ICT: a Means for what Ends?

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I. Are ICT a Means?

- 70’s: Information Technology
- 80’s: Information Economy
- 90’s: Information Society
- 00’s: Knowledge Society
- 10’s-20’s-30’s … ?

ICT still in search of a **Paradigm**

ICT ➔ Knowledge Society ?

What Paradigm(s) of Knowledge?

Various Paradigms of Knowledge

- In English, **“knowledge”** and the verb **“can”** have the same etymology.

  Knowledge → utility and power.

- in French, **“savoir”** is linked to the Indo-European root <*sap*>, “to taste”, whence **“sapience”, “sagesse”**

  Savoir → wisdom and theory.

- In Russian, **“знание”** (knowledge) comes from the Indo-European root <*gen*> : “**to give birth to**, **to generate**”.

  знание → generation and creation.

Power, Wisdom, Creation

- Knowledge as power.

→ **Impact of ICT on freedom and control**

- Knowledge as sapience and wisdom**.**

→ **Impact of ICT on social justice, on community building**

- Knowledge as generation and creation.

→ **Impact of ICT on cognition, on research, on invention**

Knowledge is not beyond Political antinomies

- Freedom vs. Security
- Privacy vs. Control
- Equity vs. Deregulation
- Monopolies vs. Competition
- Public interest vs. private interests
- Global interest vs. national interests

ICT and Knowledge
For what Global Ends?

Can ICT and Knowledge help to :

- repair the global financial system?
- put an end to fiscal paradises?
- deal with global warming and “climate neutral” energy and transportation?
- avert new wars?
- guarantee fair elections?
- reduce poverty?
- put an end to human rights abuses?

ICT and Knowledge Moving Paradigms

1. Virtual and Augmented Worlds
2. Fusion Reality
3. The Future Internet
4. Convergence
5. A Singularity?

Virtual and Augmented Worlds

1.1 Virtual worlds : Simulation, modelling, training, education, serious games, communities

1.2 Mapped worlds : Geospatial tagging (GoogleEarth), location aware technologies (RFID + GPPS + Internet of things)

1.3 Augmented realities : New interfaces, new layers of information, ubiquitous computing, “internet of things”

1.4 LifeLogging : lifelong record of users and objects, in support of self-memory, control, management

1.1 Virtual Worlds

- **S**imulation, modelling
- Training, education
- Serious games
- Communities

Levels of Simulation

- Simulation for Training

- Real surgical operation in virtual room (CAVE)

Virtual Communities

- Economy of Attention
- Links with real world (Toyota, Dell, Adidas /Second Life)
- Virtual speculation (Linden dollars)
- Counterfeiting of avatars (CopyBot)

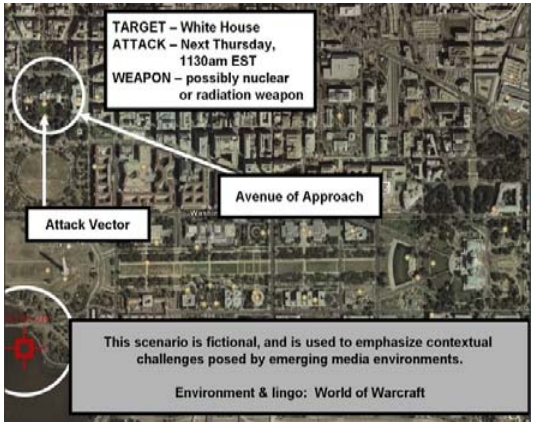
Virtual Avatars

Avatar image from Perfect World China website. http://world2.wanmei.com/

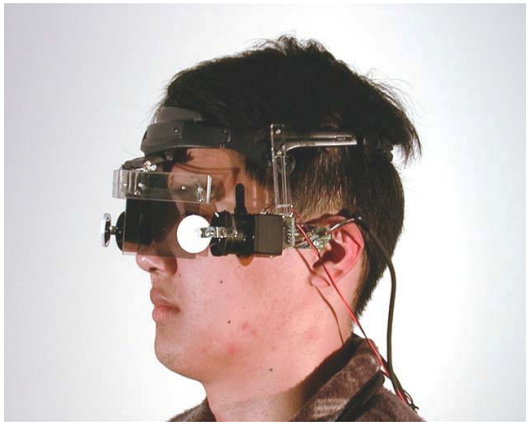
Virtual Terrorism ?

- Director National Intelligence Open Source Conference Washington Sept 08:

« *World of Warcraft* could be used to prepare terrorist attacks »



Immersion




Magnetische Positionierung
Kamera fuer optische Positionierung
Halb durch-scheinende Brille
AUGMENTED REALITY

Tele-immersion

- Blurring of reality and virtuality

Virtual Tourism

- Founder's Fall (City of Heroes)
- Red Light District Club (There)
- Molten Core (WOW)
- Svarga (Second Life)
- La jungle d'Atys (Ryzom)
- La plage de Cobalt Scar (Everquest)
- Ars Virtua Gallery (Second Life)
- Treasure island (Entropia Universe)

Very Large Simulated Worlds:
-« *There* » (Iraq)
-The Whole Earth

1.2 Mapped Worlds

- Geospatial tagging (GoogleEarth), location aware technologies (RFID + GPPS + Internet of things)
- Maps updated with satellite and aircraft imagery, and by ground-based imagery (Google Earth, military systems), produced by cars mounted with scanning cameras, to add ground-level images.

Location aware information

Virtual information overlaid on the physical world. One type of interface is a heads-up display (HUD), providing context-significant information through mobile screens or tiny lasers that paints a virtual image directly on the user's retina.

Location-Based Virtual Realities

- Sharing Augmented Realities through networks

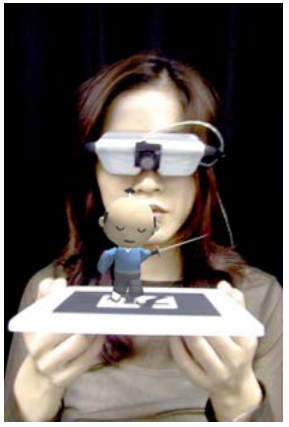
- Virtual realities and global positioning systems (GPS)

1.3 Augmented Reality

- Augmenting the body with images of internal organs

- Body interaction

  Haptic systems



Physical Hyperlinks

A high-capacity (4,300 character) square 2D barcode called the QR (“Quick Response”) in Japan (installed on all new 3G cellphones, on business cards, magazine pages, packaged goods, airline kiosks, billboards). → Audio interface, location-based cellular radio, Internet access.

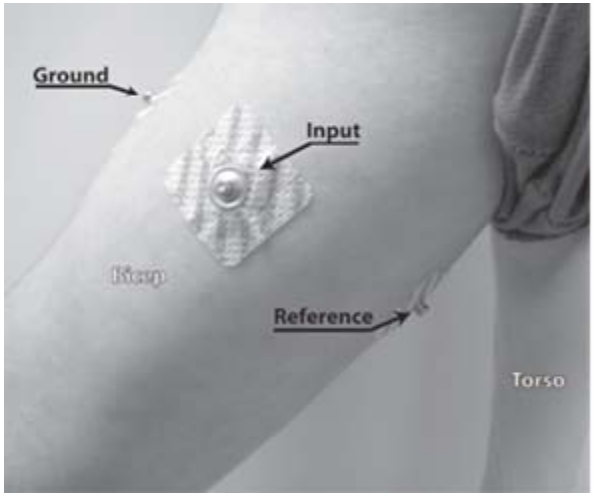
Real Time interaction with “RFID-augmented objects”

- **Touching an object produces a “menu” for services and information :**

Private Interfaces for visualisation and interaction

Wearable visualisation system for discreet, non-intrusive alert and notification

Electrodes on muscles detect personal signals



“Siftable computers”

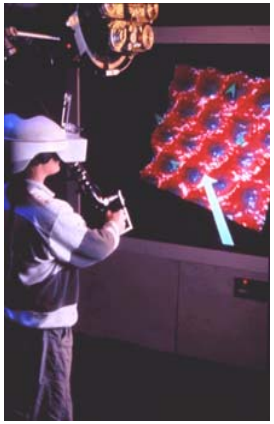
Visualisation systems using sensors to allow “tangible” manipulation of information

Retinal scanners

Retinal scanner

Augmented Presence

- Nano-presence with haptic feedback at molecular level



- Telepresence (Rover Mars)

Networking Bodies

- Australian artist **Stelarc**, *Voltage in/ Voltage Out (1995),* wired himself on the Net. World Internauts could stimulate his « 3rd arm ».
- **Steve Mann,** the 1st “cyborg”, with permanent implants and wireless wearable webcams

Drones

- More and more powerful, precise…

… connected to weapon and command and control systems

Micro-drones

- Now: 12 grammes

- Tomorrow: Nano-drones

LOCKHEED SANDERS
MICROSTAR

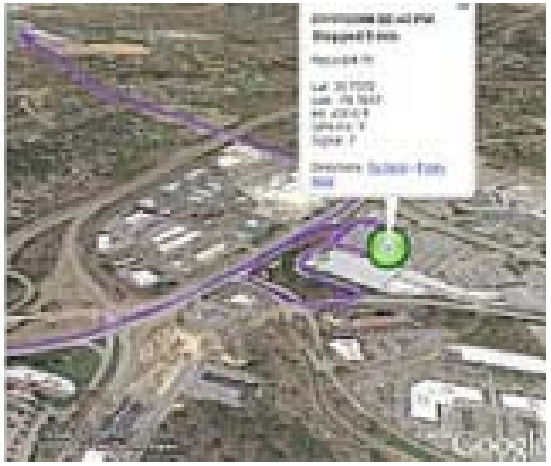
MICRO CRAFT
SLADF

SRI INTERNATIONAL
MENTOR

Networks of Augmented Realities

1.4 LifeLogging

- **Lifelong** record and report of the intimate states and histories of **users**, in support of self-memory, and administration
- **Lifelong** and permanent record and tracking of **objects**, for maintenance, management, control, surveillance…



TrackStick, a $200 GPS lifelog the size of a pack of gum Interfaces to Google Earth, concealable in cars and objects.

Nike and Apple have formed a partnership to turn shoes into lifelogs and personal trainers, using the iPod and the web.

Surveillance, sousveillance

Wearable sousveillance concept from Wearcam.org

LifeLong Surveillance

- **“Spimes”** (individually-identified objects that can be tracked through both time and space over their lifetime)
- **“Blogjects”** (objects that keep a public record of their use and condition)

2. Fusion Reality

- Increased Convergence and Blurring of Reality and Virtuality
- Different mixtures of Simulation (cognition) and Augmentation (action)
- “Everyware”

Fusion Reality developments

- →**Refinement of models, of simulation, of immersion**
- →**Proliferation of sensors, of intelligent materials**
- →**Development of interfaces and software for better awareness, better grasping the social and personal multiple environments**
- →**Issues of "consistent digital identities", open infrastructure, multiple platforms**
- →**Transparency, control, regulation of "everyware"**

3. The Future Internet

- IPv6: Tagging objects, …and molecules?
- Tagging words, sets of words, association of concepts: from data mining to idea mining.
- Web 3.0, the Semantic Web or the “Giant Global Graph”.
- But: information pollution. "You’ll get more information, but much of it will be contradictory ».

Questions

- **A global, low-cost network?**

  Mobile wireless communications will be available to anyone anywhere on the globe at an extremely low cost.

- **Will autonomous technology a problem?**

  By 2020, intelligent agents and distributed control will cut direct human input so completely out of some key activities such as surveillance, security and tracking systems that technology beyond our control will generate new dangers and dependencies.

Web Ontologies

- **OWL : The Web Ontology Language (OWL):**

  A family of knowledge representation languages for authoring ontologies, endorsed by the World Wide Web Consortium.

  This family of languages uses semantics based on Description Logics. OWL is considered one of the fundamental technologies underpinning the Semantic Web, and has attracted both academic and commercial interest.

Colliding Knowledge

- Large Knowledge Collider (LarKC)

  The aim of the EU FP 7 Large-Scale Integrating Project LarKC is to develop a **platform for massive distributed incomplete reasoning** that will remove the scalability barriers of currently existing reasoning systems for the Semantic Web.

  This will be achieved by:

- **Enriching the current logic-based Semantic Web reasoning methods** with methods from information retrieval, machine learning, information theory, databases, and probabilistic reasoning,
- **Employing cognitively inspired approaches and techniques** such as spreading activation, focus of attention, reinforcement, habituation, relevance reasoning, and bounded rationality.
- **Building a distributed reasoning platform** and realizing it both on a high-performance computing cluster and via “computing at home”.

→ MaRVIN, (”*brain the size of a planet*”)

4. Convergence (BANG)

Convergence of **B**its, **A**toms, **N**eurones, **G**enes (**BANG**)

In the US: Nanotechnology, Biotechnology, ICT, Cognitive Science → Nano-Bio-Info-Cogno (NBIC) technologies.

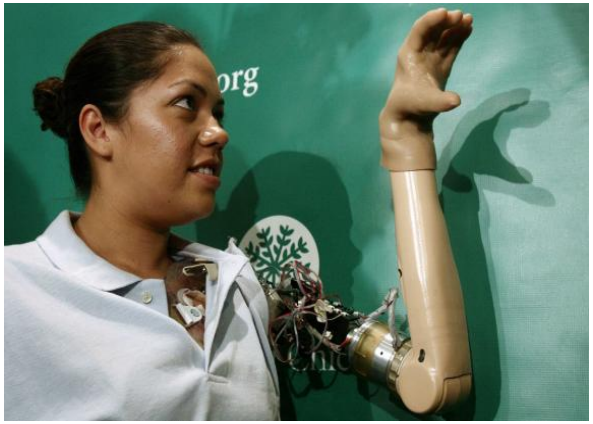
In Europe: CTEKS Converging Technologies for the European Knowledge Society → Nano-Bio-Info-Cogno-Socio-Anthro-Philo-Geo-Eco-Urbo-Orbo-Macro-Micro-Nano.

The inevitable march of electronics into the "nanocosm".

When the semiconductor industry reaches the 20 nm node and is truly being built around nanotechnology, even more will be possible.

Bits and neurones: Bionic Woman

« I can move my arm, close my hand, simply by thinking of it »

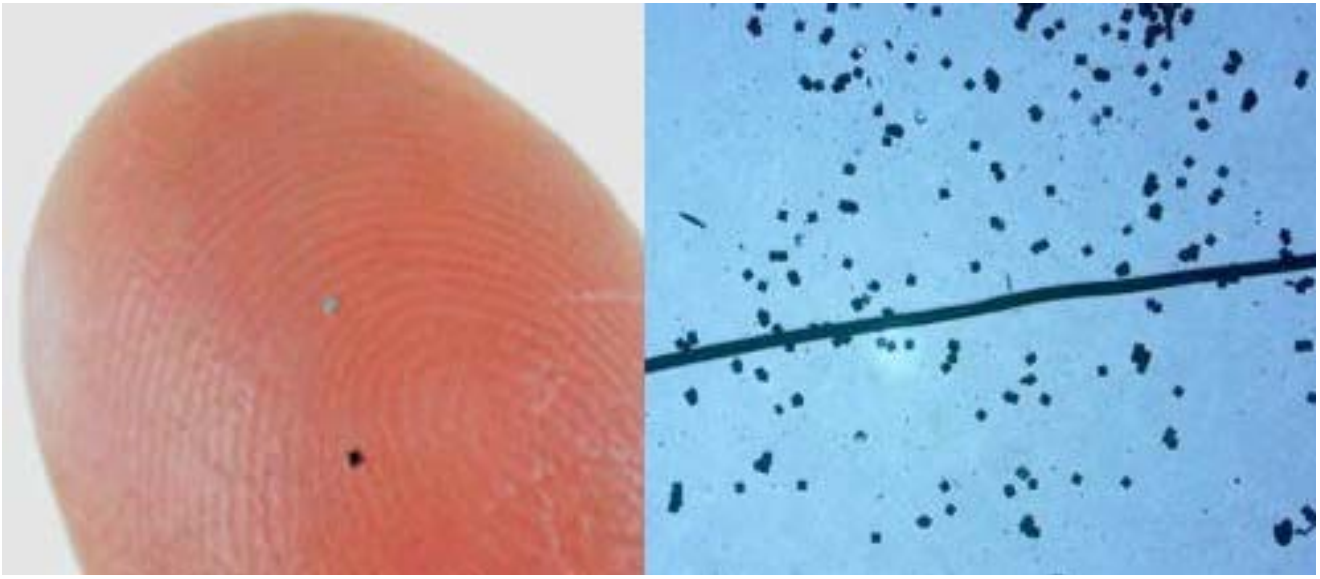


Claudia Mitchell (2006).

BANG Issues

- Proliferation of **nano-products**, of nano-particules (tracability?)
- Development of **Synthetic Biology**, DNA, bio-bricks
- Geo-ingeneering, **manipulation of Ecosystems**, Climate change, Ocean fertilization (CO2-Plancton), extreme genetic engineering, strategies to capture and commodify the world's biomass
- Medical applications of BANG Technologies, nano sensors, artificial neurones, structural modification of the human body, **Post-human Homo Sapiens**

BANG and social control: surveillance, tracking, nano RFID



Hitachi's Mu Chip, an RFID "powder" small enough to put in paper currency.

Privacy vs. Control

- **Public and private lives will become increasingly "transparent"**
- **The cost** of unlimited transparency will not simply be privacy; it will be autonomy, **freedom**, and individuality.
- **Privacy** will become a **luxury**, not a right
- **The less one is powerful, the more transparent** their lives. The powerful will remain much less transparent
- **Transparency works better for governments** intruding upon individual freedoms, than for an individual seeking government transparency (collusion, market manipulation, power money over politics, bribery, lobbying)

5. Singularity

- **The Singularity**: Our intelligence will become increasingly nonbiological and trillions of times more powerful than it is today—the dawning of a new civilization that will enable us to transcend our biological limitations and amplify our creativity. (Ray Kurzweil)

II. A Means for what Ends?

« *A Global Sustainable Future* »?

Ends = Defining “Results”

- “Contribute to the well being of all citizens around the world” (A one liner for Paradiso project)
- “A more peaceful, prosperous and just world ” (UN Millenium Declaration)
- “Freedom, equality, fraternity” (French Town Halls)

However:

→ **Multiplicity, Complexity, Transversality of Issues at stake**

→ **Difficulties in Defining Key Axis, Agreeing on Fundamental Priorities, as opposed to Establishing long, un-prioritized “Shopping lists”.**

Defining Priorities…

- **Answering the needs of an aging population**
- **Developing human resources through lifelong learning**
- **Promoting a knowledge-based economy**
- **Fighting against degradation of environment**
- **Making sustainable development a reality**

… or any other combinations of priorities …

At the Global Level:

The UN Millenium Declaration Fundamental Values

- **Freedom**
- **Equality**
- **Solidarity, Social justice**
- **Tolerance**
- **Respect for nature**
- **Shared responsibility.**

The UN Millenium Declaration Key Objectives

- **Peace, security and disarmament**
- **Development and poverty eradication**
- **Protecting our common environment**
- **Human rights, democracy and good governance**
- **Protecting the vulnerable**
- **Meeting the special needs of Africa**

UN Key Objectives (continued)

- **Maintaining peace and security,** conflict prevention, peaceful resolution of disputes, peacekeeping, post-conflict peace-building and reconstruction
- **Good governance and transparency** in international financial, monetary and trading systems.
- **Fighting transnational crime** in all its dimensions, including trafficking as well as smuggling in human beings and money laundering.
- **Striving for the elimination of weapons** of mass destruction, particularly nuclear weapons
- **Ensuring that the benefits of ICT are available to all** (Ecosoc 2000 Millenium Declaration)

UN ECOSOC 2000 Ministerial Declaration

- The role of information technology in the context of a **knowledge-based global economy**
- The ICT revolution opens vast new opportunities for **economic growth and social development** but also poses **challenges and risks**.
- The **majority of the world population** still lives in **poverty** and remains untouched by the ICT revolution

ECOSOC: Access to Information and Knowledge-sharing

is largely determined by :

- Education, transparent societies, capacity to generate and utilize knowledge
- Connectivity
- Availability of diverse content and applications
- Policy and legal/regulatory framework.

ECOSOC urges:

- Efforts to achieve **universal connectivity**
- Investment in **education**, including basic and digital literacy
- Development of **local content** and of free access to foster a culturally and linguistically diverse cyberspace
- Improvement of the **capabilities** of firms, including small and medium-sized enterprises
- National development **strategies**

Defining a Global Sustainable Future?

- Many Issues: **Energy, Population, Education, Environment, Governance, Economic and Financial Crisis.**

- Solutions? **Political? Technical? Societal? Multi stake-holders?**

Some Questions

- What role of “Policies” vis-à-vis global, systemic, immanent societal dynamics?
- What role do ICT really play in this global, auto-emerging societal fabric?

Some Conclusions

- We are still at the stone age… Screens are sort of caves!
- Enormous potentials if strategic paradigm shifts are made
- Knowledge Societies may further increase divides between haves and have-nots, if no proper strong political decisions taken.
- Huge political, societal and philosophical implications …not yet conceptualized nor understood.
- Cognitive economies and IP issues. Social benefits of Cooperation vs. Competition?
- Radically new concepts emerge for a global governance :
  → Managing in Real Time Cities. Visualizing/Simulating Nations…

- Keeping the System in order. But who keeps the keepers?