Development of a PC-Mouse for the Aged and Disabled and Transfer to Market
(Article submitted for presentation only)

Karlheinz BLANKENBACH, Alfred SCHAETTER
School of Engineering, Pforzheim University
Pforzheim, 75175, Germany

and

Christoph Jo. MUELLER
INCAP, Bauschlotter Str. 62
Pforzheim, 75175, Germany

1. Introduction
The population in many modern industrial countries is rapidly ageing [1] while the use of PCs became more and more relevant in daily life. The problems of handicapped people using a mouse are well known since two decades, e.g. [2]. Many approaches to overcome those issues have been made, e.g. [3], however they don’t provide both ergonomics and handicap-compensation in a single mouse. That was the motivation at Pforzheim University to start a new approach.

2. Mouse for the Aged and Disabled
Intensive literature examination results in the following requirements for an advanced PC mouse
- Ergonomic shaped large housing with finger rests
- Reduced functionality: No wheels etc. were integrated as surveys show the elder people mostly don’t use those features
- Simple operation by double click via dedicated button
- Hands-on sensor: Mouse pointer in PC does not move when no hand is on mouse to avoid unwanted movements.
- Adjustable ‘weight’: A current-adjustable solenoid ‘glues’ the mouse on its pad with covered steel when no hand lays on the mouse. When the hand is present, the solenoid virtually increases the weight helping to reduce tremor.

All this features could only achieved by implementing a microcontroller with USB-interface. Huge effort was necessary to glue the µC to the commercial optical mouse IC which lacks of documentation. The advantage is that all features and algorithms are implemented in the mouse. Figure 1 show the prototype developed at Pforzheim University

3. Results
Many tests (see Figure 2) were made with aged and handicapped people in order to improve the new mouse in terms of shape, placement of pushbuttons and algorithms for tremor compensation. During this time the contact to INCAP [4], a company which is a leading supplier of electronic aids, was made. Before start of mass production of the mouse, acceptance tests were made at several fairs and conferences like ATIA and CSUN in the US and REHACARE, Germany.

4. Conclusions
We developed and transferred a PC mouse with special algorithms and features for the aged and disabled from academia to industry. Tests with subjects were very successful. Our PC mouse is now available via INCAP [4] starting at 150 $.

5. References