



**KTH Numerical Analysis  
and Computer Science**

## **Centre for user-oriented IT Design**



**Final report on the 10 years  
1995 – 2005**

**Supported by NUTEK/VINNOVA, KTH and partners**

**Report CID-329**

## **Executive summary**

CID, the Centre for user oriented IT Design, was established in 1995 at KTH as one of NUTEK's 28 competence centres in different areas of technology. Its aim was to develop and maintain a multidisciplinary competence profile within user oriented design and human-computer interaction, as a basis for improving work environments and developing new products and services. After the full contract period it finished its activities in 2005. This report gives an account of the ten-year experience. Over the years the centre has had 42 partners from many strands of society, large and small industry and enterprises, consultancies, governmental agencies, museums and other educational institutions and user organisations such as handicap organisations and trade unions, all contributing mainly in-kind, with work.

The technical-scientific development in interaction possibilities between humans with information technology has exploded in the CID period 1995-2005 complementing the desktop interface and the web with mobile, ubiquitous and multimodal interaction. Important contributions by CID have been to keep focus on and develop methods and practises for user involvement in order to make the new technologies beneficial in use for all stakeholders,

Thus CID has contributed to make our partners and society in general aware of the new possibilities and to a renewal and spread in use of IT. This is manifested in the dominance by big companies among the partners in 1995 and by small development companies in 2005. A complementary contribution, affecting broad use of IT in work places, is the end-user based certification process developed together with our user organisation partners.

Concrete influences by CID in the higher education is the establishing of Human-Computer Interaction as an independent research study subject at KTH in 1997 and on multidisciplinary project courses with students from technology, social and behavioural sciences, design and art from universities and colleges in Stockholm.

## **Sammanfattning**

CID, centrum för användarorienterad IT-Design etablerades 1995 på KTH som ett av NUTEKs 28 kompetenscentra inom olika teknikområden. Denna rapport redovisar erfarenheter av den tioåriga satsningen som avslutades 2005. Genom åren har CID haft 42 partners, från många samhällsområden, storindustri, småföretag, konsultföretag, myndigheter, museer och andra utbildare, handikapp- och fackliga användarorganisationer, som all bidragit främst ”in natura”, med arbete i samverkansprojekt.

Den teknisk-vetenskapliga utvecklingen inom interaktion mellan människor och informationsteknologi har varit explosionsartad, kompletterande skrivbordsdator och web 1995 med mobil och överallt tillgänglig interaktion i många mediaformer 2005. Viktiga bidrag från CID har varit att hålla fokus på och utveckla metoder och praktik för att användarna ska kunna medverka till att tekniken blir nyttig för alla inblandade.

CID har således strävat efter att göra våra partners och samhället i stort medvetet om de nya möjligheterna och till att förnya och sprida IT-användning. Ett tecken på denna utveckling är att bland medverkande företag de stora dominerade 1995 medan de små utvecklingsföretagen dominerar 2005. Ett kompletterande bidrag, som påverkar bred användning av IT i arbetslivet är den slutanvändarnas certifieringsprocess CID utvecklat med användarorganisationerna.

Konkret inflytande från CID på högre utbildning och forskning har varit etablerandet av människa-datorinteraktion som självständigt forskarutbildningsämne på KTH 1997 och på multidisciplinära projektkurser med studenter med bakgrund i såväl teknik som social- och beteende- och kommunikationsvetenskap, design och konst, från Stockholms många högskolor.



## 1. Basic facts

### 1.1. Goals and strategy

#### Goals

The overall aim of CID was to develop and maintain a competence profile within user oriented design and human-computer interaction, as a basis for improving work environments and developing new products and services.

More specific goals for CID were formulated at the start and continued to be

- establish an internationally acknowledged centre of IT design that is based on experience and knowledge from design, interdisciplinary IT research and the Swedish tradition of ergonomic and user oriented research
- contribute to renewal of R&D by forming scientifically qualified methods for broad interdisciplinary collaboration between design sciences, human sciences and the computer sciences within the IT area
- contribute to renewal of Swedish industry in the IT design area by systematic knowledge transfer
- contribute to making it possible for user groups to influence technical development and contribute to improvements of the working environment
- contribute to making IT available for a broad range of users irrespective of education levels and special needs

CID thus strived to be known for its ability *to integrate usability aspects, technical aspects and aesthetic aspects* when designing IT systems for a large spectrum of user groups. CID emphasises the users' role within the design development process, a holistic view on the working environment and three-part collaboration between the users, the IT industry and research. Note that the "user" in Swedish context is the end user.

#### Strategy

The main strategy was to create an attractive environment at KTH for strong cooperation between all the following groups, mainly in Stockholm.

- technical researchers and developers from academy and industry
- behavioural researchers from academy and industry
- developers and artists from university colleges of art and design
- user groups and representatives from working and living environments with interesting applications of IT for communication and information

CID was formed by invitation of interested persons with relevant competence for the research programme rather than through formal agreements between their research institutions.

The strategy for knowledge transfer to industry and user organisations was based on

- industrial researchers "in residence" at CID
- CID researchers "in residence" at industry
- results in the form of demonstrators and guidelines for established technology and prototypes of new technology
- technical reports when appropriate
- seminars and thematic days on specific issues

## **1.2. Participants**

### **1.2.1 Participating contract partners from industries, agencies, user organisations**

9 Large industry partners (phase 1: 5, phase 2: 6, phase 3: 3, phase 4: 2)

- Televerket/Telia/TeliaSonera 1995-2005 (all phases 1-4)
- Ericsson 1995-2002 (phases 1-2, part of phase 3)
- Apple Computer 1995-2000 (phase 1-2)
- IBM (1995-1997, phase 1)
- ICL 1995-1997 (phase 1)
- Vattenfall 1997-2005 (phases 2-4)
- Sun Microsystems 1997-2000 (phase 2)
- Silicon Graphics 1997-2000 (phase 2)
- Teracom 2000-2003 (phase 3)

4 Large IT Consultant partners (phase 1: 0, phase 2: 1, phase 3: 3, phase 4: 1)

- Enator/Tietoerator 1997-2003 (phases 2-3)
- Lernia 2000-2003 (phase 3)
- Icon Medialab 2000-2002 (part of phase 3)
- Guide consultants 2003-2005 (phase 4)

11 SME (Small and medium enterprise) partners (phase 1: 2, phase 2: 4, phase 3: 5, phase 4: 8)

- Nomos/Ergolab 1995-2005 (all phases 1-4)
- UIdesign 1995-2000 (phase 1-2)
- Datadoktorn 1997-2005 (phase 2-4)
- No Picnic industrial Designers 1997-2005 (phase 2-4)
- Lentus AB 2000-2003 (phase 3)
- TimeCare 2000-2003 (phase 3)
- Ateles 2003-2005 (phase 4)
- Metamatrix 2003-2005 (phase 4)
- Tobii 2003-2005 (phase 4)
- Usability Partners 2003-2005 (phase 4)
- Made in Stockholm 2003-2004 (part of phase 4)

## 7 Governmental agency partners (phase 1: 2, phase 2: 2, phase 3: 4, phase 4: 6)

- Riksskatteverket/Skatteverket 1996-2005 (part of phase 1, phases 2-4)
- Riksförsäkringsverket 1996-1997 (part of phase 1)
- Skolverket/Skolutvecklingsverket 1997-2005 (phases 2-4)
- Sverige Direkt/Statskontoret 2000-2005 (phases 3-4)
- Utbildningsradion 2000-2005 (phase 3-4)
- Handikappombudsmannen 2003-2005 (phase 4)
- Terminologicalcentralen 2003-2005 (phase 4)

## 6 Museums and educational partners (phase 1: 0, phase 2: 0, phase 3: 1, phase 4: 5)

- SIT Läromedel 2000-2003 (phase 3)
- Bollnäs community education 2003-2005 (phase 4)
- National centre for flexible learning 2003-2005 (phase 4)
- Riksställningar 2003-2005 (phase 4)
- Tekniska muséet 2000-2005 (phases 4)
- Vasamuséet 2003-2005 (phase 4)

## 5 User organisation partners (phase 1: 4, phase 2: 3, phase 3: 3, phase 4: 3)

- LO 1995-2005 (all phases 1-4),
- TCO 1995-2005 (all phases 1-4)
- GF, Grafiska Företagen 1995-1997 (phase 1)
- SPI 1995-1997 (phase 1)
- HI, Hjälpmedelsinstitutet 1997-2006 (phases 2-4)

## **42 External contract partners totally:**

phase 1: 13

phase 2: 16 (8 new, 5 lost)

phase 3: 19 (7 new, 4 lost)

phase 4: 25 (13 new, 7 lost)

## 1.2.2 Participating research departments and institutes

The NADA department (Numerical Analysis and Computing Science) at KTH is the host of CID. The interdisciplinary IPLab, Interaction and Presentation Laboratory, was established at NADA in 1985 and has a long record of work in design of graphic user interfaces, computer support for the writing process, computer supported cooperative work, digital archives and object-oriented methods. IPLab now consists of 8 senior researchers and about 20 research students. A considerable part of the staff at CID has roots in its “mother laboratory” IPLab. At the end of CID, its activities and personnel have rejoined IPLab into the newly formed common HCI (Human-Computer Interaction) group and department within CSC at KTH.

SICS, the Swedish Institute for Computer Science, has been a cooperation partner with CID (and previously IPLab) since the beginning of the 1990's, especially on Distributed Virtual Reality systems and applications.

The following national partners, research, design and arts institutions, have research and education cooperation with CID and its staff and have strongly contributed to the *multidisciplinarity* of CID.

- Dept for Cinema studies, Stockholm University
- CVAP, Computer Vision laboratory, NADA, KTH
- DI (University college of Film, Theatre, Radio and Television), Stockholm
- Dept for Industrial economy, University College of Gävle
- ILU, Dept for Teacher Training, Uppsala University
- Interactive Institute, Stockholm and Malmö
- Dept for Journalism, Media and Communication, Gothenburg University
- Konstfack (University college of Art, Craft and Design), Stockholm
- KKH, Konsthögskolan (University College of Fine Arts), Stockholm
- Malmö Högskola
- Mathematics Department, KTH
- Mathematics Department, Stockholm University
- MDI, the division for Human-Computer Interaction, Uppsala University
- Media Technology, NADA, KTH
- Parallel Computer Centre, KTH
- Dept for Production Technology, Luleå Technical University
- Dept of Psychology, Stockholm University
- TMH, Dept of Speech Technology, KTH

## 1.3. Economy

The following table gives the whole picture of the funding (incomes) to CID, divided vertically into the four phases, 2 + 3 + 3 + 2 years, and within each phase contributions from the contact partners (external, NUTEK/VINNOVA and KTH) and from external EU and other Swedish research agency funding. Horizontally the contributions are the one in cash and the in-kind contributions as value of equipment and value of work time.



### 1.3.1. Financing in kSEK

Source	Cash	Equipment	Work	Total
<b>Phase 1, 1995-1997</b>				
External contract partners	1385	880	2800	5065
NUTEK	5100			5100
KTH	1000	1211	1260	3471
<b>Total phase 1</b>	<b>7485</b>	<b>2091</b>	<b>4060</b>	<b>13636</b>
<b>Phase 2, 1997-2000</b>				
External contract partners	2775	4291	10092	17058
NUTEK	17011			17011
KTH	3500	9600	5610	18710
<b>Total KC contractors phase 2</b>	<b>23286</b>	<b>13791</b>	<b>15702</b>	<b>13636</b>
EU project funding	6060			6060
Other Swedish funding	930			930
<b>Grand total phase 2</b>	<b>30276</b>	<b>13791</b>	<b>15702</b>	<b>59769</b>
<b>Phase 3, 2000-2003</b>				
External contract partners	3610	2345	15585	21540
NUTEK / Vinnova	18000			18000
KTH	3870	3000	10020	16890
<b>Total KC contractors phase 3</b>	<b>25480</b>	<b>5345</b>	<b>25605</b>	<b>56430</b>
EU project funding	14040			14040
Other Swedish funding	4179			4179
<b>Grand total phase 3</b>	<b>43699</b>	<b>5345</b>	<b>25605</b>	<b>74649</b>
<b>Phase 4, 2000-2003</b>				
External contract partners	1690	1784	12692	16166
Vinnova	12000			12000
KTH	5079	3000	6680	14759
<b>Total KC contractors phase 2</b>	<b>18769</b>	<b>4784</b>	<b>19372</b>	<b>42925</b>
EU project funding	5513			5513
Other Swedish funding	7566			7566
<b>Grand total phase 4</b>	<b>31848</b>	<b>4784</b>	<b>19372</b>	<b>56004</b>
<b>Total, 1995-2005</b>				
External contract partners	9460	9200	41169	59829
NUTEK / Vinnova	52111			52111
KTH	13449	16811	23570	53830
<b>Total KC contractors 1995-2005</b>	<b>75020</b>	<b>26011</b>	<b>64739</b>	<b>165770</b>
EU project funding	25613			25613
Other Swedish funding	12675			12675
<b>Grand total phase 1995-2005</b>	<b>113308</b>	<b>26011</b>	<b>64739</b>	<b>204058</b>

### 1.3.2. Use of the funding

The in-kind contributions from the partners is equipment for totally 9,2 Mkr, mainly computer and communication facilities, including advanced work-stations and extensive access to fibre networks.

The in-kind contributions with work from the partners is a total of 589 work months, distributed with 37 in phase 1, 117 in phase 2, 185 in phase and 140 in phase 4.

The cash contributions have been used as follows

Purpose	Phase 1	Phase 2	Phase 3	Phase 4	Total
Personnel	5685	18792	28125	18931	71533
Infrastructure (department)	588	3025	3162	2541	9316
Travel	309	558	2112	2089	5068
Equipment & material	891	1113	1710	1357	5071
Localities		4055	3090	2365	9510
Central administration		3213	4956	3923	12092
8% on cash from Partners		222	394	135	751
<b>Total cash</b>	<b>7473</b>	<b>30978</b>	<b>43549</b>	<b>31341</b>	<b>113341</b>

Thus the net result in cash is 113308 – 113341 kSEK = -33 kSEK, which has been covered by KTH.

### 1.3.3. Personel employed in full work years

Period	Seniors	Research students	Techn staff, juniors	Direction, Administ &inform	Total
Phase 1	4.5	2.0	3.5	4.0	14.0
Phase 2	11.1	15.6	6.2	6.0	38.9
Phase 3	9.7	26.2	10.1	6.0	52.0
Phase 4	11.8	14.6	5.6	3.8	35.8
Total	37.1	58.4	27.4	19.8	140.7



## 2. Organisation

### 2.1. Management

#### 2.1.1. Board of Directors

CID has been managed by a Board of Directors appointed by KTH after consulting NUTEK / Vinnova and the industrial and user organisation partners of CID.

The Board has had a chairman from the partners, 3 (from third phase 5) other representatives from partners and 3 representatives from the research community

Chairman of the Board has been

- Hans Malmquist, ICL, 1995-1996
- Tomas Berns, Ergolab AB, 1996-2005 (member 1995-1996)

Members from the partners have been

- Per-Erik Boivie, TCO & LO, 1995-1997, 2000-2005
- Torbjörn Lind, LO, 1997-2000
- Erik Andersson, ICL; 1996-1997
- Staffan Liljegren, Ericsson Telecom Medialab, 1995-1999
- Lori Robertson, Ericsson, 1999-2000
- Rolf Leidhammar, Ericsson Research, 2000-2002
- Karolin Wollin, Telia Telecom, 1997-99
- Lars Lindblad, Telia Networking, 1999-2000
- Anders Rockström, Telia/Skanova, 2000-2005
- Kim Alpgård, Vattenfall AB, 2000-2005
- Göran Isberg, Skolverket, 2000-2005
- Margita Lundman, HI, Swedish Handicap Institututr 2000-2003
- Catarina Brun, Swedish Handicap Institute, 2003-2005

Members from the research community

- Professor Björn Granström, professor, TMH (Speech Technology), KTH, 1995-2005
- Prefekt Ingrid Melinder, NADA, KTH, 1995-1997
- Professor Kerstin Severinson Eklundh, Human-Computer Interaction, NADA, KTH, 1997-2003
- Docent Ann Lantz, Human-Computer Interaction, NADA, KTH, 2003-2005
- Professor Lars-Göran Nilsson, Dept for Psychology, Stockholm University, 1995-97
- Professor Roland Lindhe, Konstfackskolan, 1997-2000
- Professor Jan Olsson, Cinema Studies, Stockholm University, 2000-2005

The Board has met every second month deciding upon CID's overall strategy and CID's organisation, approving research programmes and knowledge of transfer programmes, approving budget and financial reports and following up and evaluating the activities at CID.



### **2.1.2. Director**

The Director of CID was also appointed by KTH and was 1995-96 adjunct professor Hans Marmolin and 1996-2005 professor Yngve Sundblad, NADA, KTH.

For administration and information dissemination the director was supported by an administrator and a technical editor.

### **2.2. Scientific Advisory Board**

Since 1997 CID had an international Scientific Advisory Board (SAB), consisting of industrial and university persons with competence relevant for CID:

- Stuart Kirk, Prof. Emeritus in Consumer Ergonomics, Loughborough University, chairman
- Susanne Bødker, Professor in Computer Science, Aarhus University
- Andy Lippman, Assistant professor, MIT Media Lab
- Steven Kyffin, Coordinator of world-wide research, Philips Design, since early 2001,
- replacing Irene McWilliam, Philips Design, who served 1997-2001

The tasks of the council were

- to comment on the scientific quality and social relevance of the research
- to follow up the long-term development of CID
- to contribute with a scientific network on a high international level

SAB members have visited, studied and discussed CID with its staff in May 1997, December 1997, December 1998, June 1999, February 2000, June 2001, February 2002 and October 2003.

### 3. The 10-year centre development

#### **Phase 1**

The first phase, with much more limited resources than in the other phases, was devoted mainly to the first three goals:

- to establish an internationally acknowledged centre of IT design that is based on experience and knowledge from design, interdisciplinary IT research and the Swedish tradition of ergonomic and user oriented research
- contribute to renewal of R&D by forming scientifically qualified methods for broad interdisciplinary collaboration between design sciences, human sciences and the computer sciences within the IT area
- contribute to renewal of Swedish industry in the IT design area by systematic knowledge transfer

This was fulfilled by establishing the centre in newly renovated appropriate localities at KTH, making it a very “material” centre, forming a multidisciplinary group of senior researchers and doctoral students, development of 5 prototypes together with industrial partners, 4 fullday workshops on user-oriented methods with 30-50 participants and initiated participation in 2 EU projects.

The following five project areas within CID were defined.

*Computer supported cooperative work; Electronic publication; Electronic worlds; Advanced interaction forms; User-oriented design*

For each area a couple of applications were driven for some of the application areas: common environments, education, administration and home.

Notable is the Videocafé, that was established as the first project in 1995 for communication between CID and Ericsson Medialab, 9km apart, and still had incarnations and uses of experience at the end of CID 2005, a “sustainable” project.

The initial 11 partners (Apple, Ericsson, GF, IBM, ICL, LO, Nomos, SPI, TCO, Telia, UIDesign) were complemented half-way with Riksskatteverket, that remained for the whole of CID, and Riksförsäkringsverket, which unfortunately only stayed a year, motivating lack of effort with concentration on the Y2000 problems.

#### **Phase 2**

In the second and continuing phases CID could also start work with the remaining two goals:

- contribute to making it possible for user groups to influence technical development and contribute to improvements of the working environment
- contribute to making IT available for a broad range of users irrespective of education levels and special needs

This was accomplished by starting communication and design projects directly intended for broad use “on the floor” in work places, e.g. using Active worlds for forming a community of workers using direct visual communication about work environments. Another broad use project, with EU funding, was KidStory, involving elementary school children in Rågsved.

Based on the experience from the first stage, including an international evaluation mainly on process rather than content, and on discussions in CID's Board of Directors, in the Program Council together with the Local Research Network and directly with the partners, the research was somewhat refocused.

Three project areas were defined as a restructuring of the previous five: *Digital Worlds*, *Interactive Learning Environments* and *Smart Things and Environments*. A *User orientation* working group was formed for support and collection of experience from the project areas. For each area was appointed a scientific coordinator.

In these areas 10 projects, in some cases development of the previous projects, in other cases entirely new projects, were formulated. These projects contain studies of existing artefacts and settings as well as innovations beyond current technology, resulting in demonstrators and guidelines and research at the international fore-front, resulting in new knowledge, prototypes and accounts (analysed experience) of the interdisciplinary research and design processes involved. One example is the workplace communication project "Cyberbygget" mentioned above

CID researchers were very successful in getting EU three-year projects approved: eRENA and KidStory started with CID as main coordinator / Stockholm coordinator.

An international Scientific Advisory Board was formed just before the start of phase 2 and met regularly, 4 times, with CID's whole staff.

Five partners were lost, IBM and ICL because of closing down research in Stockholm, RFV as stated above, GF and SPI as they were too small to continue with limited personnel.

Eight new entered: Datadoktorn, HI, No Picnic, Skolverket, Vattenfall, who have all stayed to the end, Enator, that left after phase 3, Sun and SGI, who left after phase 2, when we together realised that big international manufacturers without research in Sweden can contribute with equipment and research contacts in other ways. The same was agreed with Apple after their cut-downs in Sweden.

### **Phase 3**

The main change in research programme between phase 2 and 3 was the focus of two of the research areas, reflected in name changes. Digital Worlds became *Connected Communities*, focussing more clearly on communication and information exchange in different community user settings. Smart things became *Interaction forms* focussing on technologies enabling support from IT technology in many user settings and on design methods where users are strongly involved, e.g. through technical probes. The "work group" *User oriented design* was re-established as a project area.

We were encouraged by the international "mid-term" evaluation from which we cite some paragraphs with comments.

*"CID has established an exciting research programme in User Oriented HCI-Design. It is well recognized as a resource in this area by the Swedish industry. Its research is also internationally recognized as is evidenced by publications and demonstrations in leading conferences. This needs to be augmented by developing better ways to communicate the*



*conclusions and message of the Centre's research to the general user and technical communities outside its domain of expertise."*

This was met with special effort on communication with the general and technical communities resulting in central installations at 3 large public fairs and exhibitions, coverage in several public service TV and radio programmes and coverage in daily newspapers and technical weeklies, e.g. full double-page daily paper coverage of UsersAward. Our Open Houses every half-year has drawn about 70 visitors, about 100 in the autumn 2002 when it was coordinated with the very visible TIME (Telecom, IT, Media and Entertainment) week.

*The development of a strategy to drive the supervision of research students with a focus on the completion of PhD theses research and the development of the next generation of leading Swedish researchers in this area. We anticipate between 3 and 5 PhD students graduating. We would recommend that students be more supported in their development through presentation skills, writing workshops and increased involvement in doctoral consortia such as NordiCHI, CSCW and CHI.*

The recommendation helped in forming a strategy that resulted in 5 PhD theses and 3 licentiate theses in phase 3 of CID.

*The development of new areas of research, which capitalize on the current programme exploit emerging technological possibilities and add substantial new classes of user groups. We anticipate a portfolio of new research endeavours emerging over the coming years.*

The main new and emerging technological possibilities in the portfolio were within the (partly) for phase 3 new area Interaction Forms, e.g. gesture, haptic and sound interfaces. Substantial new classes of user groups were employees on work, office and hospital floors affected by the UsersAward certification procedure, users of all generations in families (EU-project Interliving), and users with different forms and grades of disabilities (including elderly). User oriented design methods also formed parts of the portfolio, with extensive development, e.g. of probe methods, in phase 3.

For phase 3 four partners were lost, Apple, Sun and SGI are motivated above under phase 2, UIDesign disappeared when it was merged with Nokia.

The eight new, at a time, year 2000, with a lot of IT optimism, were Teracom, Icon Medialab, Lernia, Lentus, TimeCare, Sverige Direkt/Statskontoret, Utbildningsradion, SIT Läromedel. Of these Icon Medialab went bankrupt in 2002 and of the other 8 only Statskontoret, Utbildningsradion and Tekniska muséet stayed until phase 4.

## **Phase 4**

For phase 4 we were very much encouraged by the third evaluation, made by professors John Baras, Per Stenius, Tom Rodden and Patrizia Marti. We cite some general remarks and the final section with particular challenges and give comments.

### **General Remarks**

*It is clear that CID provides an environment that fosters multidisciplinary research and thinking. This is evident not only in the quality of individual research projects but also in the level of energy in the Centre. Few places bring together the disciplines evident at CID; even fewer do it with its level of enthusiasm and success demonstrated. It is clear that this*



*environment has been constructed to encourage those involved with CID to undertake research in new areas and to think in new ways. CID should see itself as an equal to most international labs including those at MIT, Georgia Tech, PARC.*

*CID has developed significant and substantial links with both industry and user groups. These lie at the heart of much of the research and are a key strength of the Centre. It is clear that CID has focused on pursuing a strategy of a small number of in-depth research areas, to complement broader connections with a larger number of organizations. They have also evolved these groupings in order to keep pace with changes in international research.*

*The supportive nature of the overall environment extends to the education of a new generation of researchers who understand the combination of disciplines.*

*Thus it would be a great waste of effort and intellectual capital not to build on and develop the competence centre experience. The CID experience is that it takes several years to form an effectively cooperating group of researchers with the multiple competences needed and a group of interested partners that understand how to cooperate in this form for development of competence and long-term knowledge. This is in line with comments made several times by the international evaluator Per Stenius.*

Based on this we took several initiatives towards VINNOVA that would make it possible for at least some of the 1995-2005 competence centres to continue in parallel to the new centres, unfortunately in vain. Our solution has been to join forces with our mother laboratory IPLab into a new department for Human-Computer Interaction.

### **General Conclusions and Recommendations**

*CID has established an exciting research programme in User Oriented HCI-Design. It is well recognized as a resource in this area by Swedish industry. Its research is also internationally leading as is evidenced by publications and demonstrations in leading conferences and journals. It plays an active part in international summer schools and in setting future research agendas.*

*Since the last review CID has progressed well and addressed nearly all of the concerns raised. In order to continue the progress already demonstrated, the CID management and leadership should address the following particular challenges during the next two-year period:*

*The researchers involved in working with Vattenfall/SwedPower should consider a closer coupling between their explorations of the broader context with the work on monitor in this class of control system. This work may benefit from the exploration of semantic web technologies within the learning environments.*

Work with Vattenfall on IT support for inspection situations has continued and led to results at a higher knowledge level, much appreciated by the Vattenfall partners.

*The information learning environments grouping should focus on ensuring take and use of the tools and monitoring their results rather than further development. Ideally, this should be in partnership with CID partners and in partnership with other CID projects, for example, the work currently underway with Vattenfall/SwedPower.*

The Interactive Learning Environments group has put much effort into spreading of these tools, including the recruitment of 4 new partners with specific interest in those CID activities.

*A strategic planning process should be established and used in defining not only broad goals and objectives, but also to link projects, evaluate progress, initiate and terminate projects and define future plans”*

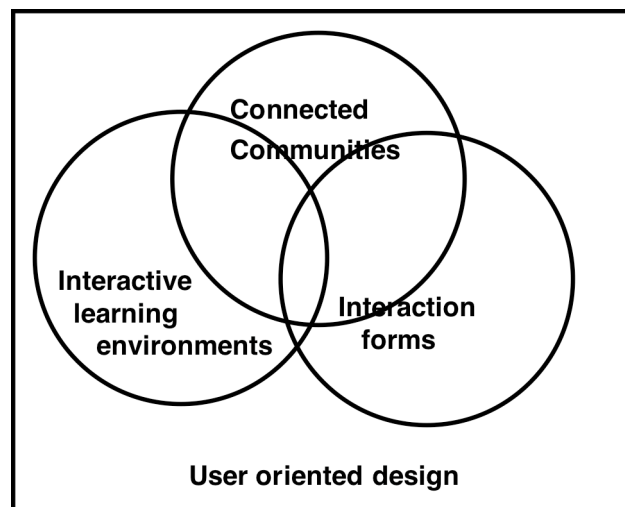
This was mainly carried through by giving a much more active role and support for the partners’ Programme Council. The result was some, but not full, improvement.

*Mechanisms should be established for development and implementation of links between the projects and for linking software and computer science design methods with user-oriented methodologies.*

Main activities in this context has been a series of workshops with different kinds of users and a textbook written 2005 by CID staff on user-oriented design methods and experience.

## Project areas

The project area structure that converged into phase three was kept in phase 4, and can be seen as “final”:



## Final partners

Between phase 3 and 4 we lost the six partners new in phase 3, that had difficulties after the problems for the most unrealistic part of the IT boom around 2001 (Teracom, Icon Medialab, Lernia, Lentus, TimeCare, SIT Läromedel) and also Tietoenator.

We were quite successful in recruiting 13 new partners for phase 4, based on strong areas:  
Usability/consultants: Guide, Ateles, Metamatrix, Usability Partners, Made in Stockholm

Education: Terminologcentralen, Bollnäs community, National centre for flexible learning

Museums/exhibitions: Riksställningar, Tekniska muséet, Vasamuséet

Other: Handikappombudsmannen (agency), Tobii (eye control equipment)

## ***Final results in relation to goals and strategy***

- CID is established as an acknowledged centre of IT design, clearly recognised nationally and internationally.
- CID has a broad range of researchers and developers from academia in subjects relevant for IT design, and is growing better and better in involving researchers and developers from its partners. A significant research and development network has been formed and in phase 3 about 30 activities in 10 joint projects have been performed.
- CID develops experience and working methods for broad interdisciplinary collaboration between design, human sciences and computer sciences within the IT area. This has been further strengthened in projects in phase 3, e.g. in the practise of working together in ethnography, design and programming in the *interLiving* project and the *Community at-a-distance* project.
- CID develops methods for involving users closely in the whole IT development process as a way of taking care of their expertise in the user situation. In phase 3 we successfully developed the method of technical and cultural probe introduction in user environments as a method for user ethnography and feedback in several projects.
- CID is, especially since phase 3, heavily involved in or has formed a strong basis for implementation, introduction and regular use of its results (technology and methods). Spectacular examples are the *Community at-a-distance* full-scale activities at a distributed call centre in Stockholm archipelago and the *UsersAward* user certification activities, a regular activity by a spin-off company.
- CID is attractive for research (PhD and licentiate) students and for Master's students from several educations in Sweden. CID has recruited more than 20 research students, with 8 PhD and 7 licentiate theses finished, and more than 60 students for Master's thesis work.
- CID put considerable effort into systematic knowledge transfer to its partners and the society at large, though several workshops and Open Houses with prototype demonstrations per year, but more can be done there. Some researchers and developers have changed "residence" between CID and partners but only to limited extent.
- CID has established, especially during the phase 3, strong links with broad user groups, that can influence technical development, especially for communication and information, and in working environments.
- CID has a growing activity in the field of making IT available for a broad range of users irrespective of education levels and special needs, e.g. for functionally disabled and small children.
- CID has, after provisional localities the first year, excellent facilities for joint project work with industry and users and for presentations and demonstrations of ongoing work.

## ***Experience of Cooperation with industrial and user partners***

Examples of cooperations made possible for CID through the competence centre organisational form are

- Industrial cooperation in projects producing demonstrators – a much more extensive and direct form of knowledge transfer than the limitation to seminars and reports in other forms of cooperation.





- Participants from design and media institutions, "artists in residence", a form cooperation not given resources before
- Use of industrial networks of contacts, not the least internationally, e.g. to MIT Media Lab and Philips Industrial Design (e.g. in Scientific Advisory Board)
- CID as a "neutral, pre-competitive meeting ground", appreciated by industry

### ***Problems encountered***

A negative experience in the start was that partner employee work months in the projects in CID's first couple of years was significantly lower than planned.

Reasons for this were

- • lack of active involvement by industrial partners in definition of the projects, which initially reflected interests, competence and possibilities of the academic researchers more than the needs of the partners
- • lack of routines at the partners to safeguard active involvement especially during periods of high workload, reorganisation and internal changes, which have been very prominent at some partners

This problem has been remedied to a great extent by active involvement of the CID Board of Directors and through establishment of the partners' Programme Council, which is a meeting place for initiating and discussing joint partner projects and selecting projects. The Programme Council has a central role in planning activities in the next phase of CID.

New for phase 3 was the problems in the IT industry, even established large companies, which led to two withdrawals from CID, Ericsson as part of changed research strategy, Icon Medialab because of bankruptcy, and one example of commissioned research only paid for to some extent, also because of bankruptcy.

This somewhat aggravated the largest difficulty, lack of resources for more activities identified by CID staff and CID partners as interesting and relevant and within the scope of CID's competence profile. It would be even worse without the EU projects, funding about 30% of the collected activities, and several other external projects funding about 20% of the collected activities, notably the SSF funded Daphne project.

## 4. Key values

### 4.1. Publications

All 329 CID publications are listed, and most full texts are available, on the web,  
<http://cid.nada.kth.se/publications/rapporter.html>

The number of publications of different types over the years are given in the table below.

Year	Reviewed conference papers	Reviewed journal papers & book chapters	EU project deliverables	Technical reports	Dissertations, PhD and Lic	Masters theses	Total
1996	3	1		1		2	7
1997	3	1		13		2	19
1998	6	1	3	11		2	23
1999	11	1	9	11		3	35
2000	14	1	8	15		1	39
2001	20	12	4	10	5	3	54
2002	15	2	1	11	1	8	38
2003	17	6		7	2	14	46
2004	11	4	1	3	3	15	37
2005	12			4	1	14	31
<b>Total</b>	<b>112</b>	<b>29</b>	<b>26</b>	<b>86</b>	<b>12</b>	<b>64</b>	<b>329</b>

The conference contributions include three video presentations accepted for and in the material from prestigious conferences (CHI 1998, CHI 2000, ECSCW200).

There is a clear tendency from mainly publishing as technical reports in the early years of CID into mainly publishing reviewed conference and journal papers in the later years.

### 4.2. International cooperation

#### 4.2.1. Key values 1995-2005

Cooperating international research institutions	Guest researchers	Researchers from CID guests abroad	EU projects	Symposia arranged by CID	Foreign company partners	International advisors
15	8	4	12	6	10	5

#### 4.2.2. Main international cooperating institutions (outside EU projects)

Special strong links were established between CID and the partners in the British EQUATOR consortium, which is an interdisciplinary Research Collaboration supported 2001–2006 with about 11 MGBP by EPSRC and focusing on the integration of physical and digital interaction.

Among the eight partners in the consortium CID has had long-term cooperation with

- University of Nottingham, e.g. prof. Tom Rodden and prof. Steve Benford
- Lancaster University, e.g. prof. Hans Gellersen,
- Royal College of Art, e.g. prof. Bill Gaver
- University of Sussex, e.g. prof. Geraldine Fitzpatrick

Direct research and education cooperation is also established with

- Aarhus University, Denmark, e.g. prof. Susanne Bødker
- University of Limerick, Ireland, e.g. prof. Liam Bannon
- King's College, London, UK, e.g. prof. Christian Heath
- University of New South Wales, Sydney, e.g. prof. Jeffrey Shaw (previously at ZKM)
- University of Maryland, USA, e.g. prof. Allison Druin and prof. Ben Bederson,
- Université Paris Sud, e.g. prof. Michel Beaudouin-Lafon
- University of Washington, Seattle, USA, e.g. prof. Alan Borning
- University of Siena, Italy, e.g. prof. Antonio Rizzo
- University of Split, Croatia, e.g. Ivica Mitrovic
- Philips Design, Eindhoven, NL, e.g. Steven Kyffin
- INRIA, Orsay, Paris, e.g. Wendy Mackay

#### 4.2.3 EU projects

This table summarises the EU project involvements, CID's role as Coordinator or full Partner.

Years	Project	Role	Partners
1992-1995	COMIC	P	Lancaster (Coord), Nottingham, Manchester, Barcelona, Milano, Oulo, Roskilde, SICS, GMD, Limerick
1996	INSCAPE	C	Nottingham, Lancaster, ZKM
1997-2000	eRENA	C	Nottingham, Illuminations, BT, ZKM, GMD, Geneva, EFPL
1998-2001	KidStory	P	Nottingham (Coord), Albany School, Rågsvedsskolan
2001-2004	SHAPE	C	Nottingham, King's College London, Limerick
2001-2003	interLiving	C	Paris Sud, INRIA Paris
2003-2007	CONVIVIO	P	Milano coordinated Network of Excellence, 14 partners
2003-2005	D4ALLnet	P	Heraklion coordinated Network of Excellence, 7 partners
2004-2007	ProLearn	P	Hannover coordinated Network of Excellence, 12 partners
2004-2007	INSCAPE	P	Toulouse coordinated Integrated Project, 15 partners
2004-2006	MESIMA	P	Luleå coordinated Leonardo Project, 4 partners

#### 4.3. Mobility and exchange with partners

Partner employed doctoral students	Adjunct professors from partners	Researchers to industry	Common publications with partners	Partners involved in board
3	2	10	40	15

#### 4.4. Spin-offs

Patents	Spin-off companies
0	2



## **5. Standing of CID in an international and national context**

### **5.1. International standing**

CID has similar goals and activities, but at a smaller scale, to internationally leading laboratories in development and use studies of modern interaction technology such as MIT Media Lab in Boston, Xerox PARC in Palo Alto, HUSAT in England and the Fraunhofer Institute in Germany. This is recognised by the Scientific Advisory Board with representatives from or with close links to those institutions, ranking CID as having equal qualities.

CID attracted leading guest researchers from the world and is very attractive as EU research partner. It has a constant stream of visitors from Sweden and abroad, at least a couple of groups each week. CID very often gets email from research student candidates from all over the world asking about opportunities. Unfortunately we cannot accept such students unless they come with own funding.

In the latter phases we have had about 10 senior visitors spending at least a week at CID. External invitations are frequent. Recently we have been invited to participate in at least 15 Integrated Projects and Networks of Excellence in the EU 6<sup>th</sup> Framework initiatives, most of which we have had to turn down.

### **5.2. The Competence Centre as a national asset**

With time CID gets more and more recognised widely in Sweden, for its sustainable work on deep technical and user oriented design knowledge on Information Technology applications. Its competence is asked for in many contexts, especially in the current, realistic, long-term view on IT and its potential implications and on the central role of knowledge about usefulness, usability and users.

Governmental and industrial committees, involved in planning future activities and priorities on, taking examples from the last few months, Swedish design extended to IT applications, handicap technology, design of IT services and others, invite CID to learn about trends, competences and skill, and for planning the future.

Similarly IT companies frequently ask for help on design and usability aspects, where we mostly can point at consulting companies in our network and/or students needing Master's projects. If it is a problem where new knowledge of research interest is needed we involve our seniors.

### **Educational interaction with industry and user organisation partners**

Making the students aware of human centred and design aspects of computer use and interaction design is a very significant form of technology transfer to the industry where most of them take jobs directly after graduation.

Through CID's contacts with our industrial and user organisations several shorter and longer projects, including supervisors have been recruited for several project courses and diploma work at KTH. Specifically all four term-long projects in a course on Software Design,



Economy and Leadership usually come from CID partners. The groups of last year Science and Engineering students majoring in Software Design spend several weeks at the partners.

The industrial contacts also result in many guest lectures, in courses, giving students understanding and contacts with industrial research, industrial problems and use problems.

### **5.3. Core competences**

The interdisciplinary and industrial and user organisation cooperation competences of CID can be summarised as follows.

- User oriented design methods for user involvement: world leading development and use in the “Scandinavian tradition”
- Design methods with strong interdisciplinary cooperation: world leading development
- Development of new technology and applications in interaction forms: nationally equal to leading laboratories
- Development of prototypes based on existing technology: nationally equal to leading laboratories
- Cooperation with industry: nationally good but not outstanding experience
- Access to work places and homes and schools for user studies and design sessions in their settings: worldwide unique possibilities and access in Sweden
- Cooperation with user organisations: outstanding experience and practise, especially on work floors, in domestic and school settings

### **5.4. The role and impact of CID within KTH and other universities**

KTH, has had the overall responsibility for CID and appointed Board and Director. KTH and guaranteed the durability of CID and its scientific quality.

The first year CID only had access to a few rooms in the premises of IPLab (Interaction and Presentation Laboratory) at NADA but since August 1996 CID has its own locality, adapted for the activities, including proper laboratories, technical installations and areas for visiting researchers, in close connection to IPLab. The CID environment has developed into a laboratory with "MIT Medialab touch", where testing playful ideas to yield serious results is encouraged as a modus operandi, and where different technical, aesthetic and humanistic competences from academia, industry and user communities meet in fruitful co-operation.

### **Research and research education – Human-Computer Interaction new subject**

A concrete, very important influence by CID in the higher education is the establishing of HCI (Human-Computer Interaction) as an independent research study subject at KTH in 1997, with Kerstin Severinson Eklundh as first and Yngve Sundblad as second professor.

This led to that HCI/KTH could bid for, together with Linköping University, an SSF funded research school in Human-Machine Interaction, which 1998-2003 funded a number of doctoral students and helped establish the subject further.

It is now a main subject at KTH with a regular stream of licentiates and doctors and specialisations in many Master educations offering about 30 courses.



CID staff have been responsible for supervising research students, both in Human-Computer Interaction and in Computing Science at NADA and as part of supervising teams at university departments such as Film Science, Media / Communication and Psychology. 15 research students worked within CID projects. Cooperation with the HMI (Human Machine Interaction) Research School continued, CID providing doctoral projects and the HMI school providing research education.

Specific mention deserves week-long, intense, summer schools for research students arranged by CID in June 1999, in June 2001 and in August 2002. The tradition has continued with EU sponsored two-week summer schools on people-centred interaction design, in 2003 (Rome), 2004 (Split), 2005 (Timisoara), 2006 (Edinburgh), arranged by the Convivio network, with CID's director as one of the two summer school directors. Between 20 and 45 doctoral students each time from computer science, media, communication and humanistic subjects get theory and practise in groups conceptualising and building an installation with use, media and technology aspects for an informal exhibition and written reflections.

### **Interaction between research groups, departments and faculties**

With its interdisciplinary character CID had to have a broad network of research contacts with different disciplines. In computer technology contacts within the NADA department with IPLab and with the Computer Vision group and with the Media Technology is manifested in joint projects. The same holds for speech technology at KTH and the ICElab group at SICS, Swedish Institute for Computer Science, in Stockholm-Kista.

Most academic media, art and humanities institutions in Stockholm are located quite close, which means possibilities for joint seminars and workshops. Through CID the possibilities and incitements for such activities have resulted in frequent activities, very scarce earlier.

Sharing competences in CID projects is usually accomplished by researchers and developers from their environments taking part-time employment at CID.

### **Interaction with basic academic education at KTH and in Stockholm**

A very important form of knowledge transfer is interaction with education at KTH and other universities in Stockholm. Making the students aware of human and aesthetical aspects of computer use and interaction design is a very significant form of technology transfer to the industry where most of the students take jobs directly after graduation.

One important such initiative is multidisciplinary project courses with students from technology, social and behavioural sciences, design and art from universities and colleges in Stockholm.

The senior research staff at CID took part as guest teachers and course leaders in several courses, especially in the latter part of the Master of Computer Science and Engineering programme and in the new Media Technology programme at KTH. With their strong interdisciplinarity they contribute to a significantly higher quality through broader perspectives and deepening of the courses. Examples of such courses are Human-Computer Interaction and Cognition.



In the elective project course User Centered Program Design, initiation triggered by the international Apple Interface Design Project, CID staff each year teach an interdisciplinary class of about 50 students in 6 projects. The class consists of last-year students from Computer Science and Electrical Engineering at KTH, Graphic Design at Konstfack and the Graphic Institute, Industrial Design at Konstfack and Psychology and Social Anthropology at Stockholm University.

More than 60 students, both from KTH and from other universities in Sweden, have been recruited to CID for Masters Thesis projects.

### **5.5. Technical and scientific achievements**

The technical and scientific achievements are best illustrated with examples of successful projects. Here we highlight recent achievements in five of the projects including implementation at partners where applicable. A complete list of the 43 projects over CID's ten years can be found in Appendix B. The more detailed CID Project catalogue is found on <http://cid.nada.kth.se>.

#### **VideoSpaces**

This project is a good example of sustainable IT application developed through long-term research and studies. It started as the very first larger project with industrial partners, as VideoCafé for continuous informal remote communication, with Ericsson and Telia in 1996. It has in different incarnations then been used between school children and airport passengers, between homes and now between distributed offices as well as for communication with common service departments of Swedpower and, in the full-scale study *Community at-a-distance*, between the locations of a distributed call centre for Stockholm County Police on three islands in the archipelago, Arholma, Sandhamn and Ornö, 150 km apart. Technically a mirror system for eye-contact and better image and sound quality (through higher bandwidth) have been developed over the years giving better feeling of contact and presence. Studies of use and communication patterns was included already in the VideoCafé. In the current use, especially the full-scale application *Community at-a-distance* extensive ethnographic studies and use studies are made as basis for introduction and evolution of the technology and its use. We thus already have a full-scale implementation for one group of about 50 users and we foresee implementations at Swedpower, both between distant management and distant operative environments. An earlier implementation (1999) was made between the daily managements of two Swedish airports, sold and seen as a "product" by Ericsson.

#### **Gestural interfaces**

This project is a good example of cooperation with other top competences at KTH, here the computer vision group, and of use of cutting-edge technical possibilities for broad and specific use. A remote control you always carry with you, the hand or some other part of the body, is used to control your IT environment. Implementations for users with disabilities have been demonstrated together with the Handicap Institute at expos and fairs and systematic design and studies with potential users is about to start. Telia shares an interest in how the gesture interaction can be implemented for remote use over Internet and other networks.



## **interLiving**

CID coordinated this EU financed project running for the three whole years 2001-2003. It was a privilege to be able to start from understanding the communication needs of geographically dispersed families consisting of household in three generations, and wait with bringing in computer technology until the second year. The methods developed, including cultural, probes, video probes and technical probes, intergenerational workshops etc, are quite unique and have already proven their value in other contexts for us and other researchers.

## **Standardized Content Archive Management (SCAM)**

This framework for building distributed archives and the shared use of information components is based on several years of research at CID on structure and use of metadata in different educational contexts. It is built on international standards for metadata and learning technology. SCAM is used by Skolverket in the development of "Project in the classroom", with user feedback for further development.

SCAM has also been successfully used in a commissioned implementation and introduction project (with separate financing from Utbildningsradion) to build Utbildningsradion's new media library. Several other enterprises with similar needs discuss possible such commissioned projects with CID.

## **UsersAward**

This project is an elaborated example of the use of sustainable knowledge and experience, developed through research and development over several years, on what constitutes useful computer applications in broad contexts. IT has roots in the cooperative design activities with workers, which some of us were involved in already in the 1980's and has developed specifically at CID since 1999. Based on an initiative from LO, the largest Swedish central union organisation, with 2.3 million members, CID applied for and coordinated the ITQ (Quality of IT support for rewarding work) project with researchers and practitioners involved from academic institutions in Uppsala, Gävle and Luleå and from LO centrally and from several workplaces. In 2002 we had results and experience from pilot studies of certain aspects, user panels, user and provider conferences, the yearly prize for good IT support at a workplace nominated by its end users and trying and modifying lists of relevant criteria. Based on this firm foundation LO together with us introduced a User certification procedure where about 30 criteria evaluated by users on the floor, information from the management and from the IT support provider are used as a basis for a strict certification procedure with passing based on meeting certain levels of satisfaction. For operation and development of this certification LO, with VINNOVA support, have formed a spin-off company, UsersAward, with CID as commissioned partner for continued research and study of the certification.



## 6. Conclusions

### 6.1. Industrial partner witnesses

An extensive questionnaire in Swedish was sent out to the contact persons for all 26 CID partners in phase 4 and 15 full answers were obtained. The answers are given in appendix C together with a text in free form about the CID experiences by Staffan Liljegren, Ericsson Medialab, one of the “founders” active in CID 1995-1999.

Here just a few quotes are selected and translated.

#### **Staffan Liljegren on growth from CID research:**

*Ten years of knowledge accumulation within the area of usability and interaction design is fertile for creating growth and since the area itself is very generically applicable it has been easy to use results in the form of methods. At Ericsson this has occurred at several places and there are today several development methods and usability labs in production.*

*If we look further we can see examples where CID research has directly or indirectly been transformed into commercial services or products, e.g. the VideoCafé, which was initiated early with Ericsson Media Lab and carried through at CID. Internally at Ericsson it was commercialised into a system for telemedicine.*

*Another relevant research area is Smart Things, where CID and Ericsson started common research in 1998 around services, tools and methods for smart things. Ericsson had a parallel track for commercialising a system for simple connection of web services to physical objects. This was an activity in the spin-off company ConnectThings, which started in 1999 and was bought by AirClic against capital investments of a couple of hundred million dollars. It was financed by Symbol, Ericsson, Motorola and Goldman-Sachs. Today AirClic sells company solutions for tracking, e.g., persons, assets or processes on the move over large distances.*

*Seeing this a risk capitalist would be quite satisfied with this capital accumulation on the small research budget of CID, around ten million per year during the active period.*

#### **Key results from questionnaire with 14 answering partners**

Well working cooperation fulfilling expectations

Contacts, also with other partners, spreading insight about the importance of usability.

Mainly in long term projects, prototypes, exhibits

Knowledge transfer, seminars, competence

Industrial doctoral students.

Accessibility to the network around CID with multidisciplinary environment.

New contacts, stronger trademark, insight where the research frontlines are in certain areas.

Expert competence

Support for knowing the area even when less effort is devoted in the own organisation

Joint applications for funding.

### Less well working cooperation

Still difficult to bridging differences in project cultures in companies and academy

Project initiation, responsibility of both partners and academy

### Partners' own contributions

Contacts, project ideas, information, seminars

Knowledge about functional impairment, accessibility questions

Arena to show modern research to the public.

Testbed, discussion partners for ideas, impulses and catalysis.

Technical and human challenges in real industrial environments.

### Forms for continuation of CID network and research cooperation academy/industry

Continue network, using distance-bridging technology.

Competence development via seminars.

Joint applications for project funding.

Mainly bilateral projects when partner funding is needed.

Joint user-oriented method development.

Design methods involving alla group of users, also with age and/or impairment.

Contact point to search for partners and research in the area.

Industrial doctoral students.

## **6.2. Lessons for the future**

### **Reviewers (again): Do not waste effort**

We cite the internationally renowned four experts reviewing CID in March 2003:

*Thus it would be a great waste of effort and intellectual capital not to build on and develop the competence centre experience. The CID experience is that it takes several years to form an effectively cooperating group of researchers with the multiple competences needed and a group of interested partners that understand how to cooperate in this form for development of competence and long-term knowledge. This is in line with comments made several times by the international evaluator Per Stenius.*

Based on this we took several initiatives towards VINNOVA that would make it possible for at least some of the 1995-2005 competence centres to continue in parallel to the new centres, unfortunately in vain.

## What to safe guard for the future

Currently there is a strong interest and understanding in Sweden for the role of design in creating innovative products for sustainable growth. Especially important to safeguard are valuable factors that need considerable time to establish and capitalise on.

For CID these are

- the broad interdisciplinarity, combining technical, user oriented and aesthetical aspects
- the close contacts with industry and user organisations, giving access to real life settings for ethnography, design and technology
- the tradition of cooperation over professional boundaries in working together in all phases of a project inventing, designing, implementing and introducing IT support
- the user based certification process

## CID continues to live, in other forms

Our solution has been to join forces with our mother laboratory IPLab into a new department for Human-Computer Interaction. We are confident that all experiences described above can and will be used there in future development of the user-oriented IT design area for benefit of all stakeholders in society, industry, the common sector, education and academy.

CID will still live in the form of examination of at least eight doctors, previously financed by and working with projects in CID, taking their degrees in the next couple of years.

The number of doctoral students in our HCI subject, and also in our neighbouring departments, has diminished drastically because of lack of funding. The interest among young people to gain and develop knowledge in that way is still very large and society must meet it better.

Another citation from the reviewers of March 2003:

*The strong support of CID from many public organizations shows that there is currently a strong interest in Sweden in the role of design in creating innovative products for sustainable growth in general and design of IT products and services in particular. The frontline position of CID in its core competence areas, in particular interactive learning environments and user-oriented design, imply that the prospects of further successful research and implementation of results in applications for the public sector and industry should be good. CID is actively participating in the on-going debate on where future research in IT should be aiming.*

To take care of this opportunity is a main task for the HCI department at KTH!

## Appendix A. Examination

During the ten years of CID its personnel took 10 doctoral exams and 6 licentiate exams. Another 8 ex-CID personnel will finish their doctoral degrees in the coming two years.

### **Doctor degrees**

Ann Lantz, Ph.D. in Psychology November 1996:

*Computer Mediated Communication in a Work Context: an Interdisciplinary Approach*

Björn Eiderbäck, PhD, Computer Science, SU, 23 March 2001: *Object Oriented Frameworks with Design Patterns for Building Distributed Information Sharing*

Angela Boltman, PhD, Computer Education Science, Univ. of Maryland, 25 Sept 2001: *Childrens Storytelling Technologies: Differences in Elaboration and Recall*

Konrad Tollmar, PhD, Computer Science, Stockholm University, 12 October 2001: *Towards CSCW design in the Scandinavian tradition*

Åke Walldius, PhD, Cinema Studies, Stockholm University, 18 December 2001: *The Documentary Meets Digital Media*

Cristian Bogdan, TechD, Human-Computer Interaction, KTH, 14 February 2003: *IT Design for Amateur Communities*

Anders Hedman, TechD, Human-Computer Interaction, KTH, 30 January 2004: *Visitor Orientation in Context - The historically rooted production of soft places*

Kai-Mikael Jää-Aro, TechD, Human-Computer Interaction, KTH, 5 March 2004: *Reconsidering the avatar: From user mirror to interaction locus*

Sara Ilstedt-Hjelm, PhD, Human-Computer Interaction, KTH, 26 March 2004: *Making sense - Design for Well-being*

Gustav Taxén, TechD, Human-Computer Interaction, KTH, 3 June 2005: *Participatory Design in Museums – Visitor-oriented perspectives on Exhibition Design*

Eight more research students with roots in and part of their financing from CID will take their Doctoral exams in 2006 and 2007:

Minna Räsänen, PhD in Human-Computer Interaction

Ovidiu Sandor, TechD in Human-Computer Interaction

Fredrik Paulsson, PhD in Computer Science

Sinna Lindquist, PhD in Human-Computer Interaction

Fredrik Winberg, TechD in Human-Computer Interaction

Matthias Palmér, PhD in Media Technology

Eva-Maria Jacobsson, PhD in Media Technology

Rósa Gudjonsdottir, PhD in Human-Computer Interaction

## **Licentiate degrees**

Kai-Mikael Jää-Aro. Tech.Lic. in Computing Science October 1996:

*Three-dimensional Interaction and Presentation for Computer-Supported Cooperative Work.*

Stefan Junestrand, Tech.Lic. in Architecture February 1999:

*IT och bostaden - ett arkitektoniskt perspektiv (IT an the home - an architectonic perspective)*

Anders Hedman, TechL, Human-Computer Interaction, Feb 2001:

*Accommodating visitors in digital communities*

Fredrik Winberg, TechLic, Human-Computer Interaction, KTH, 12 December 2001:

*Auditory Direct Manipulation for Blind Computer Users*

Marie-Louise Rinman, FilLic, Human-Computer Interaction, KTH, 31 May 2002:

*Forms of Interaction in Mixed Reality Media Performance - A study of the artistic event  
DESERT RAIN*

Gustav Taxén, TechLic, Human-Computer Interaction, KTH, 15 May 2003:

*Towards Living Exhibitions*

## **MSc and MA theses - Diploma works**

In the list of 329 CID publications on

<http://cid.nada.kth.se/publikationer/rapporter.html>

there are 64 Master thesis reports, of which 52 are within the 4,5 year Master of Engineering and Science educations at KTH and the other 12 are from other universities, mainly in Stockholm, Uppsala and Umeå.

Subjects are mainly Human-Computer Interaction and Computer Science, but there are also a few in Psychology, Social Anthropology, Mathematics and Music.

Researchers at CID have also supervised tens of other Master's theses performed in industry, also among our partners.



## Appendix B. Projects

The following lists the 43 projects performed within CID under the main research areas.

More extensive descriptions of the projects can be found on the web in the project catalogue:  
<http://cid.nada.kth.se/>

Some projects continue within the HCI and Media departments at the CSC school.

### **Connected Communities**

VideoSpace: Community at-a-distance, Mixed Mobility, Access to Governmental Services	Jan 2000-June 2005
Digital Environments: Museums and Exhibitions, Virtual Reality for Spatial Navigation, Visitor Orientation - Places and Spaces, Technical Support for Prototype Development	Jan 2002-June 2005
Gender issues in new communication media	July 2000-Dec 2005
CoPLand – Communities of Practise - Knowledge transfer in learning and mobile organisations	Oct 2003-Sep 2006
INSCAPE, Interactive Storytelling for Creative People	Sept 2004-Aug 2008
Amöba – formless and sexless –gender and technology	Jun 2000-June 2003
Online Amateur Communities	Jan 1998-Feb 2003
Citizens' Internet Terminals	Jan 2001-Dec 2002
Digital Television	July 2000-Dec 2001
Kom hem apartment	Jan 1999-Jun 2001
DiME – Digital Meeting Environments for formal meetings	Jan 1999-Jun 2001
VideoCafé	Jan 1996-Jun 2000
CyberYard - virtual meeting area for workplaces	Jul 1997-Jun 1999
Content Design on the Internet	Jul 1998-Dec 1999
Information exchange and communication in large, distributed organizations	Jan 1997-Jun 1999

### **Interaction Forms**

DAPHNE - Digital and Physical Interactive Environments	Jul 2002-June 2005
Auditory Interfaces for Blind Computer Users	Jan 2002-June 2005
SHAPE, Situating Hybrid Assemblies in Public Environments	Jan 2001–Jun 2004
interLiving, Designing Interactive, Intergenerational Interfaces for Living Together	Jan 2001-Dec 2003
Silent Sound Sculpture	Sep 2001-Aug 2003
Gestural Interfaces	Jan 2000-Jun 2003
Sonification of Towers of Hanoi	Jul 1999-Dec 2001
eRENA, Electronic Arenas for Art, Culture and Performance	Sep 1997-Aug 2000
Smart and emotional things for Communication	Jul 1997-Jun 1999
Olga - multimodal information assistant	Jul 1996-Dec 1997



## ***Interactive Learning Environments and Knowledge Management***

Edutella - Global Exchange Network for Information about Educational Resources on the Semantic Web	April 2001-
Standardization of metadata for technology enhanced learning	May 2001-June 2007
Network of Semantic Collaboration in Informal Learning	Sept 2001-
ICT Enhanced Mathematics Education	Sept 2001-June 2005
PADLR (Personalized Access to Distributed Learning Repositories)	Jan 2001–Jun 2004
MathViz – Personalized and Shared Mathematical Courselets	Sep 2001-Aug 2002
Archives, Portfolios and 3D Environments (APE)	Jan 2000-Dec 2001
Explorative mathematics with 3D visualization	Jan 2000-Dec 2001
KidStory: Collaborative Storytelling for Children-with Children	Sep 1998-Aug 2001
Garden of knowledge – associations between subject areas	Mar 1996-Jun 1999
CUT! a film is made - and you're editing it	Mar 1996-Dec 1998

## ***User Oriented Design***

UsersAward - User-driven software certification	Sept 2002-Dec 2007
Usability requirements in the Swedish public framework Agreement	Oct 2003-Feb 2005
MESIMA - Manufacturing and Enterprise Simulation and Modeling Arena	Oct 2003-Mar 2006
Making sense – design for well-being	Jan 2000–Mar 2004
ITQ - Quality of IT support for workplace end-users	Sept 1999-Dec 2002
Standardization	Jul 1996-Jun 2000
CID'97 and Usor, guidelines and methods	Jul 1997-Jun 1998

## Appendix C. Industrial and user organisation partner witnesses (in Swedish)

A survey in Swedish was sent out to the 24 partners in phase 4 of CID (2003-2005). The answers are given below and some “highlights” from them are given in English in the Conclusion section above.

A representative from a former partner gave a more extensive “witnesses” in Swedish: Staffan Liljegren at Ericsson Medialab, one of the “founders”, active in CID 1995-1999. We start with his accounts (in Swedish).

### Staffan Liljegren, Ericsson Medialab, 1995-1999

CID har byggt upp ett världsrenommé inom sin kunskapsdomän och därmed har man under de tio åren som man verkat fullföljt det mandat man fick från NUTEK/VINNOVA med råge. CID har tagit ett steg vidare med den svenska samförståndsmodellen och lyckats göra den ännu bättre anpassad för samarbete mellan forskare, företag och offentliga aktörer. Samarbetet med de sistnämnda har lett till flera offentliga initiativ på t.ex användarvänlighet som ett kriterium i offentlig upphandling. Andra CID intressenter kan redogöra för detta i mer detalj. Här ska jag mer fokusera på tillväxt med privata förtecken och tillväxt i form av ny forskning som initierats med CID som bas.

Tio år av kunskapsackumulation inom området användbarhet och interaktionsdesign är en bra grogrund för att skapa tillväxt och eftersom området i sig är väldigt generiskt tillämpligt har det oftast varit lätt att ta till sig resultat i form av metoder. På Ericsson har detta skett på flera ställen och det finns idag ett flertal utvecklingsmetoder och användbarhetslab som är i produktion.

Höjer vi blicken lite kan vi se några exempel på CID-forskning som direkt eller indirekt omsatts till kommersiella tjänster eller produkter, t.ex projektet VideoCafe som initierades av Ericsson Media Lab tidigt och sedan drevs av CID och Ericsson. Internt på Ericsson kommersialiserades det till ett system för telemedicin, på initiativ av Ericsson Sverige.

Internet42, ett forskningsprojekt som initierades 1997 av Ericsson, Bay Networks, Telia Slab och CID hade till syfte att undersöka effekter av billigt IP-baserat bredband, från infrastruktur till antropologi. Det inkluderade första storskaliga gigaEthernet över DWDM i Sverige och CID ansvarade för användbarhetsforskning inom de hushåll som var anslutna. Med principen att vara en öppen arena där olika aktörer kunde mötas för att forska och kommersialisera forskningsresultat.

De personer som sedermera startade Bredbandsbolaget var flitiga besökare och påhejare hos forskarna inom Internet42. Så åtminstone Bredbandsbolaget byggdes upp med Internet42 som direkt förebild. Sedan finns det några bolag till som indirekt startades upp, t.ex BoStream, som Bredbandsbolaget köpte upp nyligen. En annan indirekt avknoppning från Ericsson var bolaget Queyton, som kommersialiserade en Internet42 ide för DWDM stadsnät. Queyton köptes senare upp av Cisco för cirka en miljard dollar.

Ett annat relevant forskningsområde är smarta ting där CID och Ericsson startade gemensam forskning 1998 kring tjänster, verktyglådor och metoder för smarta ting. Ericsson körde



parallellt ett spår för att kommersialisera ett system för att lätt kunna koppla webbtjänster till fysiska föremål. Detta bedrevs i avknoppningen ConnectThings som startade 1999 och köptes upp av AirClic mot kapitalinvesteringar på några hundra miljoner dollar. Finansiärer var Symbol, Ericsson, Motorola och Goldman-Sachs och styrelseordförande Harvey Golub f.d. VD för American Express. AirClic säljer idag företagslösningar för att kunna spåra t.ex. personer, tillgångar eller processer i rörelse över stora geografiska avstånd.

Med facit i hand skulle en riskkapitalist vara ganska nöjd med denna kapitalackumulation på en blygsam forskningsbudget på CID som legat på drygt tio miljoner per år under den aktiva perioden.

Beträffande forskningsavknoppningar kan man också se CID som förhållandevis proaktiv. Interaktiva Institutet (II) startades med en VD som kommer från CID och dessutom valde vi att låta II ta över Smarta Ting studion som ett forskningsfrö att bygga vidare på. En annan forskningsavknoppning är fortsättningen på Internet42 i form av Folkets Hubb, som haft stor betydelse för utformningen av den svenska testbäddsverksamheten kring bredbandsnät. Folkets Hubb har blivit den de-facto testbädd som Acreo erbjuder sina forskningsprojekt.

Sammantaget kan man med ett företags fågelperspektiv se en stor tillväxt i och runt kompetenscentrat CID. Hållbar i bokstavig bemärkelse har denna tillväxt definitivt varit. Om den är hållbar i sin egentliga ekologiska betydelse får tiden utvisa.

### ***Enkät till CIDs intressenter 2003-2005 om erfarenheter och resultat från 10 års samarbete i detta kompetenscentrum***

Enkäten skickades till de 24 intressenterna i fas 4 (2003-2005), varav många varit med från tidigare, och vi fick svar från 14 (+ 1 extra från annan grupp inom samma intressent). Nedan följer en redovisning av svaren.

#### **Dina förväntningar på CID-samarbetet har infriats / inte infriats på följande sätt:**

*Ergolab (1995-2005):* Infriats: kontakter med andra organisationer, diskussioner med forskare, metoddiskussioner etc, diskutera FoU områden och delta i framtagning av ansökningar.

Icke infriats: mer aktivt deltagande i projekt.

*Guide (2003-2005):* Jag kunde aldrig delta i eller bidra till något forskningsprojekt, först för att det var svårt att komma in i verksamheten som nytilkommen intressent i senare delen av CIDs verksamhetsperiod, sedan för att de ansökningar jag kunde delta i inte gav något resultat och mot slutet de flesta projekt på väg att avslutas och färre nya på gång som jag kunde delta i. Mitt sätt att engagera mig var snarare att försöka bidra till hitta struktur för samverkan mellan forskning och företagande, hitta metoder för att tydliggöra vad som var på gång och vad som behövdes. Mitt viktigaste bidrag hoppas jag har varit att försöka få in projektlednings-perspektiv med mötesteknik även om det kom in lite sent då intresset att delta kanske inte var så stort längre då forskningsprojekten avtog.

*Hjälpmedelsinstitutet (1997-2005):* HI:s förväntningar har infriats, vi har tagit del i forskning och forskningsresultat, fått värdefull kontakt med andra intressenter. Kunnat lyfta frågor om funktionshinder och deras behov av användbar och användarnyttig IT-teknik

*LO & TCO (1995-2005)*: Samarbetet med CID har varit en förutsättning för att LO-projektet UsersAward (UA) skulle komma till stånd och utvecklas. CID-forskare har starkt bidragit till utvecklingen av ett användaranpassat gränssnitt för TCO Developments Internetbaserade tjänst "Arbetsplatsprovaren" - ett verktyg avsett att användas för att samla in svar på enkäter på olika arbetsplatser.

*Metamatrix (2003-2005)*: Metamatrix hade sju förväntningar/mål med sitt engagemang i CID:

1) Ökad efterfrågan på användarorientering inom IT-sektorn (jfr 24-timmarswebben):

Metamatrix har genom samarbetet med CID ökat kunskapen hos ledning och konsulter kring olika frågor inom användarorientering.

2) Ökat intresse för läresurser och lärmiljöer bland våra kunder:

Metamatrix har inte kunnat upprätta något samarbete med KMR-gruppen inom CID.

3) Uppdrag kring connected communities ? (Koppling till samarbete, lärande och kommunikation i och mellan organisationer):

Metamatrix lyckades, trots kontakter med berörda forskare, inte inleda något samarbete kring connected communities.

4) Ökad kompetens (bredd och djup):

En viss kompetensökning har åstadkommit, framför allt hos de personer inom Metamatrix som försökt upprätta samarbeten med CID.

5) Träffa (blivande) partners och kunder:

Metamatrix har fått flera nya, intressanta kontakter med potentiella partners och uppdragsgivare inom CID:s intressentgrupp.

6) Stärka Metamatrix varumärke:

Metamatrix varumärke som ett bolag med spetskompetens inom områden som knowledge management, användarorienterad IT-design etc. har stärkts genom medverkan i CID.

7) Betalande "uppdrag":

Med "uppdrag" avses här gemensamma forskningsprojekt där Metamatrix åtminstone delvis kan få finansiering från t.ex. Vinnova. Ett sådant projekt, CoPLand, har kommit till stånd.

*Skatteverket (1996-2005)*: Har tyvärr inte utnyttjat CID, vi startade ett samarbete med LO/UsersAward på eget initiativ för användarutvärdering av IT-stöd.

*Statskontoret (2000-2005)*: Den fråga som motiverade samarbetet: "Går det att ta fram en miniversion av UsersAwards leverantörsdeklaration som kan användas i Statskontorets ramavtalsupphandlingar av programvaror?" blev besvarad, och svaret var "ja, och inte bara för programvaror".

Vi är mycket nöjda med de kontakter och den hjälp som CID har bidragit till i vårt Personas-projekt. CID är en bra dörröppnare.

*Statskontoret – Guldlänken (2000-2005)*: Jag är mycket nöjd och tycker det varit förnämligt att få ta del av nischad och välutvecklad kunskap

*Tekniska muséet (2000-2005)*: Vi har haft stort och bra utbyte med CID och är glada och tacksamma för samarbetet. Vi har fått mycket information om intressenternas arbete.

Jag önskar att vi skulle kunna utveckla aktiviteter i förhållande till de andra intressenterna i högre grad.

*Telia Sonera (1995-2005):* Svårt att svara enkelt på. Både förväntningar och resultat har varierat under 10-års-perioden, både hos oss och CID.

Inledningsvis var vår förväntan att driva gemensamma undersökande projekt tillsammans med akademien och partner - vilket jag tyckte uppfylldes bra med lägenheten och projekt kring denna. Våra förväntningar har ju sedan, takt med att vi minskat egen FoU och organisation, har ju sedan minskat. Under senare år har CID, för vår del, mycket fungerat som en livsuppehållande verksamhet för vår verksamhet inom området. (Vi fick ju lite tveksamt med vår interna användbarhetsgrupp under sista året.)

*Terminologicalcentralen (2003-2005):* Vi hade nog större förväntningar på fördjupat samarbete men att det inte har blivit så har vi själva till viss del ansvar för. Under perioden som avtalat varat har vi av olika skäl nämligen inte haft möjlighet att avsätta den tid som skulle ha behövts för fördjupat samarbete.

*tobii Technologies (2003-2005):* Framför allt har våra förväntningar på oss själva och vår egen insats inte infriats. Vi hade förhoppningen att vi inom ramen för CID skulle kunna få hjälp med att driva intressant forskning kring blickmätning och ögonstyrning. Då vi själva inte riktigt investerat den tid som krävs för att få till stånd och styra möjliga projekt i denna riktning, så har det självklart inte heller blivit så. Vi tror att CID och de olika partners som funnits inom CID i och för sig varit mycket bra, så hade vi varit lite mindre nerlastade med andra delar av vår verksamhet så hade det säkert gå att infria dessa förhoppningar.

*Vattenfall (1997-2005):* Efter en någon trög start, mest deltagande i seminarier, kom samarbetet igång ordentligt med ett flertal fantasieggande och i flera fall mycket konkreta projekt. För att bara nämna några så gav "Video Caféet" och Virtuella inspektioner nya insikter i vad man kan göra med modern teknik. Det kanske viktigaste resultatet är dock att Vattenfall kommit till insikt avseende användbarhetens betydelse i människa-datorinteraktionen. Ett generellt lyft av kompetensen inom Användbarhetsområdet har skett.

### **Ditt utnyttjande av CID-samarbetet (generell utbildning, kundanpassad utbildning, projekt med kompetensutveckling, uppdragsforskning, seminarer ...):**

*Bollnäs kommun (2003-2005):* Seminarier, workshops, industridoktorand,

*Ergolab:* Kompetensutveckling främst via seminarier och diskussion med forskare

*Guide:* Jag kan inte påstå att jag/vi kunnat utnyttja CID alls, snarare har vi bidragit med föreläsningar och seminarier om Guides olika metoder för begrepps- och processmodellering m.m. plus engagemanget i programrådet som beskrivits ovan.

*Hjälpmedelsinstitutet:* Projektet omkring ljudgränssnitt för blinda personer.

Projektet Bättre Tillsammans \* hur får man med brukarnas kunskap och perspektiv i utvecklings- och forskningsprojekt

Projektet design för alla där man tittade på utformningen av almanackfunktionen i mobiltelefonen tillsammans med personer med en förvärvad hjärnskada.

*LO & TCO:*

UsersAward: Inom ramen för UA har en rad aktiviteter utvecklats i vilka CID spelat en mycket viktig roll - Användarnas IT-pris, certifiering av IT-system, IT-kartor för olika

branscher (nu senast banksektorn), internationalisering av UA:s metoder för att fånga in användarerfarenhet genom bl a användarpaneler, användargrupper och seminarier, uppbyggnad av forskarpanel och forskarnätverk i Sverige och internationellt, kunskapspridning av UA-projektet genom nationella och internationella konferenser.

Arbetsplatsprovaren: CID:s beställarkompetensprojekt bidrog till kunskapsuppbyggnaden inom TCO Development inom området användargränssnitt. En C-betygsuppsats som ytterligare ett bidrag till kompetensutvecklingen liksom deltagande i CID-seminarier.

*Metamatrix:* Metamatrix genomförde ett seminarium inom ramen för CID och deltog i ytterligare ett par seminarier. Vi deltog i möten där intressenterna träffades vilket gav goda kontakter. I övrigt försökte Metamatrix få till stånd ett antal gemensamma projekt, dock utan resultat.

*Statskontoret:* projekt med kompetensutveckling, deltagande i seminarier

*Statskontoret – Guldlänken:* Endast för Guldlänken, själv har jag dock sen 95 sporadiskt besökt era seminarier och det har varit utmärkta arenor för kunskapsinhämtande, stimulerande samtal och gott nätverkande

*Tekniska muséet:* Lite grann av det mesta av detta

*Telia Sonera:* Inledningsvis (i samband med våra gemensamma miljöer och projekt) utnyttjade vi samarbetet för demonstrationer/inspirationer externt och internt. Med avtagande verksamhet allt mindre.

*Terminologicentralen:* Vi har mest utnyttjat seminarierna och har själva stått som värd för ett.

*tobii Technologies:* I praktiken ganska lite. Vi har fått en del exponering och kontakter genom CID, men har i övrigt inte varit särskilt aktiva i projekten.

*Vattenfall:* Se ovan.

### **Exempel på samarbete / verksamhet som fungerat bra:**

*Bollnäs kommun:* Tillgången till nätverket som CID utgjort har fungerat bra. Även workshops har varit mycket givande. Dialogen med olika kompetenser både inom KTH och intressentgruppen vid de återkommande mötena har fungerat bra.

*Ergolab:* Se under infriat

*Guide:* Kontakten med CID har fungerat bra och varit stimulerade men mer med förhoppningar om samarbete.

*Hjälpmedelsinstitutet:* De projekt som omnämns ovan

*LO & TCO:* Det projekt som framförallt bör lyftas fram som ett lyckat samarbete med CID är UsersAward. Det visar vilken potential som finns i ett djupare samarbete mellan användarorganisationer och forskare. Det stora internationella intresset för UA såväl från forskare, användarorganisationerna som industri har åstadkommits genom den höga kvaliteten i projektet och att intressenterna kunnat nå ut internationellt genom dubbla kontaktvägar -genom facket och genom forskarna på CID. Framförallt har idéerna kunnat slå rot i Tyskland genom dessa insatser. Renommerade tyska forskare har tagit till sig UA vilket betyder mycket i sammanhanget. UA uppfattas som seriöst och trovärdigt.

*Metamatrix:* Samarbetet med enskilda forskare (med vilka Metamatrix sedan tidigare arbetat) har fungerat bra. Samarbetet mellan intressenterna har varit givande. Samarbetet kring EU-ansökan med Stockholms stad har fungerat bra.

*Statskontoret:* hela samarbetet om användbarhet i Statskontorets IT-upphandlingar samt Personas-projektet fungerade bra.

*Statskontoret – Guldlänken:* Se ovan

*Tekniska museet:* Vi har producerat utställningsstationer tillsammans och erbjudit nya upplevelser för publik på museet. (Ex. Uppfinningarnas brunn och Enkla Maskiner samt nu, Heat Map.) Vi har arrangerat sammankomster med studenter. Nya utvärderingsmetoder har prövats och nya kontakter har utvecklats. Vi har presenterat forskningsresultat i olika publika sammanhang. Bra gensvar på vår verksamhet. Ideer som uppstått i samtal, men inte kunnat genomföras på Tekniska museet; av praktiska skäl, har fått spridning till andra verksamheter och kommer på så vis andra till dels. Jättebra! Presentation av resultat från en sommarforskar-skola genomfördes som en följd av vårt samarbete. Mycket intressant resultat.

*Telia Sonera:* Lägenheten i Farsta

*Terminologicentralen:* Seminarierna har varit i stort sett bra, vi har fått inblick in verksamheter som vi kanske annars inte fått kännedom om. Och vi tror att en del fått upp ögonen för TNC (vilket givetvis är bra för oss).

*Vattenfall:* Den multidisciplinära miljön har varit av mycket stor betydelse där vi som tekniker kommit till insikt avseende människans kognitiva förmågor. Det mesta har varit mycket bra i de gemensamma projekten.

### **Exempel på samarbete / verksamhet som fungerat mindre bra:**

*Bollnäs kommun:* Deltagande i CID:s aktiviteter i Stockholm innebär naturligtvis en del praktiska problem och kostnader för oss som finns 30 mil från Stockholm. Ett sätt att reducera dessa svårigheter hade kunnat vara att använda distansöverbryggande teknik, dvs. att vi i CID "lever som vi lär". Kompetenscentrum CID skulle kunna vara mer än en Stockholmsbaserad företeelse.

*Ergolab:* Se under icke-infriat

*Guide:* Villkoren och förutsättningarna för akademisk forskning och kommersiell företagsamhet skiljer sig påtagligt och det har varit svårt att hitta ihop kring projekt. Att få tillgång till företagens bidrag i form av ekonomi eller resurser har nog varit en viktigare morot i det dagliga arbetet än att kunna ge företagen ökade kunskaper eller erfarenheter. Detta är inget konstigt eller felaktigt för en institution, men det kan ha bidragit till att det varit svårt att få ihop fler framgångsrika samverkansprojekt med fler aktiva företag. Målen har nog varit för otydliga..

*Metamatrix:* Det har varit svårt att få till konkreta diskussioner om projekt. I ett fall har en forskare ställt sig direkt avvisande till samarbete.

*Tekniska museet:* För liten möjlighet att ta vara på potentialen i intressentgruppen.

*Telia Sonera:* Kan inte komma på något. När vi samarbetat har det fungerat bra - problemet har ju mer varit avtagande samarbete.

*Terminologicentralen:* Kanske, tänker vi i dag när vi lite grand utvärderar samarbetet, passade inte TNC helt in i den här typen av samarbete. I alla fall skulle vi i så fall ha jobbat mer för det (se ovan).

### **Exempel på vad du / din verksamhet fått ut av CID-samarbetet:**

*Bollnäs kommun:* Vi har fått värdefulla kontakter med KTH och CID och värdefullt kompetenstillskott och inspiration. Vi har också fått värdefull feedback på vår arbetsmodell och vår inriktning.

*Ergolab:* Kontakter, metodkunskap, etc

*Guide:* Tyvärr inte så mycket, trots att vi känner en naturlig och stark gemenskap kring verksamhetsområdet samt har metoder och erfarenheter som borde vara intressanta för forskningen att tillämpa och vice versa.

*Hjälpmiddelsinstitutet:* Ett bredare kontaktnät, inblick i pågående projekt

*LO & TCO:* Se ovan

*Metamatrix:* Nya kontakter, ett starkare varumärke, bättre insikt i var forskningsfronten går inom vissa områden.

*Statskontoret:* konkreta resultat som kommit till praktisk användning i vår verksamhet.

*Statskontoret – Guldlänken:* expertkompetens

*Tekniska muséet:* Väldigt intressanta utställningsprojekt och stationer som besökare haft glädje av. Bra programverksamhet. Bollplank. Spridning till andra. Bra kontakter. Mycket information.

*Telia Sonera:* Kanal för samarbete. Ett antal gemensamma projekt (i CIDs tidiga verksamhet). Information om området. Stöd till egen tynande verksamhet under senare år.

*Terminologicentralen:* Ett vidgat kontaktnät och viss intressant information.

*tobii Technologies:* Se ovan

*Vattenfall:* Se ovan.

### **Exempel på vad du / din verksamhet kunnat bidra med i CID-samarbetet:**

*Bollnäs kommun:* Vi tror att vårt angreppssätt på användbarhetsfrågor, vår arbetsmodell och vår inriktning samt tillämpningen "ute i verkligheten" har varit positiv.

*Ergolab:* Kontakter, projektideer, information/seminarier

*Guide:* Vi har genomfört ett antal föreläsningar och seminarier för CID och övriga intressenter samt aktivt bidragit till att ge arbetet i programrådet en tydligare struktur.

*Hjälpmiddelsinstitutet:* Kunskap om funktionshinder, tillgänglighetsfrågor för målgruppen mm

*Metamatrix:* Metamatrix har, i sina kunduppdrag, arbetat med bl.a. användarorienterade metoder, knowledge management och informationshantering. Inom dessa områden har Metamatrix kompetens och erfarenhet att bidra med. Dessutom finns erfarenhet av

projektstyrning och -ledning som i vissa fall skulle kunna vara till nytta i gemensamma forskningsprojekt.

*Statskontoret:* insikt i upphandlingsverksamhet och hur användbarhetsaspekterna kommer in där.

*Statskontoret – Guldlänken:* Kanske nya infallsvinklar och nätverk?

*Tekniska muséet:* En arena att visa upp moderna forskning. Testbed. Bollplank, ideer, impulser och katalys. Erfarenhet av lärmiljöer och publikreaktioner. Spridning av forskningsresultat.

*Telia Sonera:* Inledningsvis både kompetens och projektmedel. "In kind" resurser. Under sista perioden - lika mycket.

*Terminologicalcentralen:* Förhoppningsvis har vi kunnat så lite frön till en allmän terminologisk medvetenhet.

*Vattenfall:* Vattenfall har bidragit med intressanta tekniska och mänskliga utmaningar i en verklig industrimiljö. Forskarna på CID har varit ute både i kontorsmiljö, för att studera t.ex videokonferenser, och i vattenkraftstationer och ställverk, för studier och prototypning av VR-miljöer.

### **Exempel på hur du / din verksamhet kan/vill utnyttja CID-nätverket till i fortsättningen:**

*Bollnäs kommun:* Vi vill fortsätta att verka i nätverket, nyttja distansöverbyggande teknik för att få ännu större "närvaro" i verksamheten. Vi har fått en industridoktorand antagen på KTH som ett direkt resultat av CID-arbetet och hoppas kunna knyta ytterligare reella samarbeten/projekt.

*Ergolab:* FoU ansökningar/gemensamma projekt, kompetensutveckling via seminarier

*Guide:* Guide har bl.a. en tydlig profil med tjänster kring kartläggning av behov vilket är kärnan i all kravspecifikation som föregår medvetenheten om vad användare behöver och vad som är användbart. Vi tror att de metoder vi har kan vara värdefulla i forskningsarbetet kring dessa frågor. Vi tror att vi med hjälp av CID-nätverket kan vidareutveckla våra metoder och hitta nya idéer om hur vi kan bli bättre.

*Hjälpmedelsinstitutet:* Kan inte svara på det idag

*Metamatrix:* Metamatrix skulle se det som positivt att fortsätta träffas inom CID-nätverket. Många inom nätverket är intresserade av samma områden som Metamatrix. Inom nätverket kan såväl kommersiella som andra kontakter knytas.

*Statskontoret:* informations- och erfarenhetsutbyte om användbarhetskriterier, användbarhetscertifieringar etc i fråga om standardprodukter (hyllvaror).

*Statskontoret – Guldlänken:* Hoppas alltid kunna återkomma till er för att testa nya idéer, stimulera tanken och mötas över en föreläsning.

*Tekniska muséet:* Som tidigare men med ökad aktivitet kring samverkan i gemensamma, publika projekt. Fler seminarier och tydligare vad var och en vill genomföra.

*Telia Sonera:* Jag tror (kanske hoppas) att användbarhetsfrågor och användardeltagande kommer att få ett ökat fokus i vår verksamhet. Ett CID-nätverk skulle då kunna fungera som ett bollplank för idéer, kontaktpunkt för att söka partners och forskning inom området.

*Terminologicentralen:* Seminarier, vi kan gärna tänka oss att ordna något fördjupat terminologiseminarium.

*tobii Technologies:* Vi är egentligen fortsatt intresserade av att medverka i projekt inom ramen för CID, men är lite ödmjuka inför våra möjligheter att aktivt driva för att få fram projekt. Om någon CID partner är intresserad av att titta på blickmätning eller ögonstyrning som en del av ett projekt så är vi självklart intresserade och ställer gärna upp med diskussion kring detta. Med förhoppningsvis större resurser för oss i framtiden kan vi definitivt också vara intresserade av att återigen försöka ta en mer aktiv roll inom något som CID.

*Vattenfall:* Kontakten är etablerad och "Vi vet var ni finns och vad ni kan". Arbetet inom virtuella inspektioner kan drivas mycket längre.

### **Områden för framtida kompetenscentrum inom IT-design:**

*Bollnäs kommun:* Deltagande design där "alla" användargrupper beaktas i arbetet.

*Ergolab:* Typ IDEA, tror mkt på det området. Måste dock få med större industriföretag. Användbarhet/användarcentrering som en kvalitetsfaktor/tillväxtfaktor för svensk industri.

*Guide:* Jag tror det finns mycket kunskap om MDI, gränssnitt och användbarhet - men jag tror att metodiken att kartlägga behov, begrepp och processer samt att driva förändringsarbete kan fördjupas med större förståelse för mänskliga beteenden och kommunikationsmönster i relation till IT som stöd och verktyg.

*Hjälpmedelsinstitutet:* Forskning för att få fram ny kunskap om Användargränssnitt kommer att behövas även i framtiden \* stöd till produkt/tjänsteutvecklare så att produkterna / tjänsterna kan användas och vara till nytta för så många som möjligt. Mer forskning omkring kognition / funktionshinder och vilka krav de ställer på tjänster/produkter osv

*LO & TCO:* Bredda perspektivet från "endimensionellt" användarperspektiv (anställdas IT-användning genom att addera kundperspektivet (kundens IT-stöd).

*Metamatrix:* Kunskapshantering i komplexa och mobila organisationer. Olika frågor kring semantisk interoperabilitet och informationssamverkan. Nya gränssnitt och interaktionsformer.

*Tekniska muséet:* Gestaltning, testbed för ny teknik och forskning, utbildning, produktion av interaktiv multimedia, produktion och utveckling av stationer för forskningsgestaltning. Doktorander gör studier i publika sammanhang. Forskning och erfarenhetsutbyte. Certifiering. Ansökningar. Projekt

*Telia Sonera:* Jag tror att områdets utveckling går från "användarvänlighet" och att lösa behov rätt, mot användbarhet i betydelsen att lösa rätt problem. T.ex hur man använda användare för att hitta rätt behov och lösningar.

Det har ju funnits en hel del av detta i CID - men jag tror på mera fokus åt detta hållet. (För oss som operatör är det ju så att de stora förändringarna och stora nya tjänsterna har ju alltid kommit som kompletta överraskningar för oss, -- t.ex internet)



*Vattenfall:* Vi anser att CID ingalunda hade uttömt sina möjligheter utan snarae stod i början av en skördetid, m.a.o behövs inga stora förändringar av inriktningen.

### **Bästa formerna för framtida samarbete (bilaterala projekt, industridoktorander, projektmetodik ...):**

*Bollnäs kommun:* 1. Industridoktorand, 2 Bilaterala projekt, 3. Mötesplats/nätverk, 4. Distansöverbyggande teknik

*Ergolab:* Samarbete runt Projektmetodik. För större företag tror jag mer på industridoktorander som en form av samarbete.

*Guide:* Jag tror på samverkan mellan skola och industri, men jag tror skolans deltagande i industrin och industrins deltagande i skolan behöver definieras tydligare för att det ska gå att planera aktiviteter och resurser på ett sådant sätt att det fungerar både för skola och industri. Jag tänker då på rent praktiska och vardagliga aspekter på rutiner, mål och uppdragsformuleringar m.m.

Jag kan tänka mig att företag med utvecklingsintensiv verksamhet kan se naturligare möjligheter att lägga en del av utvecklingsarbetet som forskning i samverkan med en institution men en renodlad konsultverksamhet som Guide bedriver inte forskning på det viset. Däremot kan tjänstelevererande företag ha glädja av att testa metoder eller modeller för att få återkoppling till sin tjänsteutveckling.

*Hjälpmedelsinstitutet:* Allt det Du har räknat upp här behövs tror jag.

*Metamatrix:* Metamatrix erfarenhet är att det är bra med ett informellt nätverk av intressenter med likartade intressen. Inom ramen för nätverket sker samarbetet genom bilaterala projekt där man gemensamt söker pengar. Vi förmodar att industridoktorander kunde vara ett bra sätt att samarbete men har ej haft tillfälle att prova på detta.

*Statskontoret – Guldlänken:* Eftersom vi ska få jobba mer mot forskning i framtida myndigheten är jag mycket positiv till samverkan kring doktorander. Men det handlar mer om att kunna bidra till en forskningsarena, initiera ett nytt fält, bidra med empiri etc.

*Tekniska muséet:* Alla dessa samt TM som arena för ny teknik och nya forskningsresultat. Samverkan i utbildningar och presentationer.

*Telia Sonera:* Det som fungerar bäst, tror jag, är bilaterala projekt där parterna funnit och värderat varandra under ett samarbetsparaply à la det vi pratat som CID's nätverk.

*tobii Technologies:* Exjobb, samt medverkan i projekt som primärt drivs av annan än oss.

*Vattenfall:* Framtida samarbete kommer sannolikt att ske i form av bilaterala avtal på projektbasis.

### **Andra kommentarer:**

*Bollnäs kommun:* Vi är mycket nöjda och glada över samarbetet med KTH och CID.

*Ergolab:* Genomför typ "ambassadörs" tanken/verksamheten direkt. Vi har varit för beroende av individer och inte kommit in i organisationerna på rätt sätt. Ta fram och genomför utbildning inom området snabbare, typ 5 poängskurser.

*Guide:* Vid sidan av värdet med samverkan med CID fanns en förhoppning att kunna lära känna kollegor i branschen för samarbete. En annan var att komma i kontakt med uppdragsgivare med förståelse för värdet av användbarhet och spännande uppdrag.

*Metamatrix:* Även om Metamatrix inte, i formell mening, kunnat genomföra projekt som partner inom CID har Metamatrix under samma tid genomfört två lyckade projekt tillsammans med forskare knutna till CID. Bägge projekten påbörjades innan Metamatrix blev partner i CID. Man kan på sätt och vis säga att Metamatrix kom i kontakt med CID via pågående projekt snarare än att CID gav upphov till projekt. Likväl har det varit viktigt för Metamatrix att, såsom intressent i CID, vara en tydlig och erkänd partner inom forskningsområdet användarorienterad IT-design.

*Tekniska muséet:* Vi har planterat och grott. Dags att växa...

*Telia Sonera:* En observation kring arbetsformen är att CID som organisation och verksamhet varit betydligt mer stabil och stationär än dess intressenter. Frågan är om det varit till intressenternas fördel att ha en extern stabil och långlivad partner, eller om det har varit en nackdel att CID inte förändrats i samma takt. 10 år är lång tid - och det sammanhang CID startade i och formades för såg väldigt olika ut relativt det sammanhang centret avslutades i. Jag vet inte svaret, men den här erfarenheten är något man borde ta med sig när man formar nya centra.

*tobii Technologies:* Tack för bra samarbete. Ber om ursäkt att vi inte kunnat vara mer aktiva!

*Vattenfall:* Det är uppenbarligen så att industri och akademi har svårigheter i kommunikationen sinsemellan. Industrin, som idag är hårt målstyrd, anser många gånger att det tar för lång tid att få fram efterfrågade resultat, dvs akademins tidplaner passar inte ihop med kvartalsekonomin. Det finns ett enormt behov av att öka förståelsen för varandras förutsättningar och att få acceptans för att de är två olika världar som behöver varandra för att kunna bygga morgondagens samhälle med människan och de mänskliga behoven i centrum.