Robotics Research and Innovation on Ageing Well
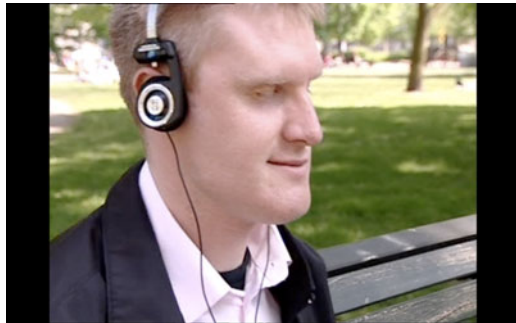
IROS 2008
Nice, 23th-24th September 2008

Rolf Riemenschneider

**ICT for Inclusion
DG Information Society
and Media**

E-Inclusion: ICT for inclusion and inclusive ICT

ICT & Ageing: Social Necessity and Economic Opportunity

- Demographic change:
- 60+ population: from 20% in 1995 to 25% in 2020
- 50+ population: 21% has severe vision/hearing/dexterity problems
- Today 4 working for 1 retired, in 2050 only 2 working for 1 retired
- Cost of pensions/health/long-term care: up by 4-8 % of GDP (2025)
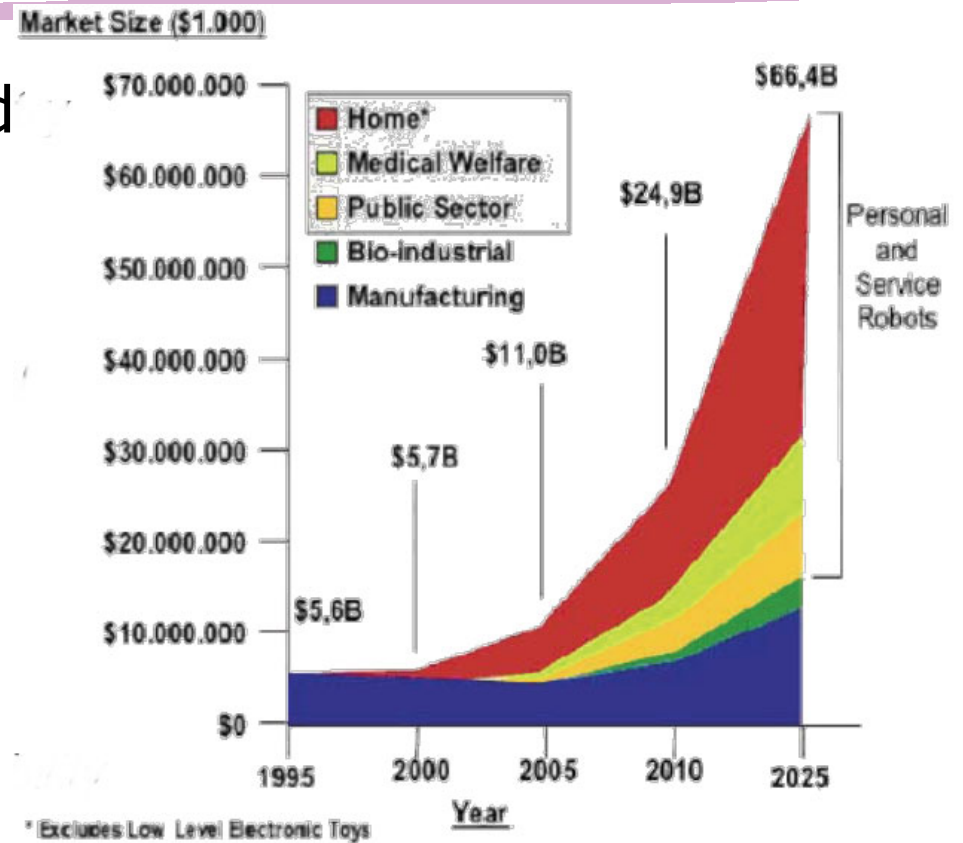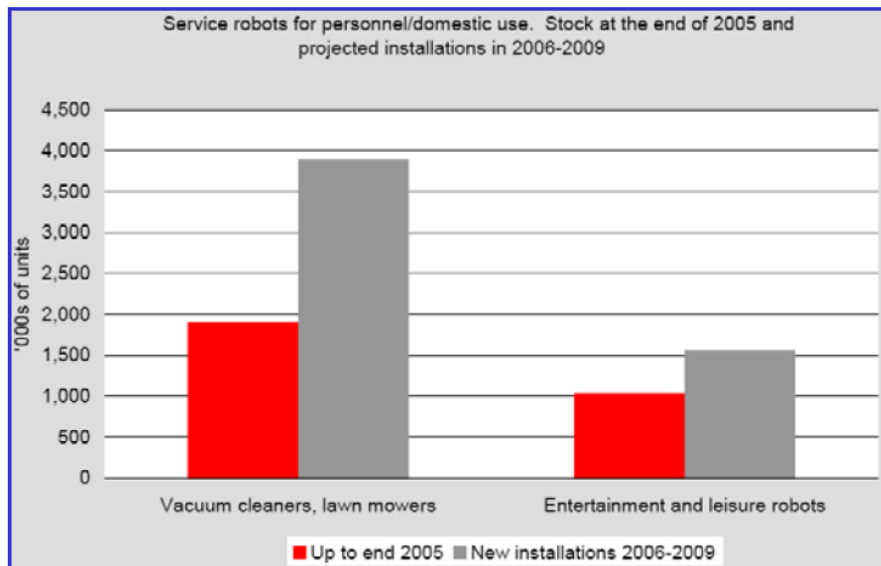- Shortfall of care staff

=== ===

- Wealth and revenues in Europe of persons over 65 is over 3000 B€
- Smart homes market will triple between 2005 and 2020

- → Economic opportunity AND Driver for Research & Innovation

Market Service Robotics

- Strong predicted market growth

Service robots for personnel/domestic use. Stock at the end of 2005 and projected installations in 2006-2009

Market Size ($1.000)

- Limited service diversification

Applications

**Infotainment
Entertainment**

**Building
Security**

Rehabilitation

**Home Care,
Health**
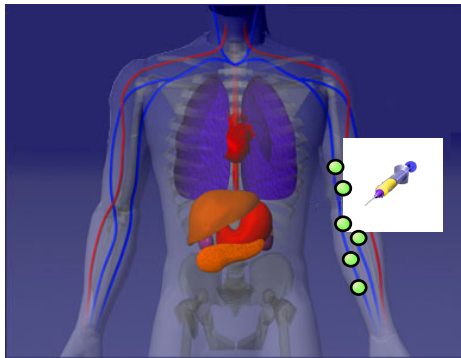
Leisure

GAming

Mobility

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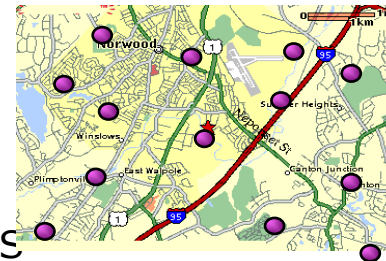
Robotics Research for Independent Living

- ➢ Building on R&D advances in robotics research and system design
- ➢ Demonstrate a combination of different services, e.g.
  - Fetch & carry
  - Cleaning
  - Infotainment

- ➢ Ensuring safe operation in a home environment
  - With people present (context detection)
  - May inferere/cooperate with other smart artefacts, e.g. camera, sensor network etc.

BNCI =
Brain and Neuro Computer Interaction and control feedback

machine learning

measurement
of neuronal activity

operant learning

action & control for
mobility enhancement

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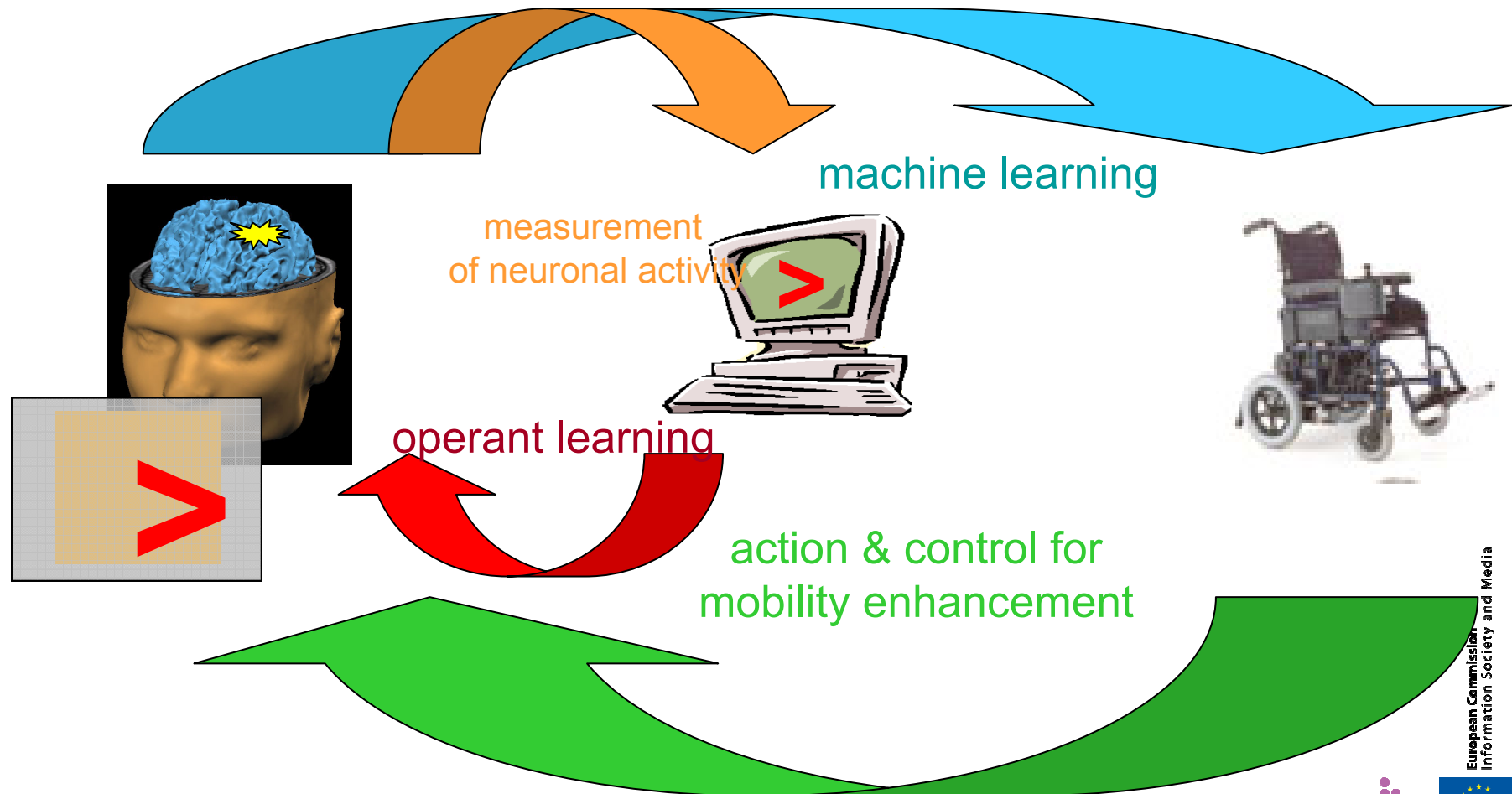
What is meant?

- Robotics (Wiki):
  - A physical robot is a moving, autonomous, electromechanical system, which, by its
    appearance or movements, conveys a sense that it has intent or agency of its own.
  - can sense its environment, and manipulate or interact with things in it.

- Service Robotics
  - No pet robots
  - No isolated stand-alone task
  - Assisting in daily activities
  - Wiki:
    - >>Service robots assist human beings, typically by performing a job that is dirty, dull, distant, dangerous or repetitive, including household chores. They typically are autonomous and/or operated by a build in control system, with manual override options. >>

So what's in the way?

- **Older people tend to live longer at home**
  - Significant cost benefit
  - Increasing single households
  - Challenging task for care givers, relatives, social participation

- **Service Robotics not yet in main-stream products**
  - No economy of scale, fragmented markets (niches)
  - Fragmentation of robotics R&D and innovation efforts
  - Not linked to care service provision
  - No integrated smart home concepts

- **Legal and technological barriers**
  - Legal, Ethical issues not at all developed
  - Lack of interoperability makes solutions expensive
  - Lack of a standard HMI difficult for elderly users

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EU R&D Support

Framework Programme 7 ICT research

Challenge 7: ICT & Ageing

- Advanced Prototypes for independent living/active ageing (Ambient Intelligence, Robotics)
- Open Systems, Reference Architectures, Platforms
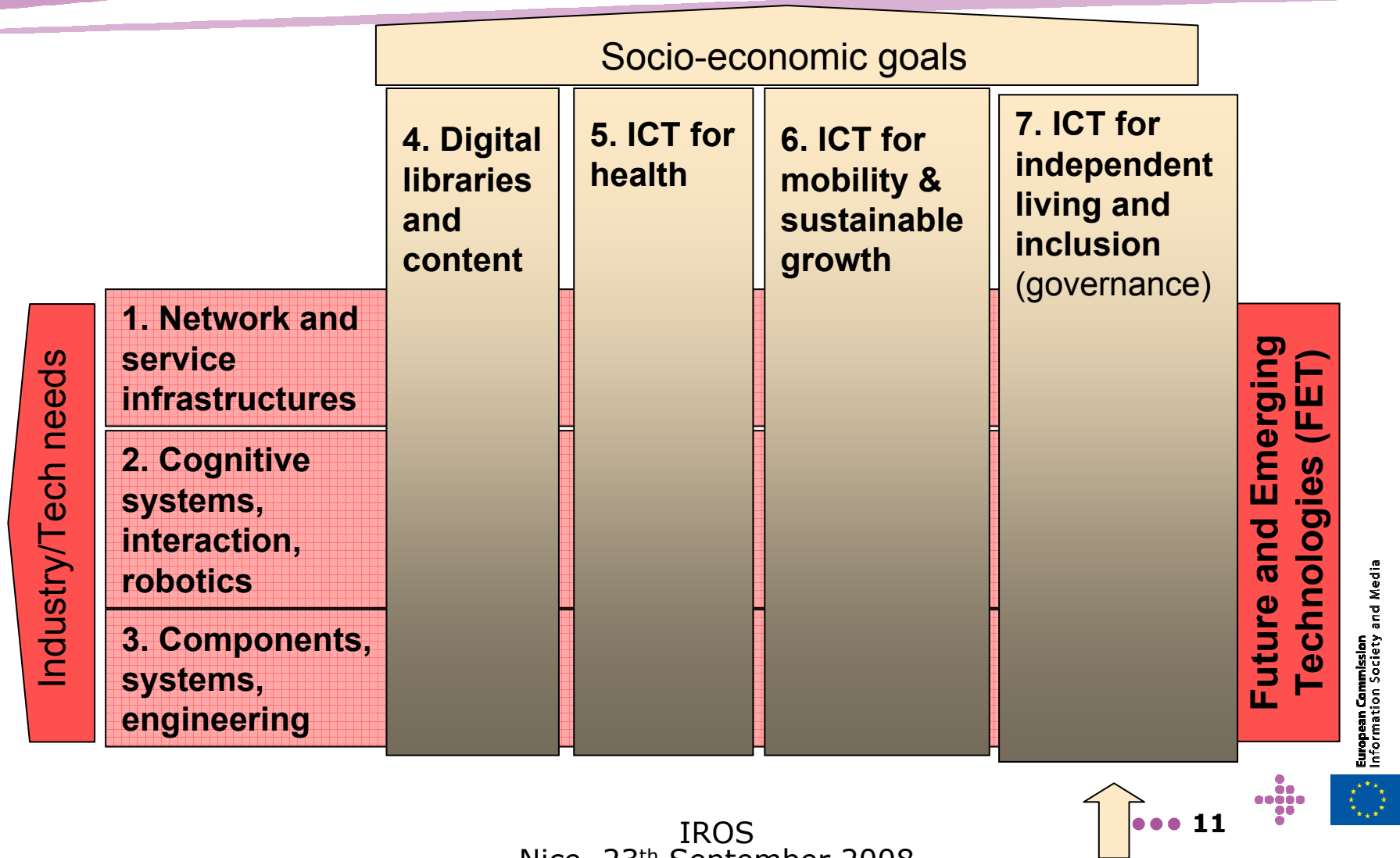- Support: roadmaps, standards

Challenge 2: Cognitive / Robotics

- Robotic components research
- Robotics system design / architectures
- Cognitive systems driving HMI.

Currently ~30 projects, 200 M€

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FP7 ICT Work Programme 2009/10 *Challenges*

Socio-economic goals

4. Digital libraries and content

5. ICT for health

6. ICT for mobility & sustainable growth

7. ICT for independent living and inclusion (governance)

Industry/Tech needs

1. Network and service infrastructures

2. Cognitive systems, interaction, robotics

3. Components, systems, engineering

Future and Emerging Technologies (FET)

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Selected FP6/FP7 Ageing Projects

	Project	Topic
IP	PERSONA SOPRANO OASIS Companiable MON-AMI	Open Platforms and tools for Ageing applications/services; Advanced integrated care service platforms; Ontology based interoperability for ageing applications; Intelligent robotic companion for safety and social support; Ambient Intelligence for independent living;
STREP	HERMES VITAL MIND ELDER GAMES I2HOME EASY-LINE+ SMILING SHARE-IT CONFIDENCE MPOWER	Cognitive care and guidance for active ageing; Advanced interactive mental training for elderly people; Improving cognitive skills of elderly people trough gaming; Innovative interaction with home appliances for all; Intelligent white goods for an ageing population; Support for mobility of an ageing population; Enhanced navigation with smart wheelchairs and walkers; Fall detection and protection for independent living; Service oriented architectures for independent living;
CSA-SA	AALIANCE CAPSIL SENIOR	European R&D coordination platform for Ageing Well; International R&D cooperation with US and Japan; Support Action on ICT and Ethics in Ageing domain

Orientations e-Inclusion FP7 WP 2009-2010

- Accessible & Inclusive ICT:
  - Brain/neuro computer interaction
  - "Virtual user"

- Ageing:
  - Open Platforms for independent living, mobile/stationary, work/home, linking to health & energy
  - Robotics for independent living

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Conclusions

- Ageing well in the Information Society - **social necessity and economic opportunity**

- Service Robotics has great potential:
  → A robot in every Home ? ,
  - but need for **Integrated care service provision**

- **FP7 ICT WP2009-10** incl. "service robotics for ageing" **launched** by the European Commission in Nov.2008
  - Building on research results from challenge 2.

- **ICT2008 conference in Lyon, 25-27 Nov. 2008**
  - An unique opportunity for networking

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Further Information

- EU ICT and Ageing Well Initiatives
  http://ec.europa.eu/einclusion

- WP2009-10 publication on CORDIS
  http://cordis.europa.eu/fp7/ict/

- ICT 2008 Conference Portal
  http://ec.europa.eu/information_society/events/ict/2008/

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