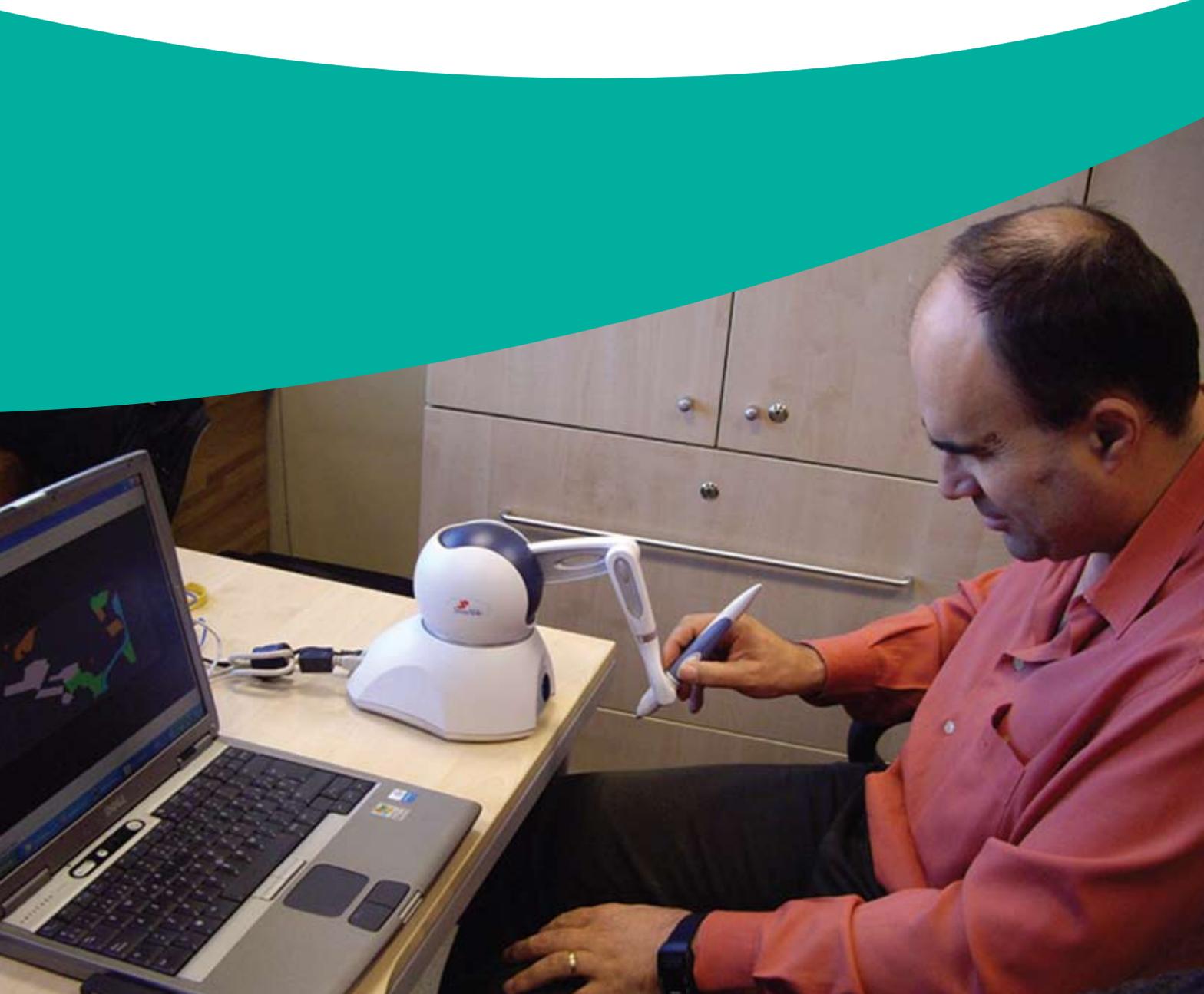# Research and development work relating to assistive technology 2007–08

Presented to Parliament pursuant to section 22 of the Chronically Sick and Disabled Persons Act 1970

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July 2008

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Introduction

About this report

Section 22 of the Chronically Sick and Disabled Persons Act 1970 requires a report to be laid before Parliament each year describing the research activity the Government has funded to improve equipment for disabled people. In 2000 the term 'disability equipment' was replaced by 'assistive technology' in the title of the report, reflecting the new terminology used in the field.

The definition for assistive technology is as follows: "Assistive Technology is any product or service designed to enable independence for disabled and older people." This broad definition means that a wide range of products and services are eligible for inclusion in the report, both high and low tech. Technological advances mean that the breadth of work covered is constantly expanding. The research covers not only specific products, but also systems, combinations of technologies, and interfaces to new mainstream technology, for example the internet.

The report aims to reflect research and development activity in relation to a wide range of impairments and health conditions and also to reflect the range of Government funding programmes across health, social care, education, housing and employment. The report covers any aspect of research and development work in assistive technology, including service provision, research on motivation, cost or patterns of use, as well as technological development.

Who is the report for?

This report is of interest to a broad audience including:

- Members of Parliament, Government decision makers and research funding organisations who can assess the impact of the investment made in research and development in this area and identify areas that may require future funding;

- The research community and industry who can identify useful activity in their area of interest, use the links to the Foundation for Assistive Technology (FAST) website, www.fastuk.org, to make contact with partner organisations and avoid duplication of effort;

- Service providers and people who use assistive technology or support others to use assistive technology, who wish to understand how advances in technology can directly benefit disabled and older people living actively in the community.

Report format

All the research featured in the report was started, finished or carried out in the UK during the period April 2007 – March 2008 and was funded by the Government or the European Union (EU). The report features projects that indicate the effectiveness of assistive technology in meeting the needs of a wide range of disabled and older people. These projects have been selected by the authors as illustrative of the potential benefits of investment in research and development into assistive technology.

The report includes, in Annex A, a listing of all Government and EU-funded research into assistive technology in the UK started, finished or carried out during the year. The listing enables readers to find further information on the FAST website, www.fastuk.org, including participant contact details and project progress. This information is freely available to the public, is regularly updated and provides the online format for this report. Further information on research and development in assistive technology funded by non-government organisations, on events, and service improvement activity can also be found on the FAST website.

Methods used for gathering information

The information provided in this report is gathered by desk research, including regular review of online information provided by research organisations, user representative and funding organisations, as well as information from sector journals, and information solicited directly from the research teams. The criteria for inclusion of projects in this report are that published project aims or progress includes a focus on assistive technology and that funding is through a Government source.

FAST are grateful for the support of the research and development community in providing the information included in this report. While all attempts are made to ensure that the information provided is comprehensive, there may be projects which have not been identified and we would be grateful for notification of any such projects.

The policy context

Organisations that support assistive technology research and development, such as the Research Councils, are increasingly channelling funding to activity that will address the social and economic challenges highlighted by Government policy. There is an acceptance that the focus of this research and development activity must reflect more closely the lives of disabled and older people and address the barriers they experience to participating in society.

Over the past year it has become apparent that the research and development community is seeking ways to make more effective use of the funding they receive. One way they are doing this is by entering into multidisciplinary collaborations that include industry partners and that seek to involve disabled and older people in the design process. There also appears to be a shift in thinking about the commercial development of assistive technology products that incorporates, from early design stages, an understanding of how to position the product to connect with the market. Increasingly this means that many products are designed for the private purchase market which opens up possibilities for new products, a greater range of styles and a clear focus on production and end product costs.

Diversification and innovation in service provision models

The greater awareness in the research community of market forces and of possible new routes to market has been stimulated by a raft of Government policy aiming for social care reform through radical "whole system change". A driving force behind the proposals is the increasing pressure on social care budgets as a result of our aging population, coupled with evidence that providing disabled and older people greater control over services results in a more effective use of resources.

In January 2008 the Department of Health published guidance on "Transforming social care", setting out the details of the new social care reform grant of **£520 million that will be allocated to councils on top of their mainstream core funding**. This funding will be provided over the next three years to help councils "redesign and reshape their systems to deliver personalisation through increasing individual choice and control". The guidance reflects the "Putting People First" concordat, also published in January, in emphasising independent living, prevention and early intervention, with greater choice and control for individuals through self-directed support and personal budgets, including the potential contribution of assistive technology and telecare.

At the same time there was concern voiced in the third annual report on the state of social care in England from the Commission for Social Care Inspection that, while those who qualify for council support are having a better experience than before, those who fall outside the system, including self funders, were reported as having a "poor quality experience that can leave them struggling to cope". These challenges have resulted in proposals that seek to find ways to support disabled and older people to access assistive technology more easily, whether through statutory services or directly through private purchase.

The Transforming Community Equipment and Wheelchair Services programme (TCEWS), being led by the Care Services Efficiency Delivery programme at the Department of Health, is currently piloting the retail model for community equipment services in the North West and, subject to Ministerial approval and completion of analysis, the retail model will be available to all England's regions from spring 2008. While the model is non-mandatory it is one of 14 key objectives in the "Putting People First" concordat for social care reform. The success of the Government's retail model for community equipment services depends on retailers in the private and third sectors responding to the challenge and expanding their product range and services. One example that retailers are responding to the needs of older customers is that in February 2008 home improvement company B&Q launched its "Can Do" product range to extend the lifespan of the home for older people. The expansion and diversification of potential routes to market is at the very early stages and the research and development community are looking at the implications of this shift and seeking to build partnerships with industry and retailers to bring prototypes through to market.

Translating research findings into health and economic benefits

Funding organisations have demonstrated a significant shift in emphasis towards increasing support for the commercialisation of assistive technology products and services to ensure disabled and older people can take advantage of the latest technologies. Key to these initiatives are collaborative partnerships between industry and researchers in universities and the NHS. It is hoped that investment in larger collaborative projects will result in less duplication of effort and in products and services that prove robust in the market and relevant to the needs of disabled and older people.

In January 2008 the Government launched two "Healthcare Technology Co-operatives" as part of the National Institute for Health Research's Invention for Innovation Research Programme. The co-operatives will bring together individuals and their carers, doctors, scientists and manufacturers to boost the development of new technology and products for people with "debilitating" conditions, fulfilling a recommendation in the final Healthcare Industries Task Force report published in March 2007.

The National Institute for Health Research (NIHR) and the Technology Strategy Board (with support from the Engineering and Physical Sciences Research Council and the Medical Research Council (MRC)) are investing up to £275,000 a year for two years in each of the two pilot co-operatives. One co-operative at the Barts and the Royal London Hospital will investigate new technologies to improve bowel function. The second based at Sheffield Teaching Hospitals will lead the Devices for Dignity Healthcare Technology Co-operative, looking into new technologies to support stroke survivors, disabled people and a range of conditions such as incontinence and chronic kidney disease. These co-operatives join an existing co-operative, the BioMed Healthcare Technology Co-operative in Bristol that was set up in April 2005 with funding from the Department of Health's Health Technology Devices (HTD) Programme. Its purpose is to accelerate the development and adoption of new technologies, treatments and devices for patients with intractable urinary incontinence.

In a separate initiative, NHS Innovations London announced the launch of a spin-off company, ATcare that will act as a design and development centre of excellence. With £2.35m funding from the London Development Agency, ATcare aims to provide the regulatory and business support required by innovators and designers in universities, the NHS and small enterprises to bring assistive technology to market. The business plan for ATcare has been informed by the expertise of key teams in academic

and NHS organisations who contributed information about the barriers faced by research teams when seeking to bring prototypes to market. The involvement of the London Development Agency is indicative of growing involvement of regional development agencies across the country in supporting their local assistive technology industries.

To establish a baseline level, FAST undertook a review of assistive technology projects funded over the past four years, looking at whether the projects aimed to develop a commercial product or service and, if they did, whether they had been successful. It appears that over the past four years:

- 15 projects aiming for product development did deliver a product that is now commercially available

- 76 projects aiming for product development did deliver a prototype or product that is not commercially available (it may be in process of commercialisation or may have failed to secure a foothold in the market)

- 9 projects aiming for product development did not deliver a product

- 279 projects did not aim for product development.
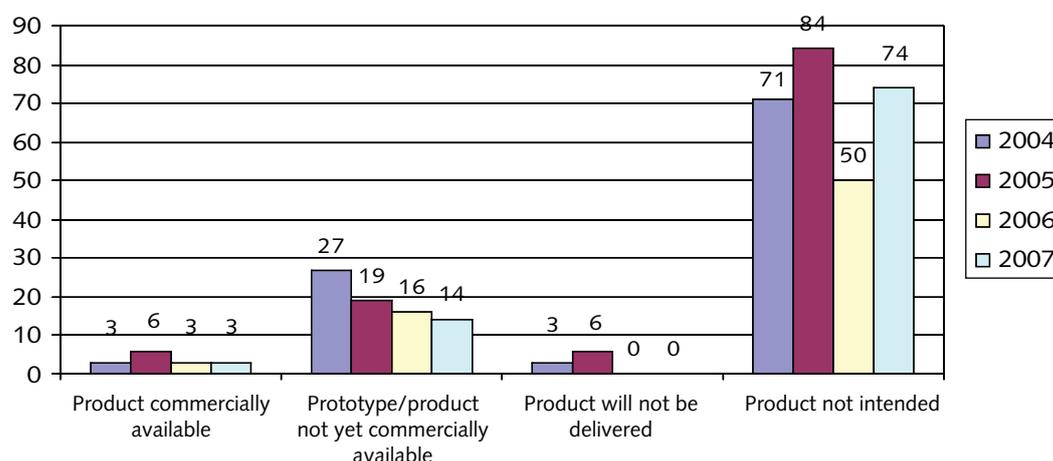
The reasons for not being able to bring a product or service through the research and development process and on to the market are multiple and complex. There are also many reasons for research and development activity in this area that does focus on commercial development of a product or services, including shaping policy and practice, understanding users' views of technology, and so on. Nevertheless this quick analysis, when repeated over the next few years, may serve to indicate a trend in research and development-funded activity towards successful commercialisation of assistive technology products and may also indicate the impact of growing links between industry and universities and the NHS.

The Department of Health is also co-sponsoring the Assisted Living Innovation Platform (ALIP) as a part of the Invention for Innovation Research Programme. ALIP, with initial funding of about £12 million, is managed by the Technology Strategy Board and aims to promote significant advances in the technology needed to enable people with chronic long-term conditions to live independently. A wide range of activity has been proposed, including fairly conventional short-term and long-term research and development. Because an Innovation Platform can take on a wide brief, the Technology Strategy Board is proposing work streams in standards, user centred design, knowledge transfer, business modelling and work towards a future technology demonstrator "suite". ALIP is also running the UK contribution to the European Ambient Assisted Living (under Article 169) Programme. The first programme of short-term research and development-funded work is due to be announced in summer 2008.

Moving healthcare closer to home for people with long-term conditions

Supporting people with long-term conditions is a key aim of a programme of "deeper and wider" reform of the NHS announced by the Prime Minister in January 2008. Plans to improve the management of long-term conditions include support for self-management and 'expert patient' programmes and more use of new technologies for remote monitoring, support and choice of treatments. The case for the widespread adoption of telecare and telehealth interventions is to be demonstrated by three large-scale telehealth pilots based on local authority/primary care trust partnerships in Kent, Newham and Cornwall. Originally proposed in the White Paper, "Our Health, Our Care, Our Say", these whole system long-term conditions demonstrator sites, launched in summer 2007, will run for two years and provide physiological monitoring of 3,000 people at a cost of £12 million.

One condition that results in significant numbers of people becoming disabled is stroke. In December 2007 the Department of Health published a national stroke strategy for England, a "10 year vision for the delivery of world class stroke services, from prevention through to life long support". A key recommendation is that stroke-specialised multidisciplinary rehabilitation should be provided within hospital, immediately after transfer to home or care home, and for as long as it continues to be of benefit. The role of appropriate equipment and adaptations is highlighted at various stages, including rehabilitation, transfer of care and support in the community. This year's report highlights several projects that explore the assistive technology needs of people who have survived stroke.

Chronic long-term mental health problems, including dementia, are receiving greater attention as more is learnt about the impact on individuals and their carers, particularly later in life. In January 2008 the House of Commons Public Accounts Committee published the report, "Improving Services and Support for People with Dementia". The report calls for the NHS to give dementia a higher priority and in August 2007 a major independent inquiry supported by Age Concern revealed that mental health problems affect many more people in later life than previously believed, with one in five people over 80 living with dementia. The charity warned that severe exclusion and isolation among older people is a significant and pressing problem that will not disappear without urgent Government action. In the same month a report by the National Audit Office into dementia found that providing earlier diagnosis and better support for people with dementia and their carers could result in massive cost savings and better care. The report calls for a holistic, case management approach and refers to the potential contribution of telecare and assistive devices. In December 2007 a survey from think-tank Demos warned that older people who are not able to use the internet risk becoming increasingly isolated.

In February 2008 the Government published "Lifetime Homes, Lifetime Neighbourhoods: A National Strategy for Housing in an Ageing Society", alongside plans to improve the Disabled Facilities Grant programme. The strategy aims to help the ageing population stay independent by providing mainstream homes that adapt as we age, alongside a better choice of specialised options such as extra care housing. The strategy is linked to other Government policies in health and social care and provides a strong foundation from which to incorporate telecare and telehealth services in a vision for future housing services.

Joining up services around the child

Cross-departmental strategies across health, social care and education are beginning to explore the potential of technology to support policy objectives for encouraging the life chances of children. In December 2007 the Secretary of State for Children, Schools and Families launched the "Children's Plan", a 10-year strategy to improve schools and other children's services. The plan builds on the White Paper "Every Child Matters" and sets out a series of ambitions to help children fulfil their potential at all stages and to support parents.

The plan includes £90 million capital over three years to improve facilities for disabled children to take short breaks and £8.4 million to extend Family Fund support for disabled young people up to age 18. A child health strategy published in February 2008 provides a further £20 million to improve palliative care services for children with life-limiting or life-threatening conditions. An additional £18 million will be spent over the next three years to improve the quality of teaching for children with special educational needs and Ofsted will be asked to review progress on special educational needs in 2009.

Also in December 2007 the Department for Children, Schools and Families (DCSF) launched the Inclusion Development Programme (IDP), a new £2 million project of training for teachers, support staff and early years practitioners. The aim is to help teachers develop teaching strategies for children with special educational needs and provide guidance on dealing with common classroom challenges. Developed in partnership with children's communication charity I CAN and Dyslexia Action, training materials will focus initially on children with speech, language and communication needs and dyslexia. The DCSF is also supporting work by the Communication Trust, a collaborative partnership of voluntary sector organisations that is working to raise awareness of the importance of speech, language and communication across the children's workforce. This workforce initiative will support practitioners to develop a wide range of skills and competence, including those relating to communication technology.

In recognition of the particular problems experienced by disabled children and young people in accessing services and assistive technology to support communication, the Prime Minister announced in autumn 2007, a major cross-Government review into these services. The review is being led by Conservative MP, John Bercow, who will report in summer 2008.

Partnership working in research and development

Reflecting the need to join up services to provide coherent and effective services that meet people's needs, the assistive technology research community is being challenged by funders to establish collaborative partnerships between academic teams with multidisciplinary expertise, and involving stakeholders along the commercialisation and marketing pathway, prioritising the involvement of potential service users and customers.

The New Dynamics of Ageing (NDA) programme is one such funding initiative. This collaboration between five of the UK's Research Councils brings an injection of around £20 million into the vital area of ageing research. The NDA programme is shaped around a seven-year multidisciplinary research programme aimed at developing practical policy and implementation guidance and novel scientific, technological and design responses to help older people enjoy better quality lives.

The first year of activity has seen the establishment of several preparatory networks which were funded for a year to develop their partnership structure and to gain consensus on the most relevant research activity to address the NDA programme's objectives. Many of the networks, which are detailed in the listing in Annex A, have submitted full proposals for the second round of funding for collaborative research projects which will be announced in summer 2008.

Central to the programme is the active involvement of disabled and older people and this reflects an increasing awareness that mechanisms to support people to engage in their own healthcare and in choosing and shaping services are crucial in order to remodel health and social care services to meet future social and economic challenges.

Designing accessible environments

There is growing realisation among architects that the built environment must be developed and updated to take further account of the needs of disabled and older people. This can mean introducing housing options which are designed to accommodate wheelchair users, or which respond to the particular needs of frail older people. Similarly workplaces need to take account of the needs of older or disabled workers. While the requirement for accessible environments is well supported, in practice there remain substantial barriers to overcome. Recent projects have aimed to provide guidance on how to design and implement accessible environments.

Remodelling sheltered housing and residential care homes to extra care housing

A key objective of health and social care policy is to support older people to live as independently as possible in the home of their choice. For the majority this will mean continuing to live in their existing home but for some the most suitable option will be extra care housing (sheltered housing with extra facilities such as additional communal space, meals and the availability of care). Research shows that this housing option is popular with older people and can be cost effective. Some care providers have recognised that an alternative to building new extra care housing schemes, an expensive and lengthy process, is to convert existing sheltered housing schemes and residential care homes.

A team from King's College London and University College London worked between May 2005 and April 2007 on a project funded by the Engineering and Physical Sciences Research Council (EPSRC) looking at the technical problems that arise when converting such homes into extra care housing, how they were overcome by the local authorities and housing associations who participated in the study and the benefits and outcomes for residents.

The final report was published in October 2007 and findings were that remodelling existing sheltered housing was far from straightforward. Two major issues were that firstly, unforeseen structural problems frequently arose and, secondly, there was a need for some tenants to remain on site during redevelopment works. While remodelled schemes aspired to provide the same level of accessibility as new build schemes there were inevitably compromises due to the space and structure of existing buildings. This particularly impacted on compliance with accessibility standards for kitchens and bathrooms. These compromises sometimes reduced residents' opportunities for independent living.
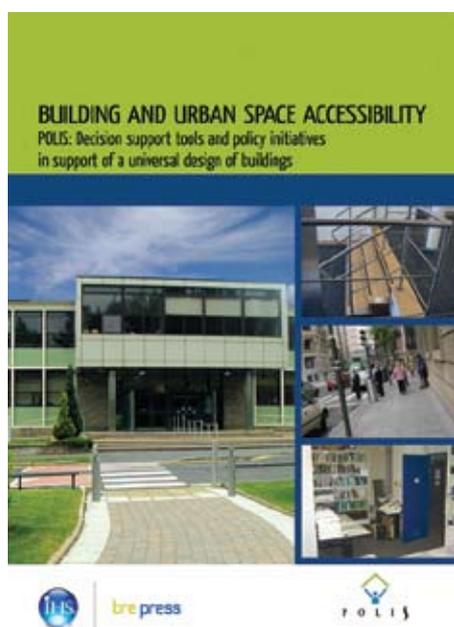
Design evaluation of older people's extra care housing: development and testing of an assessment tool

Taking work in this area forward this study, funded by the EPSRC, began in October 2007 and will end in September 2010. It aims to produce a tool that can describe the range of extra care housing, quantify the experience of the people living and working there and identify environmental features that are associated with higher quality of life. It will build on an existing evaluation tool, the Sheffield Care Environment Assessment Matrix (SCEAM) that was developed for residential care homes for the Design in Caring Environments (DICE) consortium who participated in a project previously funded under the EPSRC Extending Quality Life of Older People and Disabled People (EQUAL) programme. This successor project brings together members of the original DICE consortium from the University of Sheffield in a partnership with the Personal Social Sciences Research Unit (PSSRU) at the University of Kent, who have been commissioned by the Department of Health to evaluate schemes taking part in the Extra Care Housing Funding Initiative.

The study will initially develop a tool to be called EVOLVE (EValuation of Older people's Living Environments) using existing evidence as well as information gathered from working directly with extra care scheme residents, family members, care providers, employees, commissioners and architects. This tool will then be piloted in six extra care housing schemes in order to assess its usability and validity. The aim is to assess 250 people living in extra care schemes and to test the EVOLVE tool in these settings. The final version of the tool will be made available for download from the Department of Health's Care Services Improvement Partnership (CSIP) website.

POLIS – Universal Building Design

As life expectancy increases, it becomes apparent that accessible environments are important for residents in all European cities. Yet only a limited number of countries have developed an integrated approach, combining aspects such as planning, legislation, building regulations, monitoring, training and certification. Analysing and evaluating the policies of EU countries and other regions may be the way to develop new, integrated building design policies.

POLIS was an EU-funded project which began in January 2004 and ended in January 2008. The Building Research Establishment (BRE) was a participating organisation in the UK. The project developed a methodology called BAM (Building Accessibility Metrics) which evaluated the accessibility of building services as a whole, rather than individual elements. The methodology also sought to evaluate the relative merits of accessibility according to the sometimes conflicting needs of different citizens.

POLIS also delivered a Decision Support System for a Universal Building Design which uses the BAM methodology to help designers and building managers carry out accessibility audits on new or existing buildings. The aim in developing this system is to increase the cost-efficient adoption of universal building design across Europe.

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Soon after the project ended, a spin-off company was created in Cyprus under the name POLIS 21. The company will co-ordinate a number of business services in the area of accessibility, with a focus on accessible resort housing, accessible tourism and assistive technology products. In April 2008, BRE Press published a book called "Building and Urban Space Accessibility" which disseminates the methodology developed by POLIS.

Understanding the design of the workplace for the older worker

As we age many of us will need and want to remain in the workplace for longer than before yet few workplaces are specifically designed for older workers, those aged 65 and above. Researchers are now looking at what older workers require, how employers view the prospect of an older workforce and what help employers need to accommodate older workers.

A research team from the University of Surrey was funded by the EPSRC and the Biotechnology and Biological Sciences Research Council (BBSRC) under the Strategic Promotion of Ageing Research Capacity (SPARC) initiative to look at some of these issues during the period December 2006 to November 2007. They spoke to four organisations based in food manufacturing, supermarket retail, social care and the cleaning industry and based in different areas of England and Wales. Focus groups were conducted with over 60 workers from age groups between 40 and post retirement.

This qualitative study identified some significant themes and generated a new model of factors important to the ageing workforce. It found that the motivation of older workers to continue to work could be greatly improved if more attention was paid to their physical working environments. The project team identified that there are many small steps which could be taken by employers and designers to redesign equipment and train workers in its use in order to reduce the physical consequences of manual work, along with changes to the way in which work is scheduled.

Mobility in the community

Older people and disabled people tend to be less mobile than the general population, partly because of physical impairment which may limit movement, but also because of the inappropriate design of transport systems and products.

Maintaining safe driving in older age enables people to keep up with social activities and continues links with friends and relatives. Being able to drive is also a way of accessing essential services, such as shops, which are increasingly placed away from residential centres. However, car designers do not necessarily take account of the needs of older people. Wheelchair users can also face problems because of designers' lack of familiarity with their particular issues. The overall transport environment can limit people's options, for example, people with learning difficulties may find some street signage difficult to interpret, while the design of trains or buses may make them inaccessible to some users.

AUNT-SUE (Accessibility and User Needs in Transport for Sustainable Urban Environments)

Recent research has highlighted the ways in which poor transport and urban design may reinforce the isolation of disabled and older people. At the moment, however, there is a dearth of resources to support designers and planners who wish to design inclusive transport and street environments.

The AUNT-SUE project, funded by EPSRC from August 2004 to October 2009, is being carried out by a consortium of cross-disciplinary research teams with expertise in transport, design and social inclusion. The consortium includes research centres in London Metropolitan University, Loughborough University and University College London, as well as local authorities and commercial partners. The team is working closely with people who experience various degrees of difficulty in negotiating the 'journey chain' as well as practitioners responsible for implementing transport policy and provision. The aim of the project is to develop and test sustainable policies and practice that will deliver effective socially inclusive design and operation in transport.

One aim of AUNT-SUE is to develop a comprehensive 'tool kit' that can be used at different levels, from city-regions down to the micro-level of streets, vehicles and facilities such as bus stops, signage and ticket machines. So far the AUNT-SUE project consortium has developed and is evaluating several tools.

- AMELIA (A Methodology for Enhancing Life by Increasing Accessibility) is a geographical information system (GIS)-based tool that can be used by transport planners to establish how many more people gain access to services as a result of policy interventions.

- HADRIAN (Human Anthropometric Data Requirements Investigation and Analysis) is a computer aided design (CAD)-based tool that enables designers and planners to simulate how different individuals cope with various transport-related tasks, such as getting in or out of a vehicle. It helps identify issues at the concept stage of design, or can be used to select the optimum design from a range of commercially available options.

- Street Design Index is a GIS-based tool which is being developed to enable designers and planners to model the urban environment more comprehensively, and to understand how its diverse features can affect users' perceptions of streets and public areas.

Prolonging safe driving behaviour through technology: attitudes of older drivers

Between July 2006 and October 2007 a team from the University of the West of England looked at older people's views on how technology could help them drive in greater safety. The project was funded by the EPSRC and the BBSRC under the SPARC initiative.

In the first phase of the project 26 people took part in two focus groups, completed a driver diary and were interviewed to identify their needs. The findings highlight the importance of driving to fulfil older people's needs for independence and control and to support social status and roles. Older people's issues with driving include problems with signage; maintaining a consistent speed when driving at or near the speed-limit; tiredness and fatigue; shorter reaction times; dazzle and glare. The next phase of the project involved interviews with those who had recently given up driving, and this was followed by a discussion of the findings with experts from around the world for their comment.

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The research revealed differences between the views of older people and those of technology experts, for example, older people preferred either head-up displays of vehicle speed or an audible speed cue when it came to help with observing speed limits. However, researchers and technology experts had presumed that audible warnings when the car approached the speed limit would be more useful. The project identified several areas where more work could be done to develop solutions, in partnership with older people. These included the way in which road signs are displayed and prioritised, as well as additional speed warning systems. Those ideas will be proposed to industry experts, academics and other older people to assess their feasibility. It is hoped that the outcomes will be used by designers to incorporate technology to enable older people to continue driving longer into older age and with increased safety.

Attendant wheelchair propulsion

Of the estimated 1.2 million wheelchair users in England, a third use attendant-propelled wheelchairs as their primary method of mobility, which means someone else is responsible for pushing them. Yet very little research has been carried out to investigate how much effort and strength is required for an attendant to push a wheelchair, given that many wheelchair users and their carers are likely to be older people and/or recently discharged from hospital. Such information could be extremely valuable to wheelchair services when prescribing a wheelchair to a user who will primarily be pushed by an attendant.

The ASPIRE Centre for Disability Science is working with the Pedestrian Accessibility and Movement Environment Laboratory (PAMELA) at University College London to develop a protocol for attendant-propelled wheelchair use. The aim is to develop a performance: capacity ratio which could be used when prescribing an attendant-propelled wheelchair.

The project is funded by the EPSRC and will run for three years from September 2006. So far researchers have completed a two-dimensional pilot study focusing on the handle forces and ground reaction forces generated when the rolling resistance of the wheelchair is increased. This has been done by increasing the weight in the wheelchair and by changing the floor surface over which the wheelchair is pushed. It has been found that increasing the weight in the wheelchair significantly increases the trunk inclination angle and forces at the handle necessary to push the wheelchair, although the force felt by the foot as it presses against the ground decreases. This result was unexpected. The next phase of the research will look at predicting the forces on the lumbar spine and shoulder while pushing on flat and sloped surfaces, and while going up and down stairs.

Evaluation of a vibro-tactile sensory aid project – development of a tactile vest

As a result of stroke or a motor disorder some people experience difficulty keeping their balance when standing or walking. A team at the Spatial Disorientation Group at the Faculty of Medicine, Imperial College London, was funded by the MRC to explore the potential of a tactile vest to address this problem.

The vest has been developed for use by the US Navy and consists of tightly fitting elasticated open webbing, similar to a corset undergarment. Miniature vibrators which press against the skin are held in place in the webbing. The US Navy has demonstrated that, using this vest, a pilot can fly a plane blindfolded from take off to landing using only the tactile cues delivered to the skin. The vibrators from the vest deliver short 90Hz vibrations to areas of skin giving the pilot cues about the location and speed of the plane. This project aimed to explore the potential of the tactile vest to help people with posture impairment maintain their balance.

The project, which ran from June 2004 to June 2007, started with basic physiological investigations to identify which part of the body (head or trunk) gives rise to the fastest balance response when receiving vibration cues and which part of the body (leg, hip or shoulder) gives the best signal of changes from which vibration can be triggered. The team then evaluated the effectiveness of vibrotactile feedback in an experiment where subjects were asked to stand on a moving walkway and were exposed to an abrupt, backwards movement in the support surface. In order to remain upright, the participants had to take a step and researchers assessed how effective the vibration feedback was in encouraging them to take a step in time.

The initial abrupt jolt to the body was recorded by a gyroscope placed on the leg; this then triggered a vibration pulse to cue a forward step. Stepping responses and postural sway, with and without vibration feedback, were compared. The participants included 15 young people with normal movement, 15 older people with normal movement and 9 people who had a movement disorder.

This experiment found that vibration produced significantly shorter stepping reaction times only in the older people with normal movement who had naturally slower stepping. People with movement disorders did not appear to benefit in any way. As a result, researchers concluded that the effectiveness of vibration feedback appears limited for this application. The fact that people took a compensatory step earlier might be the result of improved decision making, rather than a reaction to a specific stimulus such as the sensation of vibration.

However, two positive findings suggest some applications of the project. The first is that researchers found that the simple vibrators of mobile phones could be used to provide an excellent and inexpensive means of physiological stimulation. The second is that when studying older people, researchers found that some who made very slow balancing corrections when their posture was disturbed on a moving platform could be speeded up with the provision of a vibration cue early on during the development of postural instability. Research is now underway to study whether the slow reactions of people with Parkinson's disease and their 'freezing' behaviour on walking can be speeded up by vibration cues.

Recovery following stroke

Every year, an estimated 150,000 people in the UK have a stroke. Most people affected are over 65, but anyone can have a stroke, including children and even babies. A stroke is the third most common cause of death in the UK. It is also a leading cause of severe adult disability, and more than 250,000 people in the UK live with impairment caused by stroke. Rehabilitation and therapy can help people who have had a stroke recover some of their functionality, provided the prescribed exercises are performed correctly and are repeated regularly.

Development of a clinically user-friendly device to measure posture after stroke

People who have had a stroke often need rehabilitation to learn to control the way they sit, stand or walk in order to overcome the muscle weakness that affects one side of their body. To establish the effects of such interventions, it is important for clinicians to be able to evaluate a person's posture and postural control. Currently, the most accurate methods are movement analysis systems which provide high-quality 3D data, but need to be housed in movement laboratories with specialist staff which is both expensive and inconvenient for the individuals undergoing assessment. For example, people need to undress to undergo the testing, which can be undignified and time-consuming. More importantly, such measurement systems are only suitable for people fit enough to travel to the laboratory. An alternative approach is to use low-technology devices such as flexi-rules and hand-held inclinometers, which are placed against the relevant parts of the body. While these are cheaper and portable, the data provided is limited in both accuracy and level of detail, and can only measure static posture.

In November 2006 a team of physiotherapists, biomedical engineers and computer scientists at the University of Salford was awarded funding from the NIHR New and Emerging Applications of Technology (NEAT) programme to develop a clinician- and person-friendly measurement device which overcomes these problems. The first stage, which was completed in mid-2007, delivered a prototype measurement system called POET (Postural Objective Evaluation Tool).

The POET device consists of inertial sensors and two lightweight portable force plates. The inertial

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sensors measure the orientation and motion of the individual's head, upper and lower trunk, arms and legs and the force plates measure the forces through their feet and buttocks. These measurements are taken as the person performs a series of simple balance tasks. The tasks get progressively harder, moving from sitting to standing and then stepping activities, depending on the person's abilities.
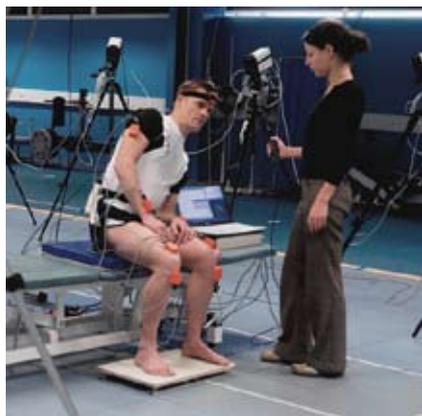
In the second stage of the project, which was completed in March 2008, the prototype system was used to collect data on a sample group of 150 people who had had a stroke which had

resulted in varying degrees of impairment, along with 110 non-disabled volunteers who provided a comparison group. In the final stage of the project, scheduled to be completed by November 2008, pattern analysis techniques will be used on the data from stage two to develop algorithms that automatically classify and grade postural impairments and condense the data collected to produce clinically relevant information.

As well as an effective prototype device which can be taken forward for commercial development, the data from this study will provide the first detailed and objective description of postural impairment after stroke. It will also clarify the relationships between postural impairment, the severity of the stroke, and the impact on someone's ability to undertake everyday activities. This information will be valuable for informing clinical trials and clinical practice.

Preliminary study using iterative learning control for the re-education of upper limb function mediated by functional electrical stimulation in healthy adults

Half the people who have experienced an acute stroke and undergo rehabilitation will continue to have marked impairment of function of one arm, of whom only about 14% will regain full function. Currently there is little evidence that conventional therapy has been shown to improve general recovery following stroke. Researchers at the University of Southampton are investigating whether training arm movements with a robot and using electrical stimulation of the arm muscles adjusted in response to the person's performance is a feasible way of improving recovery of arm function following stroke.

The project, which is funded by EPSRC, began in March 2005 and will finish in September 2008. People who have had a stroke are asked to track a spot of light by moving a vertical rod over a flat board, like moving a chess piece. As they move their arm their muscles are electrically stimulated. The aim is to use the electrical stimulation to correct the error in tracking the target. After each attempt to track the target the stimulation is adjusted to correct for the error, the minimum level of stimulation is used to encourage the patient to use their own effort.

To get the level and the timing of the stimulation right the system measures the difference between the

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direction of the movement of the arm and the movement of the spot of light. A computer programme is then used to adjust the level and timing of the stimulation to reduce the difference. Each time the programme adjusts the stimulation the effect is measured so that participants can continually improve their accuracy. This is called "iterative learning". Adjustments are made according to a set of rules and creating these rules is an important part of the project. This technique of iterative learning is often used in 'training' robots for industrial purposes, but as far as the researchers are aware, nobody has tried using it to help people who have had a stroke learn to move again. The ultimate aim is that through repetition, voluntary movement will improve, thus gradually reducing the need for artificial stimulation. Initially the system was tested with healthy volunteers and after it was shown to work with them it was used to treat a group of people who had experienced a stroke. By April 2008 five people had completed a course of 18 treatment sessions and an overall improvement has been measured. The team now hope to develop the idea using a 3D tracking system and by stimulating more muscle groups.

Development of an intelligent robotic system to aid physical therapy in stroke

Another robotic device currently under development to aid rehabilitation for people who have had a stroke is the intelligent Pneumatic Arm Movement (iPAM) device. The project team, based in the Universities of Leeds, Manchester and Aberdeen received funding from the NIHR NEAT programme to develop the prototype device between September 2004 and June 2008.

Up to 85% of people have varying degrees of arm weakness after stroke. Recovery of useful upper limb function depends upon the quantity of rehabilitation treatment and arm exercise. Robot-assisted rehabilitation treatment provides a method of supplementing physical therapy provided within conventional rehabilitation programs. The iPAM restorative rehabilitation device is a dual robot system currently being developed to aid recovery of arm function after stroke.

The iPAM system uses two co-operating pneumatic robots, linked to form a single interactive intelligent device, which mimics the guidance of the arm as undertaken by physiotherapists. The dual robot system has many advantages over single point of attachment systems because it provides greater control of arm movement during exercise and therefore allows people with severe impairment to benefit as well. The physiotherapists prescribe arm exercises depending on the person's rehabilitation requirements. The iPAM system is then able to undertake these exercises in an interactive way with automated variation in robot-assisted movement practice without the need for direct supervision by the physiotherapist. The system senses the effort made by the person when doing the exercises and adjusts the level of assistance given. By increasing the quantity of carefully controlled arm movement practice available to people with stroke, researchers anticipate that this system will accelerate recovery from arm weakness and so increase personal independence. The project team report enthusiastic involvement of end users of the device, both people with stroke and NHS therapists, throughout the development of the iPAM system.
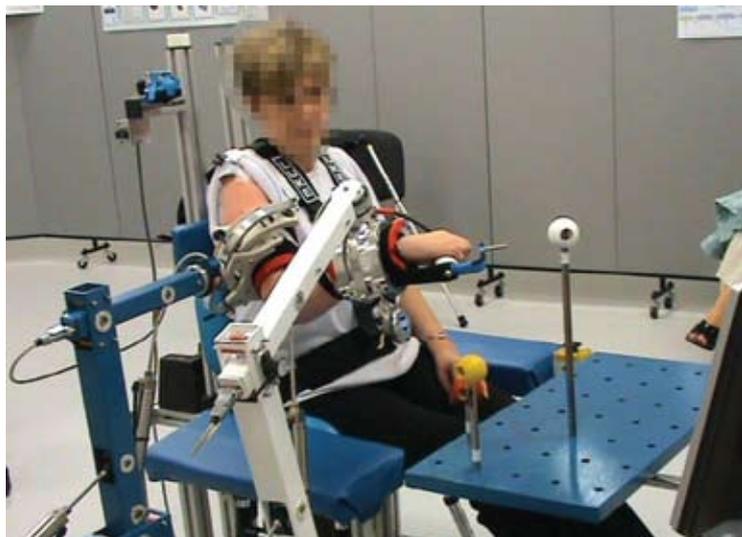
Interactive kids

Children adopt new technologies readily, particularly if they can use them for games and social interaction. Like their peers, disabled children will incorporate technology into their lives given a gadget that is well designed and relevant to their interests.

IROMEC-Interactive RObotic social MEdiators as Companions

The Adaptive Systems Research Group at the University of Hertfordshire is participating, together with several other partners across Europe, in IROMEC a pan-European project supported by the European Community's Sixth Framework Programme (FP6). The project recognises the important role of play in child development for learning about the physical and social environment and for developing social relationships.

The IROMEC project focuses on children who are prevented from playing, due to cognitive, developmental or physical impairments which affect their playing skills. The project team are investigating how robotic toys can empower disabled children to discover the range of play styles from solitary to social and co-operative play.

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This three-year project began in November 2006 with an in-depth assessment of the play needs of disabled children. There have been two rounds of user panels in five different countries of children and families (the primary users) and their therapists and educational workers (secondary users) that have given a good indication of the play activities for which robot toys could be of benefit, as well as how the target groups view robot toys. Based on this learning, some designs and scenarios about play have been specified to help potential users understand what robotic toys are being proposed. The next steps are to carry out a round of user panel meetings to confirm their support and interest in the play scenarios, the designs for the robot and how it will interface with the child. After this step the final technical specification of the robot will be worked out and the first prototypes will be developed.

MICOLE – Multimodal Collaboration Environment for Inclusion of Visually Impaired Children

The University of Glasgow was one of the partners in a pan-European project funded under FP6. The aim of the project, which started in September 2004 and ended in August 2007, was to explore techniques and develop a software architecture which would support collaboration, data exploration, communication and creativity between visually impaired and sighted children.

Research teams experimented with how to use different senses to partially replace missing vision capabilities and worked closely with national and local associations and organisations of visually-disabled people, as well as schools.

The objective was to develop techniques using multiple different senses to support visually impaired children collaborating with peers and teachers, and to understand to what extent they engage in group work. Haptic technology interfaces with the user through the sense of touch, and was one of the options the researchers explored. MICOLE's software applications are multimodal, that is, they use hearing and touch to complement different levels of visual disability.
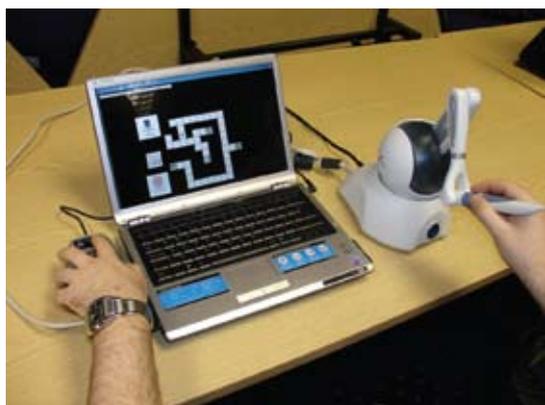
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Field study results from Austria, Finland, France, Greece, Ireland, Lithuania, Sweden and the UK showed major differences in the education of visually-impaired children; however they revealed many similarities regarding aspects of collaboration. Based on these results, a prototyping workshop was held in Stockholm where the school situation for such pupils was addressed. Various haptic and auditory applications developed within MICOLE were assessed and new designs formulated.

Project partners have developed or tested 16 different interfaces and application prototypes, such as explorative learning of the solar system, rhythm reproduction, a tactile maze game, a system to support children when learning to write, Post-it notes with a haptic barcode, an electric circuit browser, memory games, and a haptic game of the classic first video game, 'Pong'. They have also developed haptic tools for school lessons in geometry and geography.

Technology supporting disabled students

There is a growing trend for students with a variety of impairments and special needs to be integrated into mainstream education. For these students to have the same experience as their non-disabled peers requires classroom material, such as worksheets, homework assignments and assessment and examination papers, as well as books, to be made available in alternative, accessible formats. Responsible bodies, including local authorities, national government and other relevant agencies, are obliged to consider the needs of all disabled pupils, and should therefore make provision of accessible learning resources and services for all pupils who have literacy support needs.

Supporting sign language users through technology enhanced learning

Under the Disability Discrimination Act 2005, examination boards must ensure adequate access for all candidates. Some 50,000 people in the UK use British sign language (BSL) as their first or preferred language, yet there are ongoing issues and limitations with the support they are offered when sitting exams, not least that signers often lack knowledge of technical terms.

This project, led by the School of Computing Sciences, University of East Anglia (UEA), was funded under the Economic and Social Research Council (ESRC) Teaching and Learning Research Programme for the period October 2006 to May 2007. It explored how effectively a virtual reality 'person', or 'avatar', on a personal computer (PC) screen could be used to sign questions to provide BSL support for people taking the Scottish Qualifications Authority's 'PC Passport', a widely accepted computer qualification. A team from the Royal National Institute for Deaf People (RNID) notated a lexicon of signs, enabling a range of BSL phrases to be animated.
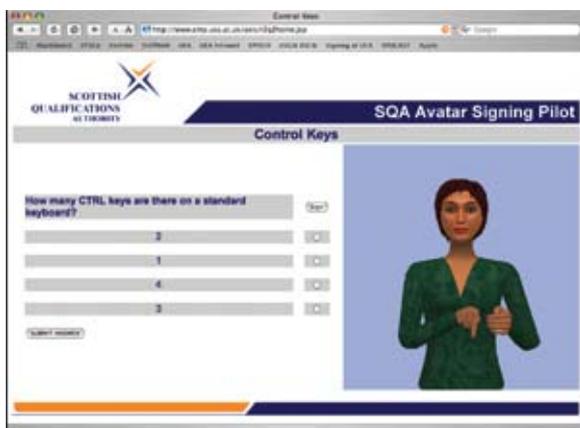
© School of Computing Sciences, University of East Anglia

Trials involving 19 deaf students and teachers were held in Scotland at three educational institutions. Questions covered different levels of the PC Passport qualification and its test areas. The results showed that the screen layout was generally liked, though it took time for candidates to 'tune in' to the style of avatar signing. It was found that, in order to avoid distraction during tests, it was essential that candidates had been exposed in advance to the technology.

The project found that avatars are not yet ready to be used during formal exams but also demonstrated the potential for this technology. As a result of this work, the UEA team released an updated avatar, incorporating improvements in the quality of the facial expression and lip patterns. The team hopes to do more work in the field of semi-automatic signed exam questions using pre-designed and structured question phrasing, so that teachers can include this when teaching course work to enable students to familiarise themselves with using avatars. The research team is taking this work further with the Deafness Cognition and Language (DCAL) Research Centre, based at University College London.

Books for all

The Communication Aids for Language and Learning (CALL) Centre at the University of Edinburgh gained funding from the Scottish Executive Education Department (now the Scottish Government) to investigate the need for and availability of books in alternative accessible formats for disabled pupils in Scotland. The project's objectives were to identify the approximate number of pupils with additional support needs who have difficulty reading printed curriculum materials, or writing/recording their responses. It also looked at the range of curriculum materials that need to be available, and the methods schools can use to support pupils who have difficulty reading and accessing printed material. The project evaluated ways of providing such material and outlined their associated advantages and disadvantages.

The project ran between November 2006 and May 2007, culminating in a report that was delivered to the Scottish Government. The report concluded that, for the relatively small number of blind and partially-sighted pupils, there is good, though not complete, availability of books and other resources in braille, large print and audio formats. In comparison there is poor availability of accessible books and materials for the much larger number of pupils with physical impairments, learning difficulties, or hearing impairment. These pupils may require, for example, adapted printed material, digital versions that can be accessed by switch or read out by a computer, audio recordings, or signed multimedia resources.

The project has proposed a model for developing such provision for consideration by the Scottish Government, local authorities and other relevant agencies. The model aims to help local authorities address current inequalities of provision and to reduce existing duplication of effort and inefficiencies by developing mechanisms for sharing resources both within and between local authorities and other service providers. A stakeholders group, the Scottish Accessible Resources Network, has been set up to take the recommendations forward.

Improving online accessibility

The internet has opened up a wealth of new business and leisure opportunities, from using email to keep in touch with friends and family in faraway places to booking flights and making purchases online. For older people and disabled people online technology can make it much easier to participate in the wider world, to find information and to overcome geographic isolation, but only if online facilities are designed to take account of their specific needs.

BenToWeb

National governments and legislative bodies now recognise the accessibility of websites as an increasingly important issue. Recent activities include the development of a Good Practice Guide on website accessibility by the Disability Rights Commission (DRC) and the British Standards Institute (BSI) and a range of initiatives across Europe to introduce accessibility standards. Yet web developers and website owners remain somewhat confused about the issues surrounding web accessibility

BenToWeb was an EU-funded project within the Web Accessibility Benchmarking (WAB) Cluster aimed to support the European public and private sector to implement new software modules and methodologies that satisfy some of the accessibility recommendations of the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). These elements could not be assessed using existing tools because of their complexity.

Work on this project was carried out between September 2004 and August 2007 with a range of project partners across Europe. The University of York was the UK partner and the project team conducted a survey of web developers and website owners to access levels of interest and knowledge about accessibility and to gather information about what kinds of support developers and owners currently have and would like to have available in the future. The team also conducted evaluations of modules to assess colour contrast and colour combinations suitable for web users with vision impairments, and to assess navigational consistency. The York researchers led the work on developing a methodology for the test suites for the validation and evaluation of accessibility guidelines. The project provided new software modules and methodologies and although the project has formally finished, researchers are still welcoming and evaluating user comments on the test suites which were developed.

ENABLED – Enhanced Network Accessibility for the Blind and Visually Impaired

This European Commission FP6 project, which ran between September 2004 and October 2007, looked specifically at the issues facing people who are visually impaired and who wish to take full advantage of the facilities offered by the internet. The project attracted £2.5 million funding and involved 14 partners across Europe with the Virtual Engineering Centre at Queens University Belfast acting as the UK representative.

The ENABLED project sought to tackle the issue of inaccessible web content by applying two parallel strategies. Firstly, researchers looked at developing technologies that create universally accessible content on the web, and algorithms that convert existing inaccessible content to be accessible, focusing primarily on indoor and outdoor maps. Secondly, research teams also worked on developing 'ubiquitous' tools that enable easy access to information, and interfaces that are adaptable and interoperable no matter where the user is and what equipment they are using.

© ENABLED FP6-2003-IST-2-004778

Researchers concentrated on developing three tools: an annotation tool for audio and haptic map representations; adaptable interfaces for exploring maps and route-planning; and a navigation aid provided via existing wireless networks. The project developed a prototype navigation system that provides guidance for visually impaired pedestrians in both indoor and outdoor settings with minimal additional equipment required, since it makes use of existing infrastructure. This, together with several of the other technologies developed, can be deployed to produce a commercial mobile navigation aid.

Improving computer interaction for older users: an investigation of dynamic on-screen targets

One problem for some older people is difficulty using a mouse to position the cursor and select targets on a computer screen. A project to address this problem was funded by the EPSRC and the BBSRC through the SPARC initiative. Researchers from the School of Systems Engineering at the University of Reading investigated techniques to improve target selection by older people in partnership with users from Age Concern in Berkshire.

Basing their investigation on Fitt's Law, a mathematical concept that can be used to describe pointing movements with a computer mouse, the team evaluated the effectiveness of two techniques, expanding targets and proxy targets. A group consisting of 10 older people and 10 younger people completed two studies. The first study compared typical targets with targets which expanded to twice their original size. The second compared typical targets with proxy targets which moved closer to the cursor once a movement had been initiated so that the distance the mouse had to travel was reduced.

The findings of the project, which ran for a year between November 2006 and November 2007, showed that older participants took almost twice as long as younger users to complete tasks. They were able to work faster when expanding targets were made available and there was a 13% time saving as a result. However, while using proxy targets had no effect on the performance of the younger participants, this approach slowed down the reactions of older participants. The project has raised questions about how these methods should be implemented for multiple targets. The work is also being extended to the investigation of difficulties older people have with the 'double click' mouse action required to perform certain tasks.

An evolvable computer interface for elderly users

Many older people could benefit from online access, but may lack confidence in interacting with computer technology compared to younger people. The main obstacle is the ageing process itself, and the consequent decline in cognitive ability, perception, memory and eyesight. However, the rate of decline varies across the population so individual help is needed when interacting with applications because older people's abilities are so diverse. A project based at the Faculty of Computing and Engineering at the University of Ulster and funded by the Department for Employment and Learning in Northern Ireland will address this problem.

The aim of this three-year project, which started in October 2006, is to develop an intelligent help facility that assists older users with browsing activities. The facility will be capable of responding to each person's specific needs and actions. The system will recognise individual user interaction patterns and be able to identify when a user needs help. The software will then offer the appropriate level of help and retain details of successful interventions for retrieval in the future.

Preliminary work undertaken by the project team has shown that it is possible to monitor and log user interaction patterns and classify these interactions, using a mathematical modelling concept called an Artificial Neural Network (ANN), to an accuracy of 96%. Work continues to gather user interaction data involving older participants. Findings are scheduled to be reported following the project end in October 2009.

Support for people with a cognitive impairment

People with cognitive impairments, for example those resulting from dementia, brain injury or stroke, may all have difficulty managing everyday tasks. There is increasing evidence that assistive technology can play a significant role in helping to keep people with cognitive impairment safe and well and support their independence.

Text messaging reminders for brain injured patients

People with an acquired brain injury commonly have problems with planning and organising, making decisions, paying attention and remembering what they need to do. Such difficulties can lead to loss of work, reduced social and leisure activities and increased strain on family relationships.
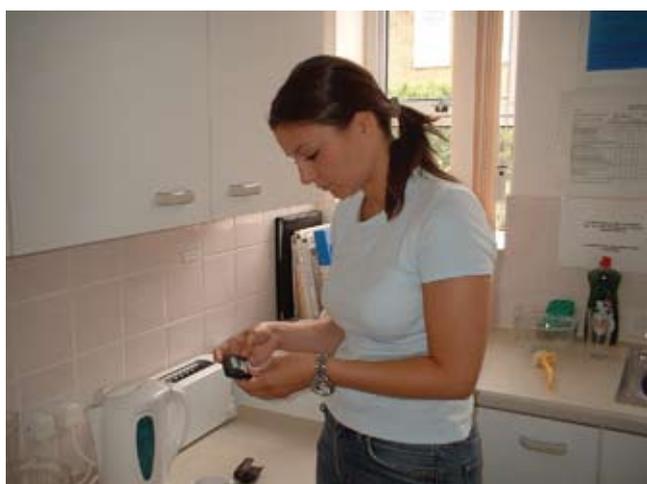
© Oliver Zangwill Centre

Researchers at the Oliver Zangwill Centre have already developed and evaluated a service called 'NeuroPage' that sends a timed electronic alert to a patient via a pager. Such alerts remind people of specific tasks, for example, 'take medication' at 6pm. This research led to the formation of the nationally available neuropage service (www.neuropage. nhs.uk) that continues to provide support to individuals around the UK. People can request their messages to be sent to a radiopager or a mobile phone (text message). It is a service ideally suited to those who cannot programme their own palm-top computer or mobile phone alarms, or who have complex schedules. However for some people there are problems with this approach due to the fact that not every task can be timed in this way and because individuals and carers have said they value having space for flexibility and spontaneity in their lives.

In December 2007, the research group was awarded a three-year grant from the NIHR Research for Patient Benefit (RfPB) programme to build on this work by offering individuals 'content free' cues (for example 'stop and think') which do not contain specific instructions but are designed to improve their ability to complete tasks. The intervention also requires the individual to be trained in a procedure called "goal management framework". Research will focus on alerts delivered via mobile phone text messaging, since this is now a prevalent and familiar technology. The project will assess whether such a service can help improve the emotional well-being and stress of the individual with brain injury and that of their carers.

Identifying key needs of people with dementia that can be supported by technology in the home

Many people diagnosed with dementia want to remain living in their homes for as along as it is safe for them to do so. Assistive technology may have an important role to play in supporting them in everyday tasks, such as washing or preparing food

Researchers at the Centre for Usable Home Technology (CUHTec) at the University of York have carried out one of the first projects to identify those tasks considered to be most important for remaining at home using interviews with individuals, their caregivers and professional carers. This information, along with an analysis of the nature of the activities that was obtained by video analysis, is being used to suggest possible technological interventions that will enable people in the early stages of dementia to carry out some selected task.

The project commenced in March 2005 and concluded in September 2007. It recruited 20 people with mild to moderate dementia, along with 20 carers and 10 occupational therapists to participate in a series of interviews. A grounded theory analysis of the interview data identified the tasks that people with dementia and their carers viewed as being most important to them. These included preparing food and hot drinks, locking-up their house, and communicating with family. The detail of what was said during interviews has provided insights about how recent developments in pervasive technology could be used to assist people with dementia.

The project team is now working with researchers at the Culture Lab, at Newcastle University, to use these insights in the construction of technology to support simple kitchen tasks such as making a hot drink. The system will track what someone is doing and prompt them if they get stuck or do something unexpected.

Living in the moment: developing an interactive multimedia activity system for elderly people with dementia

Dementia progressively undermines an individual's cognitive function, making daily living activities and social situations very difficult. The pervasive short-term memory problem makes challenges of even the simplest tasks as people continuously forget what they are doing, what has just been said and that they have started tasks, such as boiling the kettle. Consequently, dementia is disempowering as relatives and professional carers step in and gradually take over all aspects of a person's life.

Researchers from the School of Computing at Dundee University and the School of Psychology at the University of St Andrews were funded by the EPSRC between October 2004 and December 2007 to find a way for people with dementia to engage in stimulating and enjoyable activity on their own. Being able to initiate and engage in activities by themselves was identified as beneficial to the person with dementia and also to their caregivers.

The aim of the research team was to develop a computer-generated interactive experience that would provide appropriate prompting and supportive interaction. The result was a system which allows those with short-term memory loss to draw on reminiscences to converse with relatives and caregivers. It has a touch screen that displays photos, music, video, text, and other materials to help those with dementia access long-term memory.

The role of technology in dementia care

Researchers at Coventry and Warwickshire NHS Partnership Trust and the University of Warwick received funding from the Department of Health's Policy Research Programme (PRP) to examine how the networked society is changing the experience of caring for people with dementia, and how networked information and communication technologies can support carers in their role.

Examples of the types of technology assessed include the internet, telecare systems, and other technologies linking people and services in different locations. The project investigated the attitudes and beliefs of carers towards such technologies, and explored the role of the internet and related technologies in providing health and social care information and professional and peer support. The research also investigated the issues to be addressed in the implementation of new technologies with this group of people.

Work on the project began in December 2006 and finished in March 2008. The research team undertook a review of the relevant literature and then interviewed 34 family carers of people with dementia. The researchers also undertook a focus group with five paid carers and ran three stakeholder workshops (one with policymakers and industry, one with health and social care professionals, and one with a carers group).

Draft findings from the project illustrate the dilemmas that carers face and that policy makers will need to address, such as whether new technology is a complement or a substitute for existing formal or informal provision, and concerns around costs, a reduction in human contact, training, privacy, autonomy and dignity.

Researchers identified a number of barriers to the implementation of technology, including fear of increased workloads, lack of awareness of what is available and lack of experience.

The draft recommendations from the project highlight the need to integrate technology with 'human' services for carers; the need to increase awareness of the available technology and its potential uses; the requirement for technology provision to be varied, flexible and responsive; and the need for implementation to be supported as carers need help deciding what technology to use and how to use it.

Older people living well

The challenge facing the UK is to ensure that older people live well and enjoy the later stages of their lives. Assistive technologies such as telecare systems have a role to play in achieving this, as do mainstream technologies such as the internet. Some recent projects are turning their attention to look at how to better exploit a wide range of technologies that impact on people's lives in older age.

Keeping Individuals Safe and Secure (KISS): safety and security for older people

The Keeping Individuals Safe and Secure (KISS) network is supported by the NDA initiative and is being lead by a team at the University of Reading.

Its aim is to form a multidisciplinary collaboration to identify, assess and prioritise threats relating to safety and security that occur during the day-to-day lives of older people and to understand how such threats can affect their independence and quality of life. The work, which was carried out between November 2006 and October 2007, included interviews with six focus groups, in urban and rural areas, with people with visual impairment and people from ethnic minority backgrounds. This indicated four key areas of concern around security at home, in the outside environment, with other people, and for the individual in particular. These findings are being used to inform a collaborative research proposal for submission to NDA.

What makes synthetic speech difficult to understand for older people? The contribution of auditory ageing

Many older people experience a reduced ability to hear certain sounds because they are too high or too quiet. This is a consequence of normal ageing processes. Auditory ageing can potentially make it difficult for older people to understand computer-generated speech. This is a growing problem as synthetic speech is an integral part of many phone-based systems, such as interactive voice response systems, or assistive technology such as screen readers. Increasingly designers and manufacturers are using synthetic spoken speech in home-care and independent-living systems, as this is perceived to be a user-friendly format for communication.

Between December 2006 and June 2007 researchers at the Centre for Speech Technology Research at the University of Edinburgh and Queen Margaret University, Edinburgh, looked at this issue with funding from EPSRC and BBSRC under the SPARC initiative. The project tested 40 older subjects and 12 younger subjects over a three-month period. Subjects underwent testing to assess auditory ageing and working memory span. The main part of the assessment required subjects to hear 32 reminders, half produced by synthetic speech and half spoken by humans, and to answer a simple question about each reminder.

The project found that older users only had more difficulty understanding the synthetic voice than younger people if they had elevated pure-tone thresholds (increasing difficulty in hearing softer sounds) and if they were asked to listen to unfamiliar medication names. Researchers suggested that these problems can be remedied by better prompt design.

SAFER (Support and Assessment of Fall Emergencies Referral) Trial

Ambulance services are struggling to cope with steadily increasing demand. Many 999 calls are made for older people who have fallen, but this is a group that may not benefit from being taken to hospital and for whom a community-based alternative may be more appropriate.

The School of Medicine at the University of Swansea received a three-year grant from the Department of Health to assess the costs and benefits of a new model of care in a study which will end in January 2010. In this model, ambulance paramedics in two ambulance services (Wales and Great Western) are using a hand-held computer with decision support software to help them reach decisions about whether older people who have fallen need to travel immediately to hospital or can be left at home with a referral to a community-based falls service.

Outcomes will be compared between older people in the study that were attended by crew members trained to use the new technology and those attended by crew members providing care according to customary practice. Analysis will include comparisons of the number of further falls, 999 calls and unplanned attendances at hospital; quality of life, independence and satisfaction of service users; time taken to complete calls by the ambulance service; resources used within the NHS and by the individual and their families related to falls.

To gain a good understanding of how the new service has worked for service users and staff, researchers are also undertaking a small number of in-depth interviews with older people who have fallen and been attended by ambulance crews using the new technology; as well as group interviews with paramedics, emergency care practitioners and nurses or other personnel from the partner services who have been involved in the study. Through a related PhD study, funded by the Welsh Assembly Government, implementation and adoption issues will be explored and described.

ALMS – Advanced Lifestyle Monitoring Systems

The use of telecare to support both informal and formal care mechanisms and to maintain older people's quality of life in their own homes is now central to Government policy on caring for older people. The Advanced Lifestyle Monitoring Systems (ALMS) project, which is running from April 2006 to November 2009 funded by the NIHR HTD programme, aims to develop a product as part of the third generation of telecare.

The aim of the lifestyle monitoring system is to provide early detection of factors likely to lead to a future requirement for institutional care and to facilitate early intervention to prevent loss of independence. The project, which is being carried out by the Department of Medical Physics and Clinical Engineering at Barnsley Hospital NHS Trust, will combine clinical research on the triggers for older people needing more care. The project will employ artificial intelligence techniques to produce a means of detecting key triggers for requiring greater levels of care. The goal is to improve the analysis and monitoring of older peoples' behaviour over time in order to provide better services.

Bringing healthcare closer to home

The increased capacity of computerised devices and the speed of broadband telephone connections have created new opportunities for healthcare provision. Offering ways of delivering support and monitoring at home reduces the amount of time people need to spend in hospital or travelling to outpatient clinics. This is both a cost saving and an important method of improving quality of life for people who are living with long-term health conditions. There is increasing recognition that long-term conditions affect a broad range of people including those with mental ill-health. Assistive technologies are just beginning to be developed to respond to the needs of people with mental health problems.

Enabling health, independence and wellbeing for psychiatric patients through Personalised Ambient Monitoring (PAM)

One in 10 people in the UK population will experience a disabling anxiety disorder at some stage in their life, 91 million working days are lost per year due to mental health problems and the cost to the country is £32 billion in lost productivity and treatment costs. Government policy aims to help people with long-term conditions, including mental health problems, to stay independent and take control of their illness.

This project is funded by the EPSRC, will run for three years from October 2007 and brings together research teams from the Universities of Nottingham, Southampton and Stirling. PAM will allow people with mental health problems to select off-the-shelf technology that will monitor their "activity signatures". These are measurements of behavioural patterns which indicate the state of people's mental health. PAM will use a set of multiple discreet sensors in a person's home, coupled to a computer system programmed to detect changes in activity signatures. These can then be used to issue automatic alerts to the person, their family, or their doctor, thus providing the capability to avert debilitating episodes.

The project team will be focusing on people with a diagnosis of bipolar disorder. Possible monitoring devices could include accelerometers, personal diaries, mobile phones with Global Positioning System (GPS), door contacts and heart rate monitors. A key consideration will be testing which sensors are acceptable to individuals and how to personalise the approach used. The project is currently seeking ethical approval to work with a small group of people interested in monitoring their own moods and health. An operational model is being devised to test out some of the sensor options.

SMART 2: Self Management supported by Assistive, Rehabilitation and Telecare Technologies

This project involves a consortium from Sheffield Hallam University, University of Sheffield, University of Ulster and University of Bath, who will collaborate together with industrial partners Philips and BT to exploit expertise in telecare, body worn sensors and tele-monitoring technologies. The project, funded by the EPSRC, started in January 2008 and will be completed in December 2011.

The aim of the project is to understand the potential for sensor and computer-based technologies in the support of self-management of three chronic conditions: pain, stroke and congestive heart failure. Currently people living with these conditions have limited access to assistance to help them to make the necessary changes to their behaviour in order to accommodate their condition, promote continued recovery and/or prevent deterioration.

Through a user-centred design process, researchers will create technological solutions resulting in a personalised self-management system suited to the individual needs of each user. As part of this process, researchers will be looking at how information on changes in chronic conditions can be collated and fed back to users in a meaningful and usable way to help them understand and indeed manage their own conditions. They will assess how information should be presented to therapists who will be in a different location from the patient, so that they can interpret that information and promote health behaviour change.

Researchers will also be looking at how a personalised self-management system can help people adjust their life goals to accommodate and aid acceptance of their condition. Based on these developments in situ evaluations will be performed to assess the impact of the technology deployment.

Enabling fitness and physical activity

As a nation we are getting bigger. With more sedentary lifestyles and the easy availability of fast food and ready meals the goal of keeping fit and healthy can often only be achieved by undertaking an exercise programme or increasing the level of physical activities as part of our daily routine. For everyone there are problems maintaining motivation and sustaining a programme of exercise sufficient to help us manage our weight and build fitness. For disabled and older people the challenges are even greater and the opportunities more limited. A range of projects are looking at this issue.

LIFE (Long-term involvement in fitness enablement) study

Regular leisure-time activities provide health benefits in terms of physical fitness, mental health support, disease prevention and levels of participation in social activities. People with neurological disorders such as muscular dystrophy, multiple sclerosis and cerebral palsy, have been shown to benefit from involvement in physical activities. However people with these conditions may be reluctant to join local groups that are not specifically designed for disabled people.

Current rehabilitation for people with long-term neurological conditions in the UK is mainly delivered in hospitals by physiotherapists and there has been little focus on supporting participation in community-based activities. Uncertainty about the value of exercise and recognition of the low levels of participation in physical activity by people with neurological conditions led user groups to approach a research team from the School of Life Sciences at Oxford Brookes University to suggest researchers explore these issues. This Department of Health PRP project is scheduled to run from January 2007 to June 2009.

The project team are working with people with neurological disease in Oxfordshire to investigate their participation in physical activities. The aim of the project is to establish how people would like exercise programmes to be supported, to provide information to participants about the levels of activity they can safely aim for, and to determine whether exercise delivered in a leisure centre, with appropriate support, is effective in improving activity levels.

By spring 2008 researchers have completed early focus group work and pilot feasibility investigations to develop a client-centred Physical Activity Support System (PASS) and a support system for fitness professionals and trainers, which are designed to encourage participation in physical activities at Inclusive Fitness Initiative (IFI) centres. A randomised controlled trial is now underway that will examine levels of participation in physical activities at IFI centres, along with dropout rates, when people with neurological conditions are supported with the PASS.

Motivating mobility: interactive systems to promote physical activity and leisure for people with limited mobility

Disability, illness and/or increasing infirmity associated with older age can all contribute to people becoming less mobile. The reasons for reduced mobility are complex and vary with each individual, but may include fear, lack of interest or limited motivation. Researchers from the Universities of Nottingham, Southampton, Dundee, Sheffield Hallam and Sussex have proposed that interactive technologies and communication methods could be combined to provide the encouragement to disabled people needed to promote greater physical activity.

The team have been funded by the EPSRC from July 2007 until June 2010 to explore how best to use new arrangements of interactive and communication technologies to promote physical activity for people with limited mobility. An example of such activity might be a person in a hospital bed after a stroke who wants to improve their arm movement. A simple accelerometer-based device on their wrist could detect when they move their arm and their bedside television screen could then present a view of the inside of their home taken via a webcam. As they move their arm they will be able to 'walk around their house' in real time. Greater movements of the arm produce more opportunities to look at the screen representation of their house and so encourage more physical effort.

Another person may be able to walk outside, but their carer is anxious that they may become ill while out, or get lost. The same device could monitor their position and activity and note their location and also whether they are standing, sitting, or have fallen. The device could potentially connect the individual and their carer, making them both more confident about walking outside independently.

This scoping project will establish how useful these kinds of devices might be for disabled people by bringing together a multidisciplinary research team with expertise in the clinical setting, experience in the technologies needed to realise this vision and experience in supporting potential users to enable them to inform the design of the proposed devices.

The project will look at how to make the proposed approaches and treatments relevant to each individual user; what content engages and motivates people most effectively; which arrangement of sensing and communication technologies is most acceptable and useful; how the effectiveness of such an approach can be assessed, and how can it be scaled up to be relevant to a wide group of disabled people in a range of settings.

Technology to support walking

People with lower limb amputations, with muscle contracture, and those with a movement disorder caused by conditions such as cerebral palsy, rely on prosthetics and orthotics to help them achieve greater mobility. As well as being effective in supporting and recovering a full range of movement, such devices also need to be comfortable and motivating to use.

Development of a prosthetic foot with adaptable heel heights – Shape&Roll Talon

This collaborative project between the National Centre for Prosthetics and Orthotics at the University of Strathclyde, the Prosthetics Research Laboratory and Rehabilitation Engineering Research Program at Northwestern University, USA, and Elegant Design and Solutions Ltd, Knighton, aims to develop a prosthetic foot, called the Shape&Roll Talon. The project is funded under a European Commission Marie Curie International Re-Integration Grant and will run from April 2007 until April 2010.

The Shape&Roll Talon allows for individually tailored heel heights so that the prosthesis can be easily adapted to the person's choice of shoe. Adaptation to different heel heights is important so that the alignment of the prosthesis is optimised. The additional benefit is that a prosthesis that adapts to the individual's choice of shoe enables them to express their personal style in the same way as other people.

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During the first year of the project, researchers have analysed common features of high-heeled shoes, developed a simple mathematical model capable of defining the shape of a shoe's insole, and established a mini-model of a possible prototype based on the common established features of high-heeled shoes. The collaborators have also developed a computer simulation model to help in the decision making process about the final design of the prosthetic foot.

A major goal of the project is to allow for easy manufacturing techniques so that expensive machinery and highly trained personnel are not required. This will enable adoption of the prosthesis in high income, low income or developing countries. Researchers have built a wooden lever compression mould press allowing a foot to be fabricated. Preliminary prosthetic cosmetic shells have also been developed. Cosmetic shells are important as they have a substantial impact on the appearance and the acceptability of the end product.

Feasibility study for a cyclic contracture correction device

Currently available orthoses can be static or dynamic, the latter incorporating mechanical springs that provide a continuous stretching moment about the joint. Among the systems in use is one developed by the group at Orthotic Research and Locomotor Assessment Unit (ORLAU) that has been commercialised and distributed by Otto Bock in the UK and Europe. This has been used predominantly to treat contractures of the knee but the principles have also been applied to produce orthoses for the ankle, hip and elbow. People wear the dynamic orthosis typically for about one hour each day when they are resting from other activities. The treatment system has been shown to be effective for many people but clinical experience demonstrates that, for some, the corrective effect is limited.

A weakness in the design of this orthosis is that, with changes in the relative geometry of the mechanical components, the pressure from the device in resistance to the contracture reduces at the stage in the dynamic cycle where the limb comes towards the end of its range, thereby making the stretch less effective at the crucial point.

The team at ORLAU, together with Otto Bock, has been awarded an NIHR HTD grant to produce a prototype for a powered orthosis which will exert a period of 'overpressure' at the point when the joint comes toward the end of its range of movement. The control system will permit variations in pressures exerted, the speed of extension and flexion of the joint and the duration of each phase of the cycle of motion. The development of such a powered stretching orthosis, applying cyclical moments across affected joints, will produce loads on the contracted tissues that more closely resemble those seen during normal physical activity.

The project lasted from February 2007 to February 2008 and focused on the modular nature of the device, safe failure modes and development of a prototype design that is practical and cost-effective for use by people in their home environment. Thorough engineering and safety evaluation were undertaken as a prelude to a proposed programme of clinical activity to assess the therapeutic effect.

Technology evaluation

Over the past year there has been an increasing emphasis on activity to evaluate the benefits of assistive technology, comparing one device against another, comparing the pros and cons from the perspective of the user and also evaluating the benefits within the wider health and social care economy. While many projects incorporate an element of evaluation as part of a process to develop a new device or service, this is the main outcome for the projects highlighted below. Further details on these projects and links to full information on the FAST database can be found in Annex A.

Evaluation projects

A team at Imperial College undertook **modelling the impact of service innovation in chronic disease management** using **simulation modelling and economic analysis to explore the possible impact of telecare on a local health and social care system based on the area covered by the Greenwich Strategic Health Authority. This Department of Health PRP project was funded for a year and concluded in December 2007. It captured through modelling the current process of stroke care delivery in both acute and community settings and provided an interactive method of testing out different scenarios. The modelling process highlighted areas where sufficient data was not available as well as neglected problem areas in the care system. Researchers concluded that this type of modelling is suitable for application to highly complex processes, such as stroke care, and can be used successfully as a communication and decision making tool before committing real resources. However, the use of modelling is made challenging by the paucity of robust data.**

A collaborative NDA project, **AIMWELL**, led by the University of Bristol and funded by the NDA programme, aims to develop an integrated methodology for evaluating the benefits of assistive technology focusing on home improvements and adaptations. The project was funded from March 2007 to April 2008 and findings are due to be published shortly.

The Office for Disability Issues (ODI) published a report in May 2007 on the costs and benefits of support for independent living, as part of its Independent Living Review. The report highlighted the evidence that confirms that providing housing adaptations and equipment for disabled people could produce major savings to health and social care budgets. Key areas of potential savings noted in the report include: preventing admission to hospital or to residential care (or facilitating discharge), reducing the costs of intensive home-care, and preventing accidents or the need for medical treatment. Quoting similar findings by the Audit Commission, the authors point out that some savings could be "on a massive scale".

A team at the Personal Social Services Research Unit at the University of Kent have been funded by the Department of Health to establish the **Costs, Quality and Outcomes of Community Equipment Services**. The team has established the key measures associated with cost and quality variation through a review of the literature and consultation with stakeholders. They have used this information to develop and validate measures of quality and outcomes of services. These measures form the basis of a

survey currently being undertaken for the Department of Health User Experience Survey of service users and local authorities are being invited to participate in further survey work. Survey results will be available in summer 2008 following the project conclusion in May 2008.

A two-month project finishing in November 2007 at the University of Central Lancashire evaluated the **Biomechanical Effects of Using a New Low Cost Assistive Device for Home Exercise of the Lower Limbs** concluded that there were benefits to using the Ortho-Glide lower limb exerciser over the comparative standard treatment. The same department at the University of Central Lancashire are evaluating the **Biomechanical, mechanical and virtual modelling of ankle foot orthoses in the management of Cerebral Palsy** and establishing the effectiveness of different designs of ankle foot orthoses. This project is due to conclude in September 2008.

In a complementary project a team at the University of Plymouth are assessing the **Clinical and cost effectiveness of footwear and orthotic therapy in the management of the neuropathic diabetic foot** with funding from NHS R&D Transitional Funding. This project concluded in March 2008 and findings are due to be published in summer 2008.

The University of Manchester is leading a project evaluating services using assistive technology for communication. **ACT NoW (Assessing the effectiveness of Communication Therapy in the North West)** aims to provide robust evidence about the effectiveness of early, intensive therapy intervention, including the use of assistive technologies, for people with aphasia or dysarthria following stroke. The project is funded by the NIHR Health Technologies Assessment (HTA) programme and is due to conclude in 2010.

Evaluation programmes

The NHS Purchasing and Supply Agency (PASA) Centre for Evidence Based Purchasing (CEP) funds assistive technology evaluations through the Assistive Technology Assessment Centre at Derby Hospital NHS Foundation Trust. Current evaluations being undertaken cover **Night time postural management equipment and Compression hosiery**.

The Bath Institute of Medical Engineering (BIME) Evaluation Centre, on behalf of CEP, is also currently undertaking a project to produce a **Buyer's Guide for Wheelchair Power-assist devices/ Power-Packs**. There is a lack of comparative information about the wide range of technically diverse products available on the UK market. The team at BIME will collate this information using a range of sources and approaches including asking wheelchair users what they think about the power-assist devices/power-packs they use.

In December 2007 CEP published an evidence review, **Pain-free artificial lower limb patient interfaces – CEP 07029**. The conclusions included that:

- There is little consistent agreement in the literature on the most effective way of providing the structural/mechanical (stump to prosthesis) interface.

- The quality of study design was variable.

- No fitting options have been shown to be consistently better than others.

- Further research is required to improve understanding of biomechanical variables at the interface (e.g. pressure, friction, temperature, moisture accumulation).

A team at the ASPIRE Centre for Disability Sciences was funded by the Medicines and Healthcare products Regulatory Agency (MHRA) between March 2005 and April 2007 to carry out an **Evaluation of Wheelchair Cushions**. Issues measured included heat and water vapour transfer, pressure distribution, horizontal stiffness and impact damping characteristics across a wide range of commercial products. The evaluation is complete and publication of the results is pending.

In addition a team at the Peninsula Technology Assessment Group are examining the **Effectiveness and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults**, with funding from the NIHR HTA programme. The purpose of this project was to appraise the clinical and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults. Findings are currently under appraisal and National Institute for Health and Clinical Excellence (NICE) guidance is due to be published later in 2008.

Annex A: Complete listing of assistive technology research and development activity 2007-08

Glossary of acronyms for funders:

BBSRC	Biotechnology and Biological Sciences Research Council
Department of Health PRP	Policy Research Programme
Department of Health (ICT RI)	Information Communication Technology Research Initiative
DIUS	Department for Innovation, Universities and Skills
DTI	Department of Trade and Industry now Department for Business, Enterprise and Regulatory Reform (BERR)
EPSRC	Engineering and Physical Sciences Research Council
EPSRC EQUAL	Extending Quality Life of Older People and Disabled People
ESRC	Economic and Social Research Council
European Commission eTEN	e-services Trans-European Network
European Commission ISMD	Information Society & Media Directorate
European Commission IST	Information Society Technologies priority
European Commission TEP	Transactional Exchange Programme
European Commission FP6	Framework Programme 6
HEFCE	Higher Education Funding Council for England
MHRA	Medicines and Healthcare products Regulatory Agency
MRC	Medical Research Council
NDA	New Dynamics of Aging programme. A collaboration between 5 UK Research Councils: ESRC, EPSRC, BBSRC, MRC and AHRC (Arts and Humanities Research Council)
NESTA	National Endowment for Science, Technology and the Arts
NIHR	National Institute for Health Research
NIHR RfPB	Research for Patient Benefit programme
NIHR HTA	Health Technologies Assessment programme
NIHR HTD	Health Technology Devices programme
NIHR NEAT	New and Emerging Applications of Technology programme
PACCIT	People at the Centre of Communications and Information Technology programme, funded by the DTI, EPSRC and ESRC
SPARC	Strategic Promotion of Ageing Research Capacity network, funded by EPSRC and BBSRC

Project title
    Organisation(s)
    Funding
	Project
	summary
		Start and
		finish dates

A Novel Active Electrode Book for Multi-Functional Restoration after Spinal Cord Injury **Research team:** Dept of Electronic & Electrical Engineering, University College London **Contact:** 020 7679 7306 **Funder:** EPSRC **Amount:** £491,965	This project is looking at how current limitations in existing implant devices can be overcome by generating stimulation currents close to the electrodes inside the spine. The stimulation can then be controlled by the end user. Link to more information on the FAST website	01/01/2008 31/12/2010
A Tongue Movement Command and Control System Based on Aural Flow Monitoring **Research team:** Dept of Mechanical Engineering, University of Bristol **Contact:** 0117 928 7741 **Funder:** EPSRC **Amount:** £269,165	This project aims to develop ways for people to control common household devices using tongue movements. The strategy is based on detecting specific tongue motions by monitoring air pressure in the outer ear. Link to more information on the FAST website	01/10/2007 30/09/2010
AABAC – Adaptive Asynchronous Brain-Actuated Control **Research team:** Dept of Computing and Electronic Systems, University of Essex **Contact:** 01206 872770 **Other partners:** University of Oxford **Funder:** EPSRC **Amount:** £442,401	The project is researching ways in which computer systems and robots could be controlled by using brain waves. Link to more information on the FAST website	01/04/2006 31/03/2009
ACT – Advanced Care Technologies Project **Research teams:** Sheffield Institute for Studies on Aging (SISA) and Barnsley NHS Foundation Trust **Contact:** 0114 2226248 **Funder:** European Regional Development Fund Objective One **Amount:** £1,900,000	This project aims to enable South Yorkshire companies to benefit from a fast expanding world market for assistive telecare technology. Expected outcomes include R&D projects, jobs and increased sales of products. Link to more information on the FAST website	01/10/2006 01/10/2008
ACT NoW – Assessing the effectiveness of Communication Therapy in the North West **Research team:** Human Communication and Deafness, University of Manchester **Contact:** 0161 275 3389 **Funder:** NIHR HTA programme **Amount:** £1,457,940	The project aims to provide robust evidence about the effectiveness of early, intensive therapy intervention, including the use of assistive technologies, for people with aphasia or dysarthria following stroke. The project is in a trial stage and is now actively recruiting up to 330 participants across eight sites in the North West of England. Link to more information on the FAST website	01/10/2004 28/02/2010

Project title
  Organisation(s)
  Funding
	Project
	summary
		Start and
		finish dates

Adapting support to sustain autonomy: understanding the implications of changing capabilities for older ICT users **Research team:** Dept of Information Science, Loughborough University **Contact:** 01509 22 3052 **Funder:** NDA **Amount:** £20,348	This multidisciplinary research network used facilitated workshops to identify new ways to support older people effectively in order for them to sustain their computer usage as their capabilities change. These preliminary studies will inform a major research proposal for further work in this area. Link to more information on the FAST website	01/11/2006 31/10/2007
Ageing in Construction Workers **Research team:** Dept of Civil and Building Engineering, University of Loughborough **Contact:** 01509 222884 **Funder:** EPSRC, BBSRC (SPARC) and EPSRC **Amounts:** £33,073 and £148,000	A series of in-depth semi-structured interviews with workers in several roles in the construction industry identified the impact of working conditions on their health and career paths. The project is now complete and a report is in preparation. As a result of this EPSRC, BBSRC (SPARC) project, the research team secured a £148,000 EPSRC award to develop an ageing construction worker simulation 'suit' which will be used to assist in the development of new working practices and the design of tools and equipment used in the construction industry. Link to more information on the FAST website	01/12/2006 30/11/2007
AHVIIT – Audio Haptics for Visually Impaired Information Technology **Research team:** Royal National College for the Blind **Contact:** 01432 265725 **Funder:** European Commission Leonardo Da Vinci programme **Amounts:** £ not stated	The aim of the project is to develop pilot materials and online training programmes which will improve the inclusion of workers or trainees who are blind or partially sighted. It will do so by presenting visual graphical information in a non-visual format using touch and sound. Link to more information on the FAST website	01/10/2006 01/09/2008
AHVITED – Audio Haptics for Visually Impaired Training and Education at a Distance **Research Team:** Royal National College for the Blind **Contact:** 01432 265725 **Funder:** European Commission Leonardo Da Vinci programme **Amounts:** £ not stated	This project is looking at the problems associated with delivering graphical learning materials to visually impaired learners studying by distance learning. This will result in the development of accessible materials and software, primarily designed using 'talking tactile' technology. Link to more information on the FAST website	01/10/2006 01/09/2009
AIMWELL – An integrated methodology for measuring the health benefits and cost savings of interventions in the home environment **Research team:** Centre for Urban Studies, University of Bristol **Contact:** 0117 954 6755 **Other partners:** University of Bradford, De Montfort University, University of Bristol, University of Birmingham, Foundations **Funder:** NDA **Amounts:** £ not stated	This project is establishing a network to bring together people from different backgrounds to develop an integrated methodology for evaluating the benefits of assistive technology focusing on home improvements and adaptations. The project will establish evaluation methods relating to health and well-being gains to older people and in quantified savings to health and social care budgets. Link to more information on the FAST website	30/03/2007 01/04/2008

Project title
    Organisation(s)
    Funding
	Project
	summary
		Start and
		finish dates

ALMS – Advanced Lifestyle Monitoring Systems **Research team:** Dept of Medical Physics and Clinical Engineering, Barnsley Hospital NHS Foundation Trust **Contact**: 01226 730000 **Funder**: NIHR HTD **Amount:** £770,700	This team is evaluating third generation telecare systems to provide sophisticated monitoring of the well-being of older people in their own home. Link to more information on the FAST website	01/04/2006 01/04/2009
Ambient Kitchen **Research team:** Culture Lab, School of Computing Science, University of Newcastle **Contact:** 0191 246 4646 **Other partners:** University of York, Newcastle University **Funder:** One NorthEast through Centre of Excellence for Life Sciences (CELS) **Amount**: £ not stated	The project is a lab-based project assessing a variety of high tech devices that will be incorporated in a wide range of standard kitchen devices and furniture. The project aims to research ways to enable people requiring assistance to live independently at home, looking specifically at the wireless collection of activity data and the display of helpful information. Link to more information on the FAST website	01/02/2007 31/12/2008
An Evolvable Computer Interface for Elderly Users **Research team:** Faculty of Computing and Engineering, University of Ulster **Contact:** 028 9036 6305 **Funder:** Dept for Employment and Learning in Northern Ireland (DELNI) **Amount:** £ not stated	The aim of the project is to develop an intelligent help facility that provides personalised assistance to older people who are using the computer to browse the web. Link to more information on the FAST website	01/10/2006 30/09/2009
ART – Attention Responsive Technology **Research team:** Applied Vision Research Unit, Loughborough University **Contact:** 01509 63 5703 **Funder:** PACCIT **Amount:** £246,248	This project produced a prototype system for severely disabled people to operate and control electronic devices, including home automation systems, in their environment by using eye gaze technology. A follow on project (ARTIFICE) funded by the EPSRC will continue this work in 2008. Link to more information on the FAST website	01/06/2004 31/05/2007
ASK-IT – Ambient Intelligence System of Agents for Knowledge-based and Integrated Services for Mobility Impaired users **Research team:** School of Civil Engineering and Geosciences, University of Newcastle **Contact:** 0191 222 6323 **Funder:** European Commission FP6 **Amount:** €8,500,000 total	This project is developing outdoor equipment, services and information sources for people with mobility impairments to use while in transit. The project brings together 55 partners across Europe. At March 2008 the pilot site and evaluation process is underway in all eight European participating cities. Link to more information on the FAST website	01/10/2004 30/09/2008

Project title 　Organisation(s) 　Funding	Project summary	Start and finish dates
AT Commands for Assistive Mobile Device Interfaces **Research team:** School of Computing, University of Dundee **Contact:** 01382 344151 **Funder:** European Telecommunications Standards Institute (ETSI) **Amount:** £ not stated	In August 2007 the project produced a European-wide technical specification for assistive mobile devices which details how they should interact with mobile terminals. The team are now actively disseminating the findings. The document is downloadable from the project website. Link to more information on the FAST website	31/03/2006 31/03/2008
Attendant Wheelchair Propulsion **Research team:** ASPIRE Centre for Disability Sciences (ACDS) **Contact:** 020 8954 2300 **Other partners:** University College London **Funders:** EPSRC; NHS stipend **Amount:** £25,000	The aim of the project is to assess how difficult everyday tasks are when pushing an occupied standard manual wheelchair. Such information could be extremely valuable to wheelchair services when prescribing a wheelchair to a user who will primarily be pushed by an attendant. Link to more information on the FAST website	25/09/2006 15/09/2009
Attention Responsive Technology Implementation For Independent Control of the Environment (ARTIFICE) **Research team:** Applied Vision Research Unit, Loughborough University **Contact:** 01509 63 5703 **Funder:** EPSRC **Amount:** £97,259	This project is continuing the ART research to enable people whose mobility is impaired to operate environmental control systems using eye gaze technology. Link to more information on the FAST website	01/10/2007 30/09/2008
AUNT-SUE (Accessibility and User Needs in Transport for Sustainable Urban Environments) **Research team:** Transport Research And Consultancy (TRaC), London Metropolitan University **Contact:** 020 7133 3028 **Other partners include:** London Metropolitan University, Loughborough University, University College London **Funder:** EPSRC **Amount**: £296,702	The aim of the project is to develop and test sustainable policies and practice that will deliver effective socially inclusive transport design and operating procedures. Link to more information on the FAST website	01/07/2007 31/12/2009
Automatically-determined unit inventories for unit selection text-to-speech synthesis **Research team:** Centre for Speech Technology Research, University of Edinburgh **Contact:** 0131 650 4434 **Funder:** EPSRC **Amount:** £238,471	The aim of this project is to develop methods which will make it quicker and cheaper to create new voices for speech synthesisers and which will also allow non-experts to carry out this work. Link to more information on the FAST website	01/06/2006 31/05/2009

Project title
   Organisation(s)
   Funding
	Project
	summary
		Start and
		finish dates

BenToWeb **Research team:** Human-Computer Interaction Research Group, University of York **Contact:** 01904 432722 **Funder:** European Commission FP6 **Amount:** €1,700,000	The project delivered new software modules and methodologies that satisfy some of the accessibility recommendations of the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). The project partners intend to maintain the website as a source of information. Work on the project's test suites will continue under the umbrella of the WCAG 2.0 Test Samples Development Task Force (TSD TF) of W3C, where the work is being migrated. Link to more information on the FAST website	01/09/2004 31/08/2007
Biomechanical Effects of Using a New Low Cost Assistive Device for Home Exercise of the Lower Limbs **Research team:** Faculty of Health, University of Central Lancashire **Contact:** 01772 894567 **Funder:** HEFCE **Amount:** £ not stated	The project tested the Ortho-Glide lower limb exerciser against the alternative standard treatment prescribed for home rehabilitation after lower limb trauma or surgery. The project concluded that there were benefits to using the Ortho-Glide over the comparative standard treatment. Link to more information on the FAST website	01/09/2007 30/11/2007
Biomechanical, mechanical and virtual modelling of ankle foot orthoses in the management of Cerebral Palsy **Research team:** Faculty of Health, University of Central Lancashire **Contact:** 01772 894567 **Funder:** Lancashire Teaching Hospitals NHS Foundation Trust **Amount:** £ not stated	The project is evaluating the effectiveness of different designs of ankle foot orthoses (ankle splints) for adults with cerebral palsy. Link to more information on the FAST website	05/09/2005 05/09/2008
BioMed Healthcare Technology Co-operative (HTC) **Research team:** BioMed Centre, Southmead Hospital **Contact:** 0117 959 5690 **Funder:** NIHR HTD **Amount:** £499,000	The co-operative was created to accelerate the development and adoption of new technologies, treatments and devices for people with intractable urinary incontinence. The co-operative is supporting the development of a range of products and services. The team are applying for continuing funding and it is intended to continue the work of the co-operative. Link to more information on the FAST website	01/04/2005 31/03/2008
BiosensorNet: Autonomic Biosensor Networks for Pervasive Healthcare **Research team:** Dept of Computing, Imperial College London **Contact:** 020 7589 5111 **Funder:** EPSRC **Amount:** £1,403,809	The aim of this project was to investigate how intelligent miniaturised biosensors will allow the monitoring of people as they maintain their normal daily activities, and provide warnings when critical events arise. Link to more information on the FAST website	01/10/2005 30/09/2007

Project title Organisation(s) Funding	Project summary	Start and finish dates
Books for All **Research team:** CALL Centre, University of Edinburgh **Contact:** 0131 651 6235 **Funder:** Scottish Government Education Department **Amount:** £14,000	The project investigated the need for books and other learning materials to be provided in alternative, accessible formats in schools in Scotland and resulted in the formation of the Scottish Accessible Resources Network. Link to more information on the FAST website	01/11/2006 01/05/2007
CAALYX – Complete Ambient Assisted Living eXperiment **Research team:** Faculty of Health and Social Work, University of Plymouth **Contact:** 01752 233842 **Funder:** European Commission FP6 **Amount:** €1,850,000 (total)	The project is investigating how to prolong the time people can live independently, through the use of intelligent, highly personalised networked embedded sensors and systems. Current progress includes publications. Link to more information on the FAST website	01/01/2007 01/01/2009
Clinical and cost effectiveness of footwear and orthotic therapy in the management of the neuropathic diabetic foot **Research team:** Faculty of Health and Social Work, University of Plymouth **Contact:** 01752 233842 **Funder:** NHS R&D Transitional Funding **Amount:** £ not stated	The aim of the study is to determine whether therapeutic shoes used with two types of inserts reduce peak pressure in the at-risk diabetic foot, and to determine which of the orthotics is most effective. Link to more information on the FAST website	03/03/2006 02/03/2008
COGAIN – Communication by Gaze Interaction **Research team:** ACE Centre Advisory Trust **Contact:** 01865 759800 **Other partners:** Loughborough University; De Montfort University **Funder:** European Commission FP6 **Amount:** €2,900,000	The project provides a forum for bringing together researchers, equipment developers, user representatives and users of eye gaze communication technology with the common aim of integrating the expertise to develop new, improved and affordable technology. Link to more information on the FAST website	01/09/2004 31/08/2009
Cogniron – Cognitive Robot Companion **Research team:** Adaptive Systems Research Group, University of Hertfordshire **Contact:** 01707 284303 **Funder:** European Commission FP6 **Amount:** €8,000,000	This project studied the perceptual, representational, reasoning and learning capabilities of embodied robots in human-centred environments. A series of papers were published in 2007 and the final deliverable papers are due for publication in spring 2008. Link to more information on the FAST website	01/01/2004 31/12/2007
Costs, Quality and Outcomes of Community Equipment Services **Research team:** Personal Social Services Research Unit, University of Kent **Contact:** 01227 827672 **Funder:** Department of Health Policy Research and Development Directorate **Amount:** £ not stated	The research team have established the key aspects of quality and outcomes and other factors associated with cost and quality variation through a review of the literature and consultation with stakeholders. They have used this information to develop and validate measures of quality and outcomes of services. Survey work is currently being undertaken with results due in spring 2008. Link to more information on the FAST website	01/01/2007 01/05/2008

Project title
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Design and Development of Novel Compression Therapy Regimes for the Treatment of Venous Leg Ulcers **Research team:** Centre for Materials Research and Innovation (CMRI), University of Bolton **Contact:** 01204 900600 **Funder:** EPSRC **Amount:** £152,142	The aim of the project is to design and develop novel single layer bandages that will effectively fulfil the requirements of both padding and compression bandages. Link to more information on the FAST website	24/10/2005 23/01/2009
Design and fabrication of a high dynamic range log-domain Bionic Ear **Research team:** Dept of Bioengineering, Imperial College London **Contact:** 020 7594 5179 **Funder:** EPSRC **Amount:** £111,588	The project addresses the issue of the design and implementation of a new analog cochlear signal processor (bionic ear). Link to more information on the FAST website	01/09/2004 31/08/2007
Design and the Home **Research team:** Art and Design Research Centre – Sheffield Hallam University **Contact:** 0114 225 2686 **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £23,178	The project designed and constructed a physical living room environment as a test lab for the evaluation of different theories and conceptual designs in response to the needs of older people who wish to continue living independently. Link to more information on the FAST website	01/10/2006 01/09/2007
Design Enabling Autonomy and Independence through Smart Clothes and Wearable Technology **Research team:** Smart Clothes and Wearable Technology Research Group, University of Wales **Contact:** 01633 432432 **Other partners include**: University of Salford, University of Ulster; University of Bristol, London College of Fashion, University of Westminster **Funder:** NDA **Amount:** £ not stated	This preparatory network aimed to define a methodology for the application of emerging smart clothes and wearable technologies, which will enable older people to enjoy better quality lives. Link to more information on the FAST website	01/04/2007 01/04/2008
Design evaluation of older people's extra care housing: development and testing of an assessment tool **Research team:** School of Architecture, University of Sheffield **Contact:** 0114 222 0399 **Other partners:** Personal Social Services Research Unit (PSSRU) **Funder:** EPSRC **Amount:** £553,906	This study aims to produce a tool that can describe the range of extra care housing and to quantify the experience of the people living and working there, and to identify environmental features that are associated with higher quality of life. Link to more information on the FAST website	01/10/2007 30/09/2010

Project title
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Developing a Virtual Clinic for Diabetes Care **Research team:** Health Sciences Research Institute, Warwick Medical School **Contact:** 02476 522891 **Funder:** Warwick Medical School **Amount:** £ not stated	The aim of this project is to develop an internet-based "Virtual Clinic" as an innovative way to help people with diabetes to manage their condition. A version of the virtual clinic has been developed and will be tested over a period of six months. Link to more information on the FAST website	01/08/2005 31/07/2008
Development of a clinically user-friendly device to measure posture after stroke **Research team:** Centre for Rehabilitation and Human Performance Research, University of Salford **Contact:** 0161 295 2275 **Funder:** NIHR NEAT **Amount:** £ not stated	The project developed a portable device for measuring posture for people who have had a stroke which uses a combination of body sensors and force plates and does not require specialist staff or resources. The prototype is now being assessed in clinical trials. Link to more information on the FAST website	24/11/2006 01/11/2008
Development of a new reusable absorbent incontinence garment (Pantegral) for women **Research team:** Continence and Skin Technology Group, University College London **Contact:** 020 7679 0200 **Funder:** NIHR HTD **Amount:** £266,884	This project aims to develop an improved type of continence product with significantly improved leakage performance. Link to more information on the FAST website	01/06/2007 30/05/2010
Development of a prosthetic foot with adaptable heel heights – Shape & Roll Talon **Research team:** National Centre for Prosthetics and Orthotics, University of Strathclyde **Contact:** 0141 548 3433 **Funder:** European Commission Marie Curie International Re-Integration Grant **Amount:** €80,000	This project aims to develop a prosthetic foot that allows for individually tailored heel heights so that the prosthesis can be easily adapted to any individual's choice of shoe. Link to more information on the FAST website	01/04/2007 01/04/2010
Development of an intelligent robotic system to aid physical therapy in stroke **Research team:** Academic Department of Rehabilitation Medicine, University of Leeds **Contact:** 0113 392 4719 **Other partners:** Woodend Hospital Aberdeen, University of Manchester **Funder:** NIHR NEAT **Amount:** £350,883	The project involves developing a robotic system that provides intelligent, interactive, safe movement treatment to help recovery of arm weakness after stroke. Link to more information on the FAST website	01/09/2004 30/06/2008

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DIADEM – Delivering Inclusive Access for Disabled and Elderly Members of the community **Research team:** Dept of Information Systems, Brunel University **Contact:** 01895 266022 **Funder:** European Commission FP6 and ISMD (eInclusion) **Amount:** €3,000,000 total (€1.95m from ISMD)	The project is looking at ways to provide support for older and cognitively disabled people with memory difficulties who find online transactions challenging. Link to more information on the FAST website	01/09/2006 31/08/2009
Disability Equipment Evaluation Programme 2 **Research team:** ASPIRE Centre for Disability Sciences **Contact:** 020 8954 2300 **Funder:** MHRA **Amount:** £91,617	Evaluation of wheelchair cushions to measure heat and water vapour transfer, pressure distribution, horizontal stiffness and impact damping characteristics on a wide range of commercial products. Link to more information on the FAST website	01/04/2004 31/03/2009
Dynamic Faces: Understanding the Dynamics of Real Faces **Research team:** Centre for Vision, Speech and Signal Processing, University of Surrey **Contact:** 01483 686030 **Funder:** EPSRC **Amount:** £254,130	The aim of this research is to create dynamic 3D representations of real faces for realistic animation to be used as visual aids for people with hearing loss. Link to more information on the FAST website	01/10/2005 30/09/2009
ECLIPSE – European Cooperation and Learning to ImpPlement transport Solutions to combat Exclusion **Research team:** Transport & Travel Research Ltd **Contact:** 01543 416416 **Other partners:** Polis **Funder:** European Commission TEP **Amount:** £ not stated	The aim of this project was to raise awareness of the role that transport can play in increasing mobility for marginalised groups, including the older population and those with a disability. Guidance was developed, conferences were held in 2006 and 2007 and a book is due to be published in spring 2008. A Good Practice Guide has been published Link to more information on the FAST website	01/09/2005 01/08/2007
ECO-VIP **Research team:** Royal National College for the Blind **Contact:** 01432 265725 **Funder:** European Commission Leonardo Da Vinci programme **Amount:** € not stated	The aim of the project is to develop a training course to qualify participants to educate blind and partially sighted learners via e-learning. Link to more information on the FAST website	01/11/2006 01/10/2008
Effectiveness and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults **Research team:** Peninsula Technology Assessment Group **Contact:** 01392 406918 **Funder:** NIHR HTA **Amount:** £ not stated	The purpose of this project was to appraise the clinical and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults. Findings are currently under appraisal. NICE guidance is due to be published in June 2008. Link to more information on the FAST website	13/11/2006 20/09/2007

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Effect of different angles of tilt-in-space wheelchairs on the posture and function of children with cerebral palsy **Research team:** Chailey Heritage Clinical Services **Contact:** 01825 722112 **Funder:** Association of Paediatric Chartered Physiotherapists; NHS R&D Transitional Funding **Amount:** £ not stated	This study looked at the impact on postural ability and spinal profile of using tilt-in-space wheelchairs in the backwardly titled and upright positions. Link to more information on the FAST website	22/12/2005 01/09/2007
Effects of positioning of complex seating systems on swallowing performance in dysphagic adults with severe neurological disability **Research team:** Royal Hospital for Neuro-disability **Contact:** 020 8780 4500 **Funder:** NHS R&D Transitional Funding, Sir Jules Thorn Charitable Trust, and Neuro Disability Research Trust **Amount:** £5,991	This project examined the effects of posture on swallowing function and risk of aspiration to identify whether changes in wheelchair positioning affected swallowing efficiency. Link to more information on the FAST website	01/04/2005 30/04/2007
Effects of reverberation on conversation in rooms **Research team:** School of Psychology, Cardiff University **Contact:** 029 20874523 **Other partners:** University of Reading **Funder:** EPSRC **Amount:** £349,691	The project aims to provide architects with tools to help make appropriate design modifications so that room environments are less noisy. The acoustic design of spaces is even more critical for listeners with hearing impairment. Link to more information on the FAST website	01/02/2006 31/01/2010
Effects of seating on the scoliotic deformity and posture in non-ambulant individuals **Research team:** School of Mechanical Engineering, University of Leeds **Contact:** 0113 34 32155 **Funder:** NHS R&D Transitional Funding, British Scoliosis Research Foundation **Amount:** £51,828	The project developed a clinical measurement system for identifying the best seating system for an individual in the management of spinal deformity and posture. Link to more information on the FAST website	28/05/2004 01/08/2007

Project title Organisation(s) Funding	Project summary	Start and finish dates
EIAO – European Internet Accessibility Observatory **Research team:** Centre for Research in Library and Information Management, Manchester Metropolitan University **Contact:** 0161 247 6142 **Funder:** European Commission FP6 **Amount:** €3,150,000	The project assessed the accessibility of European websites and participated in a cluster developing a European Accessibility Methodology. The first International Conference on Technology for Participation and Accessible eGovernment Services was held in Norway in June 2007. Link to more information on the FAST website	01/01/2004 01/01/2008
ENABLE – A wearable system supporting services to 'enable' elderly people to live well, independently and at ease **Research team:** Dept of Computer Science, Reading University **Contact:** 0118 378 8617 **Funder:** European Commission FP6 **Amount:** €2,800,000	The project will develop a wrist unit and external sensors worn on the body which can transmit details of a person's location and their health status to a central information bank, which can in turn notify medical staff and caregivers. Link to more information on the FAST website	01/01/2007 30/12/2009
ENABLED – Enhanced Network Accessibility for the Blind and Visually Impaired **Research team:** Virtual Engineering Centre (VEC), Queens University Belfast **Contact:** 028 9097 4332 **Funder:** European Commission FP6 **Amount:** €3,700,000	The goal of this project was to enhance blind and visually impaired people's access to information and services on the internet. The ENABLED project results were demonstrated at workshops in Dusseldorf in October 2007 and Liverpool in July 2007. Link to more information on the FAST website	01/09/2004 31/10/2007
Enabling health, independence and wellbeing for psychiatric patients through Personalised Ambient Monitoring (PAM) **Research team:** Institute of Sound & Vibration Research, University of Southampton **Contact:** 01786 467423 **Other partners:** University of Nottingham, University of Stirling **Funder:** EPSRC **Amount:** £112,461	This research plans to use off-the-shelf technology to monitor changes in the behavioural patterns which indicate people's mental health state and to issue automatic alerts to the person, their family, or their doctor, providing the capability to avert debilitating episodes. Link to more information on the FAST website	01/10/2007 30/09/2010

Project title / Organisation(s) / Funding	Project summary	Start and finish dates
EQUATOR – Technological Innovation in Physical and Digital Life **Research team:** School of Computer Science and Information Technology, University of Nottingham **Contact:** 0115 951 4254 **Other partners:** University of Bristol, Lancaster University, University of Sussex, University of Glasgow, University of Southampton, University College London, Goldsmiths College **Funder:** EPSRC **Amount:** £10,670,638	This Interdisciplinary Research Collaboration has engaged in a series of projects with different user communities to develop new combinations of physical and digital worlds. The digital care strand of EQUATOR has focused on two areas of research. The first is a cluster of projects based around supporting the day-to-day life of a care home. The second cluster of projects is a series of experiments to investigate how immersive virtual environments can help people with phobia. Link to more information on the FAST website	01/10/2000 30/06/2007
Ergonomic Self Propelled Wheelchair (ESP): an evaluation of energy expenditure and ride comfort: a pilot study **Research team:** Clinical Research Centre for Health Professions, University of Brighton **Contact:** 01273 643647 **Funder:** NIHR HTD **Amount:** £94,980	The project is developing the ergonomic self-propelled wheelchair kit which will convert a standard manual wheelchair so that it can be used by people with hemiplegia (weakness on one side of the body). A pilot study with non-disabled participants has so far shown that the adapted wheelchair is more efficient and comfortable. Link to more information on the FAST website	01/01/2007 30/06/2008
EUAIN – European Accessible Information Network **Research Team:** Royal National Institute of the Blind **Contact:** 01733 375332 **Funder:** European Commission IST FP6 (e-inclusion) **Amount:** €959,984	The project created a European Accessible Information Network to bring together organisations in the content creation and publishing industries. The aim of the project is that accessibility for print impaired people is an integrated component of the document management and publishing process and not a specialised, additional service. The website continues to be maintained as a resource and further projects are underway but with no UK representative. Link to more information on the FAST website	01/11/2004 31/10/2007
Evaluation Of A Vibro-Tactile Sensory Aid Project – Development of a tactile vest **Research team:** School of Medicine, Imperial College London **Contact:** 020 8846 7634 **Funder:** MRC **Amount:** £231,069	This project researched the use of a prosthetic device which a person with impaired posture can wear and which will remind them, by providing tactile cues, of the need to keep their body in the correct alignment. Link to more information on the FAST website	01/06/2004 01/06/2007

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Evaluation of Two Virtual Reality Technologies with the Potential to Teach Children with Autism Spectrum Disorders **Research team:** School of Psychology, University of Oxford **Contact:** 01865 226515 **Funder:** NESTA **Amount:** £30,000	The project evaluated the effectiveness of two different virtual reality systems aimed at improving social communication in children with autism. Link to more information on the FAST website	31/01/2006 31/07/2007
Experiences and Uses of Technology in Older Age **Research team:** Division of Psychology and Social Change, Manchester Metropolitan University **Contact:** 0161 247 2569 **Funder:** NDA **Amount:** £ not stated	This preparatory network brings together experts from a range of academic, public and private organisations with older potential users to explore how technology can enhance access to information/communication and improve quality of life. Link to more information on the FAST website	01/04/2007 01/04/2008
E-YES **Research team:** Royal National College for the Blind **Contact:** 01432 265725 **Funder:** European Commission Leonardo Da Vinci programme **Amount:** £ not stated	The aim of this project is to develop new tools for creating and managing eLearning programmes which are fully accessible to visually impaired people. Link to more information on the FAST website	01/11/2006 01/10/2008
Facilitating Wider Uptake of Inclusive Design **Research team:** School of Engineering and Design, Brunel University **Contact:** 01895 265814 **Other partners:** University of Cambridge **Funder:** EPSRC **Amount:** £244,067	The aim of this project is to explore the unmet needs of experienced designers and to develop a prototype Inclusive Design Support Tool which can integrate in a novel way anthropometric data that is the data available about the distribution of body dimensions in the population which is used to optimise products. Link to more information on the FAST website	31/03/2008 30/03/2011

Project title Organisation(s) Funding	Project summary	Start and finish dates
Factors affecting mobility in Parkinson's Disease and the value of virtual reality glasses as an aid to mobility in Parkinson's Disease **Research team:** Institute of Neurology, University College London **Contact:** 020 7837 3611 **Funder:** NHS R&D Transitional Funding and Parkinson's Disease Society (PDS) **Amount:** £150,000	This project assessed whether the provision of visual clues through virtual reality glasses improved mobility in people with Parkinson's disease. The medical engineer, Clive Curtis, who invented the glasses, is working with the East London Innovations Hub (ELIH) to find a way of taking the glasses to market. A patent application has been filed and future developments are looking at attachments to conventional glasses to make device less obtrusive. Now his 'walking glasses' have been awarded first prize in the Innovative Device or Technology section of the London NHS Innovation Competition which was held in spring 2008. Clive will receive £5,000 to further his work. Link to more information on the FAST website	30/08/2005 01/09/2007
Feasibility of Semi-Active Damping for Advanced Rowing Ergometry **Research team:** School of Health and Social Care, Oxford Brookes University **Contact:** 01865 48 2600 **Funder:** EPSRC **Amount:** £110,224	Rowing machines (ergometers) are widely used to train and select athletes for rowing and sculling. However, these machines do not accurately replicate the feel and force actions experienced in a boat. Indoor rowing using an ergometer is also a sport which can be enjoyed by disabled participants. This project aims to explore new ideas in ergometer design and to develop a test prototype for further research. Link to more information on the FAST website	01/07/2007 30/06/2008
Feasibility study for a cyclic contracture correction device **Research team:** Orthotic Research and Locomotor Assessment Unit (ORLAU) **Contact:** 01691 404531 **Funder:** NIHR HTD **Amount:** £32,361	The objective of this project was to produce a prototype powered orthosis which stretches the joints affected by contracture in a way which more closely resembles the patterns seen during normal physiological activity. Link to more information on the FAST website	01/02/2007 01/02/2008
Future bathroom: A study of user-centred design principles affecting usability, safety and satisfaction in bathrooms for people living with disabilities **Research team:** Art and Design Research Centre, Sheffield Hallam University **Contact:** 0114 225 2686 **Funder:** EPSRC **Amount:** £409,952	This project aims to improve the quality and design of bathroom furniture for older people with the goal of producing products which all bathroom users find acceptable as well as meeting the specific needs of older and disabled people. Link to more information on the FAST website	01/04/2008 31/03/2011

Project title / Organisation(s) / Funding	Project summary	Start and finish dates
Giving Young People who use AAC a Voice **Research team:** Centre for the Study of Childhood and Youth, University of Sheffield **Contact:** 0114 222 6069 **Funder:** ESRC **Amount:** £ not stated	A 3-year PhD project where the researcher will follow 10 AAC users aged 10–16 during the course of a year. The aim is to reveal the views of a group who are usually excluded from research. Link to more information on the FAST website	01/10/2006 01/09/2009
GUIDE – General User Interface for Disorders of Execution **Research team:** Southern General Hospital, Glasgow **Contact:** 0141 201 1100 **Other partners**: University of Stirling **Funder:** Chief Scientist Office, Scotland **Amount:** £49,096	The project is testing the use of a memory aid device which allows a user to be "talked through" the component steps of a given task by a human voice. Link to more information on the FAST website	18/02/2008 18/09/2008
HAPTEX – Haptic Sensing of Virtual Textiles **Research team:** School of Physics, University of Exeter **Contact:** 01392 264083 **Funder:** European Commission FP6 **Amount**: €1,663,980	This project investigated how far it is possible to provide a user with a completely reliable sense of fabric through a virtual experience. Link to more information on the FAST website	01/12/2005 31/10/2007
Healthcare@Home **Research team:** School of Computer Science, Cardiff University **Contact:** 029 2087 4812 **Funder:** DTI Technology Programme **Amount:** £ not stated	The project has developed an integrated system for health data monitoring based on NHS processes for the management of long-term conditions, such as diabetes, that offers improved monitoring of outcomes. The system was positively evaluated in conjunction with clinical staff. The website provides links to results and publications. Link to more information on the FAST website	01/01/2005 30/10/2007
Healthy Aims **Research team:** Centre for Rehabilitation and Human Performance Research, University of Salford **Contact:** 0161 295 2275 **Other UK partners include:** North Bristol NHS Trust, Queen Mary and Westfield College, University of London, Salisbury District Hospital NHS Trust, University College London, University of Newcastle Upon Tyne **Funder:** European Commission FP6 **Amount:** €26,000,000	The UK partners in this large EU project focused on functional electrical stimulation are developing a device to facilitate hand opening after stroke. The first implant was performed in late May 2007 and appeared useful as training device so a funding application was made to the Stroke Association to perform a pilot study with 15 people. At March 2008 three volunteers have received the implanted 2 channel device. Improvements have been seen in hand functionality, activities of daily living and quality of life measures. Link to more information on the FAST website	01/12/2003 01/12/2007

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Hearing dummy **Research team:** Department of Psychology, University of Essex **Contact:** 01206 873802 **Funder:** EPSRC **Amount:** £357,790	This project will develop a computer model of hearing to represent a person's hearing impairment, so that this can be used to evaluate the potential benefit of different hearing aid designs and indicate a 'best-buy' prescription. Link to more information on the FAST website	17/09/2007 16/09/2010
i~design 2 – inclusive design for the whole population **Research team:** Engineering Education Centre, University of Loughborough **Contact:** 01509 227198 **Other partners:** University of Cambridge, Helen Hamlyn Research Centre, University of Dundee, University of York **Funder:** EPSRC **Amount:** £417,211	The project developed approaches for new product development and data for designers that it is hoped will lead to products which enable independence at home and access to work for the whole population. The Inclusive Design Toolkit can be downloaded from the project website. Link to more information on the FAST website	01/10/2004 30/09/2007
i~design 3 – extending active living through more effective inclusive design **Research team:** Dept of Engineering, University of Cambridge **Contact:** 01223 332600 **Other partners:** Loughborough University, Helen Hamlyn Research Centre **Funder:** EPSRC **Amount:** £1,260,292	This project will extend the focus of earlier i~design work to encourage industry and Government to adopt the principles and practice of inclusive design. Key goals are to secure more effective application of user data to job and workplace design and to healthcare systems design. Team members are currently investigating how users may be excluded from the use of some products and technologies because of different contextual and environmental factors, e.g. using products in poor lighting conditions or in a crowd etc. Link to more information on the FAST website	01/10/2006 30/09/2010
Identifying Key Needs of People with Dementia that can be Supported by Technology in the Home **Research team:** Centre for Usable Home Technology (CUHTec), University of York **Contact:** 01904 433178 **Funder:** EPSRC **Amount:** £48,000	The project identified possible technological interventions to help people in the early stages of dementia to carry out a range of tasks. Link to more information on the FAST website	01/03/2005 30/09/2007

Project title 　Organisation(s) 　Funding	Project summary	Start and finish dates
IDGO TOO – Inclusive Design for Getting Outdoors 2 **Research team:** Research Institute for the Built and Human Environment, University of Salford **Contact:** 0161 295 4600 **Other partners:** Oxford Brookes University, Edinburgh College of Art, University of Bath **Funder:** EPSRC **Amount:** £900,000	This project focuses on particular Government policies and strategies in areas such as sustainability, urban renaissance, integrated communities and inclusive environments and looks at the practical implications for older people. Link to more information on the FAST website	02/01/2007 01/04/2011
Improved walking potential for mobility impaired patients. The Movement Centre Ski Walker **Research team:** Orthotic Research and Locomotor Assessment Unit (ORLAU) **Contact:** 01691 404531 **Other partners:** Robert Jones & Angus Hunt Orthopaedic & District Hospital NHS Trust **Funder:** NIHR HTD **Amount**: £28,594	This project aims to produce a prototype innovative walking aid which will be tested with users. The aim is to develop a product that is suitable for mass manufacture. Link to more information on the FAST website	01/01/2007 31/12/2008
Improving computer interaction for older users: an investigation of dynamic on-screen targets **Research team:** Department of Cybernetics, University of Reading **Contact:** 0118 378 8219 **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £42,703	This project studied the use of dynamic targets, such as expanding icons, as a means of improving the ways in which older people can interact with computers. Link to more information on the FAST website	01/10/2006 01/09/2007
Inclusive Design 2: providing tools to improve quality of life for the wider population **Research team:** Dept of Engineering, University of Cambridge Contact: 01223 332600 **Other UK partners:** University of York, University of Dundee, Helen Hamlyn Research Centre **Funder:** EPSRC **Amount:** £616,754	This project continued the work begun in a previous project, INCLUDE, and looked at how new products and services can be designed so they can be used by as many people as possible. Closely linked with the i~design projects, projects include product aesthetics, user characteristics, design tools and the business case for adopting inclusive practice. Link to more information on the FAST website	01/04/2004 31/12/2008

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INDEPENDENT – Investigating Enabling Domestic Environments for People with Dementia **Research team:** Division of Primary Care, University of Liverpool **Contact:** 0151 794 5597 **Other partners**: Bath Institute of Medical Engineering, University of Sheffield **Funder:** EPSRC **Amount:** £605,589	A key objective of this project was to address the needs of people with dementia in the design and manufacture of assistive technology products. The project has delivered two specific products: a music player at a pre-market stage of development and a comprehensive set of guidelines for architects, "Guidance to Activities in Dementia Care". Link to more information on the FAST website	01/11/2003 23/04/2007
Innovation in envisioning dynamic biomechanical data to inform healthcare and design practice **Research team:** Glasgow School of Art **Contact:** 0141 353 4500 **Funder:** NDA **Amount:** £ not stated	Researchers are developing a new visual and dynamic format for envisioning data which makes it easier to understand age-related mobility. The project will examine how successfully this approach allows older people to contribute, alongside practitioners from a range of disciplines, towards better design practice, rehabilitation and care plans and planning for work and leisure activities. Link to more information on the FAST website	01/11/2007 01/02/2009
Innovations in Dementia **Research team:** Innovations in Dementia **Contact:** 01392 420076 **Funder**: NESTA **Amount:** £27,300	This project will pilot a method of disseminating knowledge to day-care staff, who work with older people with dementia, of how to encourage computer use. The project will include an evaluation of the benefits of computer-based activities for people with dementia in day-care settings, as well as the effectiveness of the training for care staff. Link to more information on the FAST website	01/10/2007 10/10/2008
Innovations in Intelligent Assistive Robotics **Research team:** School of Computing and Intelligent Systems, University of Ulster **Contact**: 08 700 400 700 **Funder:** UK-India Education and Research Initiative (UKIERI) **Amount**: £145,000	The aim of the project is to develop intelligent robotic devices that could help people with severe impairments achieve greater independence. Link to more information on the FAST website	01/11/2007 01/11/2010

Project title Organisation(s) Funding	Project summary	Start and finish dates
Integrating telecare systems for chronic disease management in the community: What needs to be done **Research team:** Institute of Health and Society, University of Newcastle upon Tyne **Contact:** 0191 222 7045 **Other partners:** University of Glasgow **Funder:** Department of Health PRP **Amount:** £597,359	This study will produce new data to develop principles for action in deploying, implementing and integrating telecare systems, which can be utilised by managers and policy makers across the health and social care sectors. Link to more information on the FAST website	01/11/2006 31/03/2009
Intelligent Keyboard **Research team:** Dept of Computing, Communications Technology and Mathematics (CCTM), London Metropolitan University **Contact:** 020 7423 0000 **Funder:** DTI – Knowledge Transfer Partnership **Amount**: £78,381	This research is developing a system which will detect and compensate for errors made when using computers that are common to a specific type of impairment. Link to more information on the FAST website	08/08/2005 14/06/2009
Investigation into altered auditory feedback as a rate control tool for speakers with Parkinson's Disease **Research team:** Speech and Language Therapy Research Unit, Frenchay Hospital **Contact:** 0117 918 6529 **Funder:** NHS R&D Transitional Funding and Parkinson's Disease Society (PDS) **Amount:** £97,446	Altered auditory feedback has been used to control a variety of speech disorders. These techniques do not work for every speaker. This study aims to determine which performance aspects are indicative of whether someone with Parkinson's disease can benefit from altered feedback or not. Link to more information on the FAST website	25/01/2006 25/01/2008
Investigation into the advanced technology desires, needs and requirements of older drivers **Research team:** Design for All Research Group, Middlesex University **Contact:** 020 8411 5000 **Other partners**: Brunel University **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £55,500	This project tested a number of new products with focus groups using driving simulators. The outcomes included improved guidelines for product development and improved design rules based on informal but generally accurate methods. Link to more information on the FAST website	01/10/2005 01/04/2007

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Investigation of the benefits of a volunteer support scheme for adult hearing-aid users **Research team:** Audiology Department, Maelor Hospital **Contact:** 01978 725304 **Funder:** Powys Local Health Board **Amount:** £ not stated	This project is assessing whether support offered to hearing aid users in their home by volunteer visitors (the RNID's 'Hearing to Help' initiative) is beneficial. Link to more information on the FAST website	30/07/2005 30/12/2007
Keeping Individuals Safe and Secure (KISS): Safety and Security for Older People **Research team:** Dept of Computer Science, Reading University **Contact:** 0118 378 8617 **Funder:** NDA **Amount:** £ not stated	The aim of this multidisciplinary network was to identify, assess and prioritise threats relating to safety and security that occur during the day-to-day lives of older people and to examine how such threats can affect their independent living and quality of life. Link to more information on the FAST website	01/11/2006 30/10/2007
KITE – Keeping In Touch Everyday **Research team:** Culture Lab, School of Computing Science, University of Newcastle **Contact:** 0191 246 4646 **Funder:** One NorthEast through Centre of Excellence for Life Sciences (CELS) **Amount:** £ not stated	This study is exploring the views of people with dementia and their carers in order to help design an acceptable method of technology to support the activity of 'safe walking' for people with dementia. Link to more information on the FAST website	01/07/2007 01/07/2008
Landscapes of Cross-Generational Engagement **Research team:** Art and Design Research Centre, Sheffield Hallam University **Contact:** 0114 225 2686 **Other partners**: Goldsmiths College, University of York. **Funder:** NDA **Amount:** £488,000	This project aims to enhance people's experiences of growing older. It will investigate how interactive technologies can promote older people's engagement with their physical and social environments and encourage new forms of interaction with younger people. Link to more information on the FAST website	01/12/2007 01/12/2008
LIFE (Long-term involvement in fitness enablement) study **Research team:** School of Life Sciences, Oxford Brookes University **Contact:** 01865 483600 **Funder:** Department of Health PRP **Amount:** £243,889	The project is working with service users to investigate participation of people with neurological conditions in physical activities, including the use of inclusive fitness equipment. Link to more information on the FAST website	01/01/2007 01/06/2009

Project title Organisation(s) Funding	Project summary	Start and finish dates
Living in the Moment: Developing an Interactive Multimedia Activity System for Elderly People with Dementia **Research team:** School of Computing, University of Dundee **Contact:** 01382 344151 **Other partners:** University of St Andrews **Funder:** EPSRC **Amount:** £457,368	This project developed a computer generated interactive experience that was appealing to people with dementia and that they were able to use on their own. Link to more information on the FAST website	01/10/2004 31/12/2007
MAPPED (Mobilisation and Accessibility Planning for People with Disabilities) **Research team:** Research and Development Directorate, BMT Group Ltd **Contact:** 020 8943 5544 **Funder:** European Commission FP6 **Amount:** £2,895,000	The project is developing a route planner to provide users with the ability to plan excursions at any time, using public transport, their own vehicle, walking, or using a wheelchair, taking into consideration all their accessibility needs. Link to more information on the FAST website	01/09/2004 01/08/2007
MATCH – Mobilising Advanced Technologies for Care at Home **Research team:** Dept of Computing Science and Mathematics, University of Stirling **Contact:** 01786 467423 **Other partners:** University of Dundee, University of Glasgow, University of Edinburgh **Funder:** Scottish Higher Education Funding Council (SHEFC) **Amount:** £1,274,324	The goal of MATCH is to develop a research base for advanced technologies in support of social and health care at home. The project will establish a research infrastructure in the specific areas of home care networks, lifestyle monitoring, speech communication and assistive technology. The team are also developing and evaluating a range of integrated technologies to support home care. Project publications are available from the website. Link to more information on the FAST website	01/11/2005 30/10/2009
MATCH – Multidisciplinary Assessment of Technology Centre for Healthcare **Research team:** School of Information Systems, Computing and Mathematics, Brunel University **Contact:** 01895 203397 **Other partners:** University of Nottingham, University of Birmingham, University of Ulster, King's College London **Funder:** EPSRC **Amount:** £3,616,134	This project aims to support the UK medical devices sector through fundamental and applied research, working closely with industrial partners. Researchers aim to develop assessment methodologies which will catalyse a new consensus between the manufacturer, regulator and user communities. Link to more information on the FAST website	03/11/2003 02/11/2008
Mathematical Modelling of Age Related Differences in Web Browsing **Research team:** Centre for Human Computer Interaction Design (CHCI Design), City University London **Contact:** 020 7040 8427 **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £41,317	This project developed predictive mathematical models to describe age-related differences in web browsing. The project's findings show that older people have more problems navigating the web than younger people. Further research is proposed to see if peripheral vision is a factor in how older people look at websites. Link to more information on the FAST website	01/11/2006 30/10/2007

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MATILDAH – Making Advanced Technology Useful for Independent Living for Disabled People at Home **Research team:** School of Education, Social Work and Community Education, University of Dundee **Contact:** 01382 344151 **Funder:** ESRC **Amount:** £250,000	The project will examine the use, role and application of advanced technologies for disabled people. Data will be gathered from service users and designers as well as health and social care professionals. Link to more information on the FAST website	23/10/2006 22/10/2008
Measuring and modelling arm dynamics to support studies into reducing tremor in individuals with multiple sclerosis **Research team:** Dept of Mechanical Engineering, University of Bristol **Contact:** 0117 928 7741 **Funder:** EPSRC **Amount:** £ not stated	The aim of this project is to measure intention tremor in the upper limbs of people with multiple sclerosis. These measurements will be used as input to a dynamic model of what is happening in the arm. The aim is then to use functional electrical stimulation to control intention tremor. Link to more information on the FAST website	01/10/2005 30/09/2008
MICOLE – Multimodal Collaboration Environment for Inclusion of Visually Impaired Children **Research team:** Multimodal Interaction Group, University of Glasgow **Contact:** 0141 330 4256 **Funder:** European Commission IST FP6 **Amount:** €2,500,000	The project developed a software architecture that supports collaboration, data exploration, communication and creativity for both visually impaired and sighted children. It incorporates applications that use touch as well as vision. Project partners have developed or tested 16 different interfaces and application prototypes, and the Glasgow team has produced a tactile maze game. Link to more information on the FAST website	01/09/2004 31/08/2007
MAPPED (Mobilisation and Accessibility Planning for People with Disabilities) **Research team:** School of Engineering and Electronics, University of Edinburgh **Contact:** 0131 650 5567 **Funder:** EPSRC **Amount:** £124,180	The project has been looking at how to reduce reverberation in situations where the sensor may be at varied distances from the sound source, for example when a hearing-aid user chooses to move around the room. Link to more information on the FAST website	01/04/2006 31/03/2008
Modelling the impact of service innovation in chronic disease management **Research team:** Tanaka Business School, Imperial College London **Contact:** 020 7594 9137 **Funder:** Department of Health PRP **Amount:** £ not stated	This project used simulation modelling and economic analysis to explore the possible impact of telecare on a local health and social care system based on the area covered by the Greenwich Strategic Health Authority. Link to more information on the FAST website	01/12/2006 01/12/2007

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Models of Multi-disciplinary Working in Children's Trusts **Research team:** ACE Centre Advisory Trust **Contact:** 01865 759800 **Funder:** Department for Innovation, Universities and Skills (DIUS) **Amount:** £ not stated	This project is in its second year and four children's trusts are currently working with the two ACE Centres. Support is being given by the ACE Centres to the local teams to develop assessment protocols and practice and to provide training in assistive technology and augmentative and assistive communication (AAC). Link to more information on the FAST website	01/04/2006 31/03/2009
Motivating Mobility: Interactive Systems to promote Physical Activity and Leisure for people with limited mobility **Research team:** School of Computer Science and Information Technology, University of Nottingham **Contact:** 0115 951 4254 **Other partners:** University of Southampton, University of Dundee, Sheffield Hallam University, University of Sussex **Funder:** EPSRC **Amount:** £493,359	This project seeks to motivate people to extend or maintain physical activities using a combination of mobile technology and interactive personalised games. The team will use this approach in the context of a range of limitations on mobility; being bed based at home or hospital, with limited mobility within the home; or concerned about walking safely outdoors. Link to more information on the FAST website	01/07/2007 30/06/2010
Multiplicative and fractal noise coding for cochlear implants **Research team:** School of Engineering, University of Warwick **Contact:** 0247 6528193 **Other partners**: Guy's and St Thomas' Hospital Trust **Funder:** EPSRC **Amount:** £252,671	The project built on work carried out in a previous pilot study to investigate the benefit of multiplicative and fractal noise in more complete models of the electrically stimulated ear to determine how to optimise information transmission. Link to more information on the FAST website	01/04/2005 31/03/2008
Multisource – Audio-Visual Speech Recognition in the Presence of Non-Stationary Noise **Research team:** Dept of Computer Science, University of Sheffield **Contact:** 0114 22 21800 **Funder:** EPSRC **Amount:** £117,000	This project developed novel techniques for using visual speech information (e.g. lip and face movements) in the design of automatic speech recognition systems. Link to more information on the FAST website	28/02/2005 27/05/2007
MultiVis II: Multimodal Tools to Allow Blind People to Create and Manipulate Visualisations **Research team:** Multimodal Interaction Group, University of Glasgow **Contact:** 0141 330 4256 **Funder:** EPSRC **Amount:** £254,543	The project developed two new products: Graph Builder allows visually impaired people to easily read and modify graphs using a force-feedback device; TableVis offers a means of having an overview of an entire table contents. Link to more information on the FAST website	01/07/2004 30/06/2007

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National Information Resource of Assistive Technologies for People with Dementia **Research team:** Trent Dementia Services Development Centre **Contact:** 0116 257 5017 **Other partners:** University of Leicester **Funder:** Department of Health (Section 64 grant) **Amount:** £165,940	The project has developed a web-based information resource on assistive technologies for people with dementia (www.atdementia.org) which includes a database of products. Link to more information on the FAST website	01/09/2005 01/09/2008
New metrics for exploring the relationship between mobility and successful ageing **Research team:** School of Psychology & Sport Sciences, University of Northumbria **Contact:** 0191 227 3571 **Funder:** NDA **Amount:** £241,000	The project will employ movement and location aware systems to track older people's activities both indoors and outdoors. This data will be combined with a device that logs activity associated with bodily movements in order to gain a fuller understanding of mobility. Link to more information on the FAST website	01/01/2008 01/01/2010
No speech but lots to say! **Research team:** ACE Centre North **Contact:** 0161 684 2333 **Funder:** Department of Health (Section 64 grant) **Amount:** £40,526	The research team will work with adults with neurological conditions who are unable to speak, together with their families/carers and voluntary sector staff to plan, trial and evaluate different systems and strategies to promote the meaningful involvement of adults with little or no speech in planning and developing their local services. Link to more information on the FAST website	01/08/2007 01/08/2010
Older People's Use of Unfamiliar Space (OPUS) **Research team:** Dept of Applied Social Sciences, University of Swansea **Other partners:** Kingston University London, Anglia Ruskin University, Middlesex University **Contact:** 01792 295318 **Funder:** NDA **Amount:** £300,000	The main aim of this research is to determine the ways in which older people respond when navigating unfamiliar spaces using different types of transport. The specific objectives concentrate on coping mechanisms in unfamiliar environments, the possible curtailment of autonomy and independence, and the environmental triggers that may make places troubling or worrisome for older people. Link to more information on the FAST website	01/01/2008 01/07/2009

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Optimising quality of sleep among older people in the community and care homes: an integrated approach **Research team:** Dept of Sociology, University of Surrey **Contact:** 01483 689365 **Other partners:** Loughborough University, Bath Institute of Medical Engineering, University of Surrey, King's College London, University of Surrey **Funder:** NDA **Amount:** £ not stated	This collaborative research project addresses practice and policy issues arising from the nature, impact and management of the sleep-wake balance in later life. It will look at options to improve quality of sleep, such as monitoring with sensors. Link to more information on the FAST website	01/12/2006 01/12/2010
PAMELA – Pedestrian Accessibility and Movement Environment Laboratory **Research team:** Accessibility Research Group, University College London **Contact:** 020 7679 7009 **Funder:** EPSRC **Amount:** £1,200,000	The research team built a specialist laboratory which is computer-controlled and has a large range of surface materials, lighting effects, sound and ambient noise effects. With physical and sensory systems all under the control of the researchers they can set up a combination of conditions to carry out experiments on pedestrian interactions and then, if desired, can change individual components of the overall conditions to study the effects of such a difference. Link to more information on the FAST website	01/01/2003 31/07/2007
Patients' and professionals' views of telemonitoring in heart failure: a qualitative study **Research team:** Faculty of Medicine, Imperial College **Contact:** 020 758 95111 **Funder:** NHS RfPB Programme **Amount:** £27,659	Using a qualitative approach this study aims to explore the views and experiences of patients and professionals using telemonitoring in managing heart failure. Link to more information on the FAST website	01/07/2007 31/12/2008
POLIS – Universal Building Design **Research team:** Building Research Establishment (BRE) **Contact:** 01923 664000 **Funder:** European Commission FP6 **Amount:** € not stated	POLIS is a collaborative policy programme by organisations across the EU with UK representation from the Building Research Establishment. The project created decision support tools and policy initiatives to promote a universal standard for accessible design of buildings. In April 2008 BRE Press published a book called Building and Urban Space Accessibility. Link to more information on the FAST website	01/01/2004 01/01/2008

Project title Organisation(s) Funding	Project summary	Start and finish dates
Preliminary study using Iterative Learning Control for the re-education of upper limb function mediated by functional electrical stimulation in healthy adults **Research team:** School of Health Professions & Rehabilitation Sciences, University of Southampton **Contact:** 023 8059 3131 **Funder:** EPSRC **Amount:** £379,946	The project investigated whether training arm movements using a robot, and with electrical stimulation of the arm muscles adjusted in response to the patient's performance, is a feasible way of improving recovery of arm function following stroke. Link to more information on the FAST website	01/04/2005 31/03/2008
Prolonging safe driving behaviour through technology: attitudes of older drivers **Research team:** Centre for Transport and Society, University of the West of England **Contact:** 0117 32 83219 **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £27,691	The project identified several areas where more work could be done to develop solutions in partnership with older people. These included the way in which road signs are displayed and prioritised, as well as additional speed warning systems. Those ideas will be introduced to industry experts, academics and other older people to assess their feasibility. Link to more information on the FAST website	01/07/2006 01/10/2007
Reasons for non-use of electronic assistive technology (EAT) within a motor neurone population using a grounded theory approach **Research team:** Walton Centre for Neurology and Neurosurgery NHS Trust **Contact:** 0151 525 3611 **Funder:** NHS R&D Transitional Funding **Amount:** £ not stated	The research investigated, within a defined disabled population, reasons for the non-use of electronic assistive technology in the Greater Manchester area. Link to more information on the FAST website	01/06/2006 01/06/2007
Remodelling Sheltered Housing and Residential Care Homes to Extra Care Housing **Research team:** Institute of Gerontology, Kings College London **Contact:** 020 7872 3035 **Other partners:** University College London **Funder:** EPSRC **Amount:** £260,214	The final report published in October 2007 found that remodelling of sheltered housing was far from straightforward. Two major issues were unforeseen; structural or building problems and the need for some tenants to remain in situ during redevelopment works. Compliance with accessibility standards was patchy, with the design of kitchens and bathrooms particularly problematic, and these compromises sometimes reduced residents' opportunities for independent living. Link to more information on the FAST website	01/05/2005 30/04/2007

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RoboBraille **Research team:** Royal National College for the Blind (RNCB) **Contact:** 01432 265725 **Funder:** European Commission eTEN **Amount:** € not stated	The project is investigating an email-based translation service capable of translating email attachments to and from braille and to synthetic speech. RoboBraille is now available as a service and has received an award from the British Computer Society. Link to more information on the FAST website	01/10/2006 01/03/2008
SAFE (Support and Assessment of Fall Emergencies) Trial **Research team:** School of Medicine, University of Swansea **Contact:** 01792 513400 **Funder:** Department of Health PRP **Amount:** £99,000	This project is based on a randomised controlled trial which aims to provide an evaluation of the costs and benefits of computerised on-scene decision support for emergency ambulance personnel to assess and plan appropriate care for older people who have fallen. Link to more information on the FAST website	01/01/2006 01/01/2008
SAPHE: Smart and Aware Pervasive Healthcare Environments **Research team:** Tanaka Business School, Imperial College London **Contact:** 020 7594 5928 **Other partners:** University of Dundee **Funder:** Department for Innovation, Universities and Skills (DUIS) **Amount:** £1,000,000	The project aims to develop a new generation of telecare networks using miniaturised wireless sensors worn on the body or embedded in the environment to provide early detection of disease changes or of increased frailty and to offer support for compliance with care plans. Link to more information on the FAST website	01/03/2006 01/02/2009
SEE-VIP **Research team:** Royal National College for the Blind **Contact:** 01432 265725 **Funder:** European Commission Socrates/Grundtvig1 framework **Amount:** £ not stated	The aim of the project is to analyse the learning needs of people with visual impairment, to specify the curricula for e-learning courses and to investigate the opportunities for people with a visual disability to work in ICT. Link to more information on the FAST website	01/11/2005 01/10/2007
Self management of chronic disease in older people, through wireless sensor network applications **Research team:** School of Computing and Keyworth Institute, University of Leeds **Contact:** 0113 343 5472 **Funder:** NDA **Amount:** £ not stated	This preparatory network aims to convert the theoretical knowledge of how chronic disease can be prevented or managed into a mode of use that is consistent with the target group's lifestyle. Link to more information on the FAST website	01/04/2007 01/04/2008

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Self Management of Chronic Conditions using telemedicine **Research team:** Dept of Engineering Sciences, University of Oxford **Contact:** 01865 273000 **Funder:** NIHR HTD **Amount:** £275,925	There are two main objectives to this project: the refinement of patient-specific models to enhance the personalised feedback given to patient, and the development of robust algorithms for alerting clinicians when the patient's data deviates from the expected pattern. Link to more information on the FAST website	01/10/2006 31/03/2008
SESAME – Sensing for Sport and Managed Exercise **Research team:** Dept of Computer Science, University College London **Contact:** 020 7679 7214 **Other partners:** University of Cambridge, Royal Veterinary College, University of Wales Institute Cardiff, University College London **Funder:** EPSRC **Amount:** £971,747	The project's goals are to improve athletes' performance and to advance sports science using a range of both hardware and software technologies which are generic and which may also have applicability for rehabilitation and for disabled people. Link to more information on the FAST website	01/07/2006 01/07/2010
ShoeMOTE: shoe-based monitoring of gait & mobility **Research team:** Culture Lab, School of Computing Science, University of Newcastle **Contact:** 0191 246 4646 **Funder:** HEFCE **Amount:** £20,000	This project aims to develop a shoe-based mobility assessment system to collects sensor data as the user walks around their everyday environment. Link to more information on the FAST website	01/01/2006 01/01/2008
SMART 2: Self Management supported by Assistive, Rehabilitation and Telecare Technologies **Research team:** Faculty of Computing and Engineering, University of Ulster **Other partners:** University of Bath, Sheffield Hallam University **Funder:** EPSRC **Amount:** £2,300,000	This project will look at how technologies can be used to help individuals and their families to manage the consequences of long-tem conditions and maintain quality of life, supported by professionals. Link to more information on the FAST website	01/07/2007 30/06/2011
SMILING – Self Mobility Improvement in the eLderly by counteractING falls **Research team:** Dept of Mechanical Engineering, University of Strathclyde **Contact:** 0141 548 4851 **Funder:** European Commission 7th Framework programme **Amount:** £ not stated	The most effective way to counteract falls is to improve movement capabilities. This may be achieved by rehabilitation programs that enhance or recover the problem solving used in normal situations (walking on rough grounds, standing up, climbing stairs, overcoming obstacles). The project is developing a wearable non-invasive computer-controlled system which will mimic the effect of these real life challenges. Link to more information on the FAST website	01/01/2008 01/01/2010

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SOPRANO – Service Oriented Programmable Smart Environments for Older Europeans **Research team:** Tunstall Group Ltd **Contact:** 01977 661234 **Other UK partners:** University of Liverpool **Funder:** European Commission FP6 **Amount:** €7,000,000	The SOPRANO consortium aims to design and develop innovative, context-aware, affordable smart services with natural and comfortable interfaces for older people. The project aims to develop a fully networked home environment where integrated appliances and devices will support users to carry out desired activities and receive remote health support and monitoring. Link to more information on the FAST website	01/01/2007 30/04/2010
SPECS – Speech-driven Environmental Control Systems **Research team:** Dept of Medical Physics and Clinical Engineering, Barnsley Hospital NHS Foundation Trust **Contact:** 01226 730000 **Other partners:** University of Sheffield **Funder:** Department of Health HTD **Amount:** £400,000	The project aims to develop a novel environmental control system for disabled and older people. The system will be controlled by automatic speech recognition technology which takes account of the varying levels of background noise found in most homes and the fact that many potential users often have a speech disorder such as dysarthria. Link to more information on the FAST website	01/02/2006 01/07/2009
Studies of normal and impaired hearing and development and evaluation of signal processing hearing aids **Research team:** Dept of Experimental Psychology, University of Cambridge **Contact:** 01223 333550 **Funders:** MRC; Deafness Research UK **Amount:** £1,527,012	This project aims to develop and evaluate procedures for fine-tuning the settings in a hearing aid to suit individual needs and preferences. Link to more information on the FAST website	01/12/2003 01/12/2008
Supporting Sign Language Users Through Technology Enhanced Learning **Research team:** School of Computing Sciences, University of East Anglia **Contact:** 01722 425138 **Funder:** ESRC (Teaching and Learning Research Programme) **Amount**: £60,000	The project's aim was to improve support for people with preference for British Sign Language (BSL) during automated assessment of European PC Passport tests. It demonstrated the effectiveness of avatar signing to support learning. Link to more information on the FAST website	01/11/2006 01/05/2007
Surface Textures for Affective Communication **Research team:** School of Mechanical Engineering, University of Leeds **Contact:** 0113 34 32155 **Funder:** EPSRC **Amount:** £323,624	The project will attempt to find a meaningful way of analysing the feelings which specific textures produce in individuals and the emotional response. Link to more information on the FAST website	01/08/2006 31/07/2009

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Tactons: An Investigation of multimodal interaction with tactile displays **Research team:** Multimodal Interaction Group, University of Glasgow **Contact:** 0141 330 4256 **Funder:** EPSRC **Amount:** £234,872	The research is investigating a range of tactile displays to improve the experience of haptic (touch-based) computer interface and the cutaneous (skin) experience. A key application is to increase access to visualisations for blind users and mobile/wearable computer interfaces. Link to more information on the FAST website	01/10/2003 30/09/2008
TARGET – Trendsetting Accessibility Research Group in Engineering and Transport Platform Grant **Research team:** Accessibility Research Group, University College London **Contact:** 020 7679 7009 **Funder:** EPSRC **Amount:** £430,856	This Platform Grant is designed to support and encourage collaboration between the members of the Accessibility Research Group and to allow future blue-skies research to be started. Link to more information on the FAST website	01/05/2005 30/04/2010
TATE – Through Assistive Technology to Employment **Research team:** Home Farm Trust **Contact:** 020 7679 7009 **Funder:** European Social Fund (EQUAL) **Amount**: £4,400,000	This multi-regional partnership tested whether electronic assistive technology has a role to play in empowering individuals and enhancing the employability for people with learning disabilities and their carers. Innovative assistive technology devices were installed in trial sites. Several new software programs are available for sale and an implementation handbook has been produced for organisations who wish to implement an assistive technology strategy. Link to more information on the FAST website	01/05/2005 31/12/2007
Telemonitoring and self management in hypertension (TASMINH 2): A randomised controlled trial and qualitative evaluation of the efficacy and acceptability of telemonitoring and self management in the control of hypertension **Research team:** Dept of Primary Care and General Practice, University of Birmingham **Contact:** 0117 9302600 **Funder:** Department of Health PRP **Amount:** £330,000	The project is based on a randomised controlled trial in a primary care setting that uses economic and qualitative analysis to evaluate the costs and effects of increasing patient involvement in blood pressure management. It compares home monitoring and self measurement of anti-hypertensive medication compared to usual care. Link to more information on the FAST website	01/02/2007 30/06/2009
Tenuta: Simplified Guidance for Usability and Accessibility **Research team:** Human-Computer Interaction Research Group, University of York **Contact:** 01904 432722 **Funder:** European Commission IST eTEN **Amount:** € not stated	Tenuta was a project designed to help improve the usability and accessibility of trans-national EU electronic-services (e-services) supported by the eTEN programme. The project provided simple, easy to apply guidance on how to improve usability and accessibility. The project website provides access to guidance and final reports. Link to more information on the FAST website	01/05/2005 01/04/2007

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TESS – Testing Evaluation of Speech Synthesis **Research team:** Centre for Speech Technology Research, University of Edinburgh **Contact:** 0131 650 4434 **Funder:** EPSRC **Amount:** £246,817	The project is working to develop a reliable method for evaluating the quality of synthetic speech. Link to more information on the FAST website	01/01/2005 31/12/2008
Text messaging reminders for brain injured patients **Research team:** Oliver Zangwill Centre, The Princess of Wales Hospital **Contact:** 01353 652165 **Funder:** NHS RfPB **Amount:** £250,000	The aim of the project is to investigate methods for helping patients with acquired brain injury cope with the demands of their day-to-day lives. Research will focus on evaluating the impact of alerts delivered via mobile phone text messaging. These alerts are intended to assist people with acquired brain injury to achieve daily tasks. Link to more information on the FAST website	01/12/2007 01/12/2009
The effect of functional electrical stimulation (FES) on i) inferior glenohumeral subluxation ii) shoulder pain in ambulant stroke patients **Research team:** Dept of Physiotherapy, Northwick Park Hospital **Contact:** 020 8869 2416 **Funder:** NHS R&D Transitional Funding **Amount:** £8,510	The objective of this study was to see whether functional electrical stimulation (FES) could be applied to the shoulder as an alternative treatment to using a conventional sling to reduce pain, but without interfering with walking. Link to more information on the FAST website	01/08/2003 10/04/2007
The role of technology in dementia care **Research team:** Health Sciences Research Institute, Warwick Medical School **Contact:** 01353 652165 **Funder:** Department of Health PRP **Amount:** £ not stated	This research aims to understand the impact of the electronically networked society on the experience of caring for someone with dementia, and to make recommendations to policymakers concerning how networked technologies can be used to support carers in their role. Link to more information on the FAST website	01/12/2006 28/02/2008
To assess the effectiveness of postural management programmes in reducing hip dislocation and spinal curvature in children with bilateral cerebral palsy **Research team:** Chailey Heritage Clinical Services **Contact:** 01825 722112 **Funder:** NHS R&D Transitional Funding **Amount:** £ not stated	The focus of the project is assessment of children with a diagnosis of bilateral cerebral palsy to determine whether the early introduction of postural management equipment can reduce levels of hip dislocation at five years compared to an historical control group. Link to more information on the FAST website	28/02/2005 31/01/2008

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Uncertainty Modelling in Technologies for the Elderly **Research team:** Centre for Computational Intelligence (CCI), De Montfort University **Contact:** 01225 824103 **Funder:** EPSRC **Amount:** £45,447	This project will look at how a mathematical technique called 'fuzzy logic' can be used to improve the effectiveness of the existing monitoring equipment and of new technologies which could be used in the future. Link to more information on the FAST website	01/10/2007 30/06/2008
Understanding the design of the workplace for the older worker **Research team:** Robens Centre for Health Ergonomics, University of Surrey **Contact:** 01483 698213 **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £36,357	This study examined what the over 65 workforce requires, how organisations view these issues or what help employers need in order to accommodate older workers. Link to more information on the FAST website	01/12/2006 30/11/2007
Use of video games to prevent the 'never learned to use' component of disability arising from hemiplegia after perinatal stroke **Research team:** Dept of Clinical Medical Sciences, University of Newcastle **Contact:** 0191 222 7149 **Funder:** Newcastle Upon Tyne Hospitals NHS Trust **Amount:** £ not stated	This research looked at how playing video games can help very young children who have experienced damage to their brain to compensate for this by reorganising neural pathways. Link to more information on the FAST website	01/09/2006 31/08/2007
VIVOCA – Voice Input Voice Output Communication Aid **Research team:** Dept of Medical Physics and Clinical Engineering, Barnsley Hospital NHS Foundation Trust **Contact:** 01226 730000 **Funder:** NIHR NEAT **Amount:** £309,355	The project worked on developing a portable speech-in/speech-out communication aid for people with disordered or unintelligible speech, initially concentrating on people with moderate to severe dysarthria. Initial field trials started in November 2007 and early results are positive. Link to more information on the FAST website	01/11/2004 01/11/2007
Walking in cluttered environments: visual influences on gait in Parkinson's disease **Research team:** School of Psychology and Clinical Language Sciences, University of Reading **Contact**: 0118 378 8523 **Funder:** EPSRC **Amount:** £170,842	This project plans to measure slowing, hesitation and veering in people with Parkinson's disease as they negotiate doorways and other objects. Link to more information on the FAST website	01/09/2005 31/08/2008

Project title Organisation(s) Funding	Project summary	Start and finish dates
What makes synthetic speech difficult to understand for older people? The contribution of auditory ageing **Research team:** Centre for Speech Technology Research, University of Edinburgh **Contact:** 01483 689678 **Funder:** EPSRC, BBSRC (SPARC) **Amount:** £17,775	This project analysed the difficulties older people can experience in listening to synthetic speech that is often used in telephone prompts. Link to more information on the FAST website	01/12/2006 01/06/2007
Working Late: Strategies to Enhance Productive and Healthy Environments for the Older Workforce **Research team:** Dept of Human Sciences, Loughborough University **Contact:** 01509 223036 **Funder:** NDA **Amount:** £ not stated	The aim of this preparatory network is to develop a multidisciplinary research programme which will ultimately inform employment policies and lead to significant improvements in occupational health services and the built environment. Link to more information on the FAST website	01/04/2007 01/04/2008
Workplace design for an ageing labour force: innovation and intervention to sustain working lives **Research team:** Warwick Institute for Employment Research, University of Warwick **Contact:** 024 76523284 **Funder:** NDA **Amount:** £20,000	The aim of the project was to develop a network to bring together academic and practitioner experts in engineering and design; work-related stress and well-being; ergonomics and human factors; employment trends and management practices; and workforce ageing and policy interventions. Link to more information on the FAST website	01/11/2006 30/10/2007

Information provided from the Foundation for Assistive Technology research and development database by:

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