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# FIRST EVALUATION OF THE INSTITUTE EXCELLENCE CENTRES PROGRAMME

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**About VINNOVA**

VINNOVA´s mission is to *promote sustainable growth*
by funding *needs-driven research*
and developing *effective innovation systems*.

Through its activities in this field, VINNOVA aims to make a significant contribution to Sweden´s development into a leading centre of economic growth.

Institute Excellence Centres is a programme that is run jointly by VINNOVA, the Knowledge Foundation and the Swedish Foundation for Strategic Research (SSF). It began in 2005 with a first call for applications for planning grants.

Research institutes should co-operate with universities, colleges and the business and industrial sectors within the framework of the programme with the aim of creating leading international environments for research, development and innovation activities in fields that are important to the future growth and competitiveness of Sweden.

The programme will have a maximum budget of SEK 600 million over a period of six years. A maximum of SEK 300 million of this sum will come from VINNOVA, the Knowledge Foundation and SSF, while the rest will come from the companies involved. VINNOVA will provide a maximum of SEK 30 million per year and the Knowledge Foundation and SSF will each contribute no more than SEK 10 million.

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Research and Innovation for Sustainable Growth

# First Evaluation of the Institute Excellence Centres Programme

by

Per Stenius & Kaj Mårtensson

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# Preface

In this report The Swedish Governmental Agency for Innovation Systems (VINNOVA), the Knowledge Foundation (KK-stiftelsen) and the Swedish Foundation for Strategic Research (SSF) present the first evaluation of the Institute Excellence Centre programme.

The Institute Excellence Centres programme is to run for up to 6 years. The Centres are funded in two stages: for 3 years based on the initial application and for an additional period of 3 years based on evaluation and renewed application. The partners of a Centre are industrial companies and research institutes in collaboration with a University/Institute of Technology. The parties contribute jointly to the centre's research programme, financially or in the form of active work.

This first evaluation was carried out at an early stage, i.e. less than 16 months after Centre start up. Its primary purpose is assessment of the ways Centre organisation and performance of the research programme in a Centre format has been established and the potential for long-term development. This is an opportunity for evaluators to give advice and recommendations on how each centre can be even more efficient and effective. On a programme level this is also valid for the financing agencies.

At present 8 Institute Excellence Centres are running. Although each of the centres has a formal name, centres are often commonly referred to by an acronym. In this report the following Institute Excellence Centres were reviewed:

| | |
|---|---|
| EcoBUILD: | Centre for eco-efficient and durable wood-based materials and products |
| CODIRECT: | Controlled Delivery and Release |
| FOCUS: | FOI Centre for Advanced Sensors, Multisensors and Sensor Networks |
| AFOC: | Acreo Fiber Optic Center |
| PRISMA: | Center for Process Integration in Steelmaking |
| IMAGIC: | IMAGing Integrated Components |
| CIC: | Casting Innovation Centre |
| CNS: | Center for Networked Systems |

On behalf of VINNOVA, the Knowledge Foundation and SSF we want to express our appreciation to the evaluators. They accomplished their hard work with great enthusiasm and professionalism. Their reports will be of great value for further development of the Institute Excellence Centres programme.

Stockholm in April 2008

| | | |
|---|---|---|
| *Per Eriksson* | *Madeleine Cæsar* | *Lars Rask* |
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# 1 Overall Impressions and Programme-wide Issues

This is a report on the first evaluation of the eight Institute Excellence Centres (IEC) financed by VINNOVA, the Knowledge Foundation and the Foundation for Strategic Research. The primary target of these evaluations, which took place in March 2008 (see the Appendix), about 14 months after the startup of the Centres, was an assessment of the way each Centre had established its organisation and started up its research programme. The evaluations did not concern scientific and technical results. A second evaluation, including assessment by scientific expertise, will take place during year 3, before stage 2 in the IEC programme.

The focus of the evaluation was the approach and measures taken so far by each Centre and its potential for long-term development towards a successful IEC. Two important objectives were to create a reference for forthcoming evaluation(s) and to comment and counsel the Centres on their performance.

The evaluations took place in the form of on-site hearings - discussions based on presentations of activities by Centre staff - at each Centre. Before the hearings, the evaluators were supplied with annual reports, research programmes and tables of key facts from the Centres.

The evaluation committees consisted of Per Stenius (chairman of the IEC program committee), Kaj Mårtensson (external evaluator) and one or two additional members of the IEC programme committee (see the Appendix). Elisabeth Bergendal-Stenberg (the Knowledge Foundation), Bengt Johansson (VINNOVA) and Olof Lindgren (SSF) were also present at all hearings. The Centres were represented by Centre management (director, vice director), members of Centre Board, representatives of the housing institute, participating universities, researchers and graduate students; the number of people from the Centres varied from 4 to15. The evaluators in all cases found the hearings to be open and very informative.

## 1.1 Program - Overall Impressions

The general impression is that the IEC programme has contributed in a very positive way to not only the participating institutes but also to the involved universities and companies. A lot of new industrial money has been invested in cooperative research between institutes and universities and it is evident that new and important knowledge from all partners will be used to develop

innovative products and processes for the Swedish industry. Many senior researchers are engaged in this research.

This complies with the vision behind the IEC program, as also is mostly well understood by the Centres. Nevertheless it seems important to stress that the vision is to create Centres with *own identities* that *bring together university and institutes* in research of international standing in *well defined, new areas* to the benefit of the Swedish industry. A recurring problem was the establishment of Centre identity as a unit in its own, although working under the auspices of an Industrial Research Institute.

Programmes of common interest and open to all partners have been initiated at some of the centres. However, not all centres seem to have realised the importance of such a programme (generic research, workshops, seminars, courses etc), as a complement to the projects working directly with industrial applications, for the development of Centre identity, expertise and industrial interest that will last also beyond the present six-year financing period.

All Centre managers had a good and a professional approach to the leadership. Activities are well under way at all Centres, although in some cases delays have occurred in the start-up of productive research projects. However, so far there is good reason to believe that all of the centres will be able to catch up with these delays during 2008. The experience of industrial research institutes in organizing external contacts and collaboration has clearly implied that they have known how to organize and manage this type of Centre formation with participants from universities and many companies. Clearly, also the requirement by the financers that a Communications strategy should be appended to the Centre contracts has been helpful in this respect.

All Centres have appointed international advisory boards, but the extent to which these have been actually engaged varies and in many cases they could be better utilized. Broader contacts with other universities and research institutes than those directly engaged as partners are desirable in many cases.

Very few Centers had developed clear strategies for starting up new companies, for the long-term survival of the Centre after the six years of public funding and for creating active mobility between the researchers in academia, institutes and industry.

In several cases it was evident during the hearings that in their annual reports the Centres had not presented full activities, i.e. also those that were not directly financed by the Centre agreement. Some reluctance to do so also occurred at the hearings. There is a risk that this gives a too narrow

picture of Centre development, and there should be no problem in giving broader reports in parallel to the formal requirements stated in the Centre contracts.

In connection with the evaluations, the Centres were requested to fill in tables of key data describing the progress and efficiency of centre activities. These data were useful as a help in evaluating Centre performance, but it was evident that there is room for improvement with respect to the data asked for and the instructions on how to fill in the tables. In some cases the reported number of partners engaged in a Centre was higher than the number of partners actually contributing and participating actively by cash support or in-kind work. There was also in many cases a strong discrepancy between the reported number of people involved and the number of those actually working in the Centres.

## 1.2 Recommendations for VINNOVA, the Knowledge Foundation and SSF

Based on the impressions and experiences described above, the following recommendations emerge:

- The Centres should be given more detailed instructions with regard to the economic reports in coming annual reports. Cash income should be clearly separated from in kind contributions. Payments to participating universities should be reported as consultancy. Personnel costs should include the normal overhead costs used at the institute. Percentages of working time spent for work within the Centre should be given for researchers, if larger than 5 %.
- The list of key numbers should be improved with respect to the data asked for and the instructions on how to fill in the tables.
- Activities relevant for the Centre but not financed by the IEC money should be reported in a way that clearly describes both the total activities at the Centre and the part of it that has been directly financed by IEC money.
- A joint workshop, a “best practice day” should be arranged between all Centers to share good experiences from each other. One specific Centre “best in class” in the area under consideration, should be asked to tell the others about how they have solved or organized a specific task like IPR and spin-offs, quality assurance system, active involvement of industry, international cooperation, including other ongoing activities to give an added value to the Centre, efficient communication, clear identity, mobility between people, cooperation with universities and institutes, a well functioning website, the organization of a generic programme, applied project areas and contract research for specific clients, the international advisory board etc.
- The annual reports should be written in English.

Finally, it should be stressed that although several suggestions for improvement are suggested above, the IEC program is off to a very good start, and so far there is every reason to believe that this is a venture which will eventually contribute very importantly to the competitiveness and competence of Swedish industries.

# 2 Assessments of the Individual Centres

## 2.1 Evaluation of the ECOBUILD Institute Excellence Centre at SP Trätek

On March 3, 2008 the evaluators, Kaj Mårtensson, Per Stenius and Michael Stöcker met with the director Magnus Wålinder, vice director Mats Westin, representatives from industry, senior scientists and graduate students of the ECOBUILD Institute Excellence Centre for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for clear presentations and open discussions.

### 2.1.1 Long-term strategy and focus of the centre

#### Competence profile and value added by being a Centre

EcoBuild has during the year 2007 established five integrated R&D programmes consisting of altogether 23 projects. Progress within these projects after just one year varies; however, several projects show very good progress. Many of these projects mirror the intention of the IEC – close cooperation between institute (SP Trätek), industry and university, with focus on the development of new bio-based materials and products. A number of the projects are headed by representatives from the industry. Considering the large number of industrial partners connected to EcoBuild, the centre has handled this challenge of research management quite well.

There is no doubt that this Centre is on the right track with respect to the overriding objectives and goals of the IEC. The topic of EcoBuild is an excellent contribution to improved utilization of renewable energy resources and eco-efficient ways to manufacture durable wood-based materials and products. It is obvious that the creation of EcoBuild has generated a synergistic effect by establishing competences which otherwise would not be available.

#### Strategy and research programme

It seems that the programmes and projects (five programmes and over 20 projects) run by the centre cover the entire range of product development: idea – basic research - applied research – development – application / implementation. Centre partners have a common understanding of how an IEC should work. However, the evaluators are looking for some degree of

generic research performed by the centre, for the benefit of all projects and partners involved.

The centre management should already now pay attention to the time after six years IEC funding period, i.e. development of a strategy of continuing the centre activity after this period. This could include further focusing of the research programme as well as involvement in applications concerning EU FP7 calls and active cooperation related to relevant European technology platforms, which have a strong influence on the topics of future calls.

The policy of starting-up of new companies has so far only to a limited extent been considered by the Centre management. More attention should be given to this topic.

#### National and international interaction with other research groups

The large number of already running projects reflects the ability of the Centre to involve leading Swedish and international companies in R&D projects. International expertise is connected to the Centre via guest- and visiting professors/scientists, but participation in European research programmes (FP 7 etc.) could be more extensive.

### 2.1.2 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

Strong efforts have been made to create an environment that would foster collaboration between researchers wholly or partially engaged in Centre activities. These efforts include

- Development of a commendably informative website with the possibility to selectively share information within projects, between projects, within the Centre as a whole and in the public domain.
- Organisation of several workshops, seminars etc. with participation of internationally leading scientists.
- Establishment of an own EcoBuild site (“EcoBuild corridor”) at SP Trätek. This site could well be extended to include laboratory and offices space for the benefit of member companies and visiting/guest researchers.

The evaluators find that the Centre is well on its way to form a coherent and well functioning research group.

### Centre personnel: senior scientists, research groups, students

According to the annual report, 42 senior scientists have been engaged in Centre activities, many of them, however, only in the planning stage or as short-time consultants. Each of the project areas is led by a senior researcher as project coordinator, but none of them is engaged full time. Thus, the total work of senior scientists within the Centre during 2007 is estimated to be about 7 man-years. However, several additional scientists have been engaged for 2008.

The research groups within the research areas are clearly still under active development, with the activity within the different sub-projects varying from very active and productive to very low or dormant. The graduate students (of which there is a satisfactory number) present at the evaluation stressed that they strongly appreciate the stimulating input from industrial contacts  An important task for the Centre leadership will be to further develop  the research groups within each project area to become functional units of sufficient size to remain sustainable.

### Industrial involvement and interaction

Presently, the Centre has 33 industrial members, ranging from large international companies via SME's to one-man businesses. Industry has participated actively in the development of the research strategy. Centre leadership was well aware of the necessity to engage industry personnel at the appropriate level and felt that they in most projects had been able to do so. The overall balance between in-kind and cash contributions to the financing of the Centre are good, although there are large variations between companies. It was not evident to what extent the in-kind contributions consisted of work by industrial representatives at the Centre. More emphasis on this very efficient way of knowledge transfer in the future is recommended. Seminars and courses already contribute to knowledge transfer.

A simple survey (mainly interviews) of industrial satisfaction with Centre performance indicated that while industry was generally satisfied with activities, there was also room for improvements. Further development of methods to assess customer satisfaction is recommended so that weak and strong points can be better identified. Existing experience at institutes other than SP-Trätek could be beneficially utilized in this development.

### 2.1.3 Leadership and management

#### Leadership and personal capacity of the centre director

The centre is managed by a centre director, Magnus Wålinder, and an assistant centre director, Mats Westin. Both have a very professional approach to the leadership of the centre, give a very good impression and seem to be very successful so far. They seem to have a good overview of the rather complex structure of EcoBuild. They also demonstrated clear visions of the future for EcoBuild and seemed very aware of the need got improvements in relevant areas.

#### Status and role of the Centre within the organization of the institute

The management promotes EcoBuild in a good way both within and outside SP, in order to give it a clear identity. It is evident that it is not easy to give a visible identity to a small and new Centre formation in a well established big company like SP. However, EcoBuild has been successful so far in creating a fairly clear own identity in SP Trätek and the whole SP Group. The Centre has its own trademark, logo and profile in all promotion materials, newsletters, an excellent home page on the web etc. The separate rooms reserved for external researchers from academia and industry within the Centre contributes to the development of an “EcoBuild” identity and the creation of a meeting place between all partners involved.

It would be useful to include in future reports also a description of activities financed by other means than through the Centre contract.

#### Interaction with university

The centre has established a fairly good cooperation with researchers at universities, especially KTH. Out of 23 projects 9 projects have participants from the academia, in three cases as a sub project leader. Chalmers and the University of Växjö are mentioned as partners in the Research Programme and in the Annual Report, but cooperation in these cases seems to be limited. The relations to other universities than KTH could be further developed. Cooperation with some research institutes (STFI-Packforsk, IVL, A&F in the Netherlands) is mentioned but so far these organisations have been involved only to a very small extent. Further development of partnerships, e.g. the form of joint research projects is recommended.

### 2.1.4 Recommendations

The ECOBUILD Centre is off to a very good start. For further improvement, we submit the following recommendations:

- The quality assessment system has to be further developed, involving a suitable method to measure the customer response and their recommendations to further improvements of the Centre activities.
- A policy with regard to the establishment of start-up companies should be developed.
- A strategy for increasing the mobility of researchers between Centre and industry should be formulated.
- Attention should already now be paid to the time after the six-year financing period by further focusing the research program and by active development of cooperation related to European technology platforms.
- Cooperation with other institutes/competence centres could be further developed to the benefit of both parties.

Stockholm, 3 March 2008

| | | |
|---|---|---|
| Kaj Mårtensson | Per Stenius | Michael Stöcker |

## 2.2 Evaluation of the CODIRECT Institute Excellence Centre at the Institute for Surface Chemistry, YKI

On March 4, 2008 the evaluators, Kaj Mårtensson, Per Stenius and Michael Stöcker met with the acting director Katrin Danerlöv, representatives from university, institute management, industry, senior scientists and graduate students of the CODIRECT Institute Excellence Centre at YKI, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for clear presentations and open discussions.

### 2.2.1 Long-term strategy and focus of the centre:

#### Competence profile and value added by being a Centre

The vision of the CODIRECT Centre is to become a leading Centre within the area of controlled delivery and release, both with respect to scientific excellence and industrial applications, and to strengthen the competence and competitiveness of its partners. CODIRECT has established four technology platforms (“block areas”) dedicated to i) sustained release, ii) triggered release, iii) perception delivery, and iv) printed functionality. Within each block area one to four integrated generic projects and a number of projects working more directly with applications have been initiated and are on track (the printed functionality area has no applied project). The technology platforms and the projects cover the whole value chain from idea generation to implementation. The projects have progressed well and some of them already show very interesting and promising results. Several projects are directed by representatives from the industry, covering a broad range of companies.

The academic partners are from the Royal Institute of Technology (KTH) and Stockholm University (SU). In particular, the cooperation with the psychology group at SU represents a new and innovative added value.

The Centre is truly developing to become a meeting place for the partners involved. This is maybe not so surprising, since YKI is familiar with this type of applied research and has a long tradition of co-operation with academia and industry. There is no doubt that this Centre is on the right track with respect to the overriding objectives and goals of the IEC. The creation of CODIRECT has had synergistic effects within YKI and was reported to have generated substantial additional direct funding to YKI which otherwise would not have come about.

#### Strategy and research programme

A clear strategy was formulated when the Centre started. The Centre partners seem to have a common understanding of how an IEC should work and the general strategy apparently has not been under discussion after start-up. In addition, the Centre performs generic research, for the benefit of all projects and partners involved.

The Centre management is aware about the situation after six years IEC funding, the strategy being to continue as a self-sustaining unit after this period. This involves focusing of the research programme and finding new external funding sources. The Centre management was quite sure about their success in this respect. The policy of starting-up of new companies has so far only to a limited extent been considered by the Centre management. More attention should be given to this topic.

#### National and international interaction with other research groups

Participation in already running projects reflects the ability of the Centre to involve leading Swedish and international companies. International expertise is connected to the Centre via a scientific council (coming in to action during 2008), . Formal connections to international research groups are under development. The evaluators encourage the Centre management to participate actively in work related to relevant European technology platforms, since these platforms will have a strong influence on the topics of future FP7 calls, an important potential source of funding.

### 2.2.2 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

Development of collaboration within the Centre has been a central topic during the first year:

- The tasks of the block area leaders have been identified to focus on activities designed to enhance collaboration, with visible results in terms of joint discussions, use of equipment and exchange of personnel.
- The identity of CODIRECT as a unit within YKI has been established
- Competence is actively promoted by arranging conferences and workshops.

We conclude that the Centre is well on its way to form a coherent and well functioning research group.

### Centre personnel: senior scientists, research groups, students

118 people have been engaged in one way or another in CODIRECT activities. On the other hand, the work of senior scientists in CODIRECT during 2007 was estimated to be about 5 man-years. However, the acting director is working almost full-time within CODIRECT, while the vice director and block area leaders are engaged up to 20-40 % of their time. Presently, five graduate students work within the Centre. Taken together, this seems to ensure that adequate resources have been allocated to management, research supervision and implementation. CODIRECT has actively developed resource allocation and definition of responsibilities in a commendable way.

Project leaders and researchers are required to define goals, milestones and time-tables of activities. The graduate student and senior scientist present at the evaluation stated that they find this requirement stimulating and useful.

### Industrial involvement and interaction

The Centre has 10 industrial members, most of them large companies with international activity. Three companies have decided to leave CODIRECT; mainly due to internal policy changes. Negotiations are under way with a couple of large international companies.

Contacts with SME's have been very limited and the policy of CODIRECT (and YKI as a whole) is to engage such companies only to the extent that these directly declare their interest, without active measures taken to increase their number. The evaluators feel that this policy may be too restrictive and that there are many SME's that would benefit from research on controlled delivery and release.

Interaction with industry in the planning and evaluation of strategy and projects is intense and well organized via the Centre Board, a General Meeting, a Centre Advisory Group, and steering groups for each project. Dissemination of results has taken place through reports, project meetings and workshops. Collaboration through work of industrial scientists at CODIRECT and *vice versa* has been limited. The CODIRECT management was aware of the need to broaden such activities.

The Centre is to be commended for having undertaken a detailed survey of industrial satisfaction with CODIRECT, and in particular for the thorough analysis of the results, with regard both to activities that work well and to items that should be improved upon. We note that industry generally seems to be satisfied with the way CODIRECT functions.

### 2.2.3 Leadership and management

#### Leadership and personal capacity of the centre director

There is a Centre director, Ulla Elofsson, (presently on maternity leave) and an assistant director, Katrin Danerlöv, now acting director during the leave of Ulla and supported by Mikael Kjellin as assistant Centre director. These changes in the management have taken place without any significant problems. Katrin and Mikael gave a very good impression and demonstrated a professional and so far successful approach to the leadership of the Centre, with excellent mastering of the rather complex structure of the organisation. Centre management seems to be very open to customer feedback and is continuously learning and is taking action based on earlier experiences. Good procedures for generating and ranking projects, organizing follow-up meetings with project leaders etc. have been established. The Centre manager meets on a regular basis with the section managers at YKI.

CODIRECT is directed by a Centre board with representatives from academia, research institutes and industry. Four board meetings have taken place during 2007. Furthermore, there is a Centre advisory group, with one representative for each partner. Each participating company has the right to ask for a general meeting, if needed. There is a leader of each of the four base block areas and a project leader and a steering group with representatives from the partners for each project within the blocks.

The first impression is that this organisation is fairly complex with many people involved and a lot of meetings. On the other hand, involvement of people from all participants is crucial for this type of Centre and it also contributes significantly to technology transfer between the parties. The importance of gathering the Centre advisory group on a regular basis has been noted. Some problems with the role of the base block leaders have been identified and solved. Problems with involving all partners actively in the steering groups have been registered; solutions have been considered and will be implemented during 2008.

#### Status and role of the Centre within the organization of the institute

The identity of CODIRECT is well established within YKI and the Centre is fully integrated with other activities in the YKI line organisation and research strategy. The Centre has its own trade mark, logo and profile in promotion materials and a home page on the web. The Centre Management will move to a separate part of the building at the end of 2008. The management endeavours maintain a clear identity by promoting CODIRECT in a good way both within and outside YKI and the SP group. It is not easy to give a clear and visible identity to a small and new Centre formation in a well established big company like SP but CODIRECT develops this step by step.

### Interaction with university and other research organisations

YKI for a long time maintained excellent interaction with the academia. The Centre has established a good cooperation with researchers at KTH and SU; separate agreements have been set up with three professors (surface chemistry, inorganic chemistry and psychology, who also have one representative in the Centre board). Four out of the ten generic projects have project managers from academia. KCL is the only research institute outside YKI which takes a significant part in CODIRECT. SP, SP Trätek and SIK are mentioned in the reports presented, but so far these organisations have been involved only to a very small extent.

## 2.2.4 Recommendations

The CODIRECT Centre is off to a very good start. The purpose of the IEC: close cooperation between institute (YKI), industry and university, is implemented in an excellent way. For further improvement, we submit the following recommendations:

- The Centre should continue to develop a strategy for increasing the mobility of researchers between the Centre and industry and the Centre web site, according to the plans set up for 2008.
- The Centre should develop a policy with regard to the establishment of start-up companies.
- The Centre should to develop a strategy for involving more SME´s in the activities.
- Attention should already now be paid to the time after the six-year public financing period, e.g. by development of cooperation related to European technology platforms.
- Cooperation with other relevant institutes, i.e. in the SP group could be further developed to the benefit of all parties.

Stockholm, 4 March 2008

Kaj Mårtensson | Per Stenius | Michael Stöcker

## 2.3 Evaluation of the FOCUS Institute Excellence Centre at FOI

### 2.3.1 Introduction

On March 5, 2008 the evaluators, Staffan Brege, Kaj Mårtensson and Per Stenius met with the director Hans Frennberg, representatives from university, institute management, industry and senior scientists of the FOCUS Institute Excellence Centre at FOI, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for informative presentations and open discussions.

### 2.3.2 Long-term strategy and focus of the centre:

#### Competence profile and value added by being a Centre

The competence profile of FOCUS is within the area of medium distance sensing, which has been divided into two subfields – advanced sensors (proximity- and high resolution systems; signal and image processing) and multisensors and sensor networks (sensor data fusion; network architecture and management). Behind FOCUS lies a very strong competence base within FOI. FOI has been given a new mission to transform military based research into civilian research and to offer business opportunities for private companies on the civilian market. This implies that FOCUS has a strong potential to become a centre of excellence of national importance through combining FOI competences with university research and company partners that are very competent and close to market driven demands on technical development. This will, however, in addition to the development of the research programme detailed below require further promotion of the brand name and image building of FOCUS as **the** national centre of excellence within its area of competence.

#### Strategy and research programme

The vision is to create a centre with a high national and international status. So far, the strategy seems primarily to have been build upon a portfolio of research projects – where each project has multiple goals of business exploitation and scientific progress. The projects can be positioned in a matrix defined by the dimensions advanced sensors versus sensor networks and by the dimensions SW solutions versus HW solutions. Nevertheless, they are managed as stand-alone projects without a common research platform at the central level of FOCUS.

To ensure sustainable development, FOCUS should endeavour to develop a more generic research within a central competence platform from which different applied projects can be better related to the overall mission. In this process the question of scope has to be raised. What is needed to build critical mass of competence? FOCUS must focus its scope of research ambitions within its activity matrix and start thinking about the next projects to add to the research project agenda. In order to be able to build a solid competence platform the inclusion of new partner companies can be necessary.

#### National and international interaction with other research groups

FOCUS has been successful in establishing international contacts, which have to be expanded and stabilized over the coming years. FOCUS has also a good knowledge of potential Swedish partners (universities, competence centres, institutes), but so far real interaction seems to be limited to LiU and CTH and organisationally coordinated towards specific projects.

The Centre has commendably utilized their international advisory board for evaluation of project quality, which was found to be generally good. The Centre has also, together with FOI and other partners succeeded well in obtaining European funding (FP7 programs).

### 2.3.3 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

Each of the seven research projects at FOCUS takes place in collaboration between one company (in one case, two), researchers at FOI and, in only two cases, university. These projects are all related to sensor technology, but there is little or no collaboration between them and university contributions takes place on a consultant basis. As noted above, a research program open to all partners of the Centre is as an essential ingredient of collaboration in order fulfil the purpose of an IEC, that is, for the Centre to become a recognised center of excellence in a well-defined area, with clearly defined identity and sustainable competence created by connecting University, Centre and industry in generic research not directly aiming at product development. The Centre has been quite successful in developing applied projects, but is strongly recommend to develop a more general research programme open to all of the industrial partners.

The workshops and seminars arranged and separate site of FOCUS within FOI are good means of promoting collaboration. The graduate school *Forum Securitatis* arranged jointly by FOI and LiU also offers an important opportunity to enhance University/Centre collaboration.

#### Centre personnel: senior scientists, research groups, students

Senior scientists (with a couple of exceptions from FOI only) connected as researchers to FOCUS were estimated to work at least 20 % within the projects, which is satisfactory. There are no graduate students connected directly to the projects. The extensive participation of senior researchers in IEC is commendable, but participation of a limited number of graduate students would be of importance for a generic part of the research programme and of benefit to a deeper connection of University research to the Centre.

#### Industrial involvement and interaction

Eight industries, six of them SME:s, are members of the Centre. At the hearing, two more detailed presentations of ongoing projects were given, demonstrating efficient cooperation, strong involvement and satisfaction with Centre work from the industrial perspective. The type of industrial contacts and cooperation represented by an IEC are new to FOI. In view of this the initiation and implementation of the research projects must clearly be considered a considerable success. However, it was not clear how FOCUS endeavours to extend these contacts by attracting new industries and a broader interest in the research program. Since just one industry member participates in six of the seven of the projects and only two in the seventh, ways of improving the interaction between the companies must be implemented. The joint seminars and workshops may to some extent have had this function and a FOCUS interest group is planned for 2008. The generic part of the research program suggested above would be of great importance also for a more general and continuous involvement of industries, in particular for attracting SME:s not directly connected to product development, for creating new projects and for marketing the values of the Centre. Broader industrial contacts would open a lot of new possibilities for FOCUS.

FOCUS has conducted an oversimplified evaluation of consumer satisfaction. The results indicated general satisfaction with results and reporting from FOCUS, but stressed the need for improved connections between the projects.

### 2.3.4 Leadership and management

#### Leadership and personal capacity of the centre director

FOCUS is directed by a Centre board with representatives from the participating companies and FOI. Four board meetings have taken place during 2007. Thee Centre director, Hans Frennberg from FOI, had a professional and enthusiastic approach to the leadership of the Centre, gave a very good impression and has managed the Centre successfully so far,

especially considering the limited experience FOI has of creating a Centre within a industrial research institute. The director is assisted by a Centre committee, composed of people from FOI and academia, on issues regarding research quality, coordination, dissemination of results and formation of new projects. The international advisory board consists of three experts from universities and institutes abroad. Six projects are managed by a project leader from industry and one by a leader from FOI. Each project has also an FOI internal project coordinator.

The organizational structure is rather simple and the responsibilities clearly defined. It would be advisable to appoint an assistant Centre director who can take over if the ordinary director is unable to lead the Centre for some reason like illness, vacation etc. The responsibility for new project generation is expected to rely on the Centre committee and/or the advisory board. However the organisation must also be able to take care of new project ideas from industry. Industry must also be involved in the other type of questions, today handled by the Centre committee. The responsibilities of questions like quality not related to the research, recruiting new industry partners, technology transfer between academia, institute and industry etc have also to be handled somewhere in the organisation where also industry can take part.

### Status and role of the Centre within the organization of the institute

The identity of FOCUS within FOI needs to be better defined. No own logo has been developed and the web site is closely integrated to that of FOI, with FOCUS described as a project within FOI. No own promotional material with activities just related to FOCUS has been produced. Centre identity is improved by its separate site in the FOI facilities, where people from industry and academia can work and get the right “Centre feeling”. It is recommended that the management set up a strategy to guarantee the survival of FOCUS also after the six years of public funding. Important parts of such a strategy might be a generic research programme, strong identity of FOCUS as a Centre in its own, a stable industrial network with more companies involved, financing ideas for the future, a quality assurance system, marketing, mobility and communication plans etc.

### Interaction with university

Through FOI, the Centre has set up separate association agreements with LiU and CTH. However, out of the 65 persons working in the Centre only four come from the academia and none from another research institute. Contacts with academia are also established through the international advisory board (who recommended contacts with the Universiy College of Skövde), through the Centre committee and in EU projects. During the hearing some other centres of relevance to FOCUS related to universities

and institutes (KTH, LTH, UU, Örebro University and Acreo) were mentioned. The Centre should develop contacts with these.

### 2.3.5 Recommendations

In terms of organisation, build up of identity and cooperation with industry in research projects FOCUS is off to a good start. However, there is clearly a need for deeper connections with university and development of the research programme for FOCUS to become an organisation that fulfils the objectives of an IEC. We submit the following recommendations:

- A more general generic research programme open to all industrial partners should be developed.
- Cooperation with university research should be increased and coordinated into the generic competence platform. Contacts and cooperation with other relevant competence centres and institutes could be extended.
- Attention should already now be paid to ensure sustainable activity after the six-year public financing period.
- The identity, brand name and image of FOCUS as **the** national competence centre within its area of competence should be developed.
- A strategy for increasing the mobility of researchers between the Centre and industry and creating a better identity of FOCUS within FOI should be formulated
- The ability to take care of new project ideas from industry should be improved. Industry should take part in the tasks handled by the Centre committee.
- A policy with regard to the establishment of start-up companies should be developed.
- The quality assessment system should be improved. Methods to measure customer response and respond to recommendations on further improvements of Centre activities should be implemented.
- An assistant Centre director should be appointed.

Linköping, 5 March 2008

| Staffan Brege | Kaj Mårtensson | Per Stenius |
|---|---|---|

## 2.4 Evaluation of the Acreo Fiber Optic Center Institute Excellence Centre at Acreo

### 2.4.1 Introduction

On March 10, 2008 the evaluators, Gunnar Björklund, Kaj Mårtensson and Per Stenius met with the director Åsa Claesson, the scientific leader Walter Margulis, representatives from university, industry and graduate students of the Acreo Fiber Optic Center (AFOC) Institute Excellence Centre at Acreo, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for informative and enthusiastic presentations and open discussions.

### 2.4.2 Long-term strategy and focus of the Centre:

#### Competence profile and value added by being a Centre

AFOC was created in 2007 when a number of partners agreed to carry out the present R&D- program based on close cooperation with the Centre's own personnel, research staff from universities and industrial partners.

AFOC has the ambition to create a pool of researchers for the benefit of the companies that develop, manufacture or use optical fibers to increase performance of their products. This is realised by the combined use of laboratories in Kista and Hudiksvall, including cooperation between KTH, MiUn and also with KI.

The competence profile seems quite appropriate for the chosen areas of activity and there are good signs of ongoing cooperation between the partners and the Centre showing that the value added by AFOC is regarded as important. The reported successful interaction with research groups outside the Centre confirms that the academic research is of high quality and contributes substantially to the value added by the Centre.

#### Strategy and research programme

The long term strategic goals for the Centre have been quantified to generate value in Swedish industry, and also to generate development projects amounting to more than 50% of the expected 25 million SEK yearly turn-over of the Centre. In addition to these goals also networking and research goals were quantified.

The experience from the first year of activities shows that the strategy described in the proposal document (dated 2005-12-30) is under implementation. There is obviously good support from most of the participating companies and contributions to the Centre are well in line with or even above the forecasts.

In order to achieve its strategic goals AFOC will need to focus more on the creation and implementation of new application projects together with its industrial partners. This means that more partners should be encouraged to actively contribute to the growth and stability of the Centre.

The research program at AFOC is oriented toward four main project areas namely:

- Harsh Environment Fibers
- Fiber Bragg gratings and their applications
- Functional Fibers
- Fiber optics in life sciences

The first three of these have developed substantially in 2007, while the fourth is not yet in full action. In total 21 scientific papers, book chapters and theses were published seminars and university classes were given at KTH and Uppsala University etc. A partner event was held in May, 2007.

#### National and international interaction with other research groups

The national interaction is dominated by the close relation between AFOC and the four academic groups located at KTH, MiUn and KI. This cooperation is also reflected by the composition of the Centre Board.

The international interaction is reflected by AFOC's international advisory group as well as many other academic contacts. The advisory board has so far just been contacted in specific questions one by one. Further development of international contacts is important for the Centre. Applications for funding from national and international research programs are playing an important role here and will give opportunities to expand more rapidly than would else have been possible. The Centre has already shown successful efforts in this direction.

### 2.4.3 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

The division of Centre activities into three programmes: generic, application and communication is clearly instrumental in fostering a systematic approach to collaboration between all partners in the Centre. Our impression is that communication between researchers and management functions well, in spite of the location of Centre facilities and personnel at four different sites. The Centre director expressed concern with regard to communication between participating industrial partners and their interest in the full research programme. Transfer of technology and knowledge has mainly taken place through written material, seminars and project meetings. Centre

leadership recognizes that communication is an essential ingredient of the IEC concept and plans to improve this during 2008.

### Centre personnel: senior scientists, research groups and students

16 senior researchers participate in Centre activities. However, the extent of participation of many of these seems to be rather limited and the total activity in the Centre during 2007 amounted to 3.7 man-years. Only two senior scientists have positions at partner universities and project leadership of the four generic projects is divided between only two researchers (the scientific leader and a senior project manager). As one of the main objectives of IEC is to extend collaboration between senior researchers at universities and the hosting institute, attention should be paid to extending this collaboration. The addition of new graduate students during 2008 may be instrumental in promoting this development.

### Industrial involvement and interaction

The Centre has 19 industrial partners, ranging from very large industries to companies with only a few employees. In terms of cash and in-kind contributions the support from the partners is satisfactory. Companies have been engaged in specific projects but not much in strategic planning; to some extent employees at the companies have been directly collaborating in work at AFOC /Acreo facilities.

However, only about half of the partners are actively engaged in research projects, whether generic or applied, and only a few projects engage more than one industrial partner. This imbalance in participation is a matter of concern. Centre management and board are aware of the need to enhance partner participation and to increase mobility between academia, Centre and industry. This implies that transfer of knowledge between the projects and partners should be enhanced. In addition to the ways to achieve this already formulated in the Communications program, industrial courses in fiber optics may be an efficient method to increase interactions.

AFOC has conducted an oversimplified evaluation of consumer satisfaction, which indicated general satisfaction with AFOC activities. Significant information requires development of a much more detailed method to monitor the impact on and the attitudes of partner companies has to be developed.

### 2.4.4 Leadership and management

#### Leadership and personal capacity of the Centre director

The Centre is directed by a Centre board with representatives from three of the participating companies, KTH, MiU and Acreo. The chairman, Stefan Ekman, comes from industry. Four board meetings have taken place during 2007. The board is appointed by the General Meeting where all parties of the Centre are represented. The leadership is composed of one Centre Manager, Åsa Claesson, and one deputy Centre Manager, Lars-Erik Nilsson. Furthermore there is one Scientific Leader, Walter Margulis, who is responsible for the research programme. All three leaders participate at the board meetings.

The organizational structure is logical and the responsibilities well defined. Åsa and Walter have both a professional approach to the leadership of the Centre, give a very good impression and seem to be very successful. One of the main challenges for the management in coming years is to increase the interaction and learning between all participating partners, the fact that there are a lot of limitations due to secrecy matters and IPR notwithstanding. Other challenges are quality measurement methods, the identity of the Centre and a strategy for the survival of AFOC after the six years of public funding, including alternative financing ideas for the future and ensuring of a stable industrial Centre network The management seems to be very open for learning from earlier experiences and is planning a lot of specific actions in coming years in order to overcome earlier weak points.

#### Status and role of the Centre within the organization of the institute

The identity of the Fiber Optic Centre within Acreo needs to be better defined. An own logo has been produced which still is closely related to the logo of Acreo. For practical reasons, the web site is closely integrated to that of Acreo. A partner specific “log in” has not yet been implemented. The Centre has no separate room space to support the identity and where people from industry and academia can work and get the right “Centre feeling”. Obviously, it is not easy to give a clear and visible identity to a small and new Centre formation in a well established company like Acreo but we would like to encourage the Centre board and management to continue to strengthen the identity of AFOC.

#### Interaction with university

The Centre cooperates with academic partner groups at KTH, MiUn and KI. FOI is classified as an industrial partner and SP is mentioned as a supporting partner. Two graduate students from KTH are engaged full time in AFOC research not employed by Acreo or financed by AFOC. Additional involvement of people from the academic partners is limited (0.3 man-year

in total). Out of 64 persons associated in the Centre eight are from academia, (two board members, two PhD students, two with no working time 2007 and two with a working time of 0.3 man-year together) and none is coming from another research institute. Contacts with academia and research institutes will in the future, according to the plans, be established through new PhD students, the international advisory board, other international research contacts and in EU-projects. We would like to encourage the Centre to further develop the external cooperation with universities and institutes.

### 2.4.5 Recommendations

AFOC is off to a good start, with a well structured research programme and good support from industry. There appears to be a need for more direct participation in Centre activities of industrial partners, and university researchers. We submit the following recommendations

- Participation of senior researchers from university in research project should be given more attention
- The Centre should further strengthen its identity within and outside Acreo, as a natural part in a strategy to ensure the survival of AFOC also after the six years of public funding.
- The Centre should to further develop external cooperation with universities and institutes. Cooperation with other relevant academic partners and institutes will be beneficial to all parties.
- The Centre should improve its quality assessment system. A suitable method to measure the customer response and their recommendations to further improvements of the Centre activities has to be developed.
- The interaction and learning between all participating partners, not least the “sleeping” ones, should be further developed in order to get an active involvement from all companies.
- Courses in fibre optics specifically designed for industry should be arranged

Hudiksvall, 11 March 2008

Gunnar Björklund | Kaj Mårtensson | Per Stenius

## 2.5 Evaluation of the PRISMA Institute Excellence Centre at MEFOS

### 2.5.1 Introduction

On March 11, 2008 the evaluators, Kaj Mårtensson and Per Stenius met with the Centre management, represented by Jan-Olof Wikström and Christer Ryman, together with representatives from university, industry and PhD students of the PRISMA Institute Excellence Centre at MEFOS, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for clear presentations and open discussions.

### 2.5.2 Long-term strategy and focus of the centre:

#### Competence profile and value added by being a Centre

The competence profile of PRISMA is within the area of Process Integration in Steelmaking including topics such as future production systems, optimizing the design of raw material, efficient and sustainable energy systems, analysis of by-products and reuse and recycling systems. Behind PRISMA lie a strong competence base and long-term experience from close cooperation between MEFOS and the partner companies. In addition the knowledge base in LTU has significantly added value to the Centre. The interaction between the partners works quite well. The formation of PRISMA has intensified the cooperation significantly. Although MEFOS earlier has been involved in projects related to energy optimization of steelmaking processes, the Centre formation and the increased resources have offered the possibility to broaden and intensify the system analytical approach to other important issues of process integration.

#### Strategy and research programme

The research programme and the strategy to implement it were well defined already at the initiation of PRISMA; goals for the first program period were formulated and a systematic approach was taken to attainment of these goals. During the first year, emphasis has been put on setting up the research groups and starting research activities, which, as a consequence, are now well under way and already have resulted in several reports. Four programme areas have been defined. Within these areas one or more projects have been created, with participants from academia, MEFOS and industry. A generic knowledge platform has been instigated, which is expected to take care of e.g. method development that is common to all project areas. Only minor activities have so far taken place in the generic platform.

Another result of the strong emphasis on initiation of research activities seems to be that less attention has been paid to some other activities of strategic importance, such as recruitment of new partners, extended cooperation with other universities and research institutes, and strategic planning for the activities of PRISMA beyond the present six-year financing period. Such measures are highly important for PRISMA to fulfil its strong potential to become an industrially relevant and sustainable Centre of Excellence of national and international importance in the area of process integration in steelmaking.

#### National and international interaction with other research groups

Due to earlier contacts of MEFOS as well as its own activities, PRISMA has broad international contacts, as manifested by direct participation in projects within EU-RP7, contacts with similar research programmes in Finland and Austria, participation in conferences, visits etc. An international scientific council with three members, from Norway, Finland and Sweden, has been appointed and will meet for the first time in the summer of 2008. On a national level, there is project cooperation with LTU and a minor project with AFOC at Acreo; other contacts seem to be limited to discussions with researchers at CTH and LU.

### 2.5.3 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

Collaboration within PRISMA has developed from earlier contacts between MEFOS, LTU and the three participating companies. The organisation and internal communication of PRISMA appear to be efficient. A management group has been formed consisting of the centre managers, an industrial director from industry and the project leaders from PRISMA of each of the four program areas. This group discusses progress of research and evaluates and suggests new projects in preparation for decisions taken by the Board. Joint courses and seminars have been arranged for all four programme areas. Visits related to the different projects by industrial researchers at PRISMA and vice versa are frequent and contacts between research and education at LTU and the Centre seem to be satisfactory. The graduate student present at the hearing stressed the advantages of belonging to an integrated research group such as PRISMA. Interactions between researchers at a level below the project leaders could probably be improved.

#### Centre personnel: senior scientists, research groups and students

Ten senior researchers participate in Centre activities, six of them with a PhD degree. Several of them have extensive experience of research cooperation with industries of the type represented by the partners. Total work of the senior researchers during the first year amounted to around four

man-years, with the vice director working about 80% in the Centre. Four graduate students are presently working within the Centre, two of them from industry. The personnel development during the first year of existence of PRISMA is quite satisfactory. It is an excellent start on the way to creation of a sustainable research community that is not oversensitive to unforeseen changes in personnel.

### Industrial involvement and interaction

All the three industrial partners in the Centre have a long tradition of membership and cooperation with MEFOS and the contacts between them and PRISMA seem to be functioning well. The partners participate in project planning and management; there is cooperation between industry researchers and PRISMA personnel at the project level and good contacts up to higher managerial levels within the industries. An open ”Process integration forum for the steel industry” has been initiated, in order to extend contacts, generate new ideas and stimulate new industrial interest in PRISMA activities. So far, no new members have been recruited, and ongoing negotiations on membership are limited. This is a matter of concern; not only is a main purpose of the IEC program to create new, broader and cross-fertilizing contacts between institute, university and industry, rather than to just consolidate those already existing, but having only three members renders PRISMA very sensitive to unforeseen changes in company policies with regard to utilization of external research and resources allocated to long-term research in general.

Reservations towards substantial broadening of membership were brought forward by PRISMA management during the hearing. Reference was made to potential problems associated with control of the sharing of knowledge, maintenance of industrial contacts at an appropriate level, location of facilites and the need for members to take an active interest from the beginning in the whole research programme. We strongly encourage PRISMA to overcome these reservations and to actively and in the near future increase their efforts to increase the number of industrial partners.

The management of PRISMA has not deemed evaluation of customer satisfaction or some other quality assurance system necessary, in view of the very close contacts between PRISMA and the three partners. However, such an evaluation would reach other persons at the member companies than those in immediate contact with PRISMA, would also be useful when the partnership in PRISMA is broadened and is of importance for external evaluation of PRISMA activities.

### 2.5.4 Leadership and management

#### Leadership and personal capacity of the centre director

A Centre board directs PRISMA, with representatives from the three participating companies, LTU and MEFOS. Four board meetings have taken place from the start until the end of 2007. There is a Centre director, Jan-Olof Wikström, and an assistant director, Christer Ryman. They both participate in the board meetings. The Centre management, the area directors and the project leaders meet once every month.

The organizational structure is logical and the responsibilities clear. The directors both have a professional approach to the leadership of the Centre, give a very good impression and seem to be very successful. They have created an excellent identity of PRISMA within MEFOS, a good communications plan, and tools for a valuable learning process between the partners. Challenges for the board and the management are to start planning for the long-term survival of PRISMA after the six years of public funding and to recruit more industrial partners.

#### Status and role of the Centre within the organization of the institute

PRISMA has been established with a very clear own identity within MEFOS. The Centre has its own trademark, logo and profile in promotion materials and the home page on the web. The web site is excellent with some parts open for the PRISMA partners only. PRISMA has been located in a separate part of the MEFOS building from the beginning at the end of 2006. The management endeavours to promote the Centre status and image in a good way both within and outside MEFOS.

#### Interaction with university

LTU participates actively in the Centre and is represented on the Centre Board. The PhD students are employed by LTU but involved in the Centre activities at the MEFOS location. Two of them are financed through PRISMA. PhD courses have been offered to all Centre participants. Contacts with universities are also established through the scientific council and in EU projects. However no academic researchers from other universities than LTU participate in the research programme. During the hearing CTH and LiU were mentioned as possible academic partners with significant competence in the field. No contacts with other industrial research institutes than MEFOS seem to be established, despite the fact that some of them are involved in research related to process integration in other industrial sectors. Also VTT and Åbo Akademi University in Finland are involved in programmes related to process integration. Contributions from both other academic partners than LTU as well as research institutes and competence centers are worth considering during coming years.

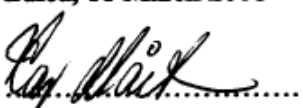
### 2.5.5 Recommendations

#### Recommendations to the Centre

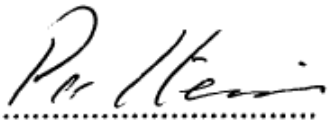
PRISMA has set up an effective organisation and managed to start up a commendably productive research programme in a remarkably short time. Interactions with the present industrial partners and university researchers are good, but some concern must be expressed with the regard to the very limited number of industrial partners. We wish to submit the following recommendations:

- Attachment of more industrial partners to the Centre is recommended as a matter of urgency.
- A quality assurance system should be developed; this will be even more important when new industrial partners are recruited in the future.
- The potential of protecting the IPR within PRISMA and developing a policy with regard to the establishment of start-up companies based on Centre results should be considered.
- Attention should already now be paid to the long-term survival of PRISMA after the six-year public financing period.
- Cooperation with other relevant academic partners and research institutes could be further developed to the benefit of all parties.

**Luleå, 11 March 2008**



**Kaj Mårtensson**



**Per Stenius**

## 2.6 Evaluation of the IMAGIC Institute Excellence Centre at Acreo

On March 12, 2008 the evaluators, Gunnar Björklund, Kaj Mårtensson, Ingrid Skogsmo and Per Stenius met with the director Jan Andersson, the vice director Susan Savage, representatives from university, industry and PhD students of the IMAGIC Institute Excellence Centre (IEC) at Acreo, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for informative presentations and open discussions.

### 2.6.1 Long-term strategy and focus of the Centre:

#### Competence profile and value added by being a Centre

IMAGIC is driven by Acreo in co-operation with an industry group, KTH and LiU. The Centre has the ambition to bring together these partners in research to realise the next generation of imaging systems, with focus on design, fabrication and evaluation of semiconductor-based detector and modulator modules at wavelengths ranging from X-ray to far IR.

The competence profile seems appropriate for the chosen areas of activity and cooperation between the partners. There are research results indicating that the value added by IMAGIC is regarded to be of high importance. The reported interaction with research groups outside the Centre confirms that the academic research is of high quality and that it contributes substantially to the value added by the Centre.

It was stated during the hearing that IMAGIC´s IEC status has facilitated engagement of national and international partners in the development of a program that would not otherwise have come about.

#### Strategy and research programme

Quantitative goals for IMAGIC’s research were described at the hearing, but were not given in the Year 1 report. Goals for the development of IMAGIC as an IEC seem not to have been specified. While existing and future needs of the industrial partners have a strong influence on the selection of projects, research ideas are mainly initiated by the researchers within IMAGIC. Industry partners are directly involved in the Centre’s relatively mature projects at the same time as they are waiting for promising results from IMAGIC´s more basic research activities.

The activities within IMAGIC are divided in two main groups:

***Key technologies and Networking.*** This project is based on cooperation between IMAGIC, KTH and to some extent LiU. The objective is to have access to key technologies necessary for module fabrication in the different technology areas. A more structured approach to this project is recommended, in order to ensure that all partners involved in the IEC remain interested. The Evaluators note that there is no common *generic* research program. Difficulties in formulating such a program were described at the hearing, but without such a program there is a clear risk that, in the long run, there will be no main connector of interest to all partners within the Centre. Individually, the industrial partners will be primarily involved with specific systems development related to the different technology projects.

***Technology areas.*** These areas include: *Uncooled thermal IR detection, Cooled IR detection, UV-detection and X-ray detection.* A slight delay during the start-up year is going to be caught up during 2008. Research within three of the areas is well under way, and has just started in the fourth of them. There is good support of these areas from the two largest participating companies and their contributions to the Centre are well in line with plans. Other partners are assumed to step up their activities as the fundamental research matures into a phase closer to applications.

#### National and international interaction with other research groups

National interaction is dominated by the close relation between IMAGIC, KTH and LiU. Through Acreo the Centre has been involved in the EU-project PIMS. Negations on two other EU projects are in progress. Plans for 2008 include exploration of possibilities to work together with IVL, SICS, STFI-Packforsk as well as a French research group.

An international advisory board, with three experts from universities, one in USA and two in Sweden (LiU and UU) has been appointed.

### 2.6.2 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

There is a steering group for each technical area and researchers from both academia and industry seem to be well involved in these, but contacts *between* the areas appear to take place only on a more informal basis between area leaders coming from Acreo. Appointment of leaders from industry has been discussed but not implemented. There is no management group in which the area leaders would meet with the directors to discuss common issues. Progress in research and suggestions for new projects are discussed by the Board. An open IMAGIC seminar has been arranged.

Internal seminars and courses have been limited to three presentations of M.Sc. theses and a four-hour course on image detectors. IMAGIC pages on the Acreo web site have been created. As pages reserved for IMAGIC partners are not accessible to others, the extent to which degree the web site might contribute to collaboration and cooperation within the Centre cannot be assessed this time.

The Communications strategy does not include a strategy for collaboration *within* IMAGIC. According to the Year 1 report, no funding has been used for communication. In order to fully develop and maintain the concept of IMAGIC as an IEC, strategy and plans for communication within the Centre should be formulated, involving internal seminars and courses etc. The appointment of a management group involving all project leaders, and the organisation of separate IMAGIC room space in the Acreo facilities should be considered.

### Centre personnel: senior scientists, research groups and students

29 senior scientists, 2 PhD students (working full time) and 18 other persons are associated with the Centre. The total amount of work devoted to the Centre in 2007 amounted to 8.3 man-years. There are clearly huge individual variations in the working hours devoted to the Centre. However the directors spend most of their time with the Centre and the time devoted by project leaders seems also to be satisfactory. Some concern can be expressed with regard to whether 8.3 man-years are really enough to maintain a sustainable Centre activity. There is clearly a need to increase this figure during coming years.

### Industrial involvement and interaction

Presently, there are ten industrial partners in the Centre. One of them, IRNova, is a spin-off company of Acreo. It is not clear to the evaluators how IRNova contributes to IMAGIC - a considerable amount of money has been spent on consultancy from this company, while its own contribution to the Centre is minimal. Only three companies (all of them comparatively large) are actively engaged in research projects in the technical areas. With the current focus on projects within these areas, the risks involved in their outcome and with the absence of more generic activities within the general programme, there is clearly a danger that the interests of other industry partners may wane. Priority should be given to engaging all partners more actively in the project work and also to enhancing mobility of researchers between industry and IMAGIC, of which there presently appears to be none.

The industry partner participating in the hearing stated that the membership in the Centre has yielded useful contacts with other partners. A reasonably detailed survey of customer satisfaction has been conducted. While the survey seems to have indicated general satisfaction with the Centre, more attention should have been paid to the answers to each individual question and their implications for the activity of IMAGIC as a whole.

### 2.6.3 Leadership and management

#### Leadership and personal capacity of the Centre director

The leadership is composed of one Centre Manager, Jan Andersson, and one deputy Centre Manager, Susan Savage. Jan had to leave the hearing early due to illness but Susan took over and made a very good presentation of the Centre activities. The Centre Board is appointed by the General Meeting where all parties of the Centre are represented. The Board has representatives from all of the participating companies, KTH and Acreo. Both leaders participate in board meetings. Board meetings have taken place about every third month.

The organizational structure of IMAGIC is logical and the responsibilities are clearly defined, although there is no management group. Susan has a good approach to the leadership of the Centre and gives a very good impression. As stated above, it is strongly recommended to increase the interaction and learning between all participating partners. These will be future challenges for the management, remembering that there are many limitations due to secrecy matters and IPR-opportunities. Improving the quality assurance system, increasing the identity of the Centre and planning for its long term survival are other future challenges. The annual report presented for 2007 was not well structured and did not contain all details belonging to a report like this.

#### Status and role of the Centre within the organization of the institute

The identity of IMAGIC within Acreo needs further clarification. An own logo has been produced which still is closely connected to the logo of Acreo. For practical reasons the website, which was reported to be well functioning, is closely integrated to Acreo´s own website. The Centre has no separate room space to support its identity and where people from industry and academia can work together and get the right “Centre feeling”.

It is important for the management to set up a strategy to guarantee the survival of IMAGIC also after the six years of public funding. Important parts of such a strategy might be the identity of IMAGIC, creation of a stable industrial Centre network with more and active partners and alternative financing ideas for the future. It is evident that it is not easy to give a clear and visible identity to a small and new centre formation in a

well established company like Acreo but we would nevertheless like to encourage the Centre board and management to continue to strengthen the identity of the IMAGIC.

#### Interaction with university

The Centre cooperates with two academic partners - KTH and LiU. KTH is classified as a partner in the Centre and a separate agreement has been set up with LiU. One PhD student from each academic site (1.5 man-year in 2007 together) has been involved in the research so far. Plans for a new PhD student from KTH in 2008 are discussed. In addition KTH has contributed with in kind work of approximately 400 kSEK. However, out of 64 persons mentioned to be involved in the Centre, only eight were from the academia and none was from another research institute. During the hearing other research institutes like STFI, Packforsk, IVL, SICS and FOI were mentioned as interesting future cooperation partners. According to the plans contacts with academia and research institutes will be established through new PhD students, the international advisory board, discussions with other research institutes and via EU-projects. We would like to strongly encourage the Centre to continue to further develop the external cooperation with universities and institutes.

### 2.6.4 Recommendations

IMAGIC is well under way, but industrial involvement needs to be broadened and a generic programme should be formulated. We wish to summarize our recommendations by the following:

- The Centre should further strengthen its identity as an IEC within and outside Acreo. This will be an essential ingredient in a strategy to guarantee the survival of IMAGIC also after the six years of public funding.
- The Centre should further develop external cooperation with universities and institutes.
- The Centre should develop its quality assessment system so that feedback from all partners is transformed into actions aiming at improving Centre performance.
- It is recommended to increase the interaction and learning between all participating partners and to increase the mobility of researchers, especially between the Centre and industry in order to get an active involvement from all companies.
- In addition to increasing the number of active partners in the projects a generic programme should be formulated that contain more research of general interest to the partners.
- Strategy and plans for communication within the Centre should be formulated and implemented

- The annual report of the Centre shows some shortcomings and should therefore be improved in the future

Stockholm, 12 March 2008

Gunnar Björklund

Kaj Mårtensson

Ingrid Skogsmo

Per Stenius

## 2.7 Evaluation of the CIC Institute Excellence Centre at Swerea SWECAST

On March 17, 2008 the evaluators, Ola Asplund, Kaj Mårtensson and Per Stenius met with the Centre managers, Rikard Källbom, and Stefan Gustafsson Ledell, representatives from Swerea SWECAST, Jönköping University of Technology (JTH), industry and PhD students of the CIC Institute Excellence Centre at SweCast, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for informative presentations and open discussions.

In the following, the Casting Innovation Centre, to which the Industry Excellence Centre belongs, is denoted CIC; the Industry Excellence Centre is denoted IEC-CIC.

### 2.7.1 Long-term strategy and focus of the Centre:

#### Competence profile and value added by being a Centre

IEC-CIC aims to become world class research, development and education Centre in the area of casting technology, building on resources at the industrial research institute Swerea SWECAST, in close cooperation with academic competencies at JTH. Partnership between these goes back to to the 1990's but was formalised in in the form of CIC 2004. The visions of IEC-CIC are very similar to those of the CIC. IEC-CIC and CIC, together with JTH total some 50 researchers within casting technology, which is internationally a large resource.

While research at CIC spans many topics in casting technology, IEC-CIC focuses on frontier technology in three areas: High strength cast iron, Light weight components, and New technologies and materials. These are topics of special interest in view of strengthening the competitiveness of Swedish Industry. Applications range over different industries, e.g. automotive industry, combustion engines, windpower, telecom and machinery. Components have to meet new demands in terms of lower weight and improved durability. This calls for new materials and production technology to handle these materials in efficient production processes.

#### Strategy and research programme

The overall strategy is to develop excellence in the three main areas, to serve industry needs and build competencies between the institute and JTH that can be sustained after the period of the current program (post 2012).

During the first year of the program efforts have been focused on planning and definition of five “Work-Packages” (WP). Within each of these, project-managers have formed a team of people from the Swerea SWECAST, JTH and a group of companies. The WP are defined with knocked-down budgets, planned activities and time-schedules. They were built up through detailed discussions with the industrial partners, in order to ensure the industrial relevance of the research. Each WP involves material development, modelling and process development. Experiments can take place both at the facilities of the Swerea SWECAST and at industrial plants while modelling, computing uses the premises of the Swerea SWECAST and/or JTH, where also some advanced instrumentation is located.

#### National and international interaction with other research groups

An international council has been formed with participants from recognised centres within the field of casting technology. The council will have its first meeting in April 2008. The task will be to discuss the work of IEC and to broaden its international network of it. Through CIC, IEC-CIC has broad international contacts, including collaboration in international projects.

### 2.7.2 Build-up of a concentrated research environment:

#### Strength of collaboration within the Centre

Four WP project leaders come from Swerea SWECAST and one from JTH. Within each area there is one or more projects. All partners in the Centre participate in at least one project. There is a project committee for each project. Thus, communication and collaboration *within each WP* seems to work very satisfactorily. WP leaders meet at irregular intervals with the Centre directors to discuss progress and common issues, and some of the WP:s collaborate in some projects.

A detailed and evidently efficient system for managing and monitoring progress within each project has been developed, which also facilitiates efficient transfer of knowledge between project leaders, Centre directors and Centre board.

However, while JTH seminars, courses and symposia are open to Centre researchers, there are no general activities common to all WP:s (joint seminars, courses etc) and no generic research programme for research of common interest to all WP:s/partners.

A plan for external communication has been formulated, but no such plan exists for *internal* communication and education. The communication plan needs to be developed further with regard to the interaction and learning between all participating partners and to ensure a broad and continuing interest among partners in Centre activities.

### Centre personnel: senior scientists, research groups and students

Presently, 9 senior researchers from JTH, 13 from Swerea SWECAST and 4 PhD students are engaged in Centre research. According to the annual report, the project leaders spend 20-40% of their working hours on Centre projects, which is satisfactory. However, the total time used for work in the Centre is reported to amount to only 3.65 man-years, which seems to be very low, in view of the large number of researchers associated with the Centre.

The time used for work is expected to increase substantially during 2008. Once fully manned, the WP:s will probably be large enough to ensure continuity, and Centre directors and Board were fully aware of the necessity to engage personnel as quickly as possibly.

### Industrial involvement and interaction

The Centre has 17 industrial partners, all also members of the Swedish Foundry Association, representing both large companies and SME:s. The Centre has managed to create a group of industries interested in more long-term research on casting technology in a commendable way. General contacts with industry appear to function well. While industry partners have been actively engaged in planning of the research program, little collaboration through work within the Centre has so far taken place. In-kind contributions to the Centre vary from 170 h to 0 (four companies). About 80 % of these contributions consist of participation in planning and project meetings. Plans exist to increase involvement of industries in research work exist; such activity should be increased substantially in the near future.

An oversimplified survey of customer satisfaction with Centre activity has been implemented; the “satisfaction index” calculated from this survey was 3.7 out of a maximum 10. However, the questionnaire was answered by only part of the partners and had probably been conducted at an too early stage of Centre development. The quality assurance system should be further developed.

### 2.7.3 Leadership and management

#### Leadership and personal capacity of the Centre director

The Centre is directed by a Centre board with representatives from five of the participating companies, JTH and Swerea SWECAST. The board is appointed by the General Meeting where all parties of the Centre are represented. The chairman, Christer Davidsson, comes from industry. Five board meetings took place during 2007. Centre leadership (Centre Manager, Rikard Källbom, assistant Centre Manager, Stefan Gustafsson Ledell and Scientific Leader, Ingvar Svensson from JTH) participates in the board meetings. The scientific leader is responsible for the research programme. The chairman and the three Centre leaders were all present during the hearing.

The organizational structure is logical and the responsibilities well defined. Rikard and Stefan have both an excellent approach to the leadership of the Centre and have been very successful so far, in particular in view of that they took over from the earlier Centre Manager in August, 2007. The Centre management seems to be very open to feedback and is continuously learning and is taking action based on earlier experiences.

The research programme has only started, no results were presented and not all of the 17 partner companies have been actively involved in the Centre so far, primarily because of the delayed start of the research activities. To catch up with this delay is an important challenge for the management.

#### Status and role of the Centre within the organization of the institute

The IEC-CIC was described as a project in the already existing CIC. The identity of the IEC-CIC within Swerea SWECAST and especially within the CIC was not clear. Also, the relation between the roles of IEC-CIC and CIC in the cooperation with JTH was not fully clarified between the people from Swerea SWECAST and JTH. No own IEC-CIC logo has been produced. A website has been developed, including a partner specific “log in”, but as a part of the CIC website, which in turn is a part of the Swerea SWECAST website. It was not obvious to the Centre management how to market the IEC-CIC as such. Some room space has been reserved for future use, but IEC has no separate localities that would support its identity and allow people from industry and academia to work and get the right “Centre feeling”,. It is strongly recommended to find a clear, joint identity of the IEC-CIC and CIC. Preferably, the structure and organization of the IEC-CIC can be applied to the CIC centre as a whole, in which all activities can be included and to which to a significant part is coming the financed by the VINNOVA/KK-foundation/SSF IEC programme. This would be an important part of a strategy to guarantee the survival of IEC-CIC and CIC

research also after the six years of public funding. Other parts of such a strategy might be building up of a stable industrial network as well as finding alternative financing sources for the future.

#### Interaction with university

IEC-CIC cooperates with one university, JTH, which is a formal partner of the Centre and has cooperated closely with Swerea SWECAST for many years. Some problems related to management of the IEC-CIC in relation to CIC have occurred. Plans are to increase the number of PhD students and senior researchers significantly in the future. Additional involvement of people from JTH includes Peter Olsson in the board, Ingvar Svensson, the scientific leader, and one more research leader. Planned contacts with other universities and research institutes have so far not been implemented. More contacts may be established through the scientific council. On the other hand, CIC has established cooperation and contacts with other Swedish universities and with similar centres abroad. Formation of one new CIC Centre out of the earlier two would give an obvious synergy and avoid confusion with respect to such contacts. The Centre is strongly encouraged to further develop cooperation with universities and institutes, not least with the centres in Australia, USA and UK mentioned in the research plan.

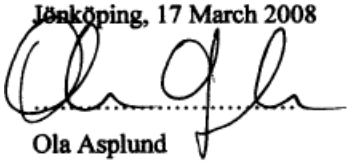
### 2.7.4 Recommendations

IEC-CIC is solidly supported by industry and university and activities have been planned in depth. Together with CIC, IEC-CIC would be well on its way to fulfill the visions of functioning as an Institute Excellence Center in cooperation between university, institute and industry. We wish to submit the following recommendations:

- A clear, joint identity of the IEC-CIC and the CIC should be established.
- The Centre should further strengthen its identity within and outside SweCast, as a natural part in a strategy to guarantee the survival also after the six years of public funding.
- The Centre should further develop external cooperation with universities and institutes.
- The Centre should develop its quality assessment system so that feedback from all partners is transformed into actions aiming at improving Centre performance.
- Interaction and learning between all participating partners and mobility of researchers, especially between the Centre and industry should be increased, in order to get an active involvement from all companies.
- Formulation of a generic programme containing more research of general interest to all participating partners is suggested.
- Strategy and plans for communication within the Centre should be implemented.

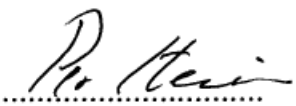
- The potential of protecting the IPR within CIC and development a policy with regard to the establishment of start-up companies based on Centre results should be considered
- The annual report of the Centre shows some shortcomings and should be improved in the future.

Jönköping, 17 March 2008



Ola Asplund

Kaj Mårtensson



Per Stenius

## 2.8 Evaluation of the CNS Institute Excellence Centre at SICS

On March 18, 2008 the evaluators, Gunnar Björklund, Kaj Mårtensson and Per Stenius, met with the Centre manager, Bengt Ahlgren and representatives from Centre Board, industry, university and researchers of the Center for Networked Systems (CNS) at SICS, for presentations and discussions on the organisation and performance of the Centre. Representatives from VINNOVA, the Knowledge Foundation and SSF were also present. We thank the organizers of the meeting for informative presentations and open discussions.

### 2.8.1 Long-term strategy and focus of the Centre

The focus of the research programme has been reformulated in connection with the approval of the project 4WARD within EU's 7$^{th}$ research framework programme. This is one of the major EU projects and was reported to lead to a new focus area in CNS, labelled "Networking of Information". This research takes the information communicated in a network as the starting point for a novel approach to the design of future communications networks.

CNS is driven by SICS together with an industry group and in close cooperation with KTH, UU and MdH. The Centre is guided by the vision of "The Reliable Internet" and has the ambition to conduct, integrate and exploit research in the area of networked systems. The vision is concretised in terms of a platform for networked systems focussing on real-time information. Examples given are live TV, sensor data collection and database synchronisation.

The goal of the Centre is to contribute with building blocks to this platform, for example interfaces, protocols and pieces of enabling technologies.

#### Competence profile and value added by being a Centre

The competence profile seems appropriate for the chosen areas of activity and cooperation between the partners. There is a close interaction between CNS and its industrial partners, representing leading international players in their respective fields. This has a strong influence on the competence profile of the Centre and ensures the added value and relevance of the ongoing research at CNS for both SICS and its industrial partners.

The Centre also brings added value to its academic partners by involvement in joint research projects, including supervision of MSc and PhD students by senior staff members and Centre project leaders.

#### Strategy and research programme

Centre strategy is based on close cooperation with industrial partners and their interests in the ongoing activities. This has led to a structure of the research programme that in 2007 was based on four projects areas led by project leaders from SICS. Five PhD students are employed by the Centre; their research projects are closely linked to the project areas.

In the application document, the Centre presented a plan for a smooth continuation of activities beyond year 2012. This plan also includes an estimate of the impact of the Centre on industry. The Centre has not reported on how well these plans are followed and there is no reference in tha Annual Report to the quantified goals in the CNS application document (SICS CNS Proposal for an Institute Excellence Center; sections 2.1 and 5.5) in the Annual Report.

#### National and international interaction with other research groups

CNS has successfully established good contacts with the international research community. This is also reflected by the outstanding members of the Scientific Advisory Board appointed by CNS: six experts from universities and research institutes, four from abroad (USA, Germany and France) and two from Sweden (CTH and KaU). The Board confirmed the excellent standard of the work and research output from the Centre in a report dated December 5, 2007. The impression of the high international level of the ongoing research at the Centre is further confirmed by the list of published articles, conference contributions etc. presented in the Annual Report and also by the reported interaction with leading academic research groups outside the Centre.

### 2.8.2 Build-up of a concentrated research environment

#### Strength of collaboration within the Centre

There are sub-projects in two of the four program areas, so that during 2007 there were, in total, eight projects. In most of these, only one industrial partner was involved. Reporting of results from the projects are both open (e.g., work by PhD students) and limited to the industrial partners. This organisation implies obvious limitations of internal communication and collaboration. Centre management is aware of the need to exchange experience and knowledge between the researchers in different projects and has endeavoured to promote such exchange through internal workshops, seminars and definition of a common research platform.

However, there is no generic programme for research of common interest to all project areas; at the hearing it became evident that CNS management finds informal communication between the open parts of the projects and workshops to be sufficient. In the opinion of the evaluators, in order to

create a solid knowledge basis and expertise as a foundation for a sustainable Centre on networking research, a generic programme should be developed. This would also be directly in line with the visions formulated in the application document. It would also be a tool to further increase the interaction and learning between the partners. This will be a future challenge for the management, the limitations due to secrecy matters and IPR opportunities notwithstanding.

Collaboration with university partners seems to be good and is based on long-time contacts between SICS, KTH, UU and MdH.

### Centre personnel: senior scientists, research groups and students

37 senior researchers and in total 60 persons (including 11 PhD students) are reported to have been involved in Centre activities in 2007. The total working hours in the Centre was 8.8 man-years. There was no break-down of how this time divided between the many people involved in the annual report, but the hearing showed that Centre management, project area leaders and some other personnel spent satisfactory parts of their total work hours on Centre projects. It also became clear that the research groups have involved personnel financed by other means than IEC funds. Therefore, project leaders found them to be of sufficient size to ensure continuity and sustainable experience. However, and partially as a result of advice from the SAB, a need to focus research on fewer projects was identified, and measures have, commendably, been taken to achieve this during 2008.

The organization of research activity into projects involving one or only a few industrial partners implies that research by PhD student may become scattered and perhaps too strictly guided. However, the PhD student present at the hearing declared that he found the many industrial contacts stimulating.

### Industrial involvement and interaction

CNS has five industrial partners, four very large international concerns and one very small company. They all contribute both in cash and in kind and are actively engaged in one or several projects. Exchange of personnel between CNS and industry has taken place. Centre management wants to increase this activity and has, commendably, formulated plans for doing so. Workshops for dissemination of results to industry have been arranged. A project involving several SME:s is under discussion. Contacts with industry are well organised and present support by partners is good.

No investigation of customer satisfaction or quality assessment has been implemented. The intention seems to be to conduct such evaluations in collaboration with SICS. CSN is strongly recommend to develop its own, CNS-specific methods to assess customer attitudes, as important means to

identify needs for improvement of present activities and ensure sustainable long-term development beyond the present six-year financing period.

### 2.8.3 Leadership and management

#### Leadership and personal capacity of the Centre director

The Centre is directed by a Centre board with representatives from all of the participating companies, KTH, MdH, UU and SICS. The chairman, Olle Viktorsson, comes from industry. The board is appointed by the General Assembly where all parties are represented. During 2006 two and during 2007 six board meetings were held. The Centre management group is composed of the Centre Manager, Bengt Ahlgren, a business leader, three project leaders and two research leaders. The Centre Manager participates in the Board meetings. The position of an assistant Centre Manager is vacant for the moment.

The organizational structure is logical and the responsibilities clear. Bengt has a good approach to the leadership of the Centre and gives a very good impression.

There is a plan for communication. So far communication has taken place in the form of workshops, project meetings, scientific and popular publications and through the web site. The SAB has already made one evaluation of the research and given some recommendations to the Centre. The way in which the Centre management has used the SAB to improve the future performance of the Centre is excellent.

#### Status and role of the Centre within the organization of the institute

The identity of CNS within SICS is to some extent not clear. No own logo has been produced. The web site, which is functioning well, is closely integrated to that of SICS. The Centre has no separate room space to support the identity and where people from industry and academia can work and get the right “Centre feeling”. It is important for the management to already now take suitable actions in order to guarantee the survival of CNS also after the six years of public funding. In the application to the IEC programme a number of clear future goals and a vision for the Centre 2012 have been set up. We recommend that the Centre management formulate and implement a strategy on how to reach these goals. Important parts of such a strategy might be the identity of CNS, creation of a stable industrial network with more and active partners and alternative financing ideas for the future. It is quite clear that it is not easy to give a clear and visible identity to a small and new centre formation in a well established company like SICS but we would, *nevertheless, like to* encourage the Centre board and management to continue to strengthen the profile of CNS.

#### Interaction with university

The Centre cooperates with three academic partners – KTH, UU and MdH and special agreements have been formulated between the Centre and the academic partners. University representatives are parts of the Centre board. Five PhD students from the academic sites (2.9 man-years together in 2007) have been involved in the research. In addition the universities contributed with in kind work of 900 kSEK. Additional contacts with university and institute partners have taken place through the SAB. Cooperation with international institutes and universities is also established in ongoing EU-projects. This seems to be handled in an excellent way. However, the mobility between involved people from the universities and CNS has been limited so far. This is an important part of the idea behind this type of Centre and can be improved in the future.

### 2.8.4 Recommendations

CNS has started up very efficiently and already produced an impressive body of results. Thus, CNS is well on its way to fulfil the IEC visions, but needs to work more on creating a sustainable identity as a Centre of Excellence on its own. We wish to submit the following recommendations

- The Centre should further strengthen its identity within and outside SICS and develop and implement a strategy on how to reach the goals and vision for 2012, as formulated in the application document.
- A quality assessment system specific to CNS should be developed so that feedback from all partners is transformed into actions for improvement of Centre performance.
- The interaction and learning between all participating partners should be increased in order to achieve a long term, sustainable involvement from all companies. Setting up a generic programme, open to all partners, can be a valuable tool.
- The Centre should develop a policy for possible startup of new companies based on the CNS activities.

We note that several of these recommendations are in direct line with the recommendations given by the SAB. We also note that CNS has taken satisfactory action on the recommendation by SAB to focus research on fewer projects. The recommendations of the SAB on formulation of goals are in line with the notes and recommendations above with regard to the

goals formulated in the CNS application. In contrast to the opinion of the SAB we find that collaboration with universities is good.

Stockholm, 18 March 2008

| | | |
|---|---|---|
| Gunnar Björklund | Kåj Mårtensson | Per Stenius |

# Appendix A
# Guidelines
## Evaluation of the Institute Excellence Centres programme
## Competence Centres at research institutes

## Guidelines for the first evaluation of Institute Excellence Centres

### Background

#### Purpose and organization of Centres

The aim of the Institute Excellence Centres (IEC) programme is to create environments for research, development and innovation of internationally competitive standing within areas of great importance to the future competitiveness and growth of Sweden, managed by research institutes in collaboration with universities and industry.

The IEC programme is to run for up to 6 years. The Centres are funded in two stages: for 3 years based on the initial application and for an additional 3 years based on evaluation and renewed application. The partners of a Centre are industrial companies and research institutes supported by University/Institute of Technology. The parties contribute jointly to the centre's research programme, financially or in the form of active work. Collaboration and financing are described in a Model Agreement for Institute Excellence Centres.

#### Strategy

General strategies to reach the objectives include

- Initiation and development of joint research projects between institutes, universities and industry
- Concentrated efforts in cooperation with universities to attract more R&D-projects from leading Swedish and international companies and other funding organisations
- Active promotion of competence and education
- Development of meeting places for creative collaboration between companies of all sizes and researchers at institutes and universities
- Creation of environments supportive of the development of high technology companies and startup of new companies.

### Expected results

The expected results and effects at the end of the IEC programme in 2012 are that the programme has substantially contributed to the status of the research institutes by creating:

- Environments that contribute to the profiling of the research institutes and their long-term development
- Internationally competitive environments for research, development and innovation within focused areas
- Attractive environments for top international researchers from industry and academy
- Environments supporting the international competitiveness of the participating industry partners
- Agents of change in industry and society through new knowledge and competence that leads to new products, processes and services
- An increased number of important R&D missions from leading Swedish and international companies and other funders
- Efficient utilization of available resources in terms of research and researchers
- Increased mobility between industry, institutes and universities
- Increased Swedish participation in international R&D programmes, in particular within the EU
- Adaptation and packaging of research results and their dissemination together with other strategic knowledge, in particular to smaller and medium-sized enterprises.

## First evaluation of IEC

### Purpose

This first evaluation will be carried out at an early stage, i.e. less than 16 months after Centre start up. Its primary purpose is assessment of the ways Centre organisation and performance of the research programme in a Centre format has been established. *Thus, the evaluation will not assess scientific and industrial results.* A second evaluation, including assessment by scientific expertise, will take place during year 3, before stage 2.

The main focus of the evaluation is to form an opinion of the approach and measures taken so far by each Centre and to assess the potential for its long-term development towards a successful IEC. Thus, the objectives of the first evaluation are *to serve as a reference for forthcoming evaluation(s) and to comment and counsel the Centres on their performance.*

The evaluators will pay special attention to the following criteria:

- Long-term strategy and focus of the centre:
  - Clear definition of competence profile and value added by being a Centre
  - Joint research programmes with clear goals
  - Relations to other research groups, national and international.
- Build-up of a concentrated research environment:
  - Strength of collaboration within the Centre:
    - Between the institute and academia
    - Between the institute and companies
    - Between companies
  - Centre personnel: senior scientists, research groups, students
  - Industrial involvement and interaction
    - Activities and level of participation of the companies.
    - Mutual personal mobility between institute-academia-companies
- Leadership and management
  - Leadership and personal capacity of the centre director.
  - Status and role of the Centre within the organization of the institute.
  - Interaction with university.

### Organisation

The composition of the evaluation team is decided by VINNOVA, The Knowledge Foundation (the Knowledge Foundation) and SSF (the Swedish Foundation for Strategic Research). The team itself decides on the distribution of the work among its members.

The evaluation will take place through on-site interviews at the Centres. During the visit the evaluators should meet with the following parties:

- The Centre Director
- The Chairman of the Centre Board
- Representatives from participating companies and University
- Researchers active within the centre, including PhD students (if any)
- Representative of the hosting institute

KK, SSF and VINNOVA staff will be present at the site visits. They will not take active part in the evaluation, but can add information during the work sessions.

Basic documentation on each Centre will be distributed to the members of the evaluation team prior to the evaluation.

### Report

The team of reviewers will, for each Centre, write a qualitative report of approximately two pages. The report will be written jointly by the team and the team has to be unanimous in its conclusions. A first version of the report will be written immediately after the evaluation has taken place. Before distribution of the final report, it will be sent for checking of factual errors to each Centre.

Each report will include:

- A short **summary** of the work of the Centre and how it contributes to the competitiveness of the institute and the industry.
- **An overall judgement** including comments on strong and weak points and an assessment of to which extent the centre appears to be heading towards the 2012 goals.
- **Comments** on other notable aspects of the centre related to e g leadership, organisation, strategic relevance, choice of research projects, applications, realism in goals/milestones, possible synergies, initiatives, interaction with industry/society, time frame, budget etc.
- Recommendations to the Centre.

Although the individual Centres are the main elements to be evaluated, it is desirable that the evaluators also comment on the concept as well as on structural and other general aspects of the IEC venture as a whole, including possible recommendations to VINNOVA, The Knowledge Foundation and SSF.

The report will be delivered to VINNOVA, The Knowledge Foundation and SSF. It will also be openly circulated to all Centres and, on request, to any other agencies or person who have expressed an interest in this type of information.

# Appendix B
# Evaluation programme

| | |
|---|---|
| January | Evaluation Guidelines was sent to Evaluation Team and Centre Leaders |
| February 15 | Status reports from centres were delivered to VINNOVA |
| February 20 | Status reports from centres were delivered to the Evaluators |
| March 2 | Pre-meeting |
| March 3 | Interviews on EcoBuild in Stockholm |
| March 4 | Interviews on CoDR in Stockholm |
| March 5 | Interviews on FOCUS in Linköping |
| March 10 | Interviews on AFOC in Hudiksvall |
| March 11 | Interviews on PRISMA in Luleå |
| March 12 | Interviews on IMAGIC in Stockholm |
| March 17 | Interviews on CIC in Jönköping |
| March 18 | Interviews on CNS in Stockholm |
| March 22 | Final draft from the evaluation team is sent to VINNOVA |
| March 25 | Final draft is sent to the centre managers for comments on facts |
| April 2 | Dead-line for comments from centre leaders to VINNOVA |
| April | Final report ready for distribution |

# Appendix C
# The Evaluation Team

**Per Stenius,** Professor emeritus

**Kaj Mårtensson,** PhD, Consultant

**Ola Asplund,** Head of Research Department, IF Metall

**Staffan Brege,** Professor, Linkoping University

**Gunnar Björklund,** PhD, Consultant

**Ingrid Skogsmo,** Vice President, AB Volvo

**Michael Stöcker,** Principal Research Scientist, SINTEF, Norway

# Appendix D
# List of participants at the interviews

## EcoBuild: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Magnus Wålinder | Centre Director |
| Mats Westin | Deputy Centre Director |
| Peter Herder, | Casco Adhesives |
| Lars Elof Bryne, | Phd student, KTH |
| Emma Östmark | Phd, SP and KTH |

### Evaluation Team

Per Stenius

Kaj Mårtensson

Michael Stöcker

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |
| Patrik Sandgren | VINNOVA |

## CODIRECT: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Katrin Danerlöv | Acting Centre Director |
| Mikael Kjellin | Deputy centre director |
| Mats Andersson | Vice President, YKI |
| Magnus Linsten | Akzo Nobel |
| Prof. Per Claesson | KTH |
| Anna Fureby | Phd |
| Lisa Skedung | Phd student |

### Evaluation Team

Per Stenius

Kaj Mårtensson

Michael Stöcker

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |
| Patrik  Sandgren | VINNOVA |

## FOKUS: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Hans Frennberg | Centre Director |
| Björn Larsson | FOI |
| David Lindgren | FOI |
| Per Grahn | FOI |
| Martin Holmberg | FOI, LiU |
| Fredrik Gustafsson | LiU |
| Anders Lundh | Saab Bofors Dynamics |
| Marin Kores | Omnisys Instruments |
| Zsolt Tóth-Pál | Consilium Navigation |

### Evaluation Team

Per Stenius

Kaj Mårtensson

Staffan Brege

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |

## AFOC: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Åsa Claesson | Centre Director |
| Walter Margulis | Acreo |
| Pär Jelger | PhD student, KTH |
| Stefan Ekman | Proximion Fiber Systems AB |

### Evaluation Team

Per Stenius

Kaj Mårtensson

Gunnar Björklund

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |

## PRISMA: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Jan-Olov Wikström | Centre Director |
| Christer Ryman | Deputy centre director |
| Mikael Larsson, | PhD, Mefos |
| Samuel Nordgren | LUH |
| Bo Lindblom | LKAB |
| Carl-Erik Grip | SSAB |

### Evaluation Team

Per Stenius

Kaj Mårtensson

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |

## IMAGIC: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Jan Andersson | Centre Director |
| Susan Savage | Deputy Centre Director |
| Prof. Mattias Hammar | KTH |
| Oscar Gustafsson | Phd student |
| Torbjörn Carlnäs | FLIR Systems AB |

### Evaluation Team

Per Stenius

Kaj Mårtensson

Gunnar Björklund

Ingrid Stensmo

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |

## CIC: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Rikard Källbom | Centre Director |
| Stefan Gustafsson Ledell | Deputy Centre Director |
| Mats Holmgren | Managing Director, SWECAST |
| Marie Gutegård | SWECAST |
| Prof. Ingvar L Svensson | JTH |
| Lennart Elmqvist | Phd student, JTH |
| Christer Davidsson | Volvo |

### Evaluation Team

Per Stenius

Kaj Mårtensson

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |

## CNS: Participation during the interviews

### Centre Representatives

| | |
|---|---|
| Bengt Ahlgren | Centre Director |
| Janusz Launberg | SICS |
| Björn Levin | SICS |
| Thiemo Voigt | SICS |
| Lars Rasmusson | SICS |
| Henrik Abrahamsson | SICS |
| Prof. Jens Zander | KTH |
| Olle Viktorsson, | Ericsson |
| Hans Thorsen | T2Data |
| Börje Ohlman | Ericsson |

### Evaluation Team

Per Stenius

Kaj Mårtensson

Gunnar Björklund

### Funding organisations

| | |
|---|---|
| Elisabeth Bergendal-Stenberg | Knowledge Foundation |
| Olof Lindgren | SSF |
| Bengt Johansson | VINNOVA |
| Patrik Sandgren | VINNOVA |

# VINNOVA´s publications

**April 2008**

See www.VINNOVA.se for more information

## VINNOVA Analysis

### VA 2008:

01 VINNOVAs Focus on Impact - A Joint Approach for Impact Logic Assessment, Monitoring, Evaluation and Impact Analysis

02 Svenskt deltagande i EU:s sjätte ramprogram för forskning och teknisk utveckling. *Only available as PDF*

03 Nanotechnology in Sweden - an Innovation System Approach to an Emerging Area. *For Swedish version see VA 2007:01*

### VA 2007:

01 Nanoteknikens innovationssystem. *For English version see VA 2008:03*

02 Användningsdriven utveckling av IT i arbetslivet - Effektvärdering av tjugo års forskning och utveckling kring arbetslivets användning av IT. *For brief version in Swedish and English see VA 2007:03 and VA 2007:13*

03 Sammanfattning - Användningsdriven utveckling av IT i arbetslivet - Effektvärdering av tjugo års forskning och utveckling kring arbetslivets användning av IT. *Brief version of VA 2007:02, for brief version in English see VA 2007:13*

04 National and regional cluster profiles - Companies in biotechnology, pharmaceuticals and medical technology in Sweden 2004. *Only available as PDF. For Swedish version see VA 2005:02*

05 Nationella och regionala klusterprofiler - Företag inom fordonsindustrin i Sverige 2006

06 Behovsmotiverade forskningsprogram i sektoriella innovationssystem. *For English version see VA 2007:15*

07 Effekter av den svenske trafikksikkerhetsforskningen 1971-2004. *For brief version in Swedish and English see VA 2007:08 and VA 2007:09*

08 Sammanfattning - Effekter av den svenska trafiksäkerhetsforskningen 1971-2004. *Brief version of VA 2007:07, for brief version in English see VA 2007:09*

09 Summary - Effects of Swedish traffic safety research 1971-2004. *Brief version of VA 2007:10, for brief version in Swedish see VA 2007:07.*

10 Effects of Swedish traffic safety research 1971-2004. *For brief version in Swedish and English see VA 2007:08 och VA 2007:09*

11 Svenskt deltagande i sjätte ramprogrammet. *Only available as PDF*

12 The role of Industrial Research Institutes in the National Innovation System

13 Summary - User-driven development of IT in working life - Evaluating the effect of research and development on the use of information technology in working life. *Brief version of VA 2007:02, for brief version in Swedish see VA 2007:03*

14 VINNOVAs fokus på effekter - En samlad ansats för effektlogikprövning, uppföljning, utvärdering och effektanalys

15 Needs-driven R&D programmes in sectorial innovation systems. *For Swedish version see VA 2007:06*

16 Biotechnology, pharmaceuticals and medical technology in Sweden 2007 - Cluster profiles

### VA 2006:

01 End of an era? Governance of Swedish innovation policy. *For Swedish version see VA 2005:07*

02 Forskning och utveckling vid små och medelstora företag. *Only available as PDF*

03 Innovationsinriktad samverkan. *Only available as PDF*

04 Teknikbaserat nyföretagande i Sverige 1990 - 2003. *Only available as PDF*

05 Offentligt stöd till universitetens samverkansuppgift - en internationell kartläggning. *Only available as PDF*

06 Inkubatorer i Sverige - analys av indikatordimensioner och nyttoefektivitet. *Only available as PDF*

## VINNOVA Forum

### VFI 2007:

01 Universitetet i kunskapsekonomin *(Innovation policy in Focus)*

02 Tillväxtgenvägen - affärsinnovation i svenska tjänsteföretag *(Innovation policy in Focus)*

## VINNOVA Information

### VI 2008:

01 Upptäck det innovativa Sverige.

02 Forskningsprogrammet Framtidens personresor - Projektbeskrivningar

03 Passenger Transport in the Future - Project Descriptions

04 Vehicle ICT - Project Descriptions

05 Forska&Väx - Program som främjar forskning, utveckling och innovation hos små och medelstora företag

06 Årsredovisning 2007

### VI 2007:

02 MERA-programmet - Projektkatalog. *For English version see VI 2007:03*

03 The MERA-program - Projects. *For Swedish version see VI 2007:02*

04 DYNAMO 2 - Startkonferens & Projektbeskrivningar

05 IT för sjukvård i hemmet - Projektkatalog.

06 VINNVÄXT - Ett program som sätter fart på Sverige! *For English version see VI 2007:09*

07 Årsredovisning 2006. *Only available as PDF*

08 Het forskning och innovationskraft - VINNOVA 2006. *For English version see VI 2007:10*

09 VINNVÄXT - A programme to get Sweden moving! *For Swedish version see VI 2007:06*

10 Red-hot research and innovation power - VINNOVA 2006. *For Swedish version see VI 2007:08*

12 Projektkatalog - Genusperspektiv på innovationssystem och jämställdhet. Forsknings- & utvecklingsprojekt för hållbar tillväxt

14 VINN Excellence Center.

16 SWEDISH RESEARCH FOR GROWTH - A VINNOVA Magazine

17 VINNOVAs satsningar för små och medelstora företag

18 EU-projekt: Mer värt än pengar

19 EU-forskning ger nya möjligheter - EU-projekt Arbete & Resultat

### VI 2006:

01 VINNOVAs verksamhet inom Transporter. *For English version see VI 2006:07*

02 Årsredovisning 2005

03 Paving the Road. For Transport Innovation and Research

04 Drivkraft för tillväxt. VINNOVA 2005. *For English version see VI 2006:08*

07 VINNOVA´s activities within the Transport Sector. *For Swedish version see VI 2006:01*

08 A driving Force for Growth. VINNOVA 2005. *For Swedish version see VI 2006:04*

09 Komplexa sammansatta produkter - Projektkatalog 2006

10 VINNVINN - Mötesarena för nya affärsmöjligheter och arbetstillfällen

13 VINNOVA´s Activities in Biotechnology. *Only available as PDF*

14 Arbetslivsutveckling - VINNOVAs satsningar inom arbetslivsområdet

16 Competence Centres in Figures - Kompetenscentrum i siffror

17 E-tjänster i offentlig verksamhet. *For English version see VI 2006:18*

18 E-Services in Public Administration. *For Swedish version see VI 2006:17*

19 Effektiv Produktframtagning - Projektkatalog 2006

## VINNOVA Policy

### VP 2008:

01 Forskning och innovation för hållbar tillväxt - VINNOVAs förslag till forsknings- & innovationsstrategi 2009-2012

02 Offentlig upphandling som drivkraft för innovation och förnyelse. *Only available as PDF. For English version see VP 2007:03*

### VP 2007:

01 Innovativa små och medelstora företag - Sveriges framtid. SMF-strategi från VINNOVA

02 Forskningsstrategi för miljöteknik - Redovisning av regeringsuppdrag till Formas och VINNOVA. *Only available as PDF*

03 Public procurement as a driver for innovation and change. *For Swedish version see VP 2008:02*

### VP 2006:

01 På spaning efter innovationssystem. *For English version see VP 2006:02*

02 In search of innovation systems. *For Swedish version see VP 2006:01*

## VINNOVA Report

### VR 2008:

01 Mot bättre vetande - nya vägar till kunskap på arbetsplatsen

02 Managing Open Innovation - Present Findings and Future Directions

03 Framtiden är öppen! Om problem och möjligheter med öppen källkod och öppet innehåll

04 First Evaluation of the Institute Excellence Centres Programme

### VR 2007:

01 Design of Functional Units for Products by a Total Cost Accounting Approach

02 Structural Funds as instrument to promote Innovation - Theories and practices. *Only available as PDF*

03 Avancerade kollektivtrafiksystem utomlands - mellanformer mellan buss och spårväg. Tillämpningsförutsättnin gar i Sverige. *Only available as PDF*

04 VINNVÄXTs avtryck i svenska regioner - Slutrapport. *For English version see VR 2007:06*

05 Utvärdering VINNVINN Initiativet

06 Effects of VINNVÄXT in Swedish regions - Final report. *For Swedish version see VR 2007:04*

07 Industry report on exhaust particle measurement - a work within the EMIR1 project. *Only available as PDF*

08 Swedish innovation journalism fellowships - en utvärdering. *Only available as PDF*

09 Rörlighet för ett dynamiskt arbetsliv - Lärdomar från Dynamoprogrammet

10 Miljöbilar och biodrivmedel - Hur påverkas Sverige av EUs direktiv?

11 Evaluation report by the VINNVÄXT International Review Team.

12 DYNAMO Arbetsgivarringar för ökad rörlighet - En slututvärdering av projekt om arbetsgivarringar inom DYNAMO-programmet

13 Är svenskt management konkurrenskraftigt? - Trettio ledare om svenskt management, dess konkurrenskraft och framtida utveckling - resultat från en intervjuundersökning

14 First Evaluation of the VINNOVA VINN Excellence Centres NGIL, HELIX, SAMOT and ECO$^2$ together with the STEM Competence centre CICERO

15 Vart tog dom vägen? - Uppföljning av forskare och forskning vid nedläggningen av Arbetslivsinstitutet

16 Bättre cyklar - en analys av äldre cyklisters behov och önskemål. *For English version see VR 2007:17*

17 Better cycles- an analysis of the needs and requirements of older cyclists. *For Swedish version see VR 2007:16*

### VR 2006:

01 Det förbisedda jämställdhetsdirektivet. Text- och genusanalys av tre utlysningstexter från VINNOVA

02 VINNOVAs FoU-verksamhet ur ett jämställdhetsperspektiv. Yrkesverksamma disputerade kvinnor och män i VINNOVAs verksamhetsområde

03 ASCI: Improving the Agricultural Supply Chain - Case Studies in Uppsala Region. *Only available as PDF*

04 Framtidens e-förvaltning. Scenarier 2016. *For English version see VR 2006:11*

05 Elderly Healthcare, Collaboration and ICT - enabling the Benefits of an enabling Technology. *Only available as PDF*

06 Framtida handel - utveckling inom e-handel med dagligvaror

07 Tillväxt stavas med tre T

08 Vad hände sen? - Långsiktiga effekter av jämställdhetssatsningar under 1980- och 90-talen

09 Optimal System of Subsidization for Local Public Transport. *Only available as PDF*

10 The Development of Growth oriented high Technology Firms in Sweden. *Only available as PDF*

11 The Future of eGovernment - Scenarios 2016. *For Swedish version see VR 2006:04*

12 Om rörlighet - DYNAMO-programmets seminarium 12 - 13 juni 2006

13 IP-telefoni - En studie av den svenska privatmarknaden ur konsument- & operatörsperspektiv

14 The Innovation Imperative - Globalization and National Competitiveness. Conference Summary

15 Public e-services - A Value Model and Trends Based on a Survey

16 Utvärdering av forskningsprogrammet Wood Design And Technology - WDAT

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VINNOVA´s mission is to promote sustainable growth
by funding needs-driven research
and developing effective innovation systems

VERKET FÖR INNOVATIONSSYSTEM – SWEDISH GOVERNMENTAL AGENCY FOR INNOVATION SYSTEMS

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