The placement of the positions will be in Kuala Lumpur in Malaysia. Are you interested ?

**Contact:** Mikael Hansson on mobile +46 70 591 73 02 or email mikael.hansson@edt.ericsson.se Memo ID: EDT.EDTHAMI Or Björn Taube on mobile +46 70 662 03 45 or email bjorn.taube@edt.ericsson.se Memo ID: EDT.EDTBJTA Or Wong Pooi Yin on phone +603-7087112,email ecmwpy@xchg. emy.ericsson.se Memo ID: ECM.ECMWPY

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# **Ericsson Eurolab**

The main responsibility of the training department is to support EED in its' ongoing process of building up the technical competence of its' internal

#### **Senior Training Engineer** - Internal Training

Project-No. 01/198

- The main tasks in this position will include: - Provide professional technicl training
- Development of training products - Support competence build-up in international
- project activities

As a suitable candidate, you have a solid technical education and good experience in Mobile and/or Fixed Networks, S/W Maintenance and/or Testing and APZ (IOG, CP). You have already prepared and held courses about Ericsson products, especially AXE10 including AXE10 Survey, -Platform, -Testing & Operation courses. You should also be familiar with project work.

We require excellent communication skills in English; knowledge in German would be an advantage but is not a must.

Team and result orientation, initiative and selfmotivation are also important personal qualities. Furthermore you need a strong interest in people and be absolutely service-minded. Please contact.

r rease contact.		
Human Resources	Manager Training	
Simon Seebass	Carsten Bruns	
Memo: EED.EEDSIMS	Memo: EED.EEDCAB,	
Dial: +49 2407 575 163	Dial: +49 2407 575 114	

#### AXE Mobile Core (AMC)

The AXE Mobile Core (AMC) System House at location Herzogenrath/Aachen is responsible for development of core products used commonly by all Ericsson digital mobile systems i. e. CME20 (GSM), CMS30 (PDC), CMS40 (PCS) and CMS88 (D-AMPS).

Our AMC System House at EED consists of the AMC operations and the design & test department

The AMC operations department is overall responsible for all activities from requirement management to integration test at our 15+ design centers working for AMC.

We are organized into product-, systems-, project-, quality- & methods-management. We also have an AMC lab group responsible for pre-development and prototyping

The AMC design & test department (former TCS) is responsible for development within product area traffic control and overall for function and system integration test activities within AMC.

#### **Process Engineer**

#### Project-No. 14/198

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The main responsibilities are the improvement of work processes within the AMC organization and monitoring the usage of the AXE 108 methods in The position is located at Ericsson Eurolab

Deutschland GmbH, Herzogenrath, and reports to EED/U/OOC.

The main tasks include Coordination of process management (PM)

activities nent of PM projects Project manage

Maintenance and improvements of design processes Establishment, maintenance and improvements

of operational processes

Being the driving force for process management As a suitable candidate, you should be familiar with the Ericsson-way-of-working and the existing processes in your current work area. Inowledge of different methodologies used in oftware engineering is a definite plus. You hould have a very good knowledge in how to

establish, maintain and improve processes. Working as a moderator and consultant a structured way of thinking, excellent communication and cooperation skills, perseverance and the ability to be the driving force for PM are important personal qualities. Overall you should see this job as a challenge in improving our existing way of working. Participation in international AMC meetings is also part of the job. Fluency in written and spoken English is a must.

If you have questions and/or are interested, please refer to your colleagues until the 15.10.1998:

Manager Methods & Quality AMC

Andreas Bleeke Dial: +49 2407 575-394

Memo: EED.EEDANB

Human Resources Simon Seebass Dial: +49 2407 575-163 Memo: EED.EEDSIMS

#### SYSTEM TEST ENGINEERS Proj.-No.: 31/98

These projects perform in an international environment and cover a vast range of development areas at the leading edge of technology, such as ISDN, IN and and Internet access. You will work with the definition and execution of SIT aswell as

trouble shooting on the faults found. Your main authorities and tasks comprise: - Definition of the prerequisites to perform a verification of the test object on AMC level in both target and simulated environment.

Performance of the test execution and reporting of the result verification. Trouble shooting.

As a suitable candidate you have good knowledge of mobile telephone systems, you are flexible, show initiative and have good communication and cooperation skills. The ability to work under pressure is also an important personal feature.

Furthermore, fluency in written and spoken English is pre-requiste. Experiences from System Verification/Test are of clear advantage.

#### Human Resources FED/U/TVC Mats Erlandsso EED.EEDMERL **Simon Seebass** FED FEDSIMS +49 2407 575 163 +49 2407 575 635

#### **PC-XSS Support** Proj. No.: 08/398

The AMC system groups are responsible for the

Please contact:

system development of the core products used

amonly by all Ericsson digital mobil systems. unning PC-AXE 106 Mobile, PC-XSS 210 25 as well as overall technical coordination of the projects in AMC are responsiblity areas of the ystem groups.

To be able to handle all the responsibilities assigned to PC-XSS, there is a need to involve one additional person that could support the chairman and in the long run take over the responsibility for PC-XSS.

PC-XSS is an inspection forum with the following purposes

- maintain XSS (APT) system properties and structure - ensure that uniform solutions are implemented

in XSS - handle allocation of functionality to products

- act as a decision making body when a number of PC-ANTs cannot come to a common decision handle allocation of functionality to products

We are looking for an AXE SW designer with at least 3 years experience, who is interested in developing the overall system competence and is nterested in leading and driving an inspection forum. As a suitable candidate you have good nunication and cooperation skills and are able to understand complex technical problems.

Please contact: EED/U/OTC Human Resources Kristina Martelius EED.EEDNKA Simon Seebass EED.EEDSIMS +49 2407 575 692 +49 2407 575 163

#### AXE10 DATACOM ENGINEERS Proj.-No.: 16/398

The border between telecommunication and data-

communication is becoming more and more diffuse. AMC needs to strengthen the competence in the datacom area focusing especially on mobile interworking and TCP/IP. We need a person to represent AMC on the system level and to contri bute to the evolution of datacom within AXE10. Your responsibilities would be to perform datacom system studies, investigations and to develop datacom strategies. Some of the results could then be objects for prototyping in a lab environment. You will cooperate with colleagues within the Mobile ons, PN and UAB.

We are looking for a system or software engineer with at least 4 years of Ericsson experience, preferably TCP/IP and/or mobile Datacom experience.

Please	contact:

Human Resources	EED/U/ORC
Simon Seebass	Gert Wallin
EED.EEDSIMS	EED.EEDGEW
+49 2407 575 163	+49 2407 575 80 58

#### AXE10 SYSTEM DESIGNERS

Proj.-No.: 21/398

AMC System activities are steadily growing, mainly due to fixed mobile convergence. To meet this challenge we need to expand.

We are participating in early project phases and are performing pre- and feasibility studies.

We are also evaluating new technologies and

perform tasks which require high competence and rofessionalism

To strengthen our capabilities for this type of system work, we are looking for an experienced system designer with more than 3 years of Ericsson experience in AXE10 design.

We are particularly interested in candidates who can provide significant competence in one or more of the following areas: AM System development, Signalling, Data Communication, O&M, Resource Module Platform, Hardware Modernization, PDC system, D-AMPS system. Due to the type of work performed, some travelling may be necessary.

Please contact:	
Human Resources	EED/U/ORC
Simon Seebass	Gert Wallin
EED.EEDSIMS	EED.EEDGEW
+49 407 575 163	+49 407 575 80 58

#### **Strategic Product Manager**

Proi.-No. 20/398 The Strategic Product Manager will be responsible for the product planning of product areas con-cerned as: ISDN Access (PRA, BA, V 5.2, ...),

Network Signal Whithin product planning, you define the direction of the development of the AMC products based on your assessment of the competitiveness and economical performance of the product over the entire life-cycle.

You inspect requirement specifications and approve function specifications. For your product area(s) you prepare the financial frame agreements with the Local Design Centers and order the development and maintenance work of AMC products. Review of the financial agreements proposed by other business units is also included.

As a suitable candidate you should have a technical background with at least 3 years of job experience, preferably in systems design and/or project management.

Please contact:	
Human Resources	EED/U/OXC
Simon Seebass	<b>Ola Melander</b>
EED.EEDSIMS	EED.EEDOME
+49 2407 575 163	+ 49 2407 575 255

#### AXE10 SOFTWARE DESIGNERS Proj.-No.: 34/98

AXE Mobile Core TCS development is responsible for design and maintenance for subsystem TCS whithin AMC and function/system test for AMC. We are participating in the execution phase and performing feasibility studies. To strengthen our capabilities in this area we are looking for an experienced SW designer in the AXE 10 area. You should be familiar with PLEX design methods and be able to perform technical studies as well as preparing technical documentation.

You should be flexible and cope with a dynamic environment. A first experience in UML or SDL would be an advantage

We are looking for a designer with 2-3 years of experience preferable in the AXE 10 area. Furthermore, fluency in written and spoken English

is required. Please contact:

Human Resources FED/U/TGC Simon Seebass EED.EEDSIMS Jo Wilke EED.EEDJOW +49 2407 575 163 +49 2407 575 399

#### **Circuit Switching** Systems (CSS)

Our CSS System House at location Herzogenrath/Aachen is part of the huge GSM family and involved in nearly all activities from requirement definition to customer supply and support around the Circuit Switching System (CSS) of AXE/CME20:

- Systems Design and Operational Product Management (EED/X/D)
- CSS/GSM Project Office (EED/X/R)
- Software Design for MSS and MMS (EED/X/P) INDUStrialization, Test Configuration
- Management, Product Line Maintenance (EED/X/S)
- World Class Provisioning of GSM products (EED/X/T)
- Software Supply and Support (EED/X/Y)

#### System Engineering and

#### **Product Management**

Migrating from GSM to the Future Proj.-No. 07/398

AMC in the area of function test, design maintenance and longer term Methods & Tools issues We are working in the area of GSM 900,1800 and 1900 systems. We are looking for people who like to affecting testing. This central STE support group

design the evolution of our GSM markets to the next generation of networks in a responsible positions.

We are the right place for business-oriented system engineers that like to work for UMTS, nternet networks, GSM systems and mobile data. You directly control the next version of Ericsson's products in the mobile world market. You are esponsible for European standardization (ETSI) and you join also sales teams in Europe and middle East to boost Ericsson's market success

Suitable candidates are familiar with system engineering of 3-5 years of AXE. Being a technical coordinator, project leader, doing marketing descriptions, giving customer presentations and doing technology evolution in the forefront of telecommunication development should give you the fun professional life has to offer.

You should enjoy to work on an entreprenercial basis and have the ability to set the right priorities within an everchanging environment. Business trips to European standardization gremia, Stockholm as well as to customer sites will enrich your day to day life.

Please contact: Frank Adelhardt, tel +49-2407-575-287. eedfad@eed.ericsson.se Andreas Thuelig, tel +49-2407-575-246, eedant@eed.ericsson.se: Simon Sebass, Human Resources, tel +49-2407-575-163.

eedsims@eed.ericsson.se.

The CSS/GSM project office at EED in Herzogenrath is responsible for all GSM Circuit Switching System projects from TG0 up to GA. We have the responsibility for overall CSS/GSM resource management, CSS/GSM Project roadmap establishment and co-ordination of all MSC/ VLR development operations based at EED, EUS, ERA, LMF and IXG.

#### **Overall Function Test Leader MSC/VLR R9** Proj.-No. 59/98

GSM/CSS R9 will be Ericsson's GSM delivery for the year 2001, containing development for the traditional GSM customers, satellite operators, GSM-Railway and most likely the first GSM part of the 3rd generation system UMTS.

- Your main tasks comprise - overall responsibility for MSC/VLR function
- test activities; involvement in related projects like AMCph7
- and GDB R9.

broad competence in the area of Circuit

the ability to work under pressure and to meet

Total Project Manager for CSS/GSM R9

GSM/CSS R9 will be Ericsson's GSM delivery

raditional GSM customers, satellite operators,

GSM-Railway and most likely first parts of the

As TPM R9 you will be responsible for the GSM

switching system development project from pre-study until general availability. This covers the

relevant node-level projects (e.g. MCS/VLR, GDB, SOG/BGW) as well as ordering responsibility

from our associated projects from e.g. AMC and

and FOA activities on our various markets.

from TG1 (feasibility study) up to MS 10

The project volume is expected to be in the

magnitude of ca. 200 - 300 kmh (excluding

EED/X/RTC

**Thomas Funke** 

EED.EEDTFU

The position is located in the CME 20 SS STE

Support Group under TCM. The group is respon-

sible for supporting STE activities within CSS and

Project Manager R9 MSC/VLR

UAB. The project will conclude at GA after INDUS

The project volume is expected to be in the magni-

You will be responsible for the MSC/VLR project

ode level project belonging to

EED/X/RC

+49 2407 575 546 +49 2407 575 135

Abbas Sabokba

EED.EEDSAAB

(system release). The MSC/VLR project will be

tude of ca. 600 - 800 kmh, excluding associated

for the year 2001, containing development for the

As a suitable candiate you have: profound project management experience;

Switching and its environment,

3rd generation system UMTS.

the tight deadlines.

Proj. No.: 52/98

projects

Proj. No.: 54/98

CSS/GSM R9.

Please contact:

Simon Seebass

EED.EEDSIMS

+49 2407 575 163

STE Test Engineer

Project-No: 9/298

Human Resources

associated projects).

will not only support EED but also other LDC's that perform CME20 SS related test and main-

tenance activities

new assignments.

Please contact:

Human Resources Thomas Kommer

+49 2407 575 7828

CME20 SS releases

We are now looking for a

**AMC7** Function Test

Proj.-No.: 24/398

TCM.

rience (desirable),

Please contact:

Simon Seebas Human Resources EED.EEDSIMS

+49 2407 575 163

**TCM Project Manager -**

CME 20 SS R8 INDUS

Proj. No.: 23/398

EIR and HLR).

project management.

Please contact:

Human Resources Simon Seebass

EED.EEDSIMS

+49 2407 575 163

**IN Specialist** 

Project -No 17/398

EED.EEDTKO

work throughout Ericsson.

As a suitable candidate, you have experience in AXE function testing or design maintenance. Experience with MGTS PASM, TSS 2000, TTCN and C coding is of added value. You also have to be service minded and prepared to quickly take

In this position you will have the opportunity to travel, perform new tools evaluations, come up with new testing strategies and increase your net-

#### EED/X/SOZC Jan Lindquis EED.EEDJLI +49 2407 575 460

The CME20 SS "Produkt Line Configuration Management Section (EED/X/SO)" has the central Test Configuration Management Responsibility for development projects from TG1 to GA of

#### TCM Project Manager - CME20 SS R9/

Your main tasks are planning and coordinating all TCM activities for the function test project.

These activities include Data Transcript, Dump Assembly and Test Network Configuration, AS Specification, Program Production, Parameter Administration, MHO Administration, and

Library Specification and Production. You will work closely with the CSS and AMC design and function test project leaders as well as the overall CME22 SS project manager.

- have AXE competence as designer, tester, or in

- have previous line or project management expe-

have strong organization, planning, coordination, and communication skills.

Dan Grinstead EED/X/SOC EED.EEDCGR +49 2407 575 341

The R8 project will provide digital switching solutions for three customer segments: satellite operators, GSM-R (GSM for railway) and traditional GSM operators. The project consists of elements from CSS (MSC/VLR), AMC, GPRS (SGSN and GGSN) and GDB (SOG, BGW, AUC,

You will work in a leading position within the Product Line Configuration Management Section, a motivated and experienced team of 38 people ble for all activities required to execute TCM projects. The TCM organisation is responsible for integration of products designed within three related design projects executed by the AMC, CSS and PA-SC organisations. The main tasks are planning, execution and control of TCM activities for the verification testing conducted at EED.

You will also coordinate TCM activities at distributed locations (three ASOs and one stand-alon FSC). TCM's activities include program production, AS specification, parameter administration. library specification, data transcript design, dump assembly and MHO administration.

A good candidate has competence in the area of AXE design, testing or TCM. Previous experience in project or line management and a good under-standing of TCM and verification/INDUS proces-ses is desirable. A good understanding of PROPS odology is a plus. As project manager you will be coordinating closely with the INDUS

> EED/X/SOC Dan Grinstead EED.EEDCGR +49 2407 575 341

#### **GLOBAL Support for the No.1 AXE application**

The Product Line Maintenance section takes central responsibility for the worldwide CME20 Switching System. It is considered as the primary competence centre for CME20 SS.

We have accepted the responsibility to verify IN solutions in a CME20 SS environment, providing high quality loadfiles to our customers. Your experience in

testing and/or development of the AXE IN platform (ideally for Mobile) (SDP, Service Scripts,

SMAS) - development and implementation of IN scripts - sharing your knowledge with team members will make you the central technical person in our IN team.

Join us, develop your skills and secure your future with the CME20 Switching System Product Line Maintenance team.

Opportunities for travel, networking, personal and technical development are outstanding. Watch yourself make a global impact with your efforts. Please contact:

Human Resources FED/X/SLC Thomas Busch EED.EEDTHB EED.EEDSIMS +49 2407 575 178 +49 2407 575 163

Project No 39/98

#### **Experienced Troubleshooters GLOBAL Support for the No.1 AXE application**

The Product Line Maintenance section takes central responsibility for the Worldwide CME20 Switching System. It is considered as the primary competence centre for CME20 SS.

Our strong resources reflect our responsibility for troubleshooting and testing on system level. Your contribution to the Help Desk team is: - Excellent testing and trouble shooting experien-

ce in Mobile AXE switching systems and their latest developments

- Commitment to provide solutions to our
- customers - Team spirit

Join us, develop your skills and secure your future with the CME20 Switching System Product Line Maintenance team.

Opportunities for travel, networking, personal and technical development are outstanding. Watch yourself make a global impact with your efforts.

ED/X/SL
Russell Hegg
ED.EEDRUH
49.2407.575-668

#### Tester Product Line Maintenance (PLM) **GLOBAL Support for the No.1 AXE application** Project No 18/398

The Maintenance section takes central responsibility for the Worldwide CME20 Switching System. It is considered as the primary competence centre for CME20 SS.

We have accepted the responsibility to verify solutions in a CME20 SS environment, providing high quality loadfiles to our customers.

Your contribution to the AC Testing team is - minimum 3 years testing experience in AXE

mobile switching system: good system overview

focus on our customers concerns

oin us, develop your skills and secure your future with the CME20 Switching System Product Line

Opportunities for travel, networking, personal and technical development are outstanding. Watch yourself make a global impact with your efforts.

Please contact Person Human Resources EED/X/SLAC Simon Seebass EED.EEDSIMS Nasser Farha +49.2407.575-409 +49.2407.575-163

#### **General Packet Radio** Service (GPRS)

The System House GPRS (General Packet Radio Services) at location Herzogenrath/ Aachen is responsible for the development, verification, support and supply of products in the field of GPRS.

GPRS is aiming for the combination of data communication and mobility. GPRS is currently standardized as an extension of GSM.

The department EED/D is responsible for the development and maintenance of the GPRS core systems OMS and PXM and for the GPRS applications VLR, SMS and PTM.

The unit Product & Operations (/D/P) just recently got the assignment to build up the Central Configuration Management (CCM) for Ericsson's GPRS products.

We are looking for:

#### **Configuration Manager GPRS** Proj.-No. 4898

who will enable us to secure, enhance and extend our current configuration management activities in the areas of:

- Development Environment (ClearCase, imake) Software/System Builds
- · Integration of PRIM/GASK/Trouble Reporting
- Trouble Report Handling (Introduction of ClearDDTS)

As a technical CM you need a good understanding of software version control, UNIX and Makefile systems. Knowledge of ClearCase and/or imake is an asset.

You need to bring initiative, very good communication and cooperation skills as well as a good ability to work under pressure.

lease contact:	
luman Resources	EED/D/PC
Simon Seebass	Stefan Eissing
ED.EEDSIMS	EED.EEDSTE
49 02407 575 163	+49 02407 575 155

#### Senior System Designer GPRS Proj.-No. 6998

We are looking for Senior System Designers who will enable us to enhance and extend our current GPRS Phase 2/UMTS standardization activities and system design of the GPRS Support Nodes (SGSN and GGSN). This task comprises:

- support for Ericsson's ETSI delegates within the Ericsson-wide standardization projects and active participation in ETSI as an Ericsson representative
- analysis of ETSI change requests
- support and influence of the design project with respect to the latest developments in ETSI support of internal customers and local product management
- investigation of the current development in IETF in order to actively influence the development in UMTS at an early stage

As a senior system designer you need a proven, solid background in the technical principles of GSM. Of special importance for this position is a good understanding of the GSM circuit switched data services and preferably also Direct Access and GPRS. Experience with typical datacom protocols such as IP. TCP/UDP. HTTP, PPP, DHCP, RADIUS, RSVP, etc. would be beneficial

Since this task requires extensive contacts to Ericsson internal personnel and to external customers and competitors, you need very good communication and negotiation skills as well as a good command of the English language. An already well established personal Ericsson network will support you to fulfil this challenging task.

Please contact:

Human Resources Simon Seebass +49 2407 575 163

EED/D/PC Stefan Eissing EED.EEDSTE +49 2407 575 159

#### Senior Software Designers GPRS Proj.-No.: 16897

The main tasks for the position are: either design of the GPRS bearer service (SMS, VLR, class A/B mobile support) or O&M product developm (OMS,PXM).

The job is performed in teams with a large degree of responsibility and authority, comprising all parts of the product life cycle from early requirement analysis up to maintenance after GA. There will be a close cooperation with the 1&V subproject at EED. Thus, we have the opportunity to see our products being integrated and verified in the real GSM datacom network.

As the GPRS organization is still rather young, there is the freedom to be pioneer for processes, system ire, usage of programming lang platforms. On the other hand, we have well defined projects and clear delivery deadlines for our

For the GPRS bearer service, the languages ERLANG, C and JAVA are used. O&M applies C++, JAVA, ERLANG and the CORBA architecture.

We are looking for persons with proven experience in the technical domain and a strong team orientation. A solid SW engineering background is a requirement. Either local or expat contracts can be offered for these positions.

Please contact: **GPRS Design Manuger Human Resources** Simon Seebass Andreas Daun EED.EEDAND EED.EEDSIMS +49 2407 575 163 +49 2407 575 163

**Ericsson Eurolab Deutschland GmbH** is a young Research & Development center located in the middle of Europe. More than 1000 employees from about 30 different nations are working in 3 locations in Germany. Due to a continuous growth we have a number of new positions for experienced engineers.

www.eed.ericsson.se



Location Herzogenrath/Aachen



**Location Hildesheim** 



Location Nürnberg



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No. 14 October 8 1998

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# contact

#### Ericsson, HF/LME/I, Room 811023, S-126 25 Stockholm

# Rented art provides variety

Ericsson's internal bank was looking for hip, young art to decorate its new office at Telefonplan. They wanted to have innovative art that would speak the same language they did. With assistance from Ericsson Real Estate, they found an unusual solution - renting art from the National University College of Fine Arts in Stockholm.

Renting art is something completely new for Ericsson. My idea was that it would provide variety. The same pieces of art won't be hanging on the walls for years and years, but rather there would be constant change, continual new creations," says Helena Hambraeus Victorson, manager for architecture and furnishing at Ericsson Real Estate.

The internal bank's new offices were finished at the end of last year. But the employees were not very happy with the coffee room. Empty coffee tables standing against cold walls in a tiny break room did not fulfill any useful function in an office filled with young currency traders working in a fast-paced market environment.

#### Hip new art

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"We are a growing, young company. Since we work hard, few people have time to sit around and drink coffee. We wanted the furnishings and the art to say something about us," says Annica Renqvist, project manager at the internal bank, and who had a hand in designing the new office.

Helena Hambraeus Victorson re-envisioned things. Out went the coffee tables and in their place came s-shaped standing tables, bar stools and a modern sofa grouping.



Annica Renqvist, project manager at the internal bank, had a hand in designing the new office.





Magnus Lindholm's tree paintings are being rented by Ericsson and hang in the internal bank's break room. The tree is a centuries-old linden located near the artist's studio. Photo: Mauro Rongione

In addition, she contacted the National University College of Fine Arts in Stockholm and asked if they had any talented art students who were willing to rent out some art to Ericsson.

The school responded favorably. Three oil paintings by art student Magnus Lindholm, depicting a linden tree, were chosen. They became the first paintings to be rented by Ericsson for a six month period.

#### Ericsson rather than dust

"It's fun that my art can be make someone happy rather than just gather dust in my studio. Of course it isn't as prestigious to have ones' art rented out to Ericsson as it is to have it on exhibition in a gallery, but I am a rather unpretentious person," says Magnus Lindholm.

Magnus views the rental agreement as a sponsorship of sorts.

"I believe that it will become increasingly

common for companies to sponsor art. Some people are skeptical about it, but I think it's just fine. I'm on my way to Majorca to paint for awhile. There, art is a status thing, and while people can have differing opinions about that, it does, in any event, create opportunities for supporting oneself."

With the new furnishings and the artwork, the internal bank has created an environment that goes hand in hand with its image.

"We are very satisfied. It looks hip and the motif on the paintings, a tree, is a symbol for something that lives and grows. Our manager has said that he may not be able to resist buying them," says Annica Renqvist, laughing.

So who knows, perhaps the rental agreement will become a purchase agreement in the end.

Mia Widell Örnung

mia. widell@lme.ericsson.se

UPCOMING

Wednesday, Oct. 7-Thursday, Oct. 8: Ericsson Management Forum in San Diego, California. Some 400 of the company's top executives will discuss Ericsson's new strategies and organization.

Monday, Oct. 12: The new Ericsson will be presented to all employees. A press conference will be held. thttp://inside.ericsson.se/now.

**Tuesday, Oct. 13:** Contact will publish a special issue with information from the meeting in San Diego, which will be distributed to Ericsson employees worldwide during the week.

#### UPDATE

Thursday, Oct. 1: Cat Logistics, a subsidiary of Caterpillar, acquired Ericsson's distribution center in Huddinge, south of Stockholm, with 350 employees.

Sunday, Oct. 4–Thursday Oct. 8: Intelec '98 in San Francisco, California.

Monday, Oct. 5–Friday Oct. 9: Ericsson participated in the Internet World trade fair in New York.

#### NEW ASSIGNMENTS

**Per-Olof Sjöstedt** has been appointed president of Ericsson's subsidiary in Russia, Ericsson Corporatia AO. Up until October 1, he was stationed at Ericsson Nikola Tesla in Croatia.

**Yngve Redling** will assume the position of regional manager for Western and Central Europe at the corporate marketing department. Previously, he was president of Ericsson's Russian subsidiary.

Lars Lindén has been appointed president of Ericsson's company in Uruguay.

The new manager of Ericsson Radio Systems' sales office in Dhaka, Bangladesh, is **Ivar Lunde**. He succeeds Hans Helgestrand, who is returning to Sweden.

#### 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 June 30, 2003. For additional information, access the web site: http://inside.ericsson.se/converti.htm



#### CONTENTS # GCNNOION Exciting new material Contact's quick guide to antennas Broadband for the masses 9 New technology increasing capacity in fibres

#### **OCTOBER 1998**

# **Exporting silicon experts**

Tord Nilsson will be one of Ericsson's representatives in a research project at Belgian development company, where he will become an expert able to maximally utilize silicon chips.

Demands on compact, power-efficient silicon solutions increase dramatically when images and video are incorporated in mobile networks. The processors require enormous computation capacity for multimedia, which consumes large amounts of energy. The problem for design engineers is that these algorithms require a different architecture for low-power designs that is not possible with current technology. New solutions are also needed to implement multiple algorithms on a single chip.

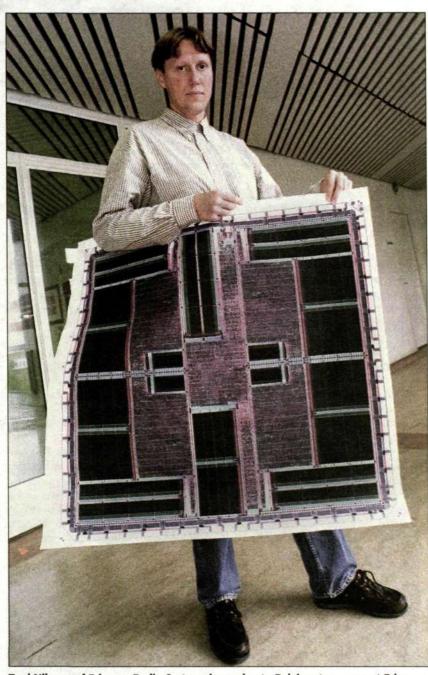
"We don't have enough engineers to handle all the developmental work that is needed, and we have to find faster ways to develop new products and cut costs," says Peter Olanders, who works with radio technology research at Ericsson Radio Systems.

Ericsson recently signed a three-year agreement with Imec, an research company in Belgium. Imec has already made some progress with MPEG4 (Moving Pictures Experts Group), the new standard for mobile multimedia. Per Tjernlund, who supervises all contacts between Ericsson Radio Systems and the research world, including universities, says Imec has become a highly accomplished designer of complicated circuits with digital signal processors and other blocks on the same ASIC (Application Specific Integrated Circuit)

According to terms of the agreement, one Ericsson researcher per year will take part in Imec's research project. The assignment calls for encoders and decoders for the MPEG4 technology, which poses a genuine challenge. The agreement also provides Ericsson researchers with opportunities to acquire new knowledge in a cutting-edge technology. During the first year of the agreement with Imec, Ericsson will be represented by Tord Nilsson, who joined the company 10 years ago. Tord Nilsson has comprehensive experience in microelectronics, with particular emphasis on signal processing. He moved recently to Leuven, about 20 km from Brussels.

#### **Extreme power efficiency**

"Low power consumption will be the overriding concern in the project. The chip should be so power efficient that it can be used in a terminal," says Tord Nils-



Tord Nilsson of Ericsson Radio Systems is moving to Belgium to represent Ericsson in a program of research cooperation with Imec of Belgium. The program is focused on finding the optimal architecture for a silicon chip. Photo: Anders Anjou

son. "At the same time, we will be starting a project at Ericsson in Kista to allow me to share what I learn from the Imec project in Leuven. I don't know yet what product we will be working with, but we need to have an application and a time frame in which to work."

Possible products are terminals, base stations and other equipment for nextgeneration mobile telephone systems. However, it is not the product, but the know-how, that is important. Imec has been working for some time to develop tools for optimizing silicon design, and it is these tools and methods that are of interest for Ericsson.

Terminals, base stations and other aspects of mobile telephony's next generation are included among probable products for the new technology. The knowledge, however, is more important than which products will benefit. Imec has worked for years on the development of tools to support optimal silicon designs, and Ericsson will concentrate on the tools and methods developed by the Belgian company.

"Thus far, we have not had any really good methods,," Tord Nilsson continues.

"We have always worked exclusively inhouse, but all of our architectures have been developed as part of independent projects, and the acquired experience has spread from project to project. We now have the opportunity to start with a fresh slate."

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#### Compromises

The difficulty in realizing algorithms in silicon is that a number of parameters must be balanced against each other. These include the processor's computational capacity, available technology, power consumption, price and a flexible hardware design that accommodates changes in the application.

Solving the equation starts with studying how an ideal processor should be designed to handle the various parts of the algorithm as efficiently as possible. Then a compromise is chosen that meets the requirements of all applications and compared with the optimal design. These results provide feedback to designers who may rework the parts of the algorithm with the most extreme requirements. The results may also indicate that it is better to use several processors, lower speeds at lower supply voltage levels, or other possibilities

"My job includes determining whether Imec can create an automatic flow that facilitates the decision-making process and to see if they have the tools needed to determine when an architecture is the most economical in terms of power and surface area," relates Tord Nilsson. "Because of the very large number of parameters, it would take far too much time to make these considerations manually"

#### Approaching the limit

Optimization at the architectural level becomes increasingly important as designers approach the limits for silicon development. The principle called Moore's Law states that silicon capacity doubles every 18 months. The law had held true thus far, but moving to smaller geometries has been the key to maintaining this pace of development.

"I'm not sure if silicon will be able to maintain the same development pace for very much longer," Tord Nilsson says. "Although we still have a number of tricks at our disposal, it's very obvious that more stringent demands will be placed on architecture in the future."

> Lars Cederquist lars.cederquist@era.ericsson.se

http://www.imec.be



### Venezuelan order for Mobitex

IN BRIEF

➤ Ericsson has received an order from Telcel, a Venezuelan operator, for a Mobitex wireless data network. The main application areas will be interactive messaging services and credit-card verification in retail shops.

Ericsson has installed Mobitex technology in more than 20 countries. The network in Venezuela, which will serve all major metropolitan areas in the country, will be taken into operation in Caracas in the beginning of 1999.

#### Nokia serves the hearing-impaired

➤ Nokia recently introduced an accessory product based on induction technology that enables hearing-impaired people to use mobile telephones. A cord carried around the user's neck is connected to his/her mobile telephone.

The new product turns off the microphone in the user's hearing aid, which serves instead as a receiver of electromagnetic energy generated by the accessory. The energy is converted into noise heard through the hearing aid. The only sound transmitted, accordingly, is produced by the telephone. All background noise is eliminated.

### Ericsson displays future in the U.S.

➤ A facility for demonstrating thirdgeneration mobile phone technology will be constructed at Ericsson's U.S. headquarters in Dallas, Texas. The technology on display will include transfer of highspeed data and video applications over a mobile network at speeds of 384 kilobits per second. The display facility, which will be erected in cooperation with AT&T, is expected to open its doors during the second quarter of 1999.

#### One network, two technologies

➤ An operator in Russia has contracted Ericsson to deliver the world's first network able to handle both GSM and NMT standards. The new technology offers greater cost-efficiency for operators, enabling them to use the same transport network and some of the same equipment for both mobile telephone standards. Multiregional Transit Telecom (MTT) of Russia will become the first operator to use the new technology.

#### Motorola increases R&D investments

➤ Motorola, the American telecom company, has invested USD 600,000 in a research project focused on development of telephones for wireless multimedia. Conducted in cooperation with Northwestern University, near Chicago, the project is designed to enhance wireless voice communications and messaging. It will soon be possible to radically reduce the size of circuit boards and, for the first time, integrate electrical and optical signals on one board using a common production process. A new material that represents a blend of plastic and glass will pave the way.

The material is called Ormocer, a transparent substance that may be likened to a blend of glass and plastic. Ormocer is an inorganic-organic photopolymer that could revolutionize the world of data and telecommunications. For the first time, it will now be possible to integrate electrical and optical conductor channels in the same circuit. The properties of Ormocer accept metallization and, by applying the new material in several layers so the surface containing the optical conductors has a higher refraction index than surrounding layers, optical signals can be transmitted in the same way they are processed in optical fibers.

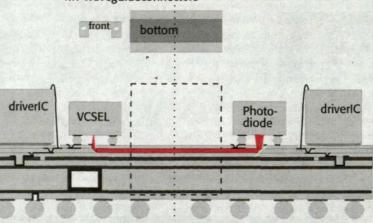
Development work on the new material was started more than 10 years ago in Germany, and the current project has now entered its fourth year. As one of many participants in the project being financed by EU, Ericsson was recently assigned overall responsibility for the development of demonstrators using the new technology.

#### A few more years

It will take a few more years before the revolutionary electro-optic solution becomes a reality, but Ormocer offers other advantages that may be utilized in the near future. The composition of the new material makes it possible at relatively low temperatures to pattern tight electrical traces on various types of substrate materials such as silicon, ceramics, metal and low-cost glass epoxy. Ormocer has strong adhesion qualities and, in some cases, may be used as bonding agent. The material can also be applied in very thin layers that will reduce by more than half the thickness of connections between components and circuit traces, which will offer savings in terms of surface area, lavers and passive components.

"I plan to use the technology to design much denser traces in my project with the flipchip technique and naked circuits," says Arne Tolvgård, who works with micro-construction for the American Standards business unit of Mobile Systems. "My work will be part of Erics-

MT-waveguideconnectors





son's contribution to one of the demonstration projects planned for the new material, and I hope to have a prototype finished by the middle of next year."

Arne Tolvgård has a vision of radio base stations no larger than 10x10 centimeters. Circuits will be placed on a metal plate that will also serve as the cooling plate and rear section of the base station, which will feature tightly packed digital circuit boards, the radio unit and antenna. The product will be smaller, signal paths will be shorter and power consumption will be lower. To achieve his vision, Arne Tolvgård needs the new technology to draw small, finely engineered conductors to the components and socalled bumps on the edge of the chip. Measurements now being mentioned are in the range of 50 one-thousandths of a millimeter between layers in the substrate and distances of 20 one-thousandths of a millimeter between the traces.

"One example we have studied is a concept whereby we mount and encapsulate the digital circuits in multichip modules," Arne Tolvgård says. "This would enable us to reduce the size of circuit boards by about 60 percent, the number of passive components by about 40 percent and save several layers in the process. The only problem we foresee is getting rid of the heat, but new substrates are available today that offer improved heat-conduction properties.

"The most unique aspect of the project is that it represents the first time we can integrate electric and optical connections in the same structure, without extra process steps," says Mats Robertsson, who recently transferred from a research posi-



tion at Ericsson Components to the Industrial Microelectronic Center (IMC) in Jönköping.

#### Saving space and energy

One advantage of optic technology is the capacity to process extremely large amounts of information per time unit over very high frequencies. Optical connections require less space and energy than electrical connections. The technology provides potential to create optical transceiver units and optical connections over short distances at only a fraction of today's costs. It represents a major breakthrough in mass-production of inexpensive, high-performance products for various Internet services, for example. Feasible application areas encompass virtually all Ericsson products, exemplified by switches, base stations and active antennas as well as access products such as fiber for private homes

"We still haven't reached the industrial phase of our Ormocer development work," says Mats Robertsson. "We are now in the process of verifying the industrial process in various projects, examining financial ramifications of the material and studying various other aspects of Ormocer and its potential. We believe the first products using the new material will be launched within the next three years.

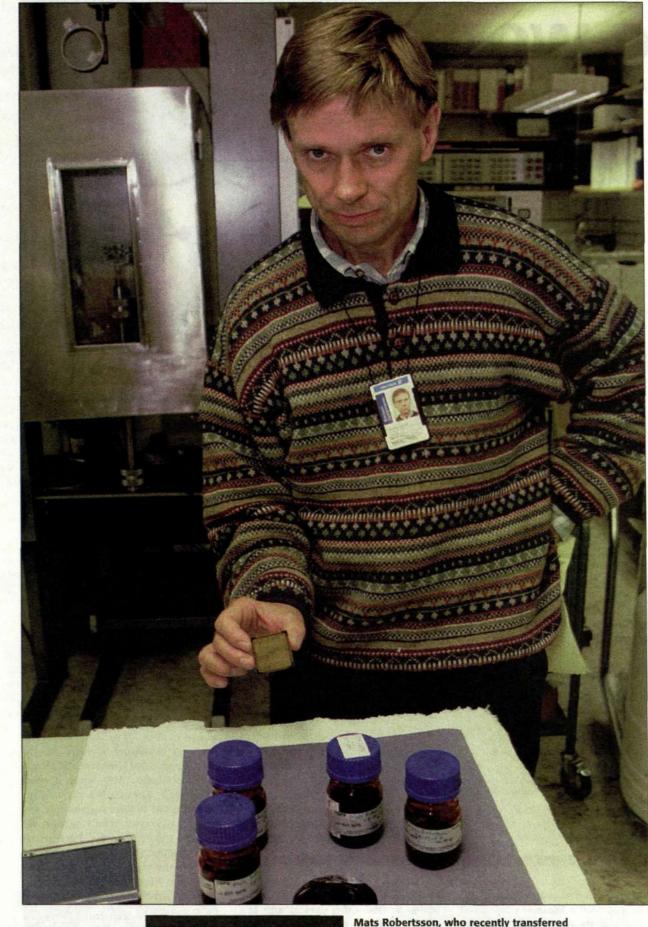
> Lars Cederquist lars.cederquist@era.ericsson.se

#### Additional reference material:

Popall et al: "ORMOCERs – New Photo-Patternable Dielectric and Optical Materials for MCM-Packaging," pp 1018–1025.

M.E. Robertsson et al: "O/e-MCM-Packaging with New, Patternable Dielectric and Optical Materials," pp 1413–1421 of "Proc 48th Electronic Components and Technology Conference, Seattle 1998."

The illustration shows an opto-electronic demonstrator with three Ormocer, thinfilm layers and three electrical conduction layers on a circuit board substrate with four electrical conduction layers and a ball grid array (BGA) on the bottom for mounting/soldering. The second layer of Ormocer contains light guides (red) and electric routing holes.



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# New material combines optics and electronics



Mats Robertsson, who recently transferred from a research position at Ericsson Components to the Industrial Microelectronic Center, shows a circuit board an opto-electric module. The board contains several optical transceivers arranged in pairs with linear light guides. The optical function can be tested electrically before it is divided into separate modules; production of 2,500 modules, for example, measuring one-square centimeter each, on a single board substrate yields extremely low production costs. Photo: Anders Anjou

# Network control from the air

➤ A new approach to the design and structure of wireless broadband networks was tested near the end of September. Angel Technologies and its business partners have created a regional network based on high-altitude aircraft instead of satellites or towers. The new Halo Network covers an area with a diameter of approximately 100 kilometers.

The network can process data speeds up to several megabits per second.

It's extremely easy to connect to the Halo Network. Users only have to draw cable to an antenna on the roof or outside their window. Because of the very sharp angle to the aircraft circling in the stratosphere high above all other aviation corridors, the risk of disturbances is minimal.

The airborne network is also connected to ground networks to transmit and receive data from subscribers outside the Halo Network.

The airplane is specially designed to remain in flight for long periods of time. The network provides 24-hour service through the use of several planes that overlap each other in flight.

A corresponding satellite network is much more expensive to install since it would require a total project from the start. The utilization of aircraft also enables the operator to expand the network one city at a time.

It's also easy to upgrade the airborne technology installed in the planes, as opposed to satellites, which remain frozen from the time they are launched.

http://www.angelcorp.com



#### Ericsson Review in its 74th year

➤ Ericsson Review is a technical journal published by Ericsson since 1924. It contains articles on topical technologies and in-depth reviews of ongoing research in Ericsson – an ideal alternative for readers who may think Contact's technical theme issues do not delve deep enough into the subject matter.

Ericsson Review is accessible on the web, in addition to printed versions published quarterly in English and Spanish.

Subscriptions are free of charge as of this year. Orders may be placed at the web site listed below.

The next edition of Ericsson Review, No. 3/98, will include a presentation of the Bluetooth technology for wireless communications between different types of portable electronic equipment. It also contains an article about Erion, a new solution for optical transmission networks.

http://www.ericsson.com/Review/

# Wireless networks may be worth billions

A wireless computer network lets you move freely with your laptop – whether on the job or at the conference hotel, or wherever you happen to be – while retaining a full-capacity connection. The industry is talking about a multimillion-dollar market growing in pace with the increasing proliferation of portable computers.

W-LAN stands for Wireless Local Area Network. Underlying the W-LAN is therefore the local network at a workplace – a network that is almost always an Ethernet network with a capacity of 10 megabits per second. It is often shared by several users. The development trend in local networks is tending toward solutions where all users have access to their own transmission capacity of ten megabits per second. In practice, this opens up possibilities such as video conferences in real-time.

W-LAN is a way to let the office computer user cut the cable and move freely around the premises. To date, capacity is less than that of fixed networks, but sufficient for the difference to be imperceptible in ordinary office work. All that is needed for a wireless system is to install base stations/access point throughout the premises at about 150-meter intervals as desired and to link these to the Ethernet LAN with an ordinary connection. The laptop user then inserts a small PC Card radio modem with antennas into the computer. Additionally, to prevent unauthorized access, firewalls are constructed around the access points to the LAN.

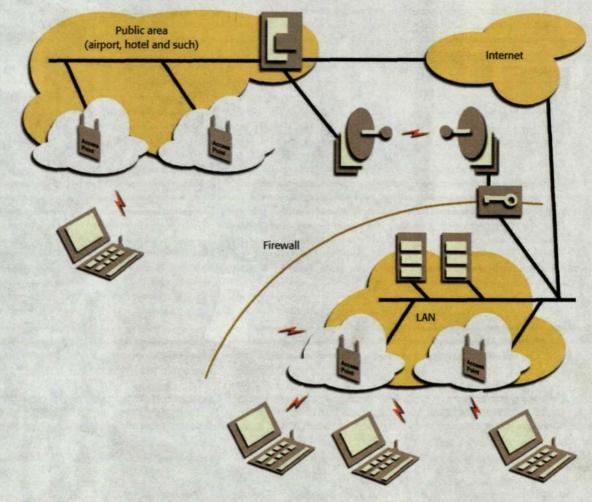
#### Growing need for connection

"This is the first step toward a wireless LAN," says Mikael Jonsson, W-LAN product manager at Ericsson Radio Systems. "Probably, the first breakthrough for the technology will occur in the workplace. We have a growing need to be continually connected to the Internet, to intranets, e-mail, etc., during the working day – even while in transit between conference rooms or buildings. The portable

#### ERICSSON'S W-LAN SOLUTION

The equipment that Ericsson is now offering for wireless LANs consists of several parts.

The computer user requires a type-II PCMCIA card and Windows 95/98/NT. It can handle 3 megabits per second with a range of 150 meters indoors and 600 meters outdoors. An access point connecting the wireless network with the Ethernet is also needed. This connection allows three megabits, but it can increase capacity up to five times if more access points are linked together. The unit's range is 150 meters indoors and about one kilometer outdoors. The access units also monitor traffic and connections to other cells.



The figure shows how the wireless computer network allows for mobility while still being connected to the workplace network

computer will soon be just as important as the telephone."

The next step is to cover strategic places outside the workplace with cells containing base stations for a wireless LAN, which is then connected to the local network by an Internet provider. The provider establishes a link, via the Internet or specially dedicated lines, to the company's local network or directly out to the Internet. The Internet provider thus acts as operator of the W-LAN in the public area, but it is also conceivable that a mobile operator could decide to supplement its network with a W-LAN. The investment in base stations is relatively small, while the potential for increased traffic is great.

In the public area, mobility will be limited, however, since the W-LAN is not so much about mobility as about capacity. Users should be able to experience the same rapid access to their data services they have from the office. An Internet connection can be a bottleneck. One solution would be to use special dedicated high-speed lines. The idea is that ten to twenty users can be connected in one cell and share 25 megabits per second. This means an average of a couple megabits per user, with and extremely high speeds for brief intervals.

"However, it will take a couple of years yet before we reach that stage," says Mikael Jonsson. "It will be possible with the next broadband standard for the 5GHz band, called Hiperlan/2 (High Performance Radio LAN), which is being promoted by Ericsson. What is currently offered is two to three megabits per second. That, however, is fully sufficient for most of today's office and Internet services. Another solution would be to increase the number of base stations. Don't forget that many fixed LANs cannot provide full capacity either when being used by several users."

#### Standard means breakthrough

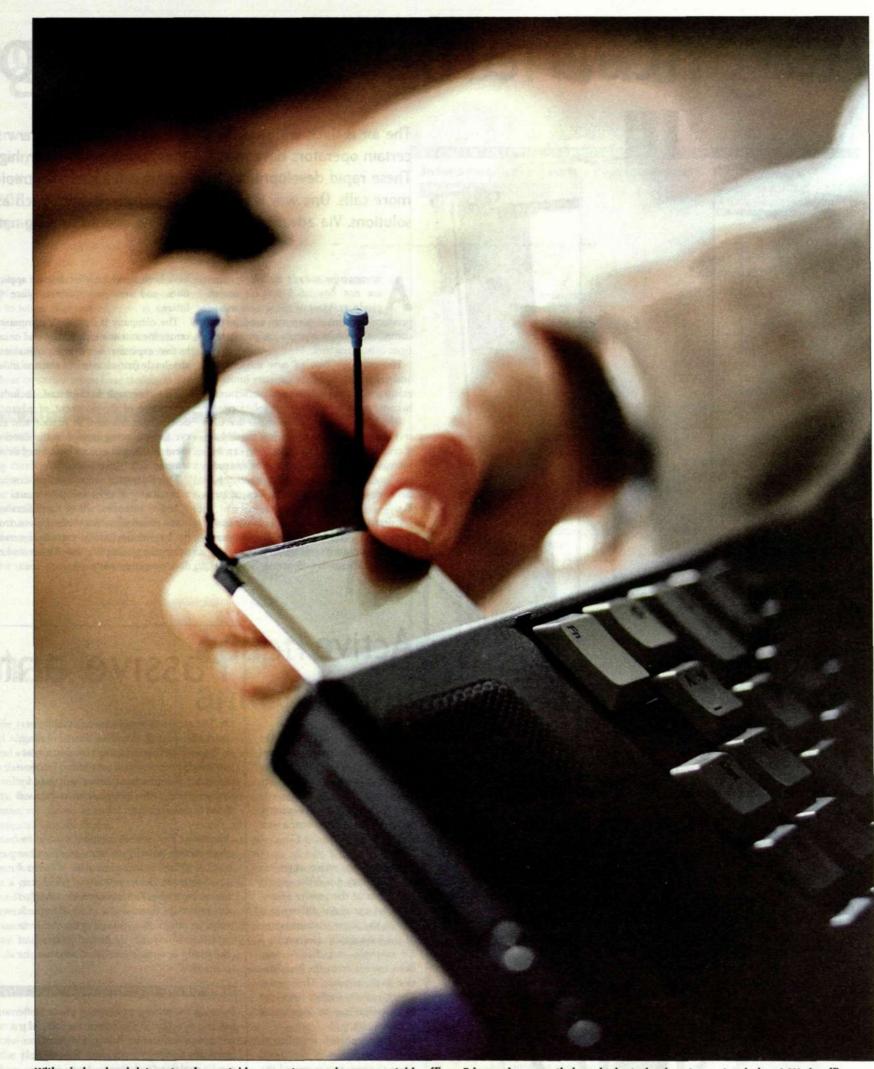
A year ago, the Institute of Electrical and Electronic Engineers (IEEE) established an international standard for wireless LANs – an important step toward a breakthrough. The IEEE standard was defined for the 2.4 GHz band, a frequency area where almost any type of radio equipment is allowed to broadcast.

The IEEE standard has now specified two separate radio technologies to support two megabits per second – frequency-hopping spread spectrum and direct-

The system includes an Ethernet bridge that can link up separate wireless LANs – for example, between two buildings.

The unit developed by Ericsson includes a firewall for security. Installed between the local network and the access point, it forces users to establish their identities and access rights and then ensures that all information transmitted is encrypted so that the user can work as safely as in the internal LAN. The encryption occurs in accordance with the new IP-security standard and in such a way that both the data component and the address component are encrypted. An important aspect of wireless LANs is mobility – that is, that users can move around within the network range. Wireless LANs are optimized for data communication. Other services such as voice transmission can also be supported, but on data-communications terms, – for example, voice over the Internet protocol.

Previously, wireless LANs were used by small businesses for tasks such as barcode reading and forklift steering. The technology was used by small specialized companies. Today, all large players – such as Lucent, Nokia and Motorola – are involved with wireless-LAN technology. Other players in the computer industry have also begun to show interest.



With wireless local data networks, portable computers can become portable offices. Ericsson has recently launched a technology to create wireless LANs in offices and public places. Photo: Alexander Crispin

sequence spread spectrum. Ericsson recommends frequency-hopping since this technology permits a tighter arrangement of cells without their interfering with each other -a useful characteristic in extending a wireless LAN to a larger network, for example, in an entire building. Coverage density can be increased in any area so that the network can handle up to 15 megabits per second, with 3 megabits per second per user.

The next developmental step will be to

globally reserve the 5.2GHz band for wireless LANs, as the broad frequency band provides essentially the same high capacity as fixed LANs.

More than 20 megabits per second effective capacity is the target for the

Hiperlan/2 standard. That, added to the fact that it will be an open standard, may prove a strong boost for the mass market.

Lars Cederquist lars.cederquist@era.ericsson.se

# Advanced antenna technology - an Ericsson strength

The air is thick with mobile phone calls. The flow of new subscribers is unabated, and already certain operators have reached their capacity ceiling in high call-density areas of large cities. These rapid developments have made it necessary to create new solutions to make room for more calls. One way is to exploit new frequencies - such as GSM 1800 - but there are other solutions. Via advanced antenna technology, an existing network's capacity can be increased.

ntennas for today's mobile systems are not one of Ericsson's major products. Most of the simple massproduced antennas currently used in the company's mobile systems are purchased from subcontractors.

However, the flow of new subscribers and the stretching of the capacity limits of existing networks is forcing manufacturers to come up with new antenna solutions.

By means of advanced antennas that direct output power to where it is needed at a certain time, network capacity can be increased. Certain easily installed systems can enable operators to strengthen their network quickly in high call-density areas.

Ericsson's extensive antenna know-how is extremely valuable in the development of these advanced systems. In Mölndal, at Ericsson Microwave Systems, antennas

have been developed for defense applications and aerospace projects since the fifties.

The company is Ericsson's competence center for antenna technology, and its collective expertise is currently considered absolutely first-class in the antenna indus-

This thorough background, including experience of development of advanced defense systems such as Arthur and Erieye, is now being tapped in the development of the next generation of mobile antennas

There are two main lines of development of antennas for mobile systems.

Active antennas, where amplifiers and other electronics have been moved from the base station to the antenna, intended primarily to simplify installation and reduce operators' costs.

Adaptive antennas, which exploit the antenna, Asta, has been beta-tested in a principle of phase shifting to direct output power to where it is needed most at any given time.

Ericsson is working on products in both these areas. The Maxite base-station solution, with an active antenna connected to a small base station, a micro base station, is already on the market. The first adaptive

#### HOW AN ANTENNA WORKS

In an antenna, an electrical and a magnetic field is generated by applying an alternating current to a conductor. The conductor, which is the antenna, can be designed in various ways depending on area of application.

The two fields combine to form an electromagnetic wave that is transmitted from the antenna. In the receiving antenna, the wave causes an alternating current with the same frequency as the current that created the wave in the transmitting antenna. Thus, the signal is transferred between two antennas. The wave that radiates from the antenna forms a lobe. In a simple antenna, where the current vibrates in a simple rod, the wave radiates in all directions around the antenna. The lobe is then said to be 360 degrees wide.

### Active antennas

► Active antennas allow the operator to quickly build a mobile network or reinforce existing networks in high call-density areas.

Ericsson's Maxite concept combines an active antenna with a micro base station.

Function: An active antenna's function does not differ greatly from that of the passive antennas. The one major difference is that in the active antenna, some of the base station electronics for example, amplifiers - have been moved from the base station to the antenna. This creates a high radiation effect while the base station can be kept small and compact.

Mobile network installation and construction is facilitated when the operator is spared the heavy cabling usually used to minimize losses between base and antenna.

Another advantage is that there is no need for cooling of the high power amplifiers in the base station, since they are located in the antenna which is cooled by the outdoor air.

### Passive antennas

> The antennas used in today's mobile networks are passive antennas. The technology is "passive" in that it does not contain any active components such as amplifiers. Ericsson does not manufacture passive antennas for separate sale; rather antennas are purchased from various subcontractors.

Function: The passive antennas used in today's mobile systems are often group antennas. A group antenna consists of several small antenna elements, each of which creates its own lobe. The lobes cancel each other out in certain directions and reinforce each other in others. By positioning the elements in different ways the shape and direction of the group antenna's combined lobe can be controlled.

#### TIME OR PHASE SHIFTING

By using the principle of time or phase shifting, the direction of the composite lobe of a group antenna can be changed without mechanically twisting the antenna. The principle can be explained as follows:

If two stones are dropped at the same time onto a water surface, the wave created by the combined rings moves outward in parallel with an imaginary line connecting the points of impact of the stones. If one of the stones is released a moment before the other, the rings created by the first stone will always be ahead of the rings created by the second

In a mobile system, the antennas should have a broad radiation pattern on the horizontal axis and a lobe that is narrow and concentrated on the vertical axis so that the radiated energy will propagate as far as possible. Consequently, the various elements of the passive antenna are placed in a column hence the elongated antenna shape.

In more modern passive antennas the elements are designed as microstrips.

Each element consists of a thin patch mounted on a grounding plate. The patch and the grounding plate are separated by an insulating layer. In the patch an alternating current is created via a feeder line, which is usually placed under the grounding plate. The current in turn creates an electromagnetic wave

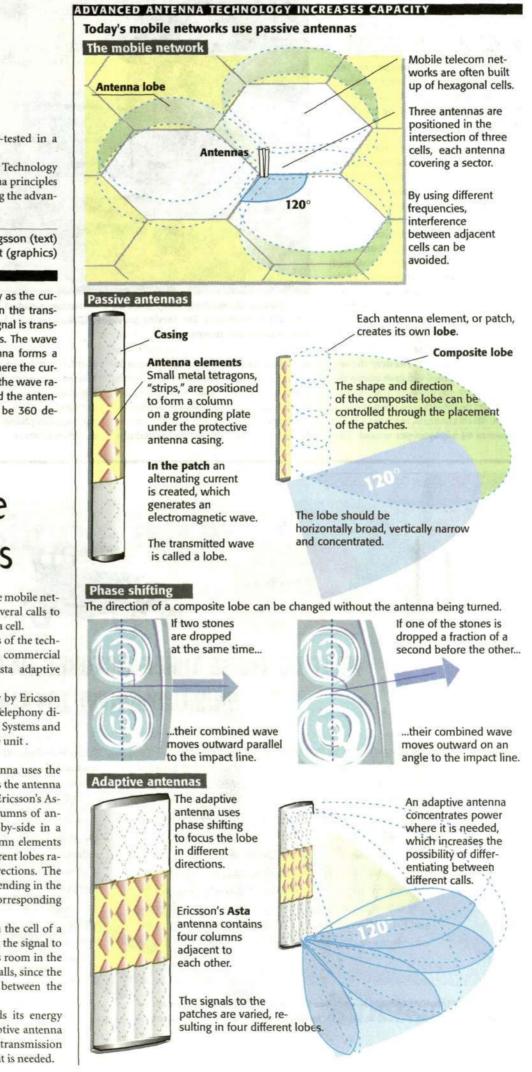
stone. The combined wave will now move outward at an angle to the imaginary line between the stone impact points.

Similarly, the direction of the combined lobe of a group antenna can be controlled. The stone impact points correspond to the various antenna elements. By changing the intervals between the pulses, the direction of the combined lobe can be changed.

Normally, phase is varied by signals from the antenna elements. The principle is the same as in the example above, where time is the variable

antenna.

manner



commercial mobile network

On these two pages, Contact Technology will explain the various antenna principles and provide background giving the advantages of each type.

> Niclas Henningsson (text) Mikael Parment (graphics)

### Adaptive antennas

> Adaptive antennas increase mobile network capacity by allowing several calls to take place simultaneously in a cell.

Recently, the first beta tests of the technology were carried out in a commercial network using Ericsson's Asta adaptive

Asta was developed jointly by Ericsson Radio Systems, the Mobile Telephony division of Ericsson Microwave Systems and the Antenna Technology core unit .

Function: The adaptive antenna uses the phase-shift principle to focus the antenna lobe in different directions. Ericsson's Asta antenna contains four columns of antenna elements placed side-by-side in a row. The signals to the column elements are varied to create four different lobes radiating in four different directions. The direction to the telephones sending in the cell is determined in a corresponding

Identifying the position in the cell of a telephone and concentrating the signal to that particular phone creates room in the cell for more simultaneous calls, since the capacity for distinguishing between the calls increases.

A passive antenna spreads its energy throughout the cell. An adaptive antenna covers a larger area since the transmission effect is concentrated where it is needed.

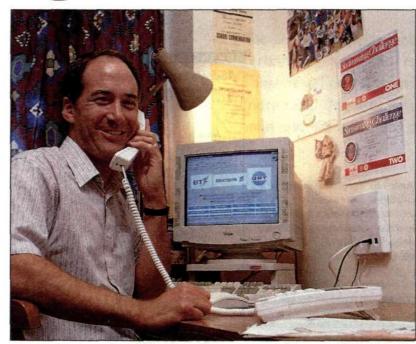
**Helping home surfers** 

A couple of weeks ago, British Telecom (BT) unveiled a new service called Home Highway. Using Ericsson's Eristream product, the service converts ordinary home telephone jacks into conduits to the information superhighway. Improving on ordinary telephone service, households can now receive ISDN service or several different telephone numbers using existing wiring.

In order for the system to work, a network interface about the size of an older style modem is required. At the local telephone exchange, the regular line card is replaced with an ISDN card. An upgrade of the exchange software is also required.

When installed, households gain the use of two ordinary telephone lines (PSTN numbers) independent of each other. A feature much appreciated by those trying to calling someone who is constantly connected to the Internet. But it gets even better than that. It is possible to have ISDN capabilities which allow for a transfer rate of 128 kilobytes per second. In that case, both of the regular telephone lines will give a busy signal.

Another possibility is to use just one of the two ISDN channels, reaching a transfer rate of 64 kilobytes per second. That



John Dunbar shows how things look on the consumer end of things for those who utilize Eristream. The service provides ISDN capacity to households without having to do any rewiring.

allows for telephone for calls to be made at the same time. Whichever method is used, the transfer rate is significantly higher than with an ordinary modem.

Yet another advantage of ISDN, in addition to higher transfer rates, is that it is also faster to make connections with the Internet, for example. No time consuming handshakes between computers are required.

Other telephone services are not affected by Eristream. "The nice thing about Eristream is that nothing needs to be done to existing wiring. It is easy to install and does not affect other subscriber services such as call forwarding, for example. Nor are devices such as answering and fax machines affected," says John Dunbat at Ericsson's British company.

Development of Eristream was conducted primarily in the U.K., under the auspices of home communications within the Public Networks unit. In addition to Ericsson, the British telecom company Telspec has also been involved in developing Eristream.

The idea for Eristream came up in discussions between Ericsson and BT. The operator was concerned about losing telephone and Internet customers to cable TV based networks. An inexpensive way for households to easily hook up was required.

The European standardization organization ETSI has classified the technology under the name NMDS (Narrow band Multiservice Delivery System). That means that other manufacturers can adapt their exchanges to this technology and that Eristream can even be installed in networks that do not use Ericsson exchanges.

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### WHAT DO THESE THREE PICTURES HAVE IN COMMON? "DNINDLOADUNAM TOARTNOO

**G**USA. Companies such as Microsoft, Hewlett Packard and Cisco selected their electronics production on contract at an early stage. Two factors have been crucial for their decision: it gives more profitability and they can concentrate on their core business.

And all three have chosen Flextronics.

When we launched this big American innovation in Sweden, we were unsure of what the reaction would be.

It was an immediate success. There are many Swedish and European companies who want to concentrate time and money on their core business. Previously, there was no choice, but now Flextronics offers a solution. Our main business is manufacturing of electronics. As we can share our investments among many customers, the costs per manufactured unit are always lower with us.

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# Speedy modem for homes in major Ericsson launch

Ericsson is now launching a concept that can radically increase data speeds for home users. The new technology, which is called ADSL Lite, blows away conventional modems.

Modems are the weak spot in the steadily advancing PC industry. A 56 kilobit/s modem cannot keep up with today's processors and software.

Behind the scenes, the telecom industry is working hard to develop a common standard for ADSL Lite. The technology functions in the same way as a modem, except with 30 times better performance, which enables telephone lines to be used for datacom services at a much higher level of quality than today. When the standardization work is finished sometime early next year, a major breakthrough for ADSL technology is expected. The industry is calling it a milestone in the computer age.

ADSL technology provides a solution. A consumer version called ADSL Lite is now being standardized. Instead of 56K, speeds will rise to 1.5 megabit/s. When

Rox System allows the flexibility to install and replace cables,

including preterminated ones. Handling also IP ratings and EMC makes it a perfect product for telecom

the standard is approved some time early next year, a breakthrough is anticipated.

"The modem has long been the weak link," says Peter Linder, product manager for ADSL Lite.

#### Simpler version for consumers

ADSL, which stands for Asymmetric Digital Subscriber Line, is a technology that increases capacity in ordinary telephone lines so that they can be used for large volumes of advanced data traffic. ADSL Lite has been developed to meet the consumer requirements for a highspeed modem that is inexpensive and easy install.

Forecasts indicate that more than half of future telecom investments will be in the access network, so this is where the money is.

#### Ericsson active on several fronts

The PC world's main players, computer supplier Compaq, software developer Microsoft and processor manufacturer Intel took the initiative about a year ago to develop new, more powerful modems

#### HOW IT WORKS

ADSL (Asymmetric Digital Subscriber Line) is a technique that opens ordinary subscriber lines for large volumes of data traffic. It is used in the access network, which is the last mile between the local station and the subscriber.

The telephone station transmits a mix of conventional telephone traffic and data. A filter splits out the data signal and sends it to the ADSL modem, which is a kind of signal converter.

Unlike ordinary modems, an ADSL modem works with high frequencies. This is why ADSL can transmit information at significantly faster speeds than conventional modems.

for ADSL. The International Telecommunications Union (ITU) is also working on a specification for ADSL Lite. Ericsson is active in both forums.

Ericsson is strongly promoting ADSL and was one of the first suppliers to develop a good solution. Customers in Europe, Asia and the U.S. have been testing

The signal coming from the ADSL modem requires further conversion before it can be interpreted by a PC or a set-top unit connected to a television.

An ordinary ADSL modem supports speeds up to eight megabits/s. A conventional modem offers 56 kilobits/s. ADSL thus increases the capacity of the access network 150 times, which makes it suitable for business customers.

ADSL is designed for business customers and for simultaneous transfer of data and video to households. ADSL Lite is primarily aimed at private customers, with the U.S. market on the forefront. ADSL Lite is simple to install; no specialized knowledge is necessary.

the system since last spring. Several field studies in datacom services and video transmission have also been performed. Ericsson's strength lies in its thorough knowledge of network construction.

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#### The Module adapts to the size of the cable

The intensive development within the cellular telecommunications

and computer industries has resulted in a rapidly increasing demand for flexible cable penetration installation systems. Rox System has proven itself to be a very attractive concept and many large, global telecom companies have chosen to replace conventional solutions with MultiDiameter technology.

Rox System is available in 70 markets and provides

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# **Rainbow solves** traffic problem

British Telecom (BT) is increasing the capacity of its international telephone network using a new kind of product from Ericsson. The product, known as Ericsson Optical Networking, or Erion, is an especially interesting newcomer to the company's product portfolio. It utilizes DWDM, technology designed to significantly increase the capacity of existing fiber-optic networks.

Erion was developed in record time for a market which is currently experiencing extremely rapid growth, driven by an enormous increase in Internet traffic.

DWDM, or Dense Wavelength Division Multiplexing, is a technology which makes significant increases in the capacity of existing fiber-optic networks possible. Operators, whose networks have become bogged down with Internet traffic, can use this technology to create space for more traffic and more customers. The alternative is to bury new fiber-optic cables, a very expensive proposition for an operator with networks all over the United States, for example. As a result, the market for DWDM technology has recently exploded.

According to Ryan Hankin & Kent, a well-respected American consulting firm, the U.S. market alone will have grown from only a few hundred million dollars last year to more than four billion dollars three years from now. Practically all local and long distance operators in the U.S. are moving full speed ahead to expand their fiber-optic networks using a fiber-optic network from one point to DWDM technology.

#### Late but rapid entry

It was only a year and a half ago that Ericsson began its own DWDM development. Although late to enter the field compared with its competitors, that delay has now been overcome by a development project which has proceeded with record speed.

"We knew from the beginning that we had to take a different approach with this project and that some sacred cows would have to go," says Anders Lundberg, Anders has been the project manager for the development project which was able to unit that worked with transport network



Photo: GreatShots

present its first commercial project less than a year after starting.

#### Strong focus on TTM

"Initiative, responsibility and flexibility have been our guiding principles. And we have focused very strongly on TTM -Time to Market," explains Anders. "That is essential in a market with very strong competition and rapid growth, resulting from the rapidly expanding data traffic." .

Anders is proud that this development project has now also resulted in another important product - Erion Networker - a DWDM application which does much more than simply increase the capacity of another

"Using Networker, we can offer a network solution for short- and mediumrange distances. This has been especially promising for American and European metropolitan areas. In this respect, Ericsson has come a bit farther than most of its competitors in the market, despite the late entry."

#### **Built using previous experience**

When the DWDM project started up, it was staffed primarily by people from the company's Transport Network Application Lab (TNAL) and from the research

DENSE WAVELENGTH DIVISION MULTIPLEXING (DWDM) - HOW IT WORKS

technology (SDH) at the Kungens Kurva facility outside of Stockholm.

"In that way, we were able to base development work on actual experience within the fields of network topology, economics and security, as well as indepth knowledge of optical transmission theory. There were a number of good ideas for projects," says Ulf Silvergran, manager of the DWDM product line

#### Sonera the first customer

The first product to see the light of day from this project was Erion Compact, an eight channel system. Telecom Finland, now known as Sonera, was the first customer. The Finnish operator was one of the DWDM pioneers within Europe.

The primary market for Erion Networker, now that it is on the market, is the U.S., where a major customer will probably soon be revealed.

"The feat of developing two strong products so quickly, and to now be vying for the important U.S. market, is something which has cost a lot of blood, sweat and tears. That is often the case with product development, especially in this project which, so far, must be viewed as a notable accomplishment and a triumph of teamwork," says Ulf Silvergran,

#### New challenges waiting

"We have implemented new ways of working together through the Erion project, ways which have yielded good results very quickly. Now, new challenges are waiting just around the corner. In the razor sharp competition of this market, we have to move forward and develop our ability to quickly handle several additional development projects simultaneously. At the same time, we have to also provide customer support including operation and maintenance," says Magnus Grenfeldt, product manager for WDM.

Carl-Magnus Hallberg, program manager for the Transport and Cable Networks business unit agrees. "Much has been accomplished since the Erion project was started, but what we have now is just the first of several different building blocks which are required for in order to establish Erion as a really strong line of business within Ericsson.

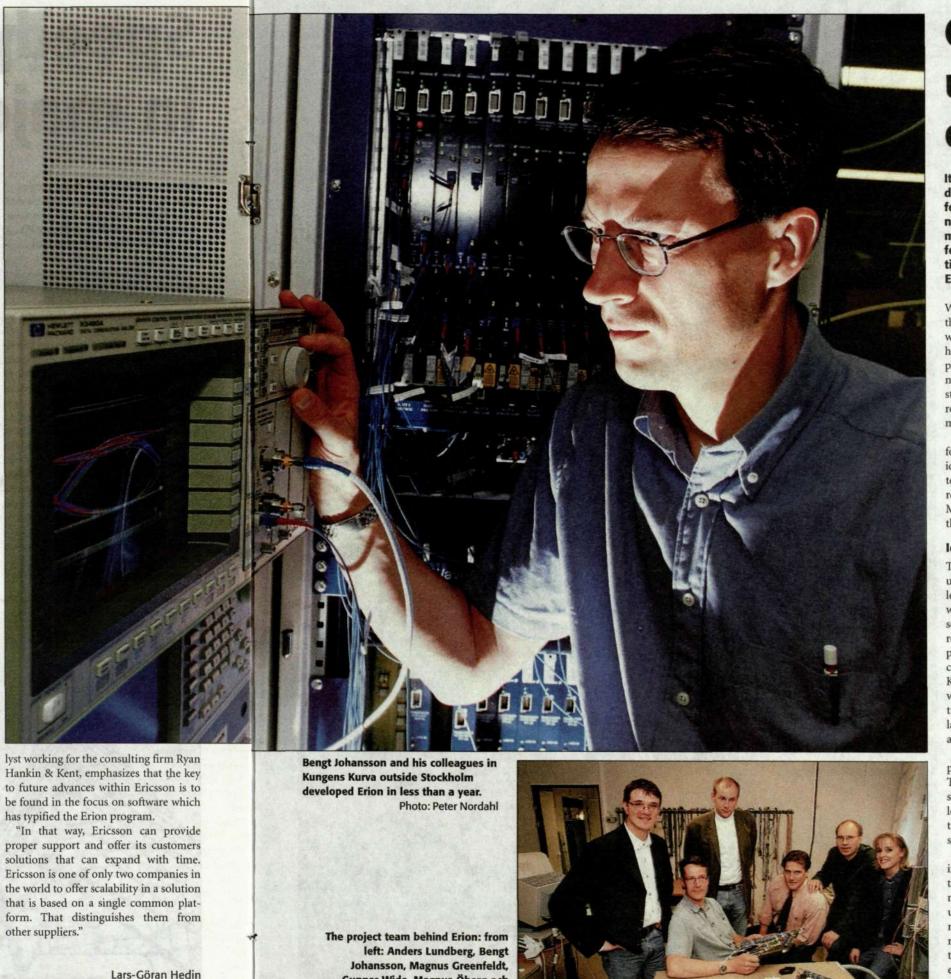
Mat Steinberg, a leading industry ana-

through the fiber-optic threads, capacity is increased by the same number of wavelengths the light is split into, at least theoretically. More about this later, Lasers, not prisms, are what is actually used to divide the incoming stream of data into separate optical wavelengths. Using this technique, the stream of light contained within the cable is able to operate at very high bandwidths and with the capacity to transmit data at gigabit speeds.

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wavelengths. They are combined and sent through the fiber-optic cable to DWDM equipment at the other end which then splits them up into different signals. Such a

CONTACT TECHNOLOGY, OCTOBER 1998 CONTACT TECHNOLOGY, OCTOBER 1998



Gunnar Wide, Magnus Öberg och Jennifer Noland

link can carry many different kinds of traffic within the pacity lowering interference to be found on every chansame fiber. Instead of having separate light signals for nel. Another phenomenon that occurs with an increased ATM, LAN and video, everything can be transmitted sinumber of channels is that the distance that light can be multaneously. As a result, DWDM holds great promise transported between two DWDM facilities is reduced. Alfor operators or users who wish to utilize the same infraso, as the light is divided up into more wavelengths, structure for different purposes. more and more expensive lasers are required.

It was mentioned that capacity increases proportionally for every new wavelength, but implied that this is in theory only. As always, reality presents certain physical and other limitations as to what technology can achieve. The more channels or wavelengths that are packed into a single fiber-optic cable, the greater the risk is for ca-

10

addition by network operators who are currently frustrated by networks that are flooded by the Internet, and which are plagued by agitated Internet customers who are frustrated over long response times and, heaven forbid network outages.

DWDM is trendy technology. It is a highly sought-after

In principle, DWDM is as simple as it is ingenious, but in reality is a rather complicated technology now in its infancy.

DWDM, and its less effective counterpart WDM, both operate using the same principle. The key is to divide up the light that is used to transmit digital signals in fiberoptic cables into several channels and wavelengths over and above the original single one. DWDM packs several wavelengths into a single fiber-optic cable, allowing for higher capacity. When a fiber-optic cable is operating at full capacity,

the operator has two choices: install an additional cable or invest in equipment which will increase capacity. This is where DWDM becomes interesting since its technology increases capacity dramatically. This is how it works:

As light is sent through the cable, it is divided up into many different wavelengths, like a prism dividing light into many colors. When this divided up light is sent

Each individual optic fiber can carry several different

### Gathered under one roof

It would not have been possible to develop a whole new product platform in less than a year if it had not been for new ideas and work methods. The Erion program differs, in many respects, from traditional product development within Ericsson.

When the Erion program was started up, the old methods of product development were unsatisfactory. Erion's goal was to have its first product out on the marketplace within a year. That is why a new formula was set up, based on four cornerstones: "small scale," "under the same roof," "reuse" and "incremental development".

The small scale created a very strongly focused development team. Bureaucratic ideas were abandoned, providing the team with the freedom to focus all of its resources on the difficult goal of Time to Market: to have the first product out on the market within twelve months.

#### Idea from ATM development

The idea of conducting all development under one roof was copied from colleagues at Varuvägen in Stockholm, where concurrent development of Ericsson's new ATM exchange was ongoing. In reality, this meant that all of the most important product development work was conducted in a single room at Kungens Kurva in Stockholm. Important support was, however, provided by many subcontractors including Erisoft, Ericsson Eurolab and Ericsson Infocom Consultants, among others.

The reuse of SDH technology consisted primarily of control system components. That was one of the main reasons for the short development period. This was followed up with incremental and controlled development aimed at a control system optimized for WDM.

The fact that the Erion platform is being continually developed, in incremental stages, means that small packets of new functions will be added to the product, in a controlled manner. Since not much is being added at any given time, new additions can rapidly complete system verification, allowing for bugs and errors in construction to be fixed quickly.

Lars-Göran Hedin

The "channel war" that has broken out should be viewed against this background. Suppliers are trying to outdo one another in advertising future products with very high channel density, or capacity. First, Ciena promised a solution that could handle 32 channels. The bid was increased to 40 before Lucent countered with 80 channels

Then Ciena struck back offering 96 and that is where we stand today. The politics of outbidding each other have confused both customers and industry analysts.

Ericsson has not speculated on what the future may hold, but rather advises its customers to invest in the technology that exists today, but to choose applications which can be easily upgraded - that is to say, Ericsson's. Systems now offered on the market can be scaled up from 16 to 32 wavelengths, increasing capacity from 40 to 80 gigabits.

# **Technology**

A supplement to Contact, October 1998 Publisher: Lars A. Stålberg, + 46 8-719 31 62 Supplement editor: Patrik Lindén, + 46 8-719 18 01, patrik.linden@lme.ericsson.se Layout: Paues Media i Stockholm AB, +46 8-665 80 72, kontakten@pauesmedia.se Printed at: Nerikes Allehanda Tryck, Örebro 1998

Roland Sjöö's background at Ericsson is varied. He has acquired a reputation as someone who get difficult jobs done. Now, as the group's Millennium Controller, he has the job of ensuring that Ericsson weathers the transition to a new millennium without our internal data systems imploding, and without our customers having to suffer from similar failure in their Ericsson equipment.

#### IN THE LIMELIGHT

# Roland Sjöö

elcome, Roland Sjöö. You have now accepted one of Ericsson's most exciting assignments. Is this the greatest challenge you have faced so far during your years with Ericsson. Definitely.

How can you dare to take on a job like this – is there not a high risk of failure?

It must not fail. If it does, not only I would be affected, but all 100,000 or more employees in the group and our customers as well. The staff of the Millennium Program Office and I are not only charged with getting the job done but also monitoring its completion, conducting reviews, and above all, naturally, providing support. The work must take place out on the line – in all units and all companies. Our success will depend on our combined efforts and ability to properly prepare ourselves for the millennium.

Isn't it a bit late to engage a controller now?

Late, but hopefully not too late. Already, a great deal of serious and intensive work is being conducted throughout the company. By creating this position, Sven-Christer Nilsson has demonstrated that he views the millennium shift very seriously. And if he does, I think everyone else at Ericsson should, too – that way, we'll manage the transition successfully.

How will you go about obtaining an overview of the actual current status of the work in progress throughout Ericsson?

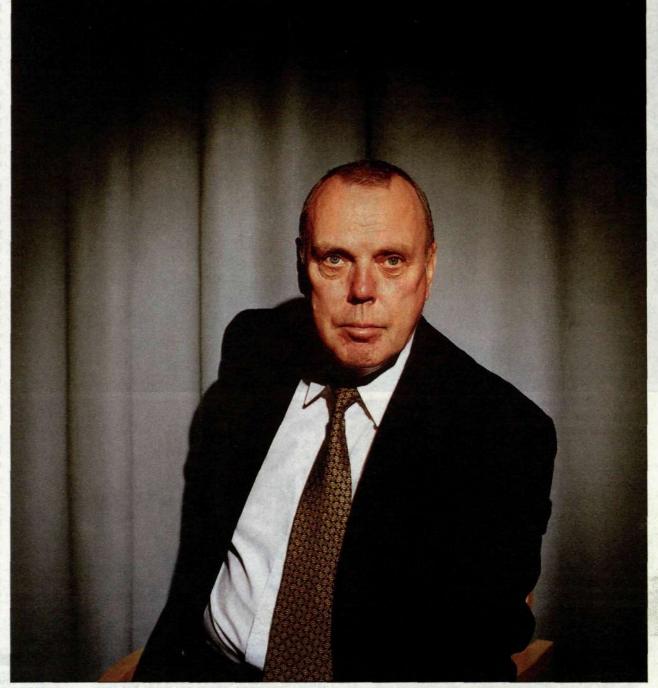
By listening to Ericsson employees who are already fully involved with the company's Millennium Program. They are everywhere – at the parent company, in the business areas and business units and at local companies – though still not in sufficient numbers. That will come. I'm sure of it.

I heard Vodafone talking about their work last spring. They were well ahead of Ericsson and they had given the issue much higher priority than we had at the time. What should we tell customers about our own work when they ask?

We are cooperating successfully with several of our customers – among them Vodafone – and suppliers.

How can we be sure our systems won't crash at that magical twelfth hour?

We will take all conceivable measures to prevent that from happening. More active involvement from the marketing side in



Roland Sjöö has been appointed Ericsson's Millennium Controller – his greatest challenge yet in all his years with the company. Photo: Gunnar Ask

cooperation with customers regarding our installations will be essential.

Are we trying to make money from upgrades to customers now?

Ericsson makes money from its business operations. The millennium shift will cost us a great deal, but that applies not just to Ericsson but to our competitors, our customers and suppliers, too. OK, Roland, last question: Where will you be on that New Year's Eve slightly more than a year from now – will you have gone underground then?

My plan is to watch what happens – together with a suitable number of other Ericsson personnel from all over the world – from the time the dateline passes 01/01/2000, 00:00 hours, to the advent of day two. Hopefully, there will be time for a few hours of sleep as well. It will take thorough planning and monitoring, from all units, of activities that must take place prior to the shift, during the shift and – equally as important – afterward.

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