

**Workshop:**

# **Assistive Technology for Persons with Disabilities and Older People with Impaired Mobility**

**Christian Dayé, Gesa Hansen, Paul Panek**

**Conference**

## **Ageing and Disability**

**Disabled people are ageing - ageing people are becoming disabled**

**June 8th to 9th, 2006, Graz, Austria**

**<http://www.ageing-and-disability.com>**

## Abstract:

Restricted mobility due to disability or old age is often caused by different factors. Not only the individual's physical situation but also fears and external factors in the living environment are playing a crucial role.

Assistive technology can significantly support older and disabled persons to overcome existing barriers; it can empower them to live their lives in a more autonomous way and thus lead to a higher quality of life. The European Commission has funded several technological research projects for developing new knowledge and products. This covers, among others, systems for supporting elderly car drivers, for prevention of falls, technical aids for persons with dementia, supportive toilets, continence management systems, criteria for supporting independent living at home and many more.

When developing technology for disabled and aged persons, they should be understood as experts who can contribute to the development process: their daily life experience, their primary knowledge about the problems related to disability or age, is an important resource.

The involvement of users right from the beginning thus leads to outcomes of higher quality and makes sure that research and development of assistive technologies take into account the actual needs and preferences of older people.

Better technology is urgently needed and appropriate new technology is accepted well if it is easy to use and tailored to the actual needs of daily life.

## Accessible version of this document:

Due to technical reasons this document was optimised for producing printed handouts. An accessible version of the presented slides can be downloaded from <http://www.fortec.tuwien.ac.at/reha.e/projects/frr/frr.html#s9>. We apologize for any inconvenience this may cause.

## Content:

### **Results and conclusions from European research actions on new technologies for the quality of life and mobility of older people ..... 4**

Dr. Gesa Hansen, Scientific officer, European Commission, Directorate General Research, Brussels, Belgium.

- Impaired mobility in old age is multifactional: there are physical, environmental factors and psychological factors.
- Research and development of assistive technologies must take into account the needs and preferences of older people.
- Older People can contribute to research, providing vital knowledge.

### **Assistive Technology to Support Older Persons' Daily Life ..... 11**

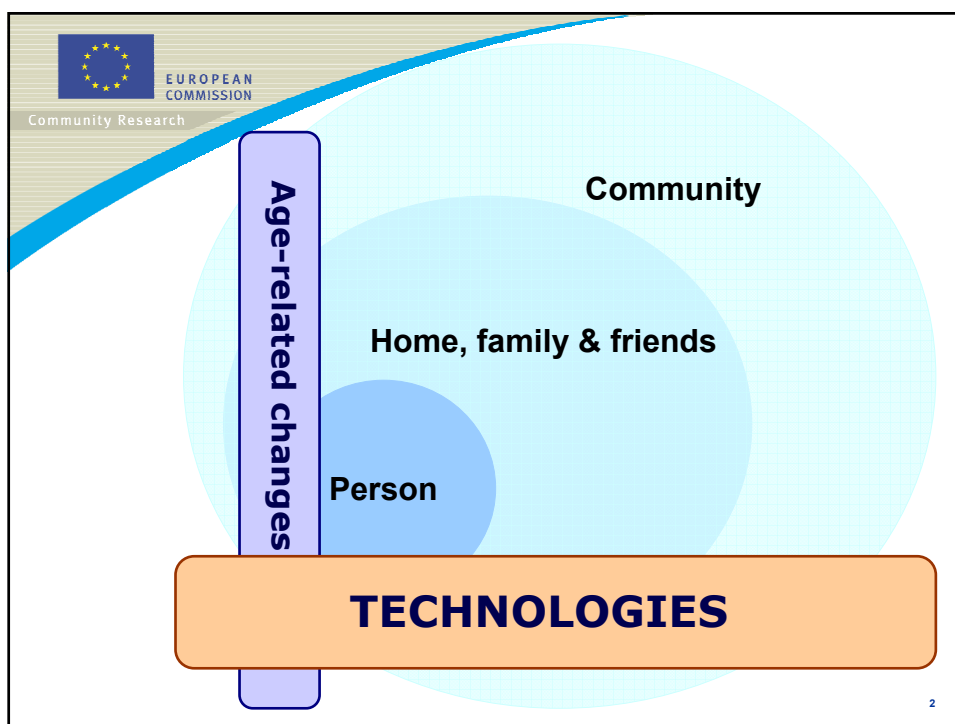
Paul Panek, Assistive Technology developer, forttec – Research Group on Rehabilitation Technology, Institute „integrated study“, Vienna University of Technology, Vienna, Austria.


- Applying new technologies in the toilet room can be very helpful for older persons.
- Users were involved in the toilet development project right from the beginning.
- New Technology is accepted well if it is easy to use and tailored to the actual needs of daily life.

### **Why Involving Users? ..... 20**

Christian Dayé, sociologist, EURAG - European Federation of Older Persons, General Secretariat, Graz, Austria.

- Better technology is urgently needed in many areas of daily life.
- User Involvement, the process of involving users into the process of developing a technical aid or a service, leads to outcomes of higher quality.
- Users should be understood as experts who can contribute to the development process: their daily life experiences are an important resource to projects concerned with Research & Technological Development.





 EUROPEAN COMMISSION


**ENABLE**

Enabling technologies for persons with dementia


**Lost objects**




**cooker-monitor**




**Day & Night Calendar**



**Big button phone with pictures**



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 Community Research

**Enable Age Project**

ENABLING AUTONOMY, PARTICIPATION, AND WELL-BEING IN OLD AGE:  
 THE HOME ENVIRONMENT AS A DETERMINANT FOR HEALTHY AGEING

THIS PROJECT IS BEING SPONSORED BY THE EUROPEAN COMMISSION (QLV6-CT-2003-00334)

**Most common physical limitations were:**

- Difficulty in bending and kneeling
- Prevalence of poor balance
- Reliance on walking aids

**Housing accessibility barriers and obstacles:**

- ➔ No grab bars at shower/bath/toilet
- ➔ No/too few seating places in public areas
- ➔ High curbs on road next to house
- ➔ Outside path and surface not level
- ➔ No handrails on staircases

**Policy recommendations:**

- ➔ Ensure accessible housing (for new houses and renovations)
- ➔ develop norms and standards
- ➔ In general reduce barriers and obstacles for all
- ➔ Provision of information for citizens on what accessible housing means

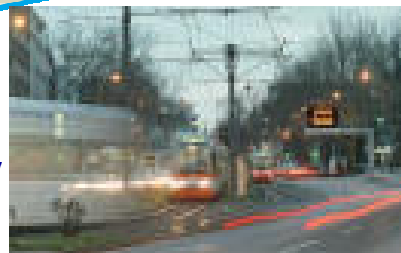
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## MOBILATE Enhancing Mobility in Later Life



**There are 2 types of environmental obstacles to outdoor mobility:**

- spatial and technological barriers
- impediments caused by a lack of mutual consideration,
- the hectic pace of traffic,
- feared hazards in public spaces.

**In view of the work carried out in the project, there is a need of integrating transportation policy, urban and social planning, promoting:**

- ⇒ fully accessible public transportation options
- ⇒ providing readily accessible shops and services in easy reach
- ⇒ mutual consideration – a social task.

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## FRR Friendly Rest Room



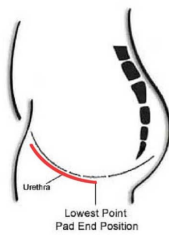
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## NICMS Non-invasive continence management system



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## PROFANE Prevention of Falls Network Europe



Balance-training



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### Technology Projects:

- **AGILE** Aged people's integration, mobility, safety and quality of life through driving



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### Older People are contributing to research, providing vital knowledge;

- As originators of ideas for technologies and new ways of coping
- As testers of technical prototypes
- As discussion-partners in technology projects; offering critique and suggesting improvements
- As co-workers in the research process (e.g. keeping research diaries)
- As subjects in advanced medical and clinical trials
- Always under full ethical controls and informed consent

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## Technology Challenges

**New technologies must be:**

- ✓ Acceptable
- ✓ Easy to use
- ✓ Appropriate
- ✓ Affordable

for older people

**Important!**

**“older people-friendly” does NOT equal  
the general term “user-friendly”**

*Example: daily used electronic equipment*

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## Conclusions

- 1. Research and development of new technologies must take into account the needs and preferences of older people across Europe.**
- 2. Technological solutions must not lead to the isolation of elderly people.**
- 3. Small and medium sized enterprises (SMEs) should participate more actively in ageing research as this is a growing but specialised economy**

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## Information about research funding

- **EC FP5 - Quality of Life Programme**

Key Action 6 The Ageing Population:

- KA6 Project Synopses (Download)
- Mid-Term Assessment Report (2003) of Key Action 6 (Download) <http://www.cordis.lu/life/>

- **General information on research:**

<http://europa.eu.int/comm/research>

- **General information on the new Framework Programme (FP7, 2006-2010):**

[http://europa.eu.int/comm/research/future/index\\_en.html](http://europa.eu.int/comm/research/future/index_en.html)

- **Information on research programmes and projects as well as FP call documents:**

<http://www.cordis.lu>

- **Information requests:**

[research@cec.eu.int](mailto:research@cec.eu.int)



# ***Assistive Technology to Support Older Persons' Daily Life***

**Workshop:**  
***Assistive Technology for Persons with Disabilities and  
Older People with Impaired Mobility***

**Paul Panek**



fortec – Research Group on Rehabilitation Technology  
Institute „integrated study“  
Vienna University of Technology

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## ***Institute „integrated study“***



**1) Support Unit for disabled  
students**

**2) Research Group for  
Rehabilitation Technology  
(fortec)**

- ❖ Head: Wolfgang Zagler
- ❖ Since 1986
- ❖ Research and Technical Development, Human Computer Interfaces for disabled and older persons, evaluation, ethics

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## ***Examples of Recent Research Projects***

- Intelligent Toilet
- Extended Emergency Call System
- Mobility Enhancement Platform

## ***Friendly Rest Rooms for Elderly and Disabled Persons (FRR) Project***

- EU funded, 2002-2005,  
10 partners from 7 countries.
- Aims:
  - ❖ User friendly toilet
  - ❖ Adapts itself to the individual needs
- Approach:
  - ❖ User driven & multidisciplinary

## ***User Involvement & Ethics***

### ■ User Involvement

- ❖ Interviews, Discussion groups, Questionnaires
- ❖ Over full project duration (user boards)
- ❖ Interaction between

user <----> toilet prototype

- ❖ Primary and Secondary Users

### ■ Ethical Review

## ***Modular Prototypes of Friendly Toilets***

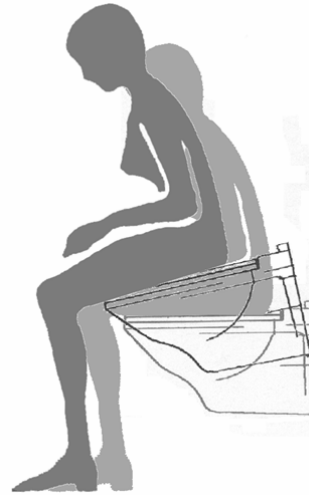
### ■ Some components:

- ❖ Adjustability of Tilt and Height
- ❖ Comfort Wash basin
- ❖ Speech Input and Output
- ❖ Sensors for recognising falls
- ❖ User Identification

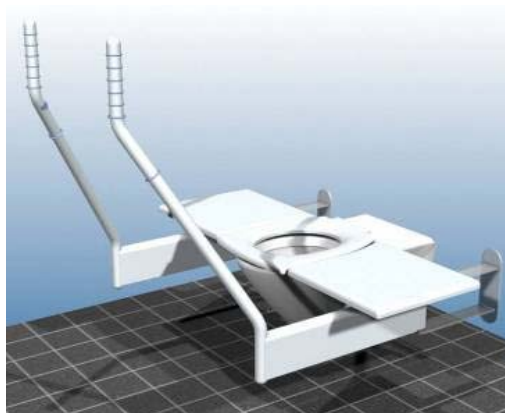
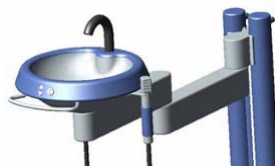


## ***Adjustable Height and Tilt***

- Height of bowl
- Tilt of bowl
- Different positions are possible e.g. for transfer, sitting...
- Standing up aid



## ***Vertical bars and moveable wash basin***



## User Identification - A self adapting toilet

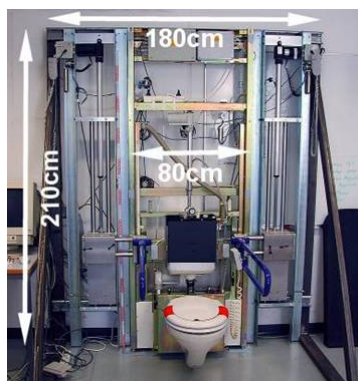
- Recognising the user and his/her preferences.
- Works in a contact less way (RFID)
- Smart Card (credit card format)
- Privacy of data



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## Tests in Laboratory

The very first prototype



Several cycles of user-testing



Note: All persons visible on these pictures have explicitly agreed to publication of this material

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## **User Tests 2002 - 2005**

- Laboratory: ~ **200 prototype tests with users** in 5 labs in Europe
- Daily Life: ~ **300 toilet sessions** in a day care centre in Vienna



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## **Main Outcomes**



**[www.santis.org](http://www.santis.org)**

- Well accepted and highly appreciated
- Benefits for primary & secondary users
- Higher autonomy, safety, quality of life
- Toilet in day care centre still in use
- Product available since early 2006
- Germany: care insurance will support private installations (Thanks to BIVA)
- Some features are part of bid of Vienna Airport skylink terminal extension

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### ***Extended Senior Alarm Systems***

- Most older people want to live in their own home as long as possible
- Existing alarm systems are useful but limited



- → Development of new portable life-signs monitors

### ***SILC – Supporting Independently Living Citizens***

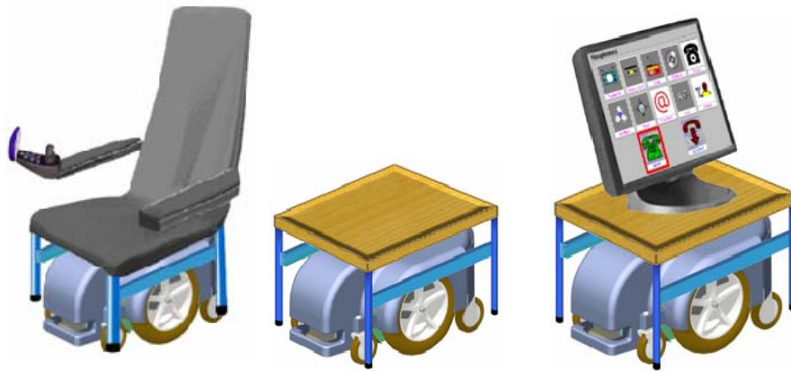
- Integrated biometric sensors
- can trigger an alarm call automatically



## **MOVEMENT**

### **Modular Versatile Mobility Enhancement Technology**

Modules for moving people, objects and information



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# ***Thank you !***



**Consider to visit the web site  
of manufacturer ([www.santis.org](http://www.santis.org))**

**Homepage:**

**[www.fortec.tuwien.ac.at/frr](http://www.fortec.tuwien.ac.at/frr)**

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## **Acknowledgements**

- FRR was partially funded 2002-2005 as project QLRT-2001-00458 in the EU/FP5/Quality of Life Programme. Project partners were:

- ❖ **Industrial Design Engineering** - Delft Univ. of Technology (NL),
- ❖ **Fortec** - Rehabilitation Technology, Vienna Univ. of Technology (AT)
- ❖ **Certec** - Dep. of Rehabilitation Engineering, Lund University (SE),
- ❖ **EURAG** - European Federation of Older Persons (AT),
- ❖ Laboratory of **Health Informatics** – University of Athens (GR),
- ❖ **Applied Computing** – Dundee University (UK),
- ❖ **Landmark** Design Holding (NL),
- ❖ **Clean Solution** Kft (HU),
- ❖ **SIVA** (IT),
- ❖ **HAGG** – Hellenic Association of Geriatrics and Gerontology (GR)
- ❖ **Ethical Review**: TU Vienna (M. Rauhala, I. Wagner)

- Special thanks to:

- ❖ Austrian **MS Society** and **Caritas Socialis**, Vienna

## **Contacts regarding Intelligent Toilet Project**

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**[www.fortec.tuwien.ac.at/frr](http://www.fortec.tuwien.ac.at/frr)**

# Why Involving Users?

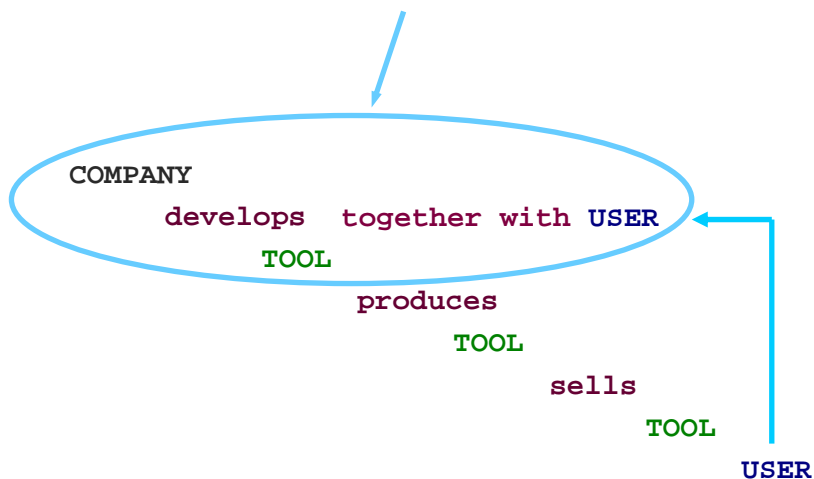
Christian Dayé

EURAG - European Federation  
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## User Involvement?



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## What does that mean for the user?

**USER:** not only **CONSUMER** of Assistive Technology, but also

**PART** of the development team,  
because s/he is seen as:

(Experience-based) **EXPERT**

(H. M. Collins & Robert Evans, 2002)

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## Why involving users?

### OVERVIEW of the argument

- There is a need for better technology
- Project realizing user involvement are more likely to lead to better technology



User involvement helps to help

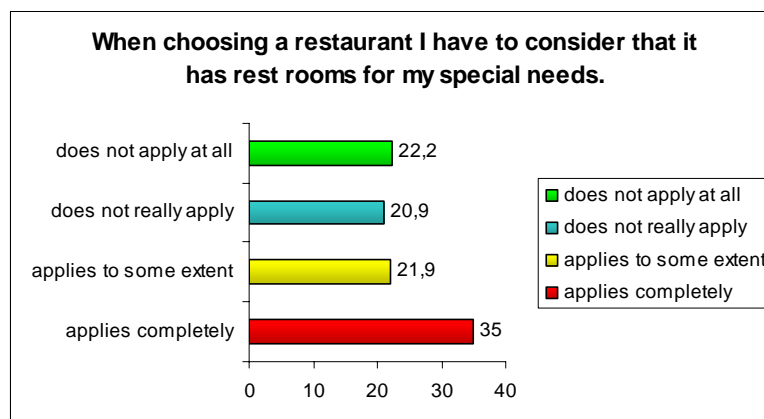
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## There is a need for better technology - example: toilet



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## There is a need for better technology - example: toilet



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There is a need for better  
technology - example: toilet



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User Involvement leads to  
better technology

KNOWLEDGE is a RESOURCE

KNOWLEDGE comes from EXPERIENCE

USERS have KNOWLEDGE

Their KNOWLEDGE is an important and  
valuable RESOURCE for those who want  
to develop new and better technology

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## What is required for User Involvement?

### COMPANY / RESEARCHER

To understand the value user involvement can bring to the outcome of research and development work

To accept and integrate users as EXPERTS who have something very valuable to offer: KNOWLEDGE based on EXPERIENCE

### USER / REPRESENTATIVES

To see that taking part in research projects contributes to the development of better technology

To participate in or to support UI projects and to seek and provide information for persons interested in UI

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## THANK YOU!

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