

The roll-over was watched from among other places Ericsson's headquarters at Telefonplan outside Stockholm.

Photo: Lars Åström

New millennium dawns

The millennium shift is over. For two years, Ericsson has been trimming, coordinating and taking stock, thus gaining knowledge that will be taken into the new millennium.

Contact begins the New Year with a special issue on how Ericsson handled the roll-over.

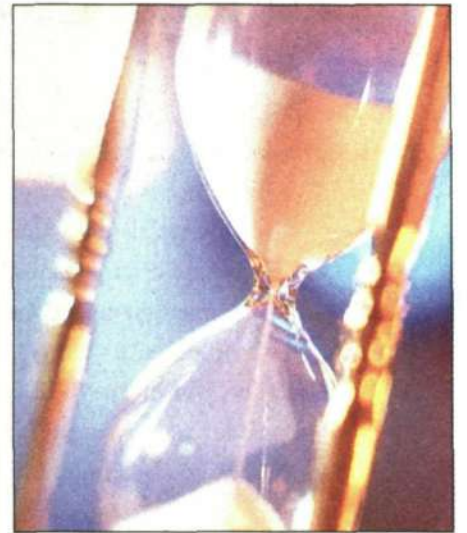


Photo: Superstock

No major problems at roll-over

After several years of preparations, expectations and fears were high in anticipation of the millennium shift. Would Ericsson and its customers survive the transition to the new century? The answer was a resounding "Yes!"

"Our goal was that nothing should happen, and we are very pleased with the turnout so far," says Roland Sjöo, who was responsible for Ericsson's Y2K program.

"However, only when we see that all plants have started up correctly and that workplaces are functioning as they should can we relax." **3**

NEWS

Millennium shift hour-by-hour

After all the predictions of computer crashes, the successful transition to the new millennium was somewhat of an anticlimax. Contact followed the Millennium Operations Center throughout the entire roll-over.

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What use is a phone network, when everyone wants to surf?

The speed of change in telecommunications is breathtaking. It won't be long before telephone traffic is overtaken – in both volume and revenue terms – by Internet, data and multimedia services.

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Calmer than expected

The world looks just as it did before the New Year began. The thousands of Ericsson employees who worked during the millennium weekend were able to calmly say that no major problems arose.

"Our goal was that nothing should happen. So far, it seems like we have succeeded," says Roland Sjöö, who was responsible for Ericsson's Y2K-compliance program, an hour after all time zones had changed over to the year 2000.



Roland Sjöö

"But we are not yet in the clear," he points out. "We cannot stop holding our breath until we see that all plants have started up properly and that all workplaces function the way they should."

Since essentially nothing happened, many people probably wonder if all the fuss was worth the trouble.

"I am convinced that, if we had not done anything at all, we would be facing major problems now," Roland Sjöö says.



Ove Wedsjö, head of sales and marketing at Enterprise Systems, did what most others monitoring events during the 24-hour New Year period did. He relaxed, reassured by the fact that Ericsson's extensive preparations really were effective. Nothing serious happened.

Photo: Lars Åström

Overloaded networks

The most troublesome factor during the 24-hour New Year period were the heavy loads on both the fixed-wire and mobile telephone networks. It was difficult to determine if they were due to Y2K problems or simply to the fact that so many people were making calls at the same time. As time passed, however, it became clear that only unusually high loads had caused a number of problems.

Also, customers who had not upgraded their systems found that minor problems were caused by the roll-over. So far, reports have been received from China that a number of MD110 systems that had not been upgraded experienced some problems.

A number of Ericsson's centers dealing with millennium-related

matters were located in the Stockholm area. The Ericsson Millennium Operations Center, which supervised the support for the Company's Network Operators business segment, was in Kista. The Ericsson Millennium Information Center was located at Telefonplan. The millennium center for the Enterprise Solutions business segment was situated in Nacka, while the Consumer Products business segment had its operations center in Kista.

A large percentage of Ericsson's top executives were on hand and worked during the changeover period so that decisions could be made quickly if this had become necessary. Things were quiet in Stockholm on

New Year's Eve. But this does not mean that many Ericsson employees were not kept busy.

Activity around the world

"Out in the marketing units, there was a great deal of activity," says Johan Wibergh, who was responsible for ensuring that the support organization was prepared for the millennium shift. "Many more customers than usual were in touch with Ericsson. We worked with the customers and helped them to deal with small problems and to utilize networks in an optimal manner during the extremely high loads that occurred New Year's Eve."

In all, Ericsson's Y2K-compliance

program – up to and including 1999 – cost SEK 2.9 billion. That is a lot of money, but a large part can be considered an investment.

"We have reviewed all internal systems and weeded out and updated very old systems," says Christer Ekengren, who was responsible for Ericsson's own business-support systems.

"Many of the tools we produced for the Y2K program are the kind that Ericsson can continue to use beneficially in the future," Roland Sjöö says.

"The support organization has been fine-tuned and welded together," says Johan Wibergh. "There has been fine cooperation between vari-

ous sectors of Ericsson, and we have learned a great deal in the course of this work."

Many customers, between 75 and 80 percent of Enterprise Systems' customer base, elected to upgrade their systems prior to the changeover to the new millennium in order to be certain that they had Y2K-compliant equipment.

"We have actually made money on the millennium shift, and our customers now have better telecommunications systems," concludes Lars E. Svensson, manager of the Enterprise Systems Business Unit.

Patrik Lindén

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Small problems handled efficiently

Seldom has Ericsson been so well prepared to handle problems, and seldom has as little happened as during the period of changeover to the new millennium. Throughout the world an estimated 10,000 Ericsson employees were working or on stand-by. One has to search diligently to find Y2K-related problems.

Everyone was well prepared and trained prior to the changeover. There were large boards on the walls of the Telefonplan millennium center on which to log reported problems. The boards were almost empty.

The problems that, despite everything, did arise were so small that their solution normally could have been postponed until later. But since there were so many technicians on hand they were solved immediately.

A small fault in a monitoring sys-

tem for a call center in New Zealand was reported when that country entered the new millennium. It was solved in an hour by Enterprise Systems people in California who took on the job.

Another small problem involving a date occurred in a web interface with Delta, an Ericsson file system for project documentation. It was a very minor problem, one of the few recorded during New Year's Eve.

"We made a mountain out of a mole hill," says Christer Ekengren who was responsible for the Y2K compliance of Ericsson's business support systems.

The staffing of Ericsson's millennium centers throughout the world was reduced after all countries had changed over to the year 2000 calmly and according to plan. But the organization is being retained until normal operations start up again.

Before the changeover to the new

millennium there was great interest on the part of the media as to how Ericsson would survive the transition.

"We fine-tuned the media-relations function, updated lists and

were well prepared for a high degree of interest from the outside world," says Pia Gideon, Ericsson's Information Manager.

Ericsson was mentioned, however,

in a number of newspaper stories and in broadcasts in connection with reports that all had gone well.

Patrik Lindén

Y2K project unites Ericsson

The Y2K project was the largest global project in Ericsson's history. All countries in which Ericsson operates were involved and thousands of employees participated.

"We have devoted a great deal of time and money," said Ericsson's president, Kurt Hellström. "This is important for Ericsson. It is not only a matter of prestige but of ensuring the performance of Ericsson's systems."

"I want to express my deep appreciation, and that of the entire management team, to all who worked on



the project. They have done an excellent job. Working during New Year's Eve meant that they had to give up something special – being with their families and celebrating the New Year!" noted Hellström.

Many, Ericsson president Kurt Hellström included, monitored the millennium shift. Photo: Lars Åström

But many employees thought that it was exciting to work.

"In any case, you avoid the pressure of trying to find the perfect party," she said. "And," said Anneli Sjöberg a quarter of an hour before midnight Swedish time, "you don't have to lie afterwards about what a good time you had."

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Reporting in conjunction with the millennium shift was facilitated by a new intranet-based tool called the Early Warning System.

Photo: Lars Åström

Lively exchange on Ericsson's intranet

During the tense period of the roll-over to the new millennium Ericsson's intranet was a lively forum for exchange.

This occurred via the Early Warning System, a special web service established for the purpose. Here, you could read how Ericsson employees throughout the world had stopped holding their breath as they passed the critical hour of midnight.

Ericsson is a global enterprise with operations in 140 countries. This becomes clearly apparent if one scans the reports in the Early Warning System.

In these reports you can see how the telecom world entered the new millennium, and you can share many of the personal comments, good wishes and cheers dispatched from various countries. Following is a random sample of this interesting reading.

Tonga:

There are 8,000 local subscribers on this island, where the first transition to the new millennium took place.

"We made the changeover without problems."

Fiji:

"Happy New Year! All went well with the Y2K roll-over."

Australia:

"The customer is happy. Now we are all going home. Good luck to all you others throughout the world."

Japan:

"All is OK with CMS30 networks in Japan. Status reports from all 6 regional offices show everything completely OK."

China:

"China has made the changeover without any problems apart from a heavy load on the network. The customers have tested billing systems. Happy New Year!"

Macao:

"Macao reports no problems."

Cambodia:

"Cambodia VMS6.0 MXE reports: No problems."

India:

"Early Warning System has been a fantastic tool for reporting. We are looking forward to its use in other contexts in the future.

"Heavy fog in Delhi is reducing visibility to virtually nil."

Pakistan:

"One of our customers noted a processor load of 99 percent. After a while this declined to 75 percent."

Russia:

"NMT systems in Novosibirsk and Omsk rolled over without problems. A total of 8 NMT systems have now rolled over."

Congo:

"No problems reported from customers."

Netherlands:

"No Y2K problems identified. But high degree of difficulty in accessing networks due to the high traffic load."

Bosnia:

"Is there anyone who has official instructions as to whether or not we can begin to scale down our support organization?"

Great Britain:

"We have no Y2K-related problems, but we have had some small restarts as a result of the heavy traffic loads."

Brazil:

"The Inmarsat telephones in San José dos Campos are working perfectly."

United States:

"Standing by in America. Hi, y'all! Everything is fine in the Big D."

Lars-Göran Hedin

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Holiday joy around the world

It has been called the greatest civilian project in the history of the world. Companies and public authorities devoted millions of hours to Y2K preparations in all parts of the globe. The major focus was on New Year's Eve itself.

But the effects will not be fully known until people return to work after the holidays.

"Everything worked very well. We have had a very fine team and have learned a great deal about working together with the different regions in China," says Tony Lau, responsible for technology (IT) and Y2K program activities in China.

The activities on New Year's Eve were managed by Michael Ricks, Ericsson's president in China, together with Key Account Managers. In all, 10,000 man-days were devoted to preparatory work.

Ericsson has the largest installed base of mobile exchanges in China. 486 large AXE exchanges were made Y2K-compliant, along with 830 mobile exchanges and base station controllers.

The changeover to the new millennium in China, which has only one time zone for the entire country, was awaited tensely and with the knowledge that New Zealand and Australia would face the test some hours in advance.

"We are highly pleased with our Y2K work," Tony Lau says. "Today, Monday, as work is starting up again in companies, no faults have yet been reported."

In a press release issued Sunday, MII, the Chinese Ministry of Information Industry, reported that all key industries in China, including the telecom, transport and banking sectors, were functioning well.

It is known, however, that a number of companies elected not to upgrade their enterprise exchanges, due to financial reasons. But companies that do not use functions such as billing are not equally sensitive to Y2K problems.

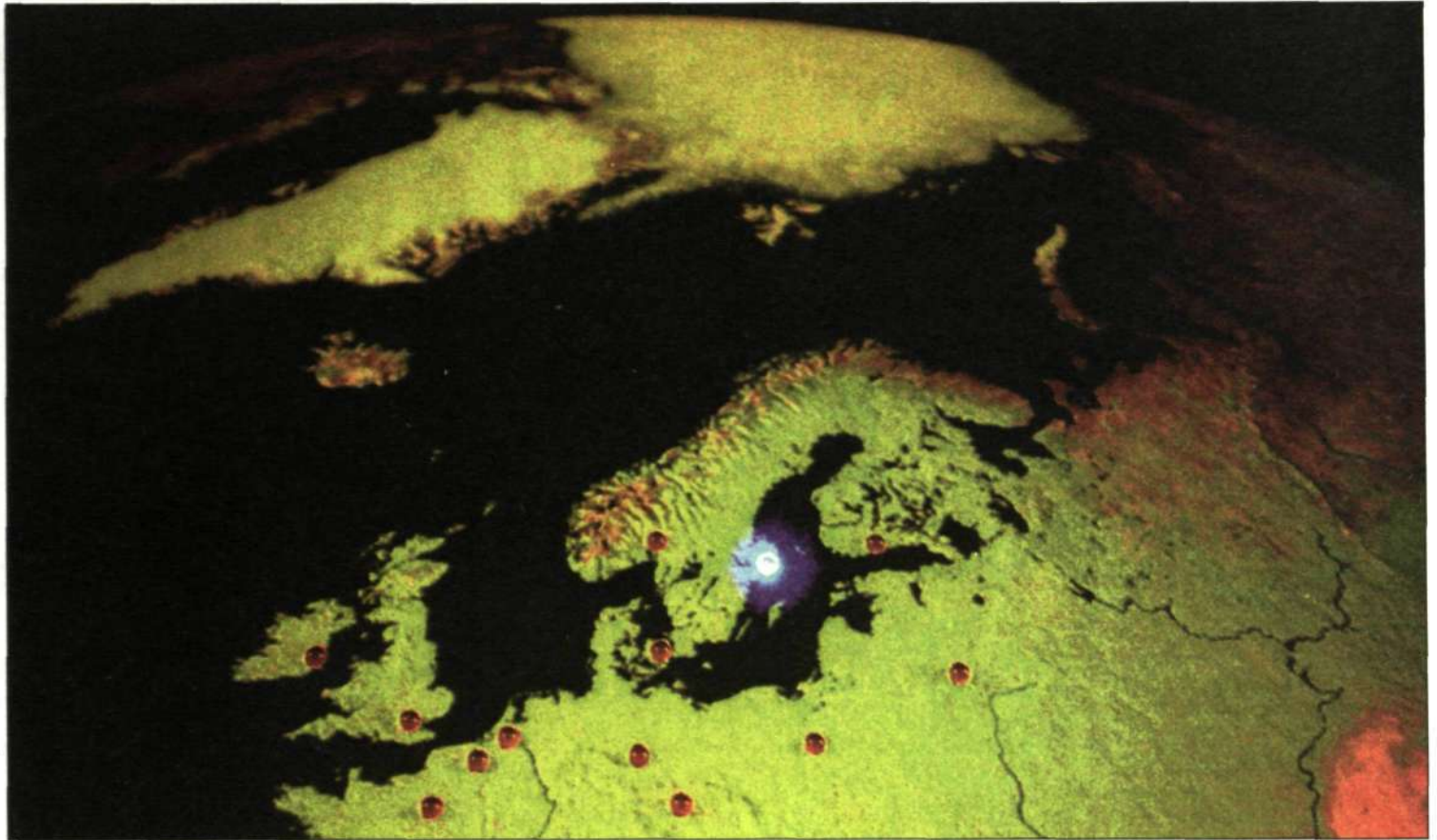
Yeltsin dominates news

"The biggest news on New Year's Eve in Russia was that President Yeltsin had resigned. Then we were naturally very pleased that everything related to our systems and products went well," says Kresimir Ruzic, the millennium controller for Ericsson in Russia.

The market unit was fully occupied in making systems Y2K-compliant until just before the New Year weekend.

"We upgraded TDMA exchanges and DRA 1900 systems as recently as during the Christmas holidays," Kresimir Ruzic says.

Ericsson has many different wireless systems in Russia; they range from TDMA, GSM, NMT and cdmaOne networks to DRA 1900, Eri-pax and EDACS. On New Year's Eve 125 persons were on the job or on stand-by, in case something should happen. This work was supervised



In a purely technical sense, the changeover to the new millennium in all parts of the world was undramatic. The Millennium Information Center in Stockholm watched how one after another, the various countries moved calmly into the year 2000. Photo: Lars Åström

from Moscow, where many members of the marketing unit's management team were located.

"The 'live exercise' on September 9 and the exercise early in December were very useful," Kresimir Ruzic notes. "They helped us be fully prepared with all functions during the New Year holidays. In particular, this required a major logistics program to manage internal flows that involved kitchen personnel, transport facilities and security."

January 5 is the first regular working day in Russia following the holidays. Until then it will not be possible to draw conclusions as to whether millennium bugs created any problems.

No failures have been reported with respect to enterprise exchanges such as the MD110 that have been in service around the clock in police stations, hospitals and other facilities.

"In the country as a whole we have had reports of a limited number of faults in other telecom networks that were not supplied by Ericsson," Kresimir Ruzic says.

Overloaded networks

The office in Montreal served as the control center for all Ericsson TDMA systems throughout the world on New Year's Eve. Two teams, each consisting of 85 persons, were available to serve Ericsson companies in all parts of the world. Smaller TDMA centers were also set up in Melbourne, Dublin and Mexico City.

"Everything went just as we wanted it to," says Nathalie Quirion, project manager for Ericsson's Y2K-compliance program for all TDMA systems.

"The most critical situation for us occurred when people on the American East Coast celebrated on the stroke of twelve. We had to restart five TDMA systems in New York and Florida. However, the problems were not caused by a millennium bug, but arose due to the overloading of net-

works," Nathalie Quirion says. "We were well-prepared and were able to restart systems within two or three minutes."

Y2K-compliance preparations for TDMA systems have been under way since the autumn of 1998. The program has involved a great deal of time and money. It is an investment that has now yielded a good dividend, Nathalie Quirion believes.

"It has been like buying an insurance policy. We planned for the worst, and came through in excellent shape. Moreover, we learned a great deal that we can use in our work in the future."



Nathalie Quirion

Storm causes problems

Four hundred persons at Ericsson in Brazil worked in three shifts during the New Year holidays. The work was supervised from Sao Paulo by Gerhard Weise, Ericsson manager in Brazil.

All social service systems functioned well during the changeover to the new millennium. The banking sector, energy systems and the telecom sector managed the transition without problems.

"A storm on New Year's Eve

caused certain minor power-supply problems in Sao Paulo, but this commonly occurs in such weather," Juliano Benatti, Ericsson's millennium project controller in Brazil, reports. "Otherwise, the media has reported only small Y2K-related failures throughout the country; these included highway toll systems that stopped working and a troublesome booking system in a hospital."

Non-event in the US

Imagine what would happen if there was no electric power? Of if the water-supply and sewage systems stopped working? At Ericsson in Richardson, Texas, 500 persons were on hand or on stand-by on New Year's Eve. They were well prepared to operate under all circumstances. Jim LeoGrande, director of Y2K compliance, and his team had planned for various worst-case scenarios. Diesel-powered generators were in place, as were satellite telephones, containers of water and portable toilet facilities.

"My number one objective for 1999 was to make the Y2K roll-over a 'non-event,'" Jim LeoGrande says. "I can happily report 'Mission accomplished!'"

Heavy traffic causes faults

"The most critical event for us occurred when our customer Saltel in El Salvador reported problems with

an ANS system (a small AXE exchange) that had stopped working at midnight. But it turned out that this was caused by overloading of the network," reports José Luis Castanedo Juárez, responsible for Y2K compliance for Ericsson in Mexico.

In all, 150 persons worked at Ericsson's Y2K center in Mexico on New Year's Eve. Developments throughout the world were followed closely via the Early Warning System.

"Someone has said that Ericsson performs best under pressure and I think this is true," José Luis Castanedo Juárez says. "Work on the Y2K project has involved two years of close cooperation within the entire Ericsson organization.

This shows what fantastic results we can achieve by working together. We are highly competitive and can meet the expectations and requirements of all customers."

Staff of 300 in Spain on hand

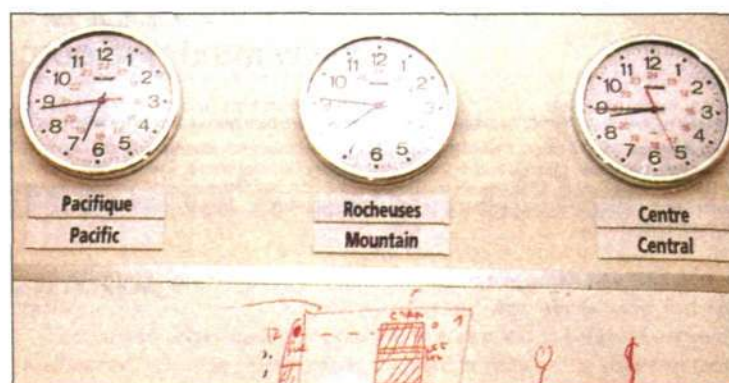
"The internal Y2K work proceeded exactly as planned during the millennium shift, and we got the results we were expecting," says Jorge Martin Nomen from corporate communications at Ericsson in Spain.

Some 300 persons worked during the New Year's weekend at Ericsson in Spain, which had been preparing for the event for two years.

"The millennium shift passed through Spain without a single problem. The government was very concerned and took the coordination and upgrading measures required to make sure that everything would work as usual," concludes Jorge Martin Nomen.



José Luis Castanedo Juárez

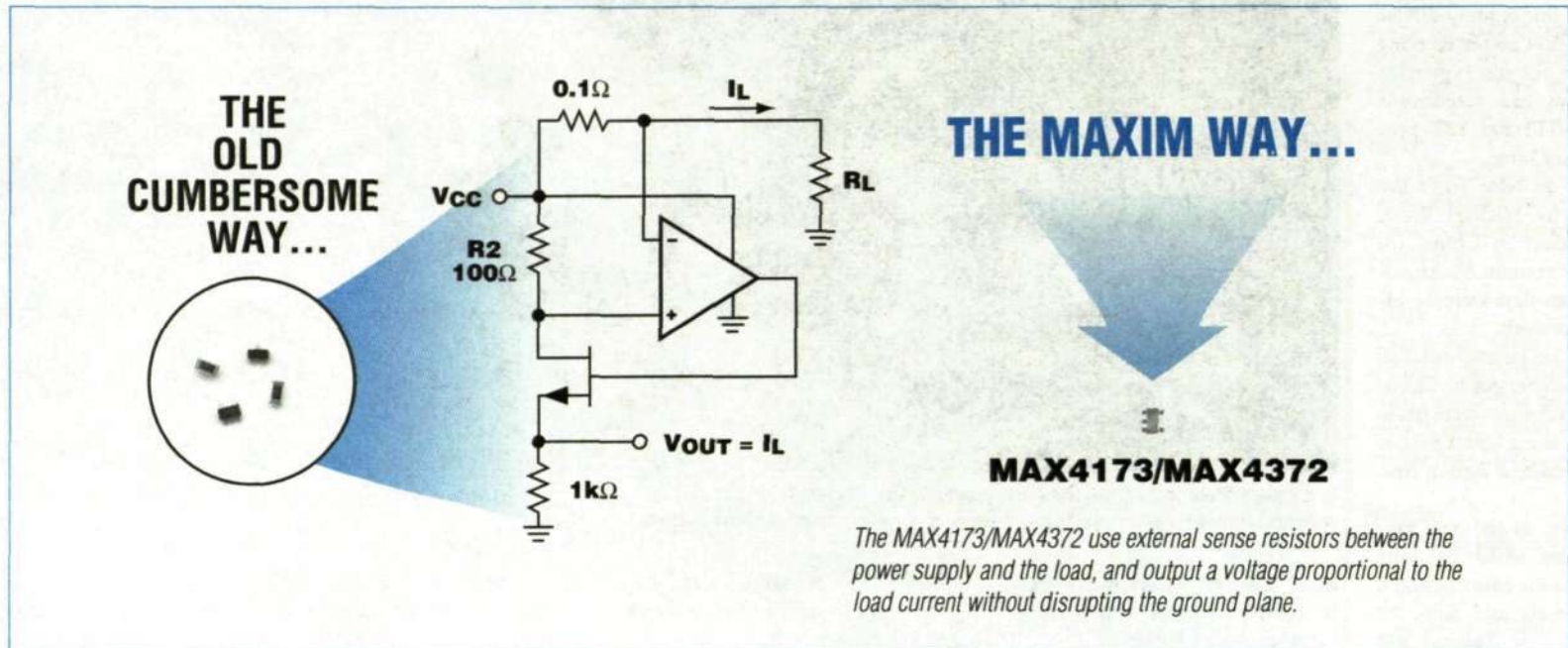


The Millennium Operations Center in Montreal functioned as the control center for all TDMA systems around the world. Photo: Lars Åström

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Daniel Mares, Oisín Kiernan and Miroslav Granolic worked on New Year's Eve at the GSM Support Center in Australia. The problems that they faced had nothing to do with the millennium shift but were due to network overloading.

Photo: Frank Styevko

Four years' work gave calm night in Australia

There was a high load on the GSM network around midnight, and there were some minor faults that were not related to the millennium changeover. The night was no more exciting than that for the 350 Ericsson "sons" and "daughters" who kept the vigil in offices in Australia. This was due to the preparations that had begun four years earlier.

Everyone is in place. At 1900 hours, local time, December 31 the "millennium watch" began at the Ericsson office in Broadmeadows, outside Melbourne.

The employees began by checking to be sure that all equipment was in place and that everything was working the way it was supposed to. Then came the waiting period. Up until 2100 hours, waiting time was spent in front of computers and on the telephone. But there was also time to circulate and query colleagues about their Christmas holidays.

The stroke of twelve occurred first on the Pacific island of Tonga. Only one exchange there carries the Ericsson name. The first country with a GSM system to undergo the millennium test was Fiji.

If the four GSM exchanges on Fiji passed the test, this indicated that more countries would emerge unscathed. But if something had happened with the exchanges, other countries would have been forewarned via Ericsson's intranet-based Early Warning System, among other measures. As soon as possible during the evening employees posted a short status report on the website to which all Ericsson personnel who were working New Year's Eve had access.

Distributed responsibility

The work in the Ericsson office in Broadmeadows in Melbourne was organized in a simple and efficient manner. If millennium-related faults had occurred in any system, Ericsson employees at the customer's location would have tackled the prob-

lem first. If they had been unable to solve it, various support groups from Ericsson would have been called in. The groups would handle different types of problems. The first group would deal with hardware and simple software faults. The second group was responsible for handling somewhat more complex software errors, and the third group – system designers – would write new software if this became necessary.

All the support groups had representatives at Ericsson's Command Center who could be consulted in difficult situations. If truly serious problems had arisen, representatives from the Command Center would have been able to turn to a managerial group that included Karl-Henrik Sundström, president of Ericsson in Australia, and Dirk Howindt, responsible for information and marketing. They, in turn, could have obtained help from the millennium offices in Stockholm and would also have been able to handle questions from the media. But this never hap-

pened on New Year's Eve; it was a quiet evening.

Apart from overloaded networks during the hours around midnight, Ericsson's largest customers in Australia, Telstra and Vodafone, were totally free of millennium-related problems.

Four years of preparation

The quiet New Year's Eve was due to good planning. Telstra began its preparations as early as four years ago. George Ganakas, one of the managers responsible for millennium planning at Telstra, is very pleased with the cooperation with Ericsson.

"Ericsson has shown great understanding of our desire for long-term planning and for early test operations of systems. This enormous project has taught us a great deal," he says. "Among other things, we have become much better at working with our suppliers."

Ulrika Nybäck

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Record celebrations in Australia's large cities

On New Year's Eve a number of records were set in Sydney, Australia's largest city in terms of geographical area and population.

The city offered a record-large and

expensive fireworks display, a record number of people gathered in Sydney's harbor area, and a record number of police officers were on hand to ensure that all went well. Melbourne also offered a magnificent fireworks show, and many individual artists

and choruses provided entertainment.

The largest stage was in central Melbourne, on the Yarra River. There, residents of Melbourne and visitors had an opportunity to close the book on the past and simultane-

ously welcome the new millennium. Dreams and hopes were inscribed on white and red slips of paper that were burned at the stroke of twelve and sent skyward with balloons.

Ulrika Nybäck

3G next challenge

Ericsson Australia had a good year in many respects in 1999. The company has entered several new areas, including WAP, Bluetooth and GPRS. One of the major challenges facing the company next year will be to speed up the 3G licensing process as much as possible.

The millennium shift is a good time to sum up the past year and look forward to the next century. Contact met Dirk Howindt, who is information manager at Ericsson Australia, and asked him what has been happening and what is planned for next year.

WAP is an area in which Ericsson Australia over the past year formed several partnerships with content providers, as well as banks, to develop new applications.

"Now that we have both the products and the technology, it is very important that there are lots of attractive and exciting applications that will make consumers want to purchase a WAP phone, for example. Forming partnerships for developing such applications was a very high priority last year and will be equally important this year," says Dirk Howindt.

Advances in GPRS were another important event during 1999. GPRS is a packet-switched technology that will allow high-speed wireless Internet access. Ericsson has started GPRS trials with its next largest customer, Vodafone.

The 3G auction process is one of the hottest topics at Ericsson Australia.

"As the first country in Asia Pacific to implement GSM, we believe that Australia will be once again one of the leaders in bringing 3G services to our customers," says Dirk Howindt.

Delivery delays for new phones were a problem in many countries last year. Ericsson Australia was no exception. The WAP phone will not be available until later this year. Other products that were launched at the end of last year and actually reached retailers, such as the T28 and the Chatboard, were warmly received. The Australian consumer market is somewhat special. Consumers are loyal, but demanding and technically savvy.

Another important even in late-1999 that will also have an impact on the market in 2000 was the privatization of state-owned telco Telstra, which is Ericsson largest customer in Australia.



Dirk Howindt

Ulrika Nybäck

IMPORTANT ORDERS

- An order from the Internet service provider Planet Edge, to upgrade its network.
- GSM orders relating to upgrading the network in preparation for the Olympics in Sydney in 2000.
- Implementation of nine new nodes for Telstra's fixed network

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Doomsday. The total collapse of computer systems. Phones going silent all over the world. Ominous prediction for the year 2000 were not lacking, but few rang true.

Here are Contact's impressions of a night that for Ericsson as a company was a tremendous success but which felt distinctly anticlimactic.

From Tonga to Western Samoa

The atmosphere in Ericsson's Millennium Center at Telefonplan in Stockholm is one of tense gaiety. In six minutes, it will be time for Tonga.

President Kurt Hellström, Roland Sjö, Manager of the Millennium Program, Torbjörn Nilsson, Vice President responsible for marketing, Information Manager Pia Gideon and all the others in the room are chatting, joking and testing equipment.

Ten second before the first millennium shift everyone becomes silent, well aware of the historic moment of which they are a part. What they do not know is that this is the most dramatic moment of the entire 24-hour period. When the millennium changeover occurs in Sweden thirteen hours later, the management at Telefonplan, as in all the other millennium centers, is almost blasé about the uneventful roll-overs. The efforts expended, not only by Ericsson but by the rest of the world, would pay off in the form of a single large "non-event," a night without fault reports but with technicians who had little to do.

Five, four, three, two, one, zero! Tonga moves into the new millennium. Everyone applauds.

"Now it has started," says a pleased Roland Sjö. "The diesel generator is running and we are completely independent of the outside world."

This is the moment for which Ericsson has

planned for two years. Video conferencing between the various millennium centers is under way, the Early Warning System is functioning, employees in all countries are on stand-by, most elevators are being shut down, and portable toilets are waiting outside if the worst should happen. Nothing seems to have been forgotten. This is largely attributable to the full-dress rehearsal on September 9, when systems were fine-tuned and forgotten details were updated.

Tonga is the proving ground. One person scrolls among the few reports that have been received up to now in the web-based Early Warning System. No, no fault reports yet. There are only small signs of life and calls from the outside world. They say that the tests prior to the roll-over in New Zealand have been completed, and that telecommunications systems in Taiwan are heavily overloaded. But no signs of life from Tonga.

Three minutes later, Jorma Moberin, manager of the Millennium Information Center, says – a bit impatiently:

"Let's call them."

The telephone number to a hotel is located and a mobile phone is picked up. The ringing is heard. Everyone is quiet, waiting. The connection is made. Jorma Moberin hands the telephone over to Kurt.

"My name is Kurt Hellström. I'm trying to reach Paul Tozer."

He waits, and laughs a little.



A change in behavior. When Petra Erntestam and her friends decide to meet, they don't set a definite time and place. Why should they? They all have mobile phones. Technology is altering the dynamics of people's social lives. Page 26

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Einar Lindqvist, manager for the Wireline Systems business unit, and Mats Dahlin, who heads the Network Operators business segment, were on hand at Ericsson's Millennium Operations Center in Kista and followed events during the New Year period.



Ericsson offices around the world were staffed on New Year's Eve. However, for most employees, such as those working at Enterprise Systems' Millennium Center in Nacka outside Stockholm, it was a long and uneventful night.

Photo: Lars Åström

"That was the night clerk who answered. There was nobody there," Kurt says a bit disappointed.

But the call had gone through, connected via international and local exchanges. So the Tongans couldn't be so completely cut off from the rest of the world, after all.

A few minutes later the report shows up on the web.

"Went through shift O.K. Andrew Massie, Tonga Telecommunications Commission." This is followed by a printout showing reports of tests of all possible systems. After the name of each system are the large capital letters: OK, OK, OK.

There is time for a short break before the roll-over is due in New Zealand. Kurt Hellström gets up to drive to the Ericsson Millennium Operation Center in Kista, which is responsible for much of New Year's Eve activity.

"But I'll be available on the mobile phone. If any system crashes you can always call me and I'll go out and fix it," he says, chuckling.

...

The decision makers are located in the Gamma Room of Ericsson's Millennium Operations Center in Kista. This is where all matters pertaining to the Network Operators segment are handled. Local companies call the Alpha Room, which then forwards questions to the Beta Room. Here, matters are sorted roughly before finally ending up in the Gamma Room.

Now people are waiting for news from New Zealand, a country which – along with Fiji – serves as a test of the Y2K compliance program. New Zealand is a large Ericsson market and when the country has made the transition to the new millennium successfully, most of Ericsson's systems will have been tested. Most of the systems that work there should work in the rest of the world.

"But there are a lot of systems that don't belong to Ericsson throughout the world, so we can't be completely sure even when New Zealand has rolled over," says Ingemar Blomqvist, one of the decision-makers around the large table in the Gamma Room. In his regular job, he manages the product unit for the Japanese PDC mobile telephony standard.

"Moreover," he adds, "PDC systems will not be tested before the roll-over in Japan."

...

China and Russia are next in line. The tension in Enterprise Systems' center in Nacka has already eased. But there is some nervousness when China is due to enter the new millennium.

"In China, where we have a large number of business networks installed, about 30 percent of

our customers have not taken Y2K measures," says Johan Holmqvist at the center in Nacka.

...

No fault reports have been received from China, at least not yet. And soon Russia and the Middle East have made the transition. No failures, not a single one. The gratifying reports pour in, interspersed with reports of overloading due to all the calls being made. After a while, reports are received about customers who have not upgraded their systems for Y2K-compliant versions and who are experiencing minor problems. There are also reports of minor interruptions where it is soon evident that the problem is not Y2K-related.

"Things are terribly quiet," says Hugo Österlund, who is one of the managers responsible

for the Ericsson Millennium Center, to someone on the other end of the line. "The technicians are just about ready to leave and I assume that this must mean that Ericsson has done a good job," he says smiling wearily.

After he has hung up, he says: "Perhaps that was a bit boastful."

But there is indeed something in what he said. In the countries that have entered the new millennium smoothly, the Ericsson forces are beginning to go home. If the worst should happen, there are plans for full staffing for a number of days. But with customers going home to bed, Ericsson offices are also closing.

...

Final reports and presentations have already been made. A large percentage of the personnel that would have been on duty longer has been promised an early trip home.

"Things have gone fantastically well, with very few problems," says Mats Dahlin. "We have built relationships with everyone in the organization, and with customers. There has been very fine cooperation throughout the organization. But of course it may have been difficult for some persons who had to stand by to solve problems that never occurred."

Western Samoa is the last country to roll over into the new millennium.

Mia Widell Örnung

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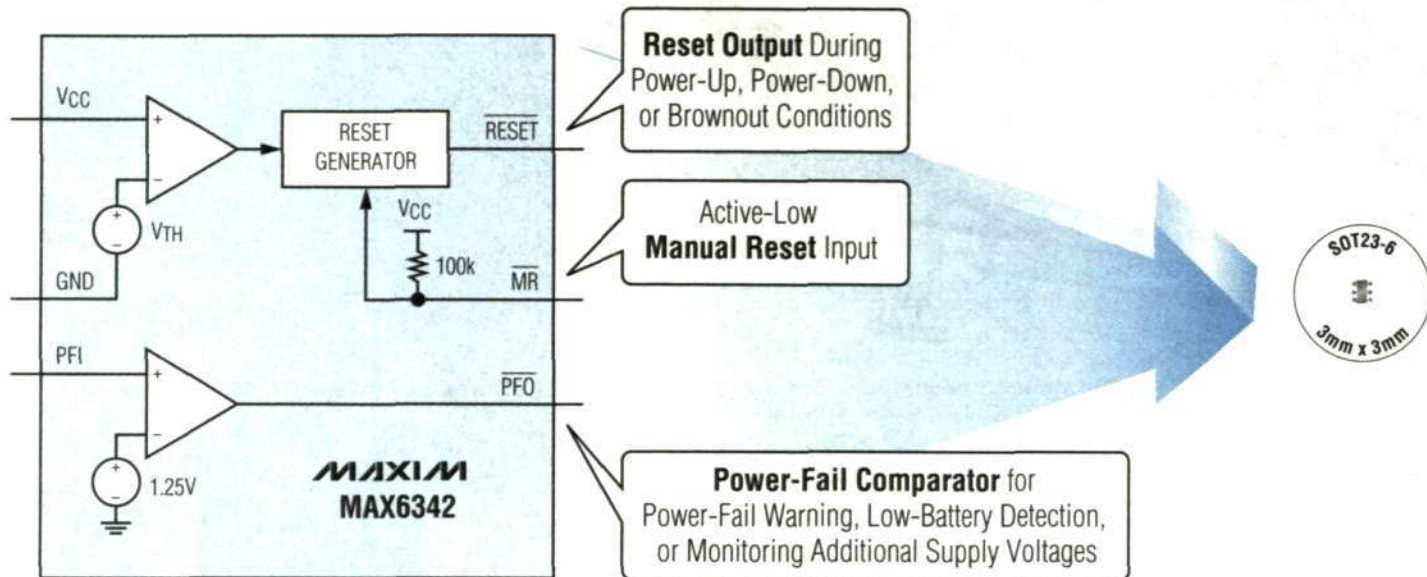


The first call to Ericsson's Millennium Information Center went to the Tonga Islands just minutes after midnight. Ericsson president Kurt Hellström, who placed the call, was pleased to find that the telephone network was working.

Photo: Lars Åström

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The eternal problems with time

With the changeover to the new millennium and the Y2K hysteria fresh in mind, it may be interesting to consider why the year 2000 is beginning right now. Many chance occurrences, political decisions, scientific disputes over leap-year and other factors lie behind today's method of keeping time.

The basic problem is that the Earth's rotation around its own axis – a day – and the time that Earth requires to circle around the sun – a year – do not really "match up." In addition to its 365 days, the year is really nearly six hours longer. In the most civilizations, to further complicate things, Man also concentrated on the moon's rotation around the Earth and then divided the year into twelve months. Since the time from one new moon to the next one is approximately 29.5 days, twelve real moon months add up to only 354 days.

Virtually all the ancient societies began counting time in moon-years and thus had years that were eleven days too short. The Greeks soon noticed that the seasons were rapidly getting out of phase and established an intercalary month at regular intervals by repeating the month of Poseidon.

A more precise calendar was invented by the Egyptians who paid no attention to the moon, and who concentrated exclusively on the sun by having twelve 30-day months plus five additional days. They didn't bother to make a correction for the nearly six missing hours.

Rigging the calendar

On the other hand, politics began to enter into the calendar in daily life. In both the Greek city governments and the Roman republic, officials were elected on a calendar-year basis. The result was that, in addition to the fact that the year was eleven days too short, the authorities began to tinker with the length of the year. They did this by adding unwarranted intercalary months as a means of extending their own terms of office, or by trying to eliminate necessary intercalary months to shorten the terms of office of their rivals. As a result of such hanky-panky, combined with a great deal of ignorance and carelessness, the new year eventually occurred two months too early in the century before the birth of Christ.

Julius Caesar straightened things out. Acting not in his capacity as a world ruler, but as a high priest, he forced through his reform, the Julian calendar. Based on the Egyptians' calendar, the year was established at 365 days – without taking the moon into account – and a leap-day was added every fourth year.

To inaugurate the new calendar year with true pomp and circumstance, it was to become effective at the first of the year that we know as 46 BC, and the authorities wanted that day to be the day of the first full moon following the shortest day of the year. All in all, as a result of all the adjustments, the preceding year had to be extended by 90 days. The year 47 BC thus acquired an extra intercalary month of 23 days between February 23 and 24, plus two extra 30-day months and an extra seven-day week following the end of November. This year is accordingly known in the annals of history as the year of confusion.

The Julian calendar proved to work exceptionally well. Via Christendom and the Holy See, it survived the Roman Empire in both the West and East. There was one small problem, however: the six hours that were adjusted by



Illustrations: Ulf Frödin

means of the leap-day every fourth year really amounts to just under five hours and 49 minutes. In other words, the years were running eleven minutes too fast.

Ten days that disappeared

In the 1500s, as a result of this dislocation, the vernal equinox was occurring ten days too early, which created problems in calculating the date of Easter. The Catholic Church could not accept this and Pope Gregory XIII appointed a commission headed by the astronomer Luigi Lilio to study the problem.

To set things right again, the commission skipped ten days. October 4, 1582 was followed immediately by October 15. The more ticklish problem of how to avoid such skips in the future was solved by deciding to eliminate three leap-days in 400 years. As a result of this adjustment, the error was reduced to 26 seconds per year, with the result that we have more than 3000 years ahead of us before the error has grown to a full day again.

The Gregorian calendar is used throughout the greater part of the world today. The rule governing the leap-days that are to be eliminated and those that are to be retained still applies and is as follows: Leap-years are years that are evenly divisible by four, but if the years have two zeroes at the end, they are to be eliminated before effecting the division. More simply stated, century years are not leap-years if they are not divisible by 400. The years 1600, 2000 and 2400 are thus leap-years, but 1700, 1800 and 1900 are not.

All was not well and good, however. For political and religious reasons, people in Protestant countries did not want to obey the pope, and instead retained the old calendar. As a result, there were two different ways of keeping time, which caused a great deal of trouble and confusion in trading and diplomacy between Catholic and Protestant countries.

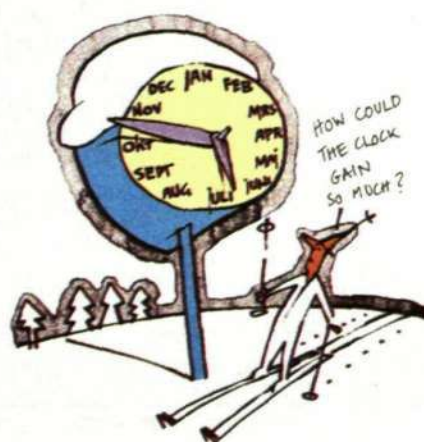
In 1699 most German Protestants decided to adopt the Gregorian calendar. The Danes,

Norwegians and Dutch followed a few years later, and England as well in the mid-1700s.

Sweden had decided to solve the problem in its own way by eliminating the leap-day in 1700 but without correcting for the ten days that had been eliminated in the Gregorian calendar. King Karl XII was largely responsible for this decision. The idea probably was that Sweden would change over completely to the calendar of the Germans and Catholics in the near future. But, as a result of war and the king's absence from the realm, nothing more happened and the consequence was that Sweden suddenly had its very own method of calculating time.

Swede's lost a week

In 1712 the Swedes decided to revert to the old method and added an extra leap-day in that year. The country was then in phase with the Julian calendar, thus making February 30, 1712 a completely correct date in Swedish annals. When England changed over to the Gregorian calendar in 1753, Sweden followed. The time difference that now amounted to eleven days was solved by having February 17 be followed directly by March 1. The period from February 18 through February 28, 1753 thus does not exist in Swedish history.



By this time most Protestant countries had changed over to the Gregorian calendar.

The situation was different in the Greek-Orthodox world, which resisted change even more strenuously. Japan waited until 1872, China until 1912 and Russia until the revolution in 1917, before changing over to the rest of the world's method of calculating time. But Greece, which delayed until 1923, was the worst.

One question remains. When does the year begin?

In ancient Rome, up until the year 152 BC, the year began on March 1. Here we have the historical reason for the illogical placement of the leap-day. There was a change to January 1. But in contrast to the experience with the Julian calendar, the new date was not something that was widely accepted in Europe. Instead, each country had its own New Year's Day, which could change a little from time to time.

New Year's in March

December 25, Jesus' birthday, was a popular date with which to begin the year, but March 25 was also common during Jesus' lifetime. Both of these dates, as well as January 1 and September 1, have been used in Sweden. But with the Renaissance and the interest in all things ancient, more and more countries changed over to January 1. But this did not happen in Germany until as late as 1648, and in England in 1752.

One good thing about all this confusion is that any hypotheses about the intervention of a Higher Power and the end of the world on New Year's Eve fell due to their own unreasonableness. The poor deities have hardly been able to foresee or even keep up with Man's confused and continuously changing calculations. Who knows, the shift to the new millennium has maybe yet to come?



Above: Communications were more "visible" in the days of the earlier millennium changeover. In the Nordic region they not infrequently consisted of Viking ships that accounted for international contacts long before mobile phones and e-mail.

Photo: Leif Milling, GreatShots.

Right: One thousand years ago no one knew that the earth was round; there were many blank spots on the world map.

Photo: Stock Imagery



What was the world like in the year before the preceding millennium changeover? There was no talk of globalization. Many highly developed cultures - in South America, for example - were as yet unknown to the rest of the world. Where the earth began and ended was not clear. No one knew that the earth was round.

The world as it was 1000 years ago

The Sung dynasty ruled in China. Fujiwara no Michinaga was all-powerful in the Japanese court. The Russian Orthodox Church was slightly more than a decade old. The Eastern Roman (Byzantine) Empire, with Constantinople as its capital, was at the height of its glory. Europe's most powerful leader was Emperor Otto III, master of the Holy Roman Empire.

The Islamic countries were expanding from Southern Spain to Tashkent on the Asian steppes. The caliphates of Cordoba in the West and Baghdad in the East were impressive cultural centers.

Viewed in a Nordic perspective, the communications facilities of the times - like those today - were well developed. This was most clearly evidenced by the seaworthy Viking ships. With these ships, journeys were undertaken in all directions in Europe. In the year 994, Olav Trygvasson of Norway and Sven Tveskægg of Denmark made an attempt to capture London, King Ethelred had to pay dearly to persuade them to retreat. In the same year Olof Skötkonung became king of the Swedes.

Rocks instead of e-mail

Important events were recorded by means of messages carved in runic characters on rocks. This was far from today's e-mail. It took time and it took space. But the messages proved lasting. Numerous rune stones can today be seen in many parts of the Nordic region.

Christendom spread throughout Europe. Even the hedonistic Nordic countries began to become Christian. In many places there was a doomsday atmosphere prior to the changeover to the new millennium. Riches were given to the churches to ensure that the donors would be on "the right side." Disquieting signs were not lacking. In 993 the Vesuvius volcano in Italy had erupted in a devastating manner. St. Peter's Church in Rome burned in the same year.

Ominous signs

During the years preceding 1000 large bands of pilgrims traveled to Jerusalem in the Holy Land. They felt they would be safer there as Doomsday approached. The fact that Pope Gregory V died in the year 999 was regarded as another ominous sign. Many were surprised that the world did not end at the beginning of the year 1000.

Many churches began to be built in gratitude for postponement of the Last Judgment. In a naval engagement at Svolder, Olav Trygvasson of Norway was killed in a battle against King Sven Tveskægg and King Olof Skötkonung, the Swede, who had been allied with the Norwegians.

In the year 1000 Leif Eriksson, son of Eric the Red, began his exploratory voyages in Viking ships - first from Norway to Iceland, and then further westward to America. It is said that he found grapes where he landed and named the place Vineland, the

site of what is known today as Newfoundland on the east coast of Canada.

Other seafaring people also left notable imprints in history. The Polynesians reached New Zealand. This was the final stage in one of the greatest seaborne migrations of peoples that the world has ever known. This operation, which made the Polynesians one of the world's most widely dispersed peoples, began 1,500 years before Christ.

Pope Gregory VIII's calendar

What about now - a thousand years later? Are we experiencing millennium panic? This is year 1389 in Teheran, 5760 in Jerusalem, and 1420 in Mecca. But in the world of computers there is only one millennium changeover. The year 2000 is based on the Gregorian calendar designed by Aloysius Lilius and introduced by Pope Gregory VIII in 1582. Sweden did not adopt the Gregorian calendar until 1753.

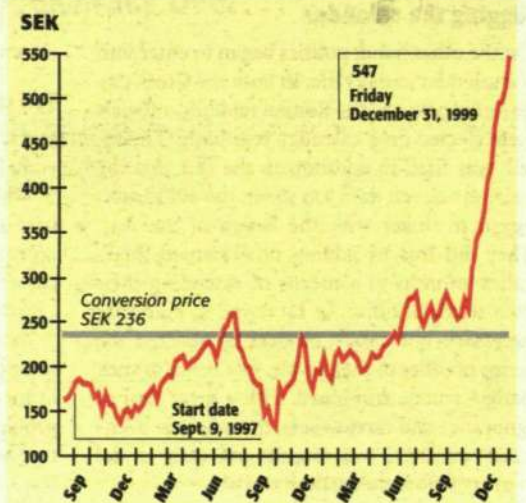
Considering all the concern about the millennium in the computer world, where so much is contingent on ones and zeroes, it is interesting to note that it was in the year 1000 that the Indian mathematician Shridhara discovered the importance of "zero."

Thord Andersson

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Sources: Bonnier Atlas of Human History, Year by Year. Rodney Castleden.

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