



Fraunhofer Institut
Integrierte Publikations-
und Informationssysteme



The Disappearing Computer

IPSI -
Integrated
Publication
and Information
Systems
Institute

Norbert Streit

AMBIENTE Research Division

<http://www.ipsi.fraunhofer.de/ambiente>

<http://www.future-office.de>

<http://www.roomware.de>

<http://www.Ambient-Agoras.org>

<http://www.disappearing-computer.net>

Overview

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- The EU proactive initiative “The Disappearing Computer” (DC)
- How do computers disappear ?
- Previous Work:
 1. and 2. Generation of Roomware[®]
- DC project “Ambient Agoras”



“The Disappearing Computer” Initiative

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5th Framework Program of the
European Union/Commission

Information Society Technology (IST) program

Future and Emerging Technology (FET)

the disappearing
COMPUTER

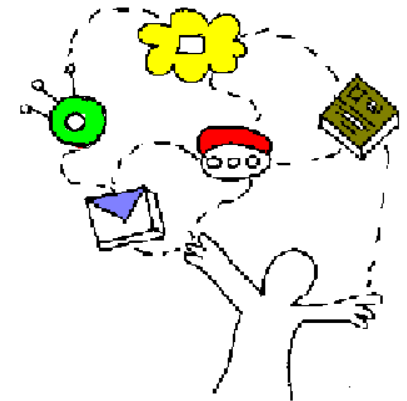
Goal of “The Disappearing Computer”

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To explore how everyday life can be supported and enhanced through the use of collections of interacting artefacts. Together, these artefacts will form new people-friendly environments in which the “computer-as-we-know-it” has no role.

The aim is to arrive at new concepts and techniques out of which future applications can be developed.

Specifically, the initiative focuses on three inter-linked objectives:



Specific Objectives of the DC-initiative

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- Developing new tools and methods for the embedding of computation in everyday objects so as to create artefacts.
- Research on how new functionality and new use can emerge from collections of interacting artefacts.
- Ensuring that people's experience of these environments is both coherent and engaging in space and time.

Overview

- 16 projects accepted for funding
- 37 institutions from academia and industry in 13 countries
- start: 1.1.2001, duration: 2-3 years
- total effort: close to 300 person years

Steering group (SG) of the DC projects network

- Norbert Streitz (chair) (GMD-IPSI, Darmstadt, Germany)
- Lorna Goulden (Philips Design, Amsterdam, The Netherlands)
- Spyros Lalis (ICS-FORTH, Heraklion, Greece)
- Paddy Nixon (University of Strathclyde, Glasgow, UK)

DC website

- <http://www.disappearing-computer.net>

DC Initiative: Network Activities

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Supporting cross-project collaboration:

- *Disappearing Days/Nights* (workshops on selected themes)
- *Research Ateliers* (joint activities of people from a range of projects to work together for a week or month)
- *Troubadour Grants* (travelling grants for visiting a number of sites)
- *Rapid Response Teams* (short focused responses helping in case of unexpected problems in a project)
- *Jamborees* (two major events as a focus for the DC community presenting and demonstrating their work)

Disappearing Technology, Calm Technology

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*The most profound technologies are those
that disappear.*

*They weave themselves
into the fabric of everyday life
until they are indistinguishable from it.*

(Mark Weiser, Xerox PARC)

- ubiquitous computing, pervasive computing
- the „invisible“/ „disappearing“ computer
- information appliances
- augmented reality
- ambient media
- tangible bits
- digital paper
- roomware

Disappearance of the Computer

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Vision of the future („beyond desktops”)

- Implies that the “*world around us*” is the interface to information and for human cooperation
- requires an integration of real and virtual worlds resulting in *hybrid worlds*
- requires *ubiquitous computing* via multiple distributed devices
- implies that the computer will be *invisible as a device* but the functionality will be ubiquitously available
- requires an “interface” being transparent for the perception of users

Disappearance of the Computer

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- Computers used to be “*primary*” artefacts
- now they become “*secondary*” artefacts and move in the “background” in several ways:
 - *Physical* Disappearance
 - vs.
 - *Mental* Disappearance

Physical Disappearance

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In this case, computer devices are

- *truly invisible* by being very small due to miniaturization
- interwoven with clothing or other fabrics
- attached to/ implanted into the body
- integrated in a “shell” of a compound artefact
(=> primary artefact)

=> *implicit interaction*

- *often not under the user's control
due to invisible sensors and actuators
=> privacy issues*

Mental Disappearance

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Computers become “invisible” to the “mental eye”. They are not perceived as “computer” devices anymore but as everyday artefacts of/ in the world around us.

- computers are being stripped of their usual casing and their components are embedded in the (architectural) environment
- *transparent, direct and explicit interaction* with information objects (real and virtual)

Examples:

- interactive tables and walls (e.g., InteracTable, DynaWall) are physically still very large and visible

Disappearance and Interaction

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Issues for disappearing computers (selection):

- How can people interact with “invisible” devices ?
- How do people migrate from explicit interfaces/ interactions to implicit interfaces/interaction ?
- How can we design for transparency and make people “understand” the interface ?
- How can we design for a coherent experience ?
- What should happen in case of errors or malfunctioning which are not explicitly perceived ?
- How can we design for user’s control and address the resulting privacy issues ?
-

Light switch or disappearing computer ?

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Approach of AMBIENTE at IPSI

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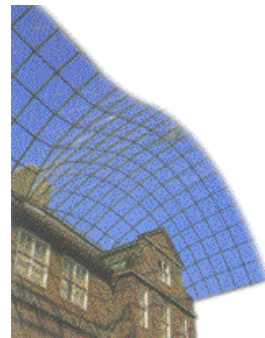
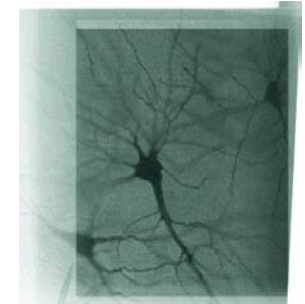
Contributing Areas

- HCI
- Hypermedia
- CSCW
- UbiCom
- AR

- Design
- Architecture
- Ergonomics
- Psychology
- Sociology



Design of Human-Centered
Communication and Cooperation Landscapes



interaction and balance of
mental structures
information structures
social structures
architectural/physical structures



Roomware® for Cooperative Buildings

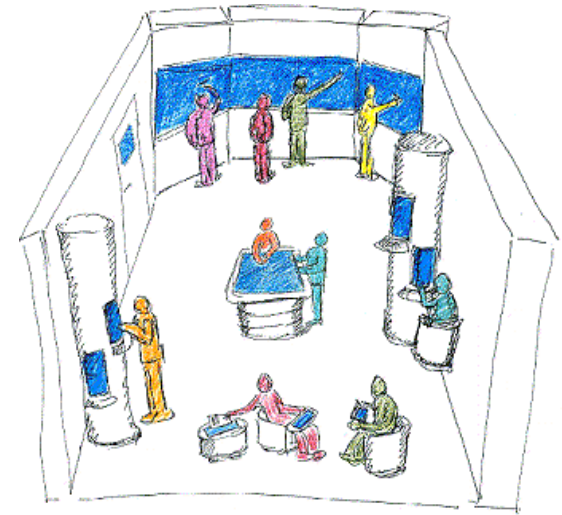
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Roomware components result from

- integration of room elements with
- information and communication technology

Roomware components are

- interactive and networked
- mobile (some) independent power supply and wireless networks
- provided with sensing technology



Vision Scribble of i-LAND in 1997

Roomware components are the constituents of attentive, active, adaptive rooms (A³-Rooms) („The room that knows you and your team“)

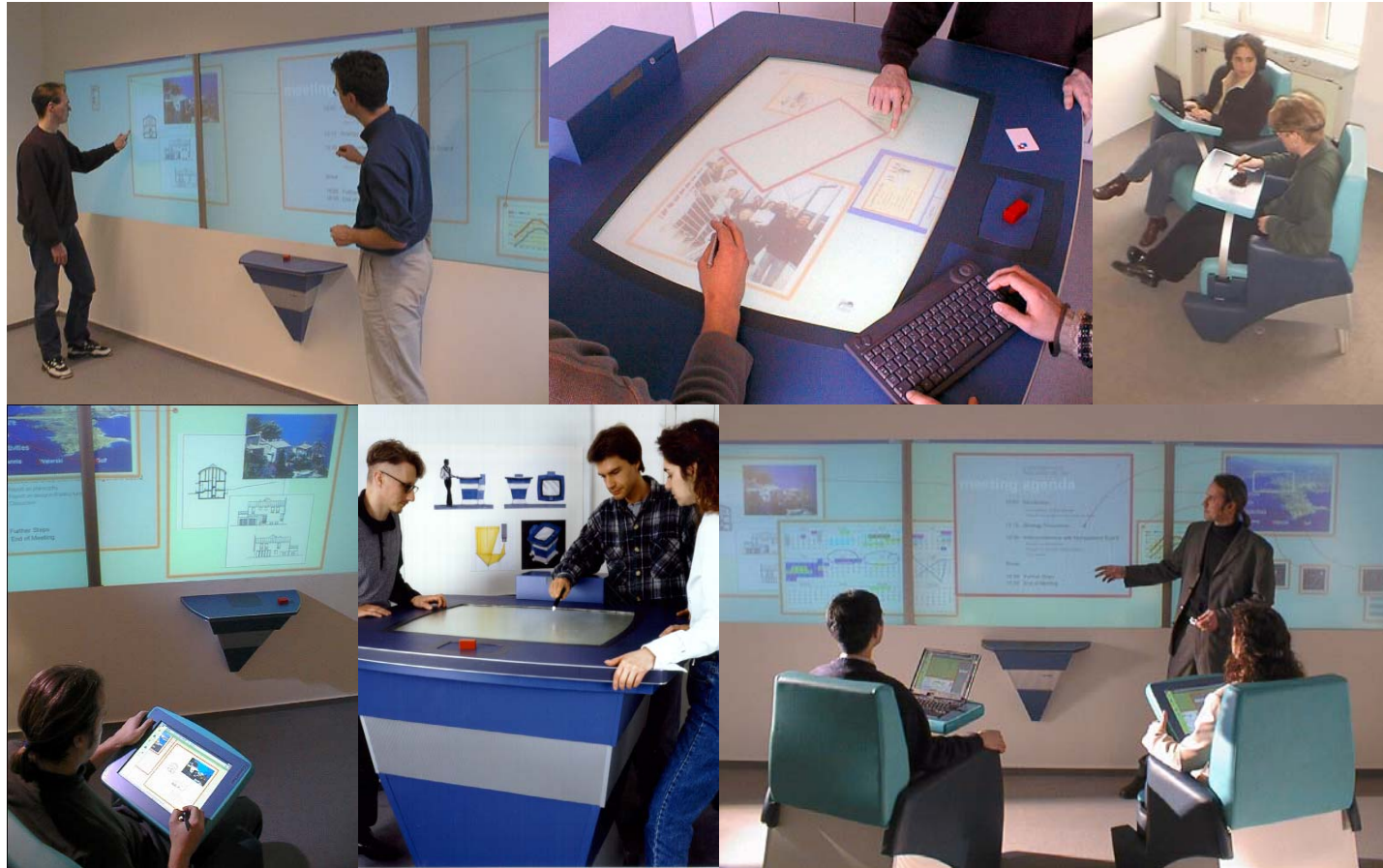
i-LAND: interactive landscape for creativity and innovation

1st Generation Roomware[®]

(Ambiente-Lab, 1997-1998)

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The Disappearing Computer



DynaWall[®], InteracTable[®], CommChair[®], Passage

Future Office Dynamics (FOD) (since 1999)

<http://www.future-office.de>

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Future Office Dynamics

R&D Consortium with partners from industry:



GMD - Forschungszentrum Informationstechnik GmbH

IPSI - Institut für Integrierte Publikations- und Informationssysteme



QUICKBORNER TEAM

Gesellschaft für Planung
und Organisation mbH

Wilkhahn

[Nemetschek 1998-1999]

2nd Generation Roomware[®] (FOD)₍₁₉₉₉₎

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The Disappearing Computer



DynaWall[®], InteracTable[®], CommChair[®], ConnecTable[®], Passage

Software for Roomware

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BEACH: with a new user-interface



MagNets: card-based creativity tool (Metaplan)



PalmBeach: mobile work “on the road”
integrated with team work in the building



Sounds@Work: audio-based awareness for groups

Videoclips of Roomware and more

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DC-Project: Ambient Agoras

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*Ambient Agoras:
Dynamic Information Clouds in A Hybrid World*



Partners

- Fraunhofer-IPSI (Darmstadt, D) (coordinating partner)
- Electricité de France (EDF) (Paris, F)
- Wilkhahn (Bad Münden, D)
- [Starlab (Brussels, B)]

Duration: 30 months (start in Jan. 2001)

Website: <http://www.Ambient-Agoras.org>

Goals of “Ambient Agoras”

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- to add a layer of information-based services to the place, enabling users to communicate for help guidance, work, and fun.
- to provide situated services, place-relevant information and feeling of the place (“genius loci”) to users enabling collaboration and social awareness
- to aim at transforming places into social marketplaces (“agoras”) of ideas and information where one can interact with people
- to integrate information into architecture through smart artefacts
- to provide the environment with memory accessible to the user
- to augment reality by providing better affordances to existing places

