Modular Versatile Mobility Enhancement Technology

Research and Development Project

MOVEMENT aims at the development of a modular versatile mobility enhancement system. The core is formed by an intelligent mobile (robotic) platform which can attach to a user definable selection of application modules (e.g. chair, manipulator, ICT Terminal) which are more or less inconspicuous mainstream articles but will become powerful assistive devices when the mobile platform attaches to them. All three dimensions of personal mobility - MOVEMENT of People - MOVEMENT of Objects - MOVEMENT of Information - are comprehensively addressed.

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Introduction

As mobility is a challenging key factor for personal independence and self determination and because it is inseparably linked to our quality of life, MOVEMENT stands for the transfer from the existing state of the art to a user oriented, modular as well as market compatible system approach to enhance societal mobility.

In our "Information Society", mobility can be described in three dimensions:

- MOVEMENT of PEOPLE: Transfer of persons to locations they want to access.
- MOVEMENT of OBJECTS: Transferring objects to facilitate an interaction with the person.
- MOVEMENT of INFORMATION: Access to and transport of information in the "Information Society".

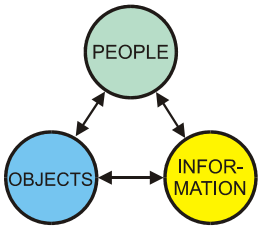

Fig.1: Interaction Triangle: Mobility in the "Information Society"

In a society where the percentage of old and disabled people is increasing at a significant rate, securing all three dimensions of mobility must be a social and technological goal of the highest priority. The MOVEMENT project will address all three dimensions of mobility in the "Information Society" by research into and development of realistic and practical modules for moving people, objects and information. Present state-of-the-art solutions such as conventional wheelchairs and stationary terminals or fixtures will be replaced by an expandable system of intelligent and interacting modules, which supports the personal mobility of old and disabled people.

Motivation

Due to the continuously increasing life expectancy of people in western countries, the percentage of motor impaired people is constantly increasing. Less recent Europe-wide statistics denoted that 1% of the population is in need of a wheelchair and an additional 5,6% of people need some kind of walking aid. When also taking persons with chronic and age related diseases (poly-arthritis, rheumatism etc.) into account, recent statistics show much higher figures. In March 2003, the German Statistics Office calculated that 1,56 Million German citizens (1,9 % of the population) depended permanently or temporarily on a wheelchair. For Europe as a whole this translates to 7,1 Million people. The increasing wheelchair usage due to ageing is shown in Fig. 2 (left). Analyses in the USA have shown that only 50% to 60% of people in need of a power wheelchair are in fact able to use state-of-the-art equipment. An additional 20% to 25% could be accommodated if more intelligent controls and user interfaces were available (Fig. 2, right).

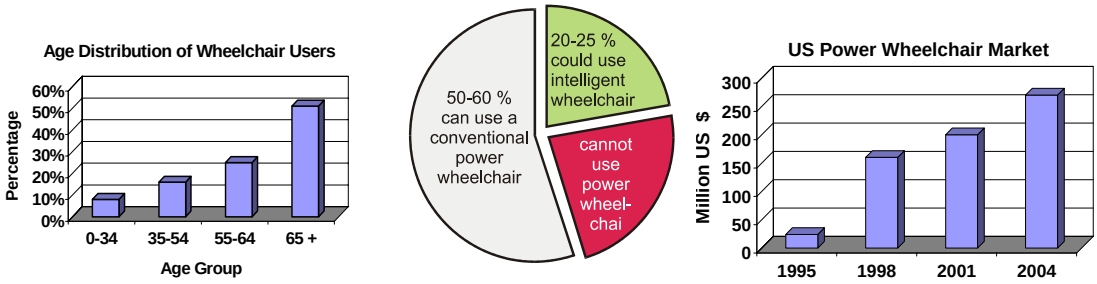

Fig. 2: Distribution of wheelchair users to age groups (left); usability of conventional wheelchairs and market segment for intelligent wheelchairs (right);

Loss of motor abilities (manipulation and locomotion) especially affects the aged female population not only due to their higher life expectancy, but also as a result of gender-specific chronic diseases. Whereas 31% of the male population aged 75-84 report mobility problems, the figure for the female population is as high as 52%. As the decrease in motor ability is gradual and slow, there is no pressing reason to begin using a wheelchair. Thus, the major part of the ageing population is shying away from using conventional mobility aids (crutches, walkers, wheelchairs) due to their stigmatising effects, even if walking causes increasing stress, fatigue and pain and despite the risk of falling and the consequences thereof.

Project Aims

The last decade saw the evolution of more and more complex wheelchairs demonstrating capabilities for navigation, manipulation and transport. However, theses systems never made it to commercialisation, since they are bulky and difficult to operate. They need to be engineered for each individual human and are still all in all very costly.

Recognizing the drawbacks, MOVEMENT aims at developing a new solution for supporting personal mobility which meets the users' expectations for an inconspicuous, non-stigmatising, tailor-able, ready to use and affordable mobility aid. As a consequence, the objectives of the project are:

- Addressing all three aspects of mobility (moving people, objects and information) by a fully modular set of assistive devices that can be freely assembled depending on the user's needs.
- Providing a concrete solution which can be placed on the assistive technology market soon after completion of the project.
- Pursuing an active dissemination and demonstration strategy by which users, care-givers and the health system is informed about the product under development, leading to awareness creation on an European level.

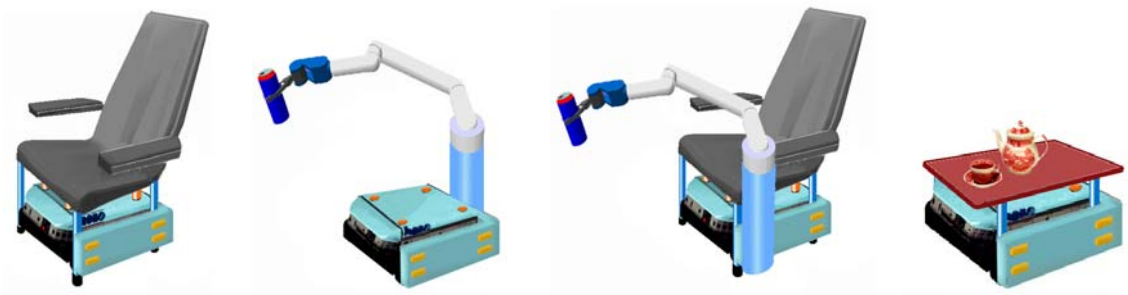

Fig. 3: Typical combinations of MOVEMENT-modules for moving people and moving and manipulating objects.

To achieve these goals the consortium integrates research and commercial know how from recent developments in the required fields of industrial automation, transport and wheelchair technology, manipulation and robotics devices, perception and control engineering, human computer interface technology, assistive technology and gerontechnology.

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offers up-to-date information on the project status and download of public project deliverables.