Cover: Olov Stähl, SICS, demonstrates the Trend Inspector, an interactive table for the visualization of trends, based on terms used in web searches or published on microblogs. Photo by Lars Nyberg.
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2009 was an inspiring and successful year for Swedish ICT and our subsidiary companies, despite the recession in the world economy. I especially want to mention our initiative for Vehicle & Transportation ICT, the merger with Imego (the research institute for sensors and sensor technology), and the fact that our subsidiary company SICS is a partner of the Knowledge and Innovation Community that was selected by the European Institute of Innovation and Technology to form the new EIT ICT Labs.

The Swedish ICT group consists of the subsidiary companies Acreo, SICS (with its subsidiary Santa Anna Research Institute), Imego, Interactive Institute, and the Viktoria Institute. For the whole group, 2009 was a year of development and consolidation as one of the leading groups of research institutes in Europe. Based on world-leading R&D, Swedish ICT has attracted well known partners from all over the world and has contributed to increased competitiveness for industry and society. In 2009 we formed four new spin-off companies. In this annual report we will identify some of our achievements and show that we are on our way to creating competitive knowledge, services, and technologies, not only for Swedish companies but also for many companies worldwide.

We are proud that our new strategic initiative, Vehicle & Transportation ICT, coordinated by Viktoria, has been successful over the last year, despite the fact that 2009 was very tough for the automotive industry. We were able to attract and initiate collaboration with several leading companies in the world as well as local companies providing technology and services for sustainable mobility.

Imego became a subsidiary of Swedish ICT in January 2009. Imego, situated in Gothenburg, is a small multi-disciplinary organization developing a broad expertise in micro and nano sensors and microsystem technology. Imego provides tailored and cost effective sensor solutions matching the needs of many different applications. Imego has special
competence in motion sensors, wireless sensors, bio and chemical sensors, and electromagnetic sensors. In 2009, Imego signed a long term agreement with the Norwegian company, Sensonor Technologies AS, for development of MEMS-based inertia sensors and navigation systems.

EIT ICT Labs will use ICT as the key enabler driving the transformation towards the Future Information and Communication Society. EIT ICT Labs will develop and deliver excellence and entrepreneurship in education and knowledge of how to build Future Internet infrastructures for novel ICT services – for individuals, businesses, and society. In Sweden, the partners are SICS, KTH, Ericsson and TeliaSonera and outside of Sweden there are partner nodes located in Finland, Germany, the Netherlands, and France.

**High Competence Level**

Swedish ICT has a very high competence level with about 36% PhDs, professors, and assistant professors, many of whom have both academic and industrial experience. This combined experience is a great strength in our collaboration with partner companies, ensuring our capability to deliver results that can also create improved business opportunities.

In 2009 we published 287 papers and gave 24 invited presentations.

**Competence Profile 2009**

- **Professor/PhD**: 36%
- **Master/Bachelor**: 21%
- **Other**: 43%

**Income 2009 (415 MSEK)**

- **International industry**: 8%
- **EU**: 12%
- **Basic funding**: 18%
- **Swedish industry**: 30%
- **Licensing**: 29%
- **Swedish project funding**: 3%

Turn over in spin-off companies and SME due to joint projects. Also government funding and income from industry to Swedish ICT.
**Financing**
In 2009 Swedish ICT had a turnover of MSEK 415, of which 41% came from Swedish and international industry, 12% from European Union projects and 18% in basic funding from the Swedish government. 29% of our income is national project funding won in competition with other research organizations.

**Creating business and increased competitiveness**
In 2009 the turnover in our 35 start-up companies was MSEK 1,150. Excluding the start-up companies, a large number of SMEs increased their sales based on joint projects. According to information from the individual companies the increase in sales was MSEK 455 in 2009. Turnover in the SMEs, including start-up companies, was around MSEK 1,800. The graph on page 5 also shows industrial financing and financing from the Swedish government. It is worth noting that income from both industry and government financing increased during 2009. The ratio between the turnover in industry as a result of collaboration with Swedish ICT and the total government financing is 10:1. Contributions in larger companies are not included in this presentation as it is very difficult to identify the effects of individual projects on the turnover of large international companies. Large international companies are nevertheless among our best partners and we will present some successful examples in this report.

The increase in government funding is based on the new Swedish government bill “A boost to research and innovation” which, although its main focus is to strengthen basic research, has been very positive for the RTOs in Sweden. The government’s part of the total funding increased to 18% in 2009. Although this is very positive compared to the situation some years ago, it is low by international standards. A healthy level would be close to 25%.

Swedish ICT and our subsidiaries work in close collaboration with some of the most important universities in Sweden and internationally. In this collaboration we like to complement the work of the universities in order to provide a partnership that is of interest to our customers and industrial partners.

**Research and responsibility**
In recent years a lot of attention has been given to Corporate Social Responsibility (CSR). CSR is not new to us in either our daily operation or the focus
of our R&D projects. Swedish ICT has a long record of CSR-related projects. Examples include new ICT to meet the needs of an ageing population and efficient transportation. In the energy domain, sensor technology and visualization techniques are used to raise awareness of and reduce energy consumption. During 2009, an internal project was also initiated aiming to exchange experiences and spread awareness of sustainability issues within the organization.

I hope you will appreciate our achievements and enjoy the annual report.

Hans Hentzell, CEO
What is Swedish ICT?

Swedish ICT is a group of research organizations with 400 highly qualified researchers in all aspects of information and communication technology, including hardware, software, design, applications, and service development. Swedish ICT contributes to growth, profitability and new business creation based on world leading research and development in the areas of Information and Communication Technology (ICT). Swedish ICT works in close cooperation with Swedish and international businesses and society, and with the international research community.

The vision of Swedish ICT is to be acknowledged as a leader in the development of scientific and technological methods, techniques, products, and services for sustainable growth in society. We achieve this by combining unique research and expertise with long- and short-term business projects and by spinning off new companies based on research results. In order to provide new technology and knowledge needed for the development of competitive new products and services, a fundamental understanding of the future needs and conditions of industry and society is essential.

Swedish ICT is the Swedish research institute in the ICT field that covers generic areas such as the future Internet, embedded intelligence, security, and vehicle & transportation technologies and services. We perform world class research on subjects such as nano electronics and distributed systems and we carry out experimental research in fast-moving research disciplines like interaction design and energy saving electronics.

Swedish ICT has, through its five subsidiaries, a close cooperative working relationship with universities and colleges, and a large international network of other research practitioners. This secures access to cutting-edge expertise and research results that can stimulate growth.

Through its research institutes Swedish ICT offers front-line expertise primarily in the following areas:

- Tele and data communication and computer systems technology
- Media and interaction design
- Industrial ICT and electronics
- Vehicle and transportation ICT
- Nano electronics
- Service development
- Disruptive technologies such as printed electronics and bioelectronics
Swedish ICT also has a special activity for supporting small and medium sized enterprises (SMEs) in these areas.

Swedish ICT AB is 60% owned by the Swedish State through RISE Holding AB and 40% by Swedish industry through two industrial associations for hardware and software business respectively, each holding 20%.

Swedish ICT is located in Kista (Stockholm), Gothenburg, Norrköping, Linköping, Hudiksvall, Eskilstuna, Västerås, Uppsala, Umeå, Piteå and Lund.

Swedish ICT offers:
- Common development projects
- Network and participation in center formation
- Prototype and production incubator
- Standardization
- Innovation purchase
- SME IT-based product and process renewal
- Advanced consultancy work
The mission of Swedish ICT is to contribute to increased competitiveness and sustainable growth for industry and society. In order to provide new technology and knowledge, needed for the development of new competitive products and services, a fundamental understanding of the future needs and conditions of industry is essential. To this end industry is involved in the development of Swedish ICT by membership in the two industry associations FAV and FMOF, both part owners of Swedish ICT.

On the initiative of the ownership associations, Strategic Research Councils (SRCs) have been established to strengthen the industrial influence and gain commitment for new research focus areas. The main purpose of the SRCs is to strengthen the dialogue between Swedish ICT and its customers, specifically concerning the long term direction of the research.

The SRCs will identify research and development areas where Swedish ICT’s broad competence can contribute to sustainable development and growth in specific business areas. The SRCs are founded on active participation by industry representatives who together with experts from Swedish ICT meet in a neutral arena where important topics and challenges for the future can be identified. This close cooperation with industry provides very important information for application driven trends besides the more technology driven development.

Primary objectives for the SRCs are

- Road maps for the different technology research and market areas
- Input for action plans for the different parts of Swedish ICT

Today three SRCs have been established

- Vehicle and transportation, with twelve participating companies
- Security, with ten participating companies and organizations
- Future Internet, with eleven participating companies and organizations

Several new strategic research initiatives will be based on the results and conclusions provided by the SRCs. Of the above mentioned councils the first is more established and the others more recently formed. Common for all three is a mapping, for the industry, of relevant parts of Swedish ICT with strengths and weaknesses and how these correspond to the industry needs.

The conclusions from the work of the councils are in part confidential and full reports are only made available to the members of the ownership associations FMOF and FAV.
In May 2008 Swedish ICT decided to finance a strategic initiative in the area of Vehicle & Transportation. The decision was very much based on input from the vehicle industry, through the Swedish ICT Vehicle Council. The goal was to clearly contribute to the global challenge of tomorrow’s sustainable mobility.

The initiative is focusing the IT and communication perspective within five application areas. Together, the group of institutes within Swedish ICT addresses a broad perspective including hardware, software, services and business development. The application areas are:

- Electric & Hybrid Vehicles
- Active Safety Systems
- Vehicle Diagnostics Systems
- Open Vehicle Telematics
- Sustainable Transport

Together with industrial partners, Swedish ICT’s Vehicle & Transportation initiative has initiated and financed new projects with a total turnover of approximately MSEK 13 in 2009. Overall turnover in the Vehicle & Transportation ICT initiative was approximately MSEK 50 in 2009. Estimated turnover for 2010 is approximately MSEK 87.

Swedish ICT is currently representing Sweden in ISO standardization work in the field of environmental data related to transportation and the field of electric vehicle and intelligent infrastructure integration.

On a project level, Swedish ICT today runs activities within all five application areas. Project partners are industry, society and academia. Swedish ICT has also become a requested partner in several projects financed by the Swedish research financing program FFI (Fordonsstrategisk Forskning och Innovation) together with industry partners.

Swedish ICT today offers global cutting-edge competence and industrial project cooperation in the following sub-domains of our application area:

- 2nd generation power electronics
- Intelligent infrastructure for electric and plug-in hybrid vehicles
- Optimization of hybrid power trains
- 2nd generation active safety functions
- Cooperative driving
- Sensor systems
- Condition-based maintenance
- Connected vehicle business development
- Nomadic Device Integration
- Open platform strategy development
- Sustainable Everyday Travelling
- Fleet Management
- Co-modal transportation
Security is a very broad technology area within Swedish ICT and it covers solutions that can be applied at accidents, natural disasters and to prevent criminality or terrorism. It also covers ICT security for private, public, enterprise and military systems. The technologies do often also have applicability outside the pure security area. The research main objective is to contribute to the future grows of the Swedish security industry.

The Swedish ICT security research strategic council has chosen to focus on two areas:

- Sensor and imaging systems
- ICT security.

A sensor measures changes in a physical quantity such as temperature, pressure, flow rate, or pH, or the intensity of light, sound, or radio waves and converts that change into an input signal that can read by an observer or instrument.

Imaging systems cover optical components as well as image processing and networks. The research within Swedish ICT is concentrated around sensors, microelectronic and network technologies.

ICT security encompasses solutions, methodologies and models for detecting vulnerabilities and/or creating secure information systems.

Some examples of activities within Sensors and Imaging Systems are:

Low-cost infrared detectors for car security; UV sensors for bio-chemical analysis; high-performance IR detectors for reconnaissance; radar sensor modules, electronics and systems; antenna systems; MEMS based sensor systems or distributed sensor networks.

Within the ICT security area the research covers security in virtualized platforms, trusted platform technologies and security in social wireless networks.
The strategic initiative, Future Internet, focuses on four main areas: Green ICT, the Internet of Things, Robust Communication, and Services.

The initiative serves as a tool to crosslink the technology groups in Swedish ICT that specialize in different subjects important for Future Internet.

The Future Internet is new as a joint initiative but is based on a wealth of broad-ranging and excellent activities within all subsidiaries of Swedish ICT. Today we are active in a number of major programs in the national and international arena together with all relevant companies in Sweden and Europe.

- SICS is a partner of the Knowledge and Innovation Community that was selected by the European Institute of Innovation and Technology to form the new EIT ICT Labs along with KTH, TeliaSonera, Ericsson, and partners in Finland, the Netherlands, Germany, and France.

- Acreo coordinates the IP Alpha project and all Converged and Optical Networks projects in the EU 7th Framework Program.

- Acreo, Interactive Institute, and SICS are partners in a number of EU 7th Framework projects aimed at technology and methods for the Future Internet.

- SICS and Interactive Institute are partners in the national competence centers Mobile Life, SICS Center for Networked Systems, and Wisenet. In addition, Acreo coordinates the National Test Bed for Broad Band Communication

The Future Internet strategic initiative has been formed to strengthen our operation and improve even further our impact on increasing the competitiveness of our partners.
The importance of growing small and midsize enterprises (SME) as the basis for tomorrow’s successful large enterprises is widely recognized. Swedish ICT has through the years been active with various SME support programs and has developed a successful model for helping SMEs become more competitive by means of new technologies and business models.

Swedish ICT has developed a methodology based on creation of commercial value in Swedish SMEs. This is done by integrating IC technology into existing products. By upgrading the products with new technology the SMEs take an innovative step that keeps them ahead of their competitors. It is important though that this new technology also gives rise to enhanced functionality that generates new business opportunities.

The methodology includes the following important steps as pictured in the figure below:

- Company selection, seminars and company visits
- Company audit and need analysis
- Business development workshop
- Competence development
- IC Technology integration in R&D projects
- Technology transfer with R&D exploitation and IPR licensing

Impact

Swedish ICT reports annually the economic impact of its R&D activities in 15 to 20 SMEs on the consolidated yearly revenue from these companies. In 2009 the result was M€ 29, which corresponds to M€ 11.6 in ROI to financing institutions. In the ROI calculation we assume that 40% of the consolidated yearly revenue from the companies is a return to the state in terms of taxes and other charges.

Impact in existing SME

- Annual increase in turn over in SME based on cooperation with Swedish ICT’s R&D input in existing SME
Acreo
Acreo is one of Europe’s foremost research companies in electronics, optics and communication technology. In particular Acreo conducts activities in micro and nanoelectronics, fiber photonics, broadband technology, and printed electronics. By providing new technology and support for business development, Acreo also contributes to increased competitiveness and growth for small and medium sized enterprises. Acreo has a total of about 140 co-workers located in Kista (its headquarters), Norrköping and Hudiksvall.

Acreo also includes the subsidiary IRnova, which has 22 co-workers developing and supplying high definition detectors for infrared radiation.

SICS, Swedish Institute of Computer Science
SICS is Sweden’s leading industrial research institute in information and communication technology with special emphasis on software, systems and services. SICS has about 120 researchers of which 45 are PhD. SICS’ head office is in Kista and activities are also carried out in Uppsala, Västerås, Gothenburg and Lund.

In addition, included in SICS is the subsidiary, Santa Anna IT Research Institute, with some ten researchers that carry out customer oriented research in information technology and its uses. Santa Anna is characterised by its broadly-based ties to the strong IT research and industrial environment in Linköping.

Swedish ICT Research

FMOF 20%  FAV 20%  Rise Holding 60%
Interactive Institute
The Interactive Institute is a Swedish experimental media research institute that combines expertise in art, design and technology to conduct world-class applied research and innovation. The Interactive Institute has about 55 employees organized in a number of research studios located in Stockholm/Kista, Piteå, Umeå, Eskilstuna, Norrköping and Göteborg.
| www.tii.se

Imego
Imego is the Swedish sensor research institute, which carries out world-leading research and development on sensors and sensor systems based on micro and nanotechnology. Particularly well-regarded are Imego’s MEMS based inertia sensors, navigation systems and innovative electromagnetic sensors and systems. Today, Imego has 40 co-workers located in Gothenburg. Imego also has a dedicated focus on small and medium sized enterprises.
| www.imego.com

Viktoria Institute
The Viktoria Institute has an international leading research centre in automotive and transport informatics focusing on how to design the use of mobile IT solutions so as to provide safer, more effective and more environmentally friendly transportation. Today the Viktoria Institute has some 25 employees and is located in Gothenburg.
| www.viktoria.se
Selected projects

Touching the Inside
— the Virtual Autopsy Table

Multiple users can interact collaboratively and simultaneously, working with large and complex data to gain deeper understanding and insight into the functions and processes inside the body.

The visualization technique used in this table is already used successfully as a complement to the conventional autopsy. It dispenses with the need for invasive surgical procedures allowing medical experts to see things that would be difficult to discover with traditional methods. Furthermore, the technique opens up new opportunities in countries where autopsies are not accepted for cultural reasons. The technique can also be applied in many other areas of health and medical practice.

The Virtual Autopsy Table is a unique medical visualization tool that allows people to explore the inside of a human body. With its intuitive gesture-based interface, the Virtual Autopsy Table totally changes the way users interact with volumetric medical data.

The Virtual Autopsy Table is developed by the Interactive Institute C-studio in collaboration with Norrköping Visualization Center and the Center for Medical Image Science and Visualization (CMIV) in Linköping, and is based on research results and patented technology from CMIV, VITA at Linköping University, Sectra Imtec AB and the Swedish National Board of Forensic Medicine.

The Virtual Autopsy Table project is initiated and funded by C-Site, a Swedish cross-boundary visualization arena in Norrköping, The Knowledge Foundation, VINNOVA, Swedish Foundation for Strategic Research, Invest In Sweden Agency, The Vårdal Foundation and the Swedish Research Council.

Get ready for an astonishing experience as you explore the inside of the body in an entirely new way.

| www.tii.se/projects/autopsy

Photo: Valentin and Jason Mellström
With new sensors the future might see electronic equipment controlled by just pointing a finger without actually touching the device.

Acreo is a partner of the European FP7 project 3PLAST (Pyroelectric and Piezoelectric Printable Large Area Sensor Technology). Within 3PLAST, polymer sensors integrated with organic electronics on large area flexible substrates are being developed. The 3PLAST sensors will provide accurate information on changes in temperature and pressure with a local resolution. The basic sensor device is comprised of a piezoelectric and/or pyroelectric polymer integrated with high-performance organic thin film transistors (OTFTs) or electrochemical transistors (ECTs) operating at low voltages acting as impedance converters and sensor signal amplifiers.

The figure above shows the concept for an integrated pyro or piezoelectric sensor element. The sensor can be activated either by light from an IR laser diode, by human body radiation (from finger or hand) or by pressure. One of the most relevant materials for the 3Plast sensor technology is the PVDF-TrFE copolymer. PVDF copolymer solutions are developed and adjusted for printing processes. Low-cost manufacturing will be enabled by high-throughput processes such as screen and reel-to-reel printing. Examples of applications envisioned for the integrated large area polymer sensor technology are smart skin, large area human machine interfaces, large area security systems (e.g. pedestrian protection in vehicles) and self-controlled machine monitoring.

Acreo’s main mission in 3PLAST is to transfer lab-scale thin film processes to large-area, production-adapted printing processes. Printing techniques addressed are: screen-printing, ink-jet printing, bar coating, and R2R printing. The components printed are: PVDF-TrFE sensor elements, electrochemical transistors (ECTs) designed for the sensor elements and electrochemical display elements. Finally, these components will be integrated into an all-printed application human machine interface (HMI) demonstrator sensor device, namely a touchless key pad.

Printed pyroelectric sensor elements integrated with ECTs and OTFTs have been realized and tested. The sensitivity to human body radiation is shown by waving a finger over the sensor. Next year the focus will be on pyroelectric and piezoelectric demonstrator fabrication.

www.3plast-sensor.eu
On March 12th 2009, a beautiful winter’s day, the REXUS 6 sound rocket was launched, equipped with the IMT40 IMU technology together with a set of student designed experiments. During its swift journey it reached an apogee of approximately 88.4 km. The purpose in the context of navigation was to evaluate the performance of the Imego designed MEMS-IMU.

The Swedish Space Corporation has launched over 500 sounding rockets from Sweden’s Space Center, Esrange, situated in Kiruna. Sound rockets play an important part in the exploration of space in the vicinity of the Earth, with no good alternatives for the region 45–200 km above the Earth’s surface. The payload consists of different scientific instruments for experiments that include space physics, space chemistry, micro-gravity, and aeronomy studies. In many of these experiments it is essential to know the position and orientation of the rocket for subsequent data analysis.

The rocket constitutes a very violent environment, with strong vibration, rotational rates of 4–6 revolutions per second and acceleration up to 20 times gravity. To track the path of the rocket as it races through space, externally referenced positioning systems such as GPS and radar are frequently used. However, detailed information on position and orientation on a shorter time scale can only be supplied by a system that measures all six degrees of freedom — and does this several hundreds of times per second. A strong candidate for this is the MEMS-based Inertial Measurement Unit (IMU) technology developed by Imego. Its state-of-the-art performance with respect to noise, stability, small size and low weight in conjunction with its high measurement range of ±3600 deg/s rotational rate and +/-500g acceleration range makes it promising for this very high dynamic application.

The REXUS program is a joint project between SSC Esrange and the Mobile Rocket Base (Moraba) of the German Aerospace Center DLR, conducted by Eurolaunch. Half of the payload is reserved for German students, while the other Swedish half has been made available to students from other European countries through collaboration with ESA Education. REXUS is considered as an annual sounding rocket program, launched from Esrange Space Center.
Before the market for sensor-network-based industrial monitoring and metering takes off there is a need for standardization of protocols. Both ABB and SICS are involved in the standardization process for important communication standards. These are WirelessHART, a standard for industrial sensor networks, and 6LoWPAN, which targets IPv6-based sensor networks. So far we have mostly worked with WirelessHART networks for condition monitoring, but we are starting up a research project in the smart energy domain. Within this project we will develop a smart metering prototype using an ABB hardware prototype and SICS’ Contiki operating system with the ulIPv6 communication stack, the world’s smallest IPv6 stack.

One of the current goals of our cooperation is a complete WirelessHART network. We have already implemented a WirelessHART security manager and protocol stack. The next steps are a WirelessHART network manager and gateway. This work is performed within the SICS Center for Networked Systems (CNS).

Other results from the collaboration between ABB and SICS include joint publications, software, pilot installations, several Swedish and international exhibitions, patents, and several theses both at master and licentiate level. The collaboration also involves personal mobility between the research groups at ABB and SICS. Two SICS researches regularly visit ABB, and one ABB researcher spends part of his time at SICS.
Selected projects

Low Cost Infrared Imaging

For many potential applications of IR imaging, the cost of today’s systems has been prohibitive for widespread use. The situation is changing with the development of new IR sensors not requiring cooling.

Infrared image sensors can give a picture of the thermal radiation from for example humans or animals and are very effective in total darkness. Infrared imaging systems are generally divided into two categories: cooled systems, which are often high performance, but require cooling to liquid nitrogen temperatures, and un-cooled systems, which traditionally do not perform as well as the cooled, but can operate at room temperature.

Acreo has developed an un-cooled sensor based on a new thermistor material made by a multilayer structure of alternating Si and SiGe layers of nanometer thickness. The key benefits of this new material are excellent electrical performance with high sensitivity, and low noise, and high temperature stability, enabling...
novel MEMS techniques to be employed during image sensor manufacturing and packaging. All things considered, the SiGe thermistor material enables significant cost reductions and performance enhancements compared to current state-of-the-art un-cooled sensors.

The Si/SiGe-based quantum-well technology that Acreo has developed enables the use of several cost reducing technologies during manufacture of un-cooled IR sensors. Sensor material manufacturing is separated from read-out circuit manufacturing and the integration of sensor material with read-out circuit employs standard MEMS technologies. Furthermore, the material is stable up to very high temperatures allowing novel wafer level packaging techniques to be used, further reducing the unit cost.

The work at Acreo is multi faceted and spans the whole range from fundamental research on material properties to device design and component manufacturing. Several batches of the new sensor material have been produced and good agreement between measured temperature sensitivities and theoretical calculations has been obtained. As a proof of concept, a 16 x 16 bolometer sensor array was manufactured together with KTH on a CMOS read-out circuit. Despite its limited resolution, it was possible to clearly follow hot point objects and to detect a person in a room-temperature environment.

In collaboration with Autoliv and Sensonor Technologies AS, a new read-out circuit is being designed. The ultimate goal is to design the read-out circuit to allow operation over a wide temperature range without temperature stabilization. The first generation of circuits with this design is expected during 2010.

In 2009 Acreo signed an agreement with Sensonor Technologies AS to cooperate on the industrialization of the new high performance sensor. The agreement includes licensing of Acreo’s patented material technology. In 2011, Sensonor plans to launch its first volume product in 2011 of the new sensor, which can be deployed in small energy effective thermal imaging cameras for inspection, surveillance and security solutions in many areas.
A project, carried out by SICS, Squace AB and Nockeby Preschools, and financed by VINNOVA, has developed PreschoolOnline, a web service also available on mobile phones. The service is organized in communities corresponding to the groups of children in preschool, and allows parents to access information about their child’s group and the preschool as well as contact information for other parents in that group. Teachers can add and update information about the preschool, parents can add and update information about themselves and their children, and everyone can post on the notice board.

During the project, PreschoolOnline was deployed in six preschools and used by more than 500 parents in a five month field trial. This gave us excellent opportunities to study real life use through surveys, interviews, and logs. In general, both parents and teachers were positive to the service. PreschoolOnline offered access to information when and where they needed it. Moreover, when the information part was taken care of through the service, there was more time to actually talk about the children, when teachers and parents met at preschool.

PreschoolOnline showed that even a simple service can improve information exchange between parents and teachers. We are now adding functionality to the service to create not only a tool for disseminating information but also to gather information, such as vacation dates and whether or not parents plan to attend a meeting.

The six original preschools have chosen to continue to use PreschoolOnline after the project has ended, and more than 40 other preschools have tried out the service on their own initiative. Furthermore, the City of Stockholm is interested in using PreschoolOnline for all preschools in the city.

Having children in preschool can be a logistic challenge. Parents need to keep track of dates for events, what to bring, changes in the opening hours of the preschool, and many other things. PreschoolOnline is an attempt to support the information exchange between parents and preschool teachers and provide an opportunity to study how ICT can be used in preschool.
Selected projects

Viktoria Institute – Towards Sustainable Mobility

Intelligent Infrastructure for the electric car
Within the application area of Electric and Hybrid Vehicles, the Institute runs a project, jointly financed by the project partners, where players from different sectors of industry work together to create the prerequisites for an “intelligent charging infrastructure” and related services based on a clear usability focus. Volvo Cars, Göteborg Energi, Ericsson, and Viktoria Institute are using workshops and scenario techniques to develop common perceptions for an “intelligent charging infrastructure” and related services based on a clear usability focus.

The project is affiliated to the Volvo Cars “electric car project”, funded by the Swedish Energy Agency among others, in which the Volvo C30 was converted to a pure electric vehicle.

Open innovation provides sustainability for everyday travel
Given the pace at which information technology in society is changing, will not the demands for support and information from everyday travelers also change? Should the public transport authorities still deliver information services directly to the passenger, or instead provide a solid information infrastructure in which open innovation and commercial players generate the final product? Can digital services increase environmental awareness among travelers, and actually change behavior towards a more sustainable way of travel?

These questions represent the starting point for a four-year research program at Viktoria Institute, ”Innovation for sustainable everyday travel”, which includes and coordinates several projects within the personal transportation area with different focuses, financiers and operators to generate a large-scale initiative.

The projects are financed by the subregion of Sjuhärad, the Region Västra Götaland, VINNOVA and Swedish ICT.

Sustainability issues have been very much in focus in society lately. Probably this is why the Automotive and Transportation industries have become symbols of how technology and innovation are essential if we are to maintain the standards of living we have today.

Here are two areas where the researchers at Viktoria Institute are focusing on sustainability in the transport sector.
It is often said that the IP traffic bandwidth demands are ever increasing. Is this true? In order to understand this, detailed measurements over long periods of time are required. Acreo performs IP traffic measurements in production networks to enable research on network traffic patterns and user behavior. The measurements are unique in the research community, since they involve live networks, and are long term (years) and detailed (application level, household level). This way, it is possible to analyze user behavior related to certain applications, like e.g. gaming or video streaming, and also detailed traffic patterns per application. Apart from user and application behavior, areas of interest include e.g. content delivery
analysis, traffic influence on network performance, network design and optimization, etc.

Acreo coordinates several research projects in the area. One of these is TRAMMS, which has been running throughout 2007–2009, coordinated by Acreo.

The main objective of the project has been to model traffic in multi-service IP networks, and to develop tools for monitoring of QoS and bottlenecks in networks. The models are built on data acquired in different parts of Europe and, combined with the new tools developed in the project, they bring significant new insight into network traffic, bottleneck analysis, user behavior and QoS monitoring. Measurements from application to packet level per household were collected in real networks located in different countries (Sweden and Spain) covering different types of access. Measurements from a large number of users were gathered for long periods of time. The project has impacted seven product lines in five different companies. All of these products are aimed at finding the bottlenecks in the network and monitoring traffic and QoS parameters, and they complement each other to get a complete picture of the status of the network, from point-to-point performance (delay, jitter), through available bandwidth in real time, to monitoring of BGP events and deep packet inspection. TRAMMS has actively contributed to standardization of active end-to-end capacity measurement methods in the International Telecommunication Union (ITU-T). TRAMMS has also contributed as a participant to the creation of the Industry Specification Group, ISG MOI (Measurement Ontologies for IP traffic), under the ETSI framework. The results of the group are intended to provide a solution for network operators, Internet service providers and businesses by providing metrics based on a common understanding of IP traffic management and measurement criteria.

The results from the traffic measurement activities are important not only for the research community and the operators, but for society as a whole, since the Internet and its use play a very important societal and social role in people’s daily lives.

In recognition of the importance of the project results the TRAMMS project was selected as the winner of the Celtic Gold Award 2009. The motivation was the expected impact of the project results for new business and jobs, and the already achieved impact on seven new product lines in five companies.

http://projects.celtic-initiative.org/tramms/
Board 2009

Ulf Wahlberg, Ericsson (Chairman)

Martin Heiman, Volvo 3P
Ulrika Hesslow, ABB Automation Products
Bert-Inge Hogsved, Hogia
Peter Holmstedt, Rise Holding

Dan Jangblad, SAAB
Ulla Lilja Berg, Apotekens Service
Tommy Nilsson, Industrifonden
Claes Nycander, TeliaSonera

Malin Gustafsson, staff representative
Björn Grönvall, staff representative
Management

Hans Hentzell, CEO
Staffan Truvé, Vice President
Lars Erik Ridderström, CFO
Maja Fredriksson, Human Resources
Kersti Hedman, Marketing Manager

Managing Committee

Hans Hentzell, CEO
Staffan Truvé, Vice President
Lars Erik Ridderström, CFO
Mårten Armgarth, CEO Acreo
Christer Norström, CEO SICS
Bill Brox, CEO Imego
Christina von Dorrien, CEO Interactive Institute
Per-Åke Olsson, CEO Viktoria Institute
**Swedish ICT**  
**CONSOLIDATED INCOME STATEMENT**  

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Operating income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net turnover</td>
<td>414 220</td>
<td>332 958</td>
</tr>
<tr>
<td>Other operating income</td>
<td>876</td>
<td>1 479</td>
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<tr>
<td><strong>Total</strong></td>
<td>415 096</td>
<td>334 437</td>
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<tr>
<td><strong>Operating expenses</strong></td>
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<tr>
<td>Other external costs</td>
<td>-154 511</td>
<td>-118 235</td>
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<tr>
<td>Personnel costs</td>
<td>-253 462</td>
<td>-210 643</td>
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<tr>
<td>Depreciation of tangible assets and intangible assets</td>
<td>-7 495</td>
<td>-5 009</td>
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<tr>
<td><strong>Total</strong></td>
<td>-372</td>
<td>551</td>
</tr>
<tr>
<td><strong>Result from financial investments</strong></td>
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<td></td>
</tr>
<tr>
<td>Result from other securities and receivables</td>
<td>-485</td>
<td>182</td>
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<tr>
<td>Interest income and similar items</td>
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<td>3 871</td>
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<tr>
<td>Interest expense and similar items</td>
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<td>-218</td>
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<tr>
<td><strong>Total</strong></td>
<td>127</td>
<td>4 385</td>
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<tr>
<td><strong>Deffered tax</strong></td>
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<td>-766</td>
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<tr>
<td>Minority interest</td>
<td>10</td>
<td>-110</td>
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<tr>
<td><strong>Net profit/loss for the year</strong></td>
<td>-1 067</td>
<td>3 509</td>
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**Swedish ICT**  
**CONSOLIDATED BALANCE SHEET**  

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>ASSETS</strong></td>
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<tr>
<td>Intangible assets</td>
<td>63</td>
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<tr>
<td>Tangible assets</td>
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<tr>
<td>Financial assets</td>
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<tr>
<td>Inventories, Work in progress</td>
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<tr>
<td>Accounts receivables – trade</td>
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<td>Other receivables</td>
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<td>Short-term investments</td>
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<tr>
<td>Cash and bank balances</td>
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<tr>
<td><strong>Total Assets</strong></td>
<td>236 617</td>
<td>215 428</td>
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<tr>
<td><strong>EQUITY AND LIABILITIES</strong></td>
<td></td>
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</tr>
<tr>
<td>Shareholders equity</td>
<td>84 001</td>
<td>67 437</td>
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<tr>
<td>Minority interest</td>
<td>489</td>
<td>485</td>
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<tr>
<td>Provisions</td>
<td>1 102</td>
<td>1 229</td>
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<tr>
<td>Advance payments from customers</td>
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<td>84 809</td>
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<tr>
<td>Current liabilities</td>
<td>60 838</td>
<td>61 469</td>
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<tr>
<td><strong>Total Equity and Liabilities</strong></td>
<td>236 617</td>
<td>215 428</td>
</tr>
</tbody>
</table>
### Swedish ICT
#### SUMMARY OVER THE YEARS

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Income statement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Net turnover</td>
<td>414 220</td>
<td>332 958</td>
<td>336 173</td>
<td>339 074</td>
<td>164 987</td>
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<tr>
<td>Result after financial items</td>
<td>127</td>
<td>4 385</td>
<td>4 169</td>
<td>-2 246</td>
<td>391</td>
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<tr>
<td><strong>Balance sheet</strong></td>
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<tr>
<td>Balance sheet total</td>
<td>236 617</td>
<td>215 428</td>
<td>192 009</td>
<td>185 012</td>
<td>210 611</td>
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<tr>
<td>Shareholders equity</td>
<td>84 001</td>
<td>67 437</td>
<td>63 927</td>
<td>60 373</td>
<td>62 584</td>
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<tr>
<td><strong>Key figures</strong></td>
<td></td>
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<tr>
<td>Net margin ratio</td>
<td>0,0%</td>
<td>1,3%</td>
<td>1,2%</td>
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<td>0,2%</td>
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<tr>
<td>Equity ratio</td>
<td>35,5%</td>
<td>31,3%</td>
<td>33,3%</td>
<td>32,6%</td>
<td>29,7%</td>
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<tr>
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<td>303</td>
<td>314</td>
<td>339</td>
<td>315</td>
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<td>Cash flow</td>
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<td>-20 824</td>
<td>32 887</td>
<td>-26 391</td>
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### Swedish ICT
#### SUBSIDIARIES 2009

<table>
<thead>
<tr>
<th></th>
<th>Acreo group</th>
<th>SICS group</th>
<th>Imego</th>
<th>Interactive inst.</th>
<th>Viktoria</th>
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<tbody>
<tr>
<td><strong>Income statement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net turnover</td>
<td>196 812</td>
<td>105 691</td>
<td>49 855</td>
<td>47 571</td>
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<td>1 156</td>
<td>330</td>
<td>67</td>
<td>-1 333</td>
<td>-164</td>
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<td><strong>Balance sheet</strong></td>
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<tr>
<td>Balance sheet total</td>
<td>94 590</td>
<td>75 617</td>
<td>27 882</td>
<td>27 675</td>
<td>6 545</td>
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<td>Shareholders equity</td>
<td>28 672</td>
<td>24 410</td>
<td>16 547</td>
<td>8 033</td>
<td>1 477</td>
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<tr>
<td><strong>Key figures</strong></td>
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</tr>
<tr>
<td>Net margin ratio</td>
<td>0,6%</td>
<td>0,3%</td>
<td>0,1%</td>
<td>-2,8%</td>
<td>-0,8%</td>
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<tr>
<td>Equity ratio</td>
<td>30,3%</td>
<td>32,3%</td>
<td>59,3%</td>
<td>29,0%</td>
<td>22,9%</td>
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<tr>
<td>Average number of employees</td>
<td>131</td>
<td>103</td>
<td>34</td>
<td>53</td>
<td>14</td>
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</tbody>
</table>

**Key figure definitions**
- Net margin ratio: resultat after financial items in % of turnover.
- Equity ratio: equity capital in % of balance sheet total.
- Average number of employees: average number of employees during the period.

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www.swedish-ict.se