

Fortec - Forschungsgruppe Rehabilitationstechnik TU Wien

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fortec – Research Group on Rehabilitation Technology, Vienna University of Technology, Institute of Industrial Electronics and Material Science (IEMW)



ISAAC Regionalgruppe, Graz, 23. Mai 2003

22/05/2003
S. 1

Fortec – Research Group on Rehabilitation Technology

fortec was established in 1986 to intensify and consolidate efforts related to research and development of new technical solutions for disabled and elderly persons.

Head:
Ass.Prof. Dr. Wolfgang L. Zagler



fortec belongs to the Institute of Industrial Electronics and Material Sciences at the Vienna University of Technology

22/05/2003
S. 2

Inhalt

- Projekt Autonom – AAC und ECS
- Projekt Fasty – Word Prediction
- Projekt RESort - Telehilfe
- Projekt SILC - Notrufsystem
- Projekt FRR – Intelligente Toilette

- Lehre – Vorlesungen

22/05/2003
S. 3

Projekt AUTONOM www.fortec.tuwien.ac.at/autonom

A Technical Assistance System is a mediator between a severely disabled person and her/his physical and social environment

Aim:

- ❖ Increasing independence and autonomy
- ❖ Improving Quality of Life
- ❖ Provision of new ways in therapy and teaching

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S. 4

Parts of the System:

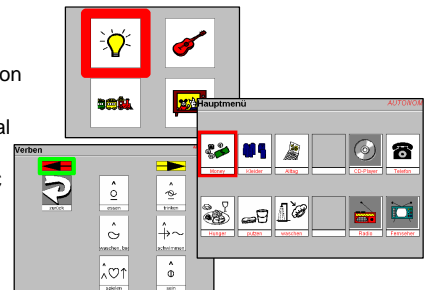
- ❖ CD-ROM with **software**
- ❖ Infra-Red for Environmental Control
- ❖ Sensor-Box for connecting input switches
- ❖ ... and a Laptop or a PC



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S. 5

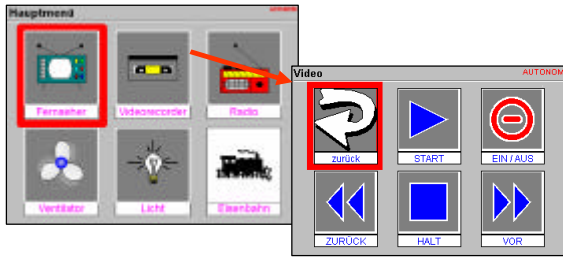
Functionality – What can I do with it?

- ❖ Communication (AAC)
- ❖ Environmental control
- ❖ Access to PC

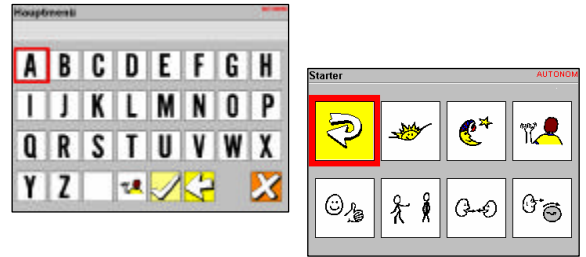


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S. 6

Environmental Control – TV, VCR, CD-Player, ...



Communication with Symbols and/or Text Using Synthetic or Pre-recorded Speech



Controlling a Phone via infra-red

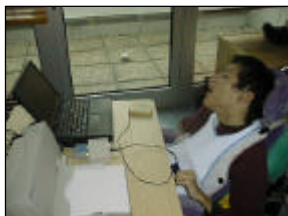


Some Selected Applications of AUTONOMY in Activities of Daily Life (1995-2002)

- Severely Motor & Multiple Impaired Children: Elisabethinum Axams, Tyrol (since 1995), Viennese school (since 1998)
- Non-Speaking wheelchair bound woman, living independently at private home in Vienna (since 1998)
- Home for the Elderly (Field Trial 1998)
- Patients after traumatic injury: AUVA Rehabilitation Centre Bad Haering in Tyrol (since 2000)
- MS Patient in privat flat in Vienna (Field Trial with occupation therapist, 2000-01)
- Non-Speaking wheelchair bound man, accessing PC and the internet via single switch, Vienna (since 2001)
- Single Switch Using Student, accessing PC for studying informatics and writing source code (since 2000)

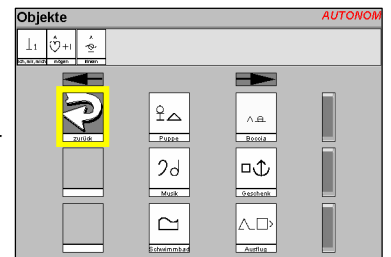
Genrot at Elisabethinum Axams

- ❖ Restricted in perception
- ❖ 2 Switches, Scanning Operation, (YES=SELECTION, NO=GO ON)
- ❖ As many senses as possible shall be touched
- ❖ Four Large Symbols, Thick red Frame
- ❖ Each symbol is combined with a sound - acoustic Feedback



Writing with BLISS

- Details:
- ❖ Simple Editor Line
 - ❖ BLISS-Letters for pen-friend in Greece are printed out independently by user



Non-Speaking Severely Motor Disabled Person Using AUTONOMY system for communication, control and listening to lectures notes
 Input device: Head stick and/or Single Switch



private home, Vienna

Student at Vienna Univ. of Technology accessing via AUTONOMY a programming environment on another PC in order to do his studies of informatics



Input via single foot switch, autom. Scanning, scan time 0.8 sec, appr. 3,600 icons (symbols) structured in appr. 115 menus (levels). Used for writing Source Code as to be done in the framework of informatics courses, personal report by student (in German) to be found on <http://www.fortec.tuwien.ac.at/seminar>

2. Anwenderseminar am Fr. 13.6. im Elisabethium Axams – Infos: www.fortec.tuwien.ac.at/seminar



Projekt FASTY
www.fortec.tuwien.ac.at/fasty

will assist motor, speech, learning and language impaired persons to produce texts faster, with better grammar and spelling.

Key word: **Predictive typing**

Goal: Increase the typing speed with the support of an intelligent program (Word prediction, Auto-completion of words, ..)

Existing predictors for English perform VERY poor with German, French, Dutch etc.

Basics about typing

■ Typical typing speeds:

- Able bodied writer using keyboard: 200 – 300 char/min
- Keyboard operated by mouth-stick: 75 – 120 char/min
- Text entry using a scanning method: 3 – 10 char/min !!

■ Typing important for:

- Written communication (letters, reports, etc.)
- Spoken communication (TextToSpeech synthesizer)
- Using Information Technology (Email, Internet, etc.)



About User Abilities

Assessment of the basic user performance with a so called 'User Ability Assessment Tool':

- User Questionnaire
- Time Measurements
- Test of Hand-Eye Coordination
- Text Writing

About Text Collection

Collection of relevant textual material from disabled people to build or supplement a text corpus

Realisation: Using a Text Collection Tool developed in the project for

- extracting text from the user's PC and from the Internet
- replacing personal data by neutral tags

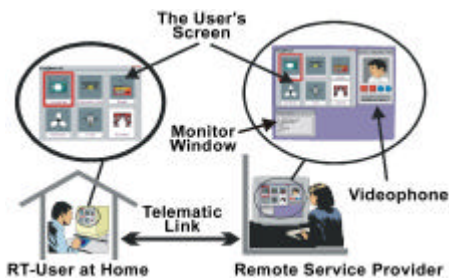
Projekt RESORT – TeleHilfe

www.fortec.tuwien.ac.at/resort

- **Lesson learned in providing Assistive Technology to severely disabled persons**
 - ❖ Starting point of a long-time tailoring-process
 - ❖ Carers (professionals and family members) are the key agents for this tailoring
 - ❖ Carers often lack technical experience
 - ❖ Professional engineering assistance is expensive (distance between customer and expert, travel costs)

RESORT

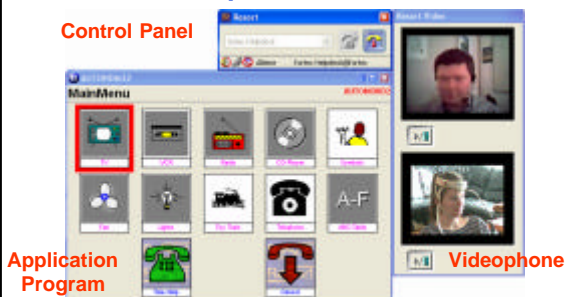
Remote Service or Rehabilitation Technology



Objectives

- Development of an innovative tool which is able to provide tele-services
 - ❖ Dedicated for users of **PC-based RT systems**
 - ❖ Including **care persons** and **disabled persons**
- Goals
 - ❖ Reducing existing barriers when using RT devices
 - ❖ Improving the overall benefits of applying RT in daily life
- Development of an open RESORT protocol

Desktop at RESORT Client



Project SILC

www.fortec.tuwien.ac.at/silc

Aim:

- Aim of the project SILC is to prolong the quality of life of older and infirm people by postponing the need for institutionalisation.
- SILC shall give the user the ability and confidence to continue to live in the community longer.
- To achieve this, a portable wrist-worn life-signs monitor is developed

SILC Usage scenarios

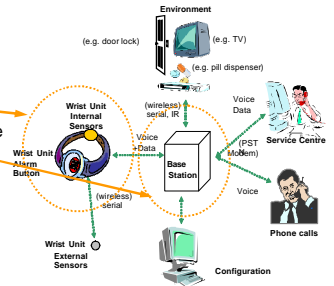
- Expressed need for more safety and security
- Health status and fall detection (automatic monitoring)
- Check call services and periodic contacts (personal communication, access telephone without need to move)
- Reminders for medication or periodic business (automatic reminder)
- Remote control of door lock or household appliances (remote control).
- Possibility to add external sensors, modularity

All applications require the user to permanently wear the SILC device in order to provide maximum benefit.

System Structure

Main units:

Wrist Unit (WU)
Base Station (BS) linked to the Service Centre (SC)



Wrist worn part

- ◆ Manual Alarm function
- ◆ Voice connection to Service Centre
- ◆ Phone function
Make/accept calls hands-free
- ◆ Environmental Control
Door lock, TV
- ◆ Sensor generated alarm



Projekt FRR – Intelligente Toilette

www.fortec.tuwien.ac.at/frr

- Gathering knowledge and perceptions (not existing today) regarding
 - ❖ toileting
 - ❖ personal hygiene
 - ❖ falls prevention
- among the aging populations in Europe

This should then provide a basis for developing a new type of toilet....

Friendly Rest Room

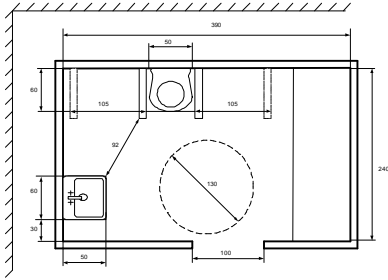
9 Probleme

- Aus-, ankleiden
- Selbstreinigung nach Benutzung der Toilette
- Boden: entweder rutschig oder schwer zu reinigen
- Bewegungsfreiheit bzw. Türöffnung-, schließung
- Einheitsgröße für alle
- Position-, Stabilität der Haltegriffe
- Fehlende Ablagemöglichkeit für persönliche Dinge
- Beleuchtung - Helligkeit, automatisches einschalten
- Position Toilettpapierhalterung, Seifenspender

9 Wünsche

- Verschieden und in Größe adaptierbare Einrichtung
- Flexible oder selbstjustierbare Haltegriffe
- Sprachgesteuerte Bedienung der Toilette
- Persönliche Datenspeicherung der Erfordernisse
- Intelligente Alarmierungseinrichtung
- Robuste, verlässliche, wartungs-, reparaturarme Einrichtung
- Selbstreinigungsvorrichtung (Bidetfunktion)
- Design welches Hilfe von 2. Person ermöglicht

Testaufbau Schweden



Testaufbau Schweden



FRR early prototype Vienna



Height: 213 cm
Width: 165 cm
Weight: 400 kg

Elektronische Hilfen für behinderte und alte Menschen

Wolfgang Zagler

Institut für Industrielle Elektronik und Materialwissenschaften

fortec

FORSCHUNGSGRUPPE FÜR REHABILITATIONSTECHNIK



VO 383.510
WS, 1,5 Std.

Kommunikationstechnik für behinderte und alte Menschen

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FORSCHUNGSGRUPPE FÜR REHABILITATIONSTECHNIK



VO 383.041
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