

Final report for

SoC-SME feasibility project

2002-06-14

Project partners:

ITEK: Association of Danish IT-, Telecomm's-, Electronics- and "Kommunikations" companies
VI: The association of Swedish Engineering Industries
SET: Federation of Finnish Electrical and Electronics Industry
Abelia: Association of Norwegian ICT- and knowledgebased enterprises
EITS: Estonian Information Technology Society
LEtERA: The Latvian Electrical Engineering and Electronics Industry Association
INFOBALT: Association of Information Technologies, Telecomm's and Office Equipment of Lithuania

Executive summary

A feasibility project supported by Nordic Industrial Fund was initiated on 1 January 2002 in order to develop a joint Nordic/Baltic project supporting SMEs adoption of the System-on-Chip technology. The project was completed with a proposal for a synergy project submitted to the Fund on 15 May 2002.

The development of the information society has had a major effect on all industries. To stay competitive, SMEs have to invest in human talent capable of creating innovative information technology based products. As a world leader in IT development and Internet use, the Nordic countries are a dynamic test bed of creativity for pioneering new IT solutions. Both the pace of change in these technologies, and the complexity of the problems to be solved, are increasing. System-on-Chip technology will be a key building block in nearly all intelligent products.

The feasibility study included the following activities:

1. Organisation of a Nordic/Baltic workshop with participants from SMEs and RTD performers in order to discuss and understand the specific System-on-Chip requirements of SMEs (including Baltic SMEs). Special attention was devoted to methods of making the design knowledge more generally available to SMEs. (Tasks included: identification of SMEs, workshop programme, invitations, invited speakers, venue costs and travel expenses for a few Baltic SMEs/training providers).
2. Identification of RTD performers matching the requirements of the SMEs. A special effort was devoted to qualify Baltic RTD performers that may act as local knowledge providers. A general System-on-Chip training programme adapted to SME requirements and with a strong focus on distance learning methods in order to overcome the geographical distances was proposed. (Tasks included: Requirement analysis, training methodologies, courses available, distance learning capabilities, SME adaptation, gap analysis).
3. Development of a proposal submitted to Nordic Industrial Fund on 15 May 2002. (Tasks included: Objectives, partners, RTD performers, dissemination strategies, etc.).

Selected centres of excellence were analysed to sort out the content and structure of their courses. Also training practices were considered (class room lectures, group work, hands-on training, internship, distance learning, etc.). The survey identified Internet based, multimedia enhanced, distance learning tools that are offered for remote training or most suited for distance learning conversion. Furthermore the analysis identified the modules missing (gap analysis) in order to provide up-to-date continuing training to SMEs.

Sponsored by Nordic Industrial Fund the Nordic and Baltic electronics industry associations¹ organised on 4 April 2002 a workshop in Tallinn in order to discuss how an advanced SoC training programme could be organised for their 3.500 SME member organisations. The associations want to provide their members with easy access to System-on-Chip knowledge required for the development of next generation of intelligent products.

The workshop (see programme and list of participants in Appendix 1) concluded that the training effort should be provided by four recognised centres of excellence (KTH, TUT, DELTA and SINTEF) already holding extensive knowledge in the SoC area. Following the workshop a survey was carried out among SMEs from all seven countries involved. The survey, which was based on replies from more than 53 users, concluded that there is a strong need for upgrading the qualifications of the SMEs. Four different levels of electronics integration were considered in the survey:

- system integration in circuit or miniature module (SoC)
- application specific integrated circuit (ASIC)
- programmable logic (PLD, FPGA)
- microprocessor

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Today 89 % of the SMEs uses PLDs, FPGAs or microprocessor based solutions and more than 74 % intend to step up on a more integrated solution like ASIC or SoC. The major barrier for doing so is reported to be lack of technical information (awareness) and advanced training in these areas. A certain part of the SMEs (48%) are for the same reason considering to use a subcontractor for the development of the ASIC/SoC. A questionnaire was made available on the web and the electronics associations encouraged their member organisations to fill it in. The questionnaire can be found at <http://edu.cs.tut.fi/soc-sme/english/>

The synergy project will build up an infrastructure for the provision of advanced SoC training to SMEs. In order to make such training generally available throughout the region (Nordic countries plus Baltic States) at a reasonable cost, it must be based on distance learning methodologies. More than 250 engineers from SMEs are expected to attend the training. The electronics associations have initially identified four advanced training courses addressing SoC issues that are available as prototypes. These on-line courses will be used to demonstrate the capabilities of the infrastructure developed. The four courses selected will be adapted to fit the requirements of SMEs. Since it is very costly to develop on-line courses the partners will pursue to reuse the courses also for curriculum purposes.

The survey also showed that there exists a more general lack of understanding of the capabilities and the constraints of the SoC technologies. Therefore the project will develop a SoC awareness course to be presented as a road-show in all seven countries involved. The awareness course will ease the SMEs take-up of the SoC technology by providing techno-economic knowledge that can be used for instance to choose whether the development should take place in-house or by means of subcontractors.

Within the microelectronics industry there is a fatal lack of skilled designers. The project will help solving this problem by continued training of professionals and by the re-use of the course material to boost the production of graduates holding SoC skills. Finally the project will develop mechanisms and practices for how to handle course fees and IPR for on-line based training.

In summary the proposed synergy project's deliverables are:

1. A Nordic platform for on-line SoC training (web, 7 national sites, on-line practices).
2. Four on-line courses adapted to SME requirements and presented throughout the region.
3. An extensive SoC awareness campaign, addressing more than 3500 SMEs, managed by the electronics associations.
4. More than 250 engineers trained in SoC design.

Evaluation of results

The proposed synergy project will strengthen the competitiveness of the Nordic electronics industry by providing state-of-the-art knowledge and training to the professionals working in innovative SMEs. The Nordic IT business sector will strongly benefit from the easy access to training and knowledge related to SoC. Furthermore, the project contributes to the graduation of students holding relevant SoC skills.

The SoC-SME project also fits excellently into the Draft Northern eDimension Action Plan (NeDAP, known to us from its Draft Version 0.5 which has been released for discussion with Business). This initiative is built on the EU's Northern Dimension and on the eEurope and eEurope+ documents, to complement national initiatives in the region.

Heads of Government and representatives of Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia, Sweden and the EU, met in Kolding on 12-13 April 2000 and requested "initiatives with the aim to develop and strengthen the Baltic Sea Region's already leading position in the IT sector in general, and at the same time asking the European Commission to include relevant IT proposals in its draft working plan on the Northern Dimension." The NeDAP is positioned as a regional initiative, in which regional bodies, government, business, and research are expected to participate.

We are aware that we do not geographically cover the entire Northern Dimension Area. We prefer, however, from a Management point of view, to start with partners who know each other and each others' competencies. Given available financial resources – perhaps forthcoming at a later stage when funds made available from EU can complement the funds available from Nordic Industrial Fund – our Steering

Group is willing to consider extending the project to cover a larger part of the Northern Dimension Area. Given our planned reliance on distance learning, that should be possible at reasonable cost and reasonable effort for our Consortium. Identification of a Russian partner (St. Petersburg based) has taken place and the Fort-Ross consortium could be such a link.

The SMEs will be offered access to a comprehensive range of research and development facilities, covering fully-serviced laboratories, methods, tools and employee training support. The initiative will develop a number of Training Satellites into leading regional locations for System-on-Chip design with special focus on enabling small scale production while enhancing competitiveness.

The System-on-Chip technology will become the basic building block of the information society, putting the maximum amount of functionality into the smallest possible space. The solution is to co-operate in the R&D related to chip design. The SoC-SME project will bring new business opportunities to the Nordic electronics and systems industry.

The SoC-SME project is proposed as a "Synergy" project meaning that it is heavily based on a number of national activities. The courses to be provided through SoC-SME are all developed or are currently being developed within national programmes. The associated national funding is in the range of 0.5-1.5 MNOK per course. Furthermore the project is based on very strong national SoC programmes as summarised below:

Sweden: Socware is a national endeavour involving business and industry, universities and institutes, Government ministries, state and local authorities and institutions. Three Swedish top universities, together with industry, now cooperate closely in defining the new research and education programmes for future System-on-Chip design.

Denmark: A Danish System-on-Chip centre named SocLab is proposed to offer access to a comprehensive range of research and development facilities, covering fully-serviced laboratories, methods, tools, virtual components and employee training support. The initiative is based on a partnership with Denmark's top universities in this field (DTU and AAU) plus DELTA and a range of private sector partners.

Finland: A graduate School in Telecommunication System-on-Chip (TELESOC) was launched in January 2002. The partners are from six different sites: TUT, UTU, Åbo Akademi, Helsinki University of Technology, Jyväskylä University, and Pori University Unit. There will be five PhD students at the beginning and more than 1000 graduate school seats for reallocation next year, ear-marked for the IT sector.

Norway: The CoDeVer-project is a Government founded research project or Consortium, consisting of several Norwegian Research Institutes, Universities and Education centres, as well as a number of industry partners, both in product development and SoC/ASIC-consultancy area. The 4-year long co-operation project has worked with tools and methods for real-time embedded system design, both for board- and SoC-implementation. The vision is: "Establish methods with tools support for abstract system level design and implementation, for real-time embedded systems". The project has been working on a web-based methodology handbook for co-design and co-verification, and has built relationships with the leading research centres in the field in Europe (e.g. TIMA and IMAG). One of the participants, Buskerud College has long time experience in establishing web-based and distance learning courses.

Estonia: Currently there are two successful companies active in System-on-Chip design in Estonia: ArsMicro and Artec Design Group. In order to support a beginning System-on-Chip industry Tallinn Technical University is starting a computer and system engineering curriculum with emphasis on digital System-on-Chip and socware design.

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Appendix 1: Workshop programme

The workshop is sponsored by:



Workshop on System-on-Chip for SMEs

4 April 2002, Grand Hotel Tallinn, Tallinn, Estonia

AGENDA

- 09.00 Welcome and introduction to the initiative /Jan Zneider, ITEK
- 09.10 Presentation of the electronics associations and feedback from national surveys:
 - ITEK: Association of Danish IT-, Telecomm's-, Electronics- and "Kommunikations" (Media/Content) companies
 - VI: The association of Swedish Engineering Industries
 - SET: Federation of Finnish Electrical and Electronics Industry
 - EITS: Eesti Infotehnoloogia Selts
 - Abelia: Association of Norwegian ICT- and knowledgebased enterprises
 - LEtERA: The Latvian Electrical Engineering and Electronics Industry Association
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- 10.20 The Northern eDimension Action Plan /Ib Grønvaldt
- 10.40 Coffee break
- 11.00 New distance learning SoC system modeling course /Axel Jantsch, KTH
- 11.20 Experiences on Processor Design course lecturing over the Internet /Jari Nurmi, TUT
- 11.40 SoC education at Tallinn Technical University /Peeter Ellervee, TTU
- 12.00 Provision of web based IP services for SoC /Bjarne Andersen, DELTA
- 12.20 Lunch
- 13.20 Case with a SME
- 13.40 Results from an EU survey on SME's adoption of new technologies /Ivan Ring Nielsen, Technoconsult
- 14.00 Co-operative project models under Nordic Industrial Fund /Holger Nielsen, Nordic Industrial Fund
- 14.20 Coffee break
- 14.40 Discussion and input to a Nordic/Baltic SoC-SME proposal /Ivan Ring Nielsen
 - Project outline and objectives
 - Identification of R&D performers (SoC and Distance Learning)
 - Identification of Technology Transfer Nodes
- 15.40 Plan for completing the proposal
- 16.00 Closing remarks /Jan Zneider, ITEK

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Workshop on System-on-Chip for SMEs

4 April 2002

Grand Hotel Tallinn, Tallinn, Estonia

LIST OF PARTICIPANTS

1	Jan Zneider	ITEK	DENMARK
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3	Jari Nurmi	Tampere Univ. of Technology	FINLAND
4	Peeter Ellervee	Tallinn Technical University	ESTONIA
5	Anders Marcelius	VI	SWEDEN
6	Leo Laaksonen	SET	FINLAND
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13	Holger Nielsen	Nordic Industrial Fund	NORWAY
14	Vladimirs Kuzmins	A/S ALFA Pro	LATVIA
15	Bjarne G. Andersen	DELTA	DENMARK
16	Jaan Liivand	Liewenthal Electronics	ESTONIA
17	Rein Sabolotny	Arsmikro	ESTONIA
18	Jüri Pöldre	Artec Design	ESTONIA
19	Kalle Tammemäe	IT College	ESTONIA