Interfaces for People with Disabilities

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Major Impairments
- a continuum of capabilities

- Vision - low vision, blindness
- Hearing - hard of hearing, deafness
- Speech - disarthric speech, swallowing
- Movement - spinal cord injury, amputation, arthritis
- Cognitive - stroke, brain injury
- Multiple - deaf/blindness
Major Functions and Activities Affected

- Vision - seeing, reading, navigation
- Hearing - communication
- Speech - communication
- Movement - mobility, grasping, feeding, navigation
- Cognitive - understanding, learning, remembering, scheduling
Computer Activities Affected by Disabilities

- seeing the screen
- moving the mouse
- keyboarding
- handling media
- using a printer
- hearing system sounds
- understanding
Rationale for Adapted / Assisitive Devices

- independence
- privacy
- quality of life
- empowerment
- cost savings
- inclusion / mainstreaming
Device Design Issues

- size, portability, battery power
- aesthetics
- social acceptance
- mental load
- physical fatigue
- communication speed
- ability to interact with environment
- ability to integrate with other devices (computers)
- market size
- economics
VA RR&D Projects

- Ultrasonic Head Control Wheelchair and Interface
- Lingraphicia
- HandBike
- Lower Body Positive Pressure
- Robotics
- Fingerspelling Hand
- Stepping Over Training
Ultrasonic Head Control
Wheelchair and Interface

- Disability - spinal cord injury
- Function - mobility
Lingraphica

- Disability - brain injury
- Function - communication
HandBike

• Disability - paralysis, amputation

• Function - mobility, recreation
Lower Body Positive Pressure

- Disability - recovery from neurologic disease and orthopedic procedures
- Function - facilitates walking therapy
Robotics

- Disability - spinal cord injury
- Function - vocational training, movement, physical therapy
Fingerspelling Hand

- Disability - deafblindness
- Function - communication
Stepping Over Training

- Disability - stroke, COPD

- Function - training to better negotiate obstacles
Commercial Products

- Braille Displays
- Screen Readers
- Computer Access software / hardware
- Speech synthesis
- Voice recognition
- Recreational devices
- Communication devices

The following products and links are presented here for reference and informational use. The Rehab R&D Center cannot accept responsibility for the product or commercial information that they may contain. The Rehab R&D Center does not endorse any particular policy, program, product, service, position, issue, conference, presentation, research, website, therapy, or commercial organization.
Memory Aid

- Disability - head injury, Alzheimer’s, ADD
- Function - planning, scheduling, cueing
**Darci** PCMCIA Card

- Disability - movement, non-vocal
- Function - computer access, communication
One Hand Keyboard

- Disability - amputation, movement
- Function - computer access, communication
Eye Gaze System

- Disability - paralysis, amputation, movement
- Function - computer access, communication
On Screen Keyboard

- Disability - amputation, spinal cord injury, movement

- Function - computer access, communication
Tongue Touch Keyboard

- Disability - spinal cord injury
- Function - computer access, environmental control, wheelchair control
Wivik On Screen Keyboard

- Disability - spinal cord injury, movement
- Function - computer access
Voice Recognition

- Disability - spinal cord injury, movement, hands busy
- Function - computer access
Personal Reader

- Disability - low vision
- Function - access to printed media
Ski Sled

- Disability - spinal cord injury
- Function - recreation
Braille Notetaking

- Disability - blindness
- Function - notetaking
Communicator

- Disability - non-vocal
- Function - communication
Communicator

- Disability - non-vocal, movement
- Function - communication
Augmentative Communication

- Disability - non-vocal, movement
- Function - communication
HandTyper

- Disability - grasping, spinal cord injury
- Function - computer access
Head Tracking

- Disability - amputation, movement, spinal cord injury
- Function - computer access
Mouse Substitute

- Disability - spinal cord injury, movement
- Function - computer access
Ke:Nx

- Disability - movement
- Function - computer access to Mac
Braille Display

- Disability - blindness
- Function - braille output
OCR Scanner

- Disability - low vision
- Function - access to printed material
On Screen Keyboard

• Disability - spinal cord injury, movement

• Function - computer access
Telebraille

- Disability - blindness
- Function - telephone communication
Tactile Braille Display

• Disability - blindness

• Function - access to graphical information
Personal Robot

- Disability - mobility
- Function - food service manipulation

Cye
Non-Human Communication

- Disability - non-vocal
- Function - communication
Portable Braille Display

- Disability - blindness
- Function - reading electronic books
Talking ATM

- Disability - blindness
- Function - personal banking
Brain Control

- Disability - lack of motor control
- Function - control computer or robot by thoughts

“Bionic Rat”
Portable AAC

- Disability - non-vocal
- Function - augmented portable communication using speech synthesis
AI Speech Recognition

- Disability - keyboarding
- Function - computer and Internet access through an agent
Java and Jini

- Disability - lack of cross-platform access

- Function - provides development environment with built-in access
VR Oscilloscope

- Disability - hands and sight occupied
- Function - hands-free control
Braille Laptop

- Disability - blindness
- Function - portable computer
Signing Avatars

- Disability - deafness
- Function - onscreen signing agent for communication or learning
Feelings

- Disability -
- Function - communicate tactile sense
Add Speech Recognition

- Disability - manipulation, hands occupied
- Function - add voice recognition interface to system
Web Resources

- Jim Lubin’s website
- RESNA SIG-11 webpage
- Rehabilitation R&D Center