## 2.6 Germany

BAGH

Bundesarbeitgemeinschaft Hilfe für Behinderte e.V.

Kirchfeldstrasse 149

D-40215 Düsseldorf

Germany

### *2.6.1 General overview of user participation in R&D related work in Germany*

#### 2.6.1.1 Summary of findings

Overall, in Germany user involvement and user training in the context of assistive technology, research and development is quite insignificant. Therefore it is very difficult to identify good methods, strategies or projects for user involvement in R&D related work.

In order to collect information on user participation and user training an extensive literature and Internet research was carried out in the framework of the project. In addition different relevant organisations and institutions as well as AT industries were contacted in order to ask for good methods and experiences in the field of user participation.

The result of the inquiry comprises only a few practicable findings or examples of good practice. Most of the gathered facts and information have only general character in form of recommendations and statements to the thematic. Everybody considers user involvement and a special user training for handicapped and elderly people to be very necessary and essential but concrete practical approaches are rare. There is a lack of detailed information on user involvement and training referring to the specific situation in the single countries, for example Germany.

#### 2.6.1.2 Relevant players

Many different organisations of handicapped people exist in Germany. The majority of the self-help groups and professional associations is subdivided into different classes of impairment or disability. The great interest groups maintain associations on a national, regional and local level, which are financial supported by the authorities and various welfare organisations in many cases. Many self-help groups are also members of the central organisations of welfare institutions and are frequently in possession of different professional services and institutions of handicapped people. These organisations, which are direct or indirect affected by the problems of handicapped and elderly people,

mainly work in the field of social and vocational rehabilitation. Their domain is the social integration of people with severe disability into all fields of daily life. That's why subject areas such as user participation in product development and technology assessment plays an insignificant role. In most cases points of contact to industries and organisations working in the field of AT only result from the participation in exhibitions of rehabilitation technology products (e.g. REHA, Düsseldorf; REHAB, Karlsruhe).

In the single governments on local, regional and federal level advisory boards especially for people with disabilities exist. The chairperson (Behindertenbeauftragter) and the members of the board give advise and support to the handicapped and elderly people especially on the subjects of social rehabilitation and suitable infrastructure for the handicapped and elderly people. The thematic of AT is of secondary importance.

In the HEART Study (1994) the importance of user involvement in the planning and development of new rehabilitation technology products was characterised as being of a high standard, which, in reality, is not the case.

According to the findings 90 per cent of the companies and organisations in the Benelux and German speaking countries declared that they practise user involvement in the process of planning and developing new RT products. Further 54 per cent of the industrial rehabilitation technology companies in the above mentioned countries claim that they are good and 17 percent very good informed about the users of assistive technology.

The experience shows that in contrast to the results of the study only few developers and manufacturers, especially bigger ones, involve users in requirement analyses, concept design, testing and marketing of products.

It is a general observation that manufacturers have much better knowledge about user's needs in traditional sectors of rehabilitation technology like moving aids or prostheses than in the application of new, i.e. computer-assisted aids.

In the field of product development and technology assessment some larger mainstream AT industries (i.e. producers of wheelchairs, producers of prostheses) practice user involvement in the form of testing their products by handicapped people.

In some cases well-known producers of AT support initiatives such as different sport teams in order to receive a variety of information concerning the product and practicable suggestions for improvement by the user experts.

In this way both sides can profit. The handicapped people get the technical equipment, i.e. special high quality sports wheelchairs constructed according to their individual needs, and support for carrying out their hobby and the producer get data of the construction and behaviour of his product by a test with hard demands on the material. Furthermore is this way to handle a good possibility for the industrial enterprise to gain a broad publicity for itself and their products.

There are only a few professional institutions, for example research centres, working in the field of AT. They involve users i.e. to assess aiding devices before their introduction to the market or to test such aids already being available for the end user. Sometimes is the technology assessment by handicapped and elderly people part of single national and international studies and projects.

#### 2.6.1.3 Results of the survey

As a result of a small survey which included 32 manufacturers in different fields (see Annex) of RT products (mainly for physical and sensorial impaired people) it seems that the user involvement in this area is not significantly high. The responses not given in writing only by telephone stated that the manufacturers would like to include users in the field of R&D if there would be a pool of qualified users acquainted with the knowledge of the process of R&D in the commercial sector. Experiences made by the manufacturers show from the commercial point of view that users are needed who are able not only to assess their individual case but also their group and their needs in general. Therefore the information was given that the manufacturers at present concentrate more on the involvement of medical experts, therapists etc. to try an effective and efficient way of R&D.

It was reported that if this qualification would be given to the users, the manufacturers would be glad to involve users more in the R&D field.

Although this survey has to be seen very carefully, it also shows the unsatisfactory situation of user involvement at present and that the formulated need is acknowledged under certain conditions.

Commercial companies in the field of R&D were chosen for the survey under the following criteria:

- Products for mobility and sensory impairments
- Share of the market (small and big companies)
- R&D activities

The base of the selection process were different publications and documentation used by self help organisations to be informed and to advise their members. An important publication was the catalogue of the worlds largest exhibition on technical aids (REHA-International) which takes place every two years in Düsseldorf. All important manufacturers show their products and new developments during this event and look also for contacts to the disabled people themselves or their self-help organisations. From this point of view it was assumed that a certain sensibility for the question of user involvement in the R&D process would exist.

### *2.6.2 Examples of good practice in the context of AT and R & D*

#### *2.6.2.1 AT Industries*

Many well- known producers of assistive technology (i.e. producers of wheelchairs, producers of prostheses) are supporting sports initiatives.
Sports are supposed to be a field of production placing extreme demands towards the construction and sturdiness of the products applied.
Furthermore, there is the possibility of gaining a broad image and good publicity for the enterprise (Paralympics).
There are many good examples of user involvement in this sector.
A German wheelchair producer, for example, is supporting a national wheelchair basketball team. From the collaboration between athletes, the user experts, and the

industry both sides can profit. The basketball team get the equipment and technical support, the producer receives a variety of information concerning the construction of wheelchairs and suggestions for modifications by the users.

The extremely hard circumstances under which the wheelchairs are used during an event lead to new perceptions concerning technical details e.g. of the geometry of the running kit, the diminution of the rolling drag, the improvement of speed and manoeuvrability.

Any piece of the sporting equipment is constructed and adapted individually according to the particular needs of any athlete.

Most of the experiences gained in this assessment process are applied to the production of ordinary wheelchairs.

Another example is the support of track-and-field sports by a large producer of prostheses. Especially new generations of micro-controlled prostheses are tested by athletes under extreme conditions (which means most mechanical parts have to stand their maximum loads and the expiry of their maximum durability can be observed in a very short time due to the sportive environment they are used in).

In this way both the social need to support sports for disabled combined with the chance of a good publicity for the companies and their products and, additionally, the technical and industrial need to get data of the behaviour of the parts and materials used and to assess new products are important reasons for the industries to act this way.

***DIAS GmbH, Hamburg***

The German DIAS GmbH is an enterprise located in Hamburg chiefly occupied with studies on quality assurance and technology assessment in the rehabilitation sector.

According to their statement DIAS supports producers of Assistive Technology in the development and improvement of technical aids. By means of an analysis of user requirements (which are carried out either by means of questionnaires, structured interviews, group discussions or practical usability tests), user profiles are developed. The results thus maintained are applied to (and so tried and proved with) prototypes as well as actual products. These tests are carried out involving both disabled and elderly

people, if required also calling therapists and medics to their assistance. Most of these proceedings are ordered by the producers themselves, whereas the main fields of present application are the testing of mobile lifters, therapeutic chairs and walking aids.

DIAS is also working in the area of consumers' research, i.e. the company is testing and assessing the quality of products and services already being on the market.

In this part of the enterprise the systematic practical testing of technical aids and services by testing persons is regarded as one of the chief means of user participation.

As assessment tools DIAS uses structured interviews, questionnaires and interviews on the phone. The data gained in the above process are analysed by applying standardised methods.

Typical users ( i.e. impaired persons or persons deserving assistance, and so being dependant on the product/service in question) and experts are always invoked into the process. The tests always take place in specific environments (like old peoples' homes, rehabilitation clinics or advice centres for technical aids).

Together with BITE GmbH (also located in Hamburg) DIAS is running a project on the support of blind and partially sighted for choosing input aids for computer work.

For some types of aids usability tests are carried out , too. These tests are carried out by blind and partially sighted experts and testing persons, based on the known ISO, EN and DIN standards.

According to DIAS, the involvement of blind or partially sighted in the assessment of software has nearly become a standard means of testing computer input aids, but there is an evident lack of standardised methods or approaches to involving users.

***Forschungsinstitut Technologie - Behindertenhilfe der Evangelischen Stiftung Volmarstein***

The Forschschungsinstitut Technologie-Behindertenhilfe (FTB) is the general department for requirement analysis, research, development, evaluation, and exploitation of assistive technology of Evangelische Stiftung Volmarstein (ESV). ESV is a large orthopaedic rehabilitation centre with about 1200 employees and about 1300 disabled persons, which provides the necessary background for analysis, test, and

application of technical aids for the individual needs of people with disabilities and elderly people.

In 1996 FTB got the acknowledgement as an scientific institution at the FernUniversität-Gesamthochschule-Hagen from the Ministry of Science and Research of Nordrhein-Westfalen.

FTB is organised in three areas of responsibility, the information centre, the development centre and the test centre.

The tasks of FTB comprise for example:

- requirement analysis with direct involvement of handicapped and elderly people and the rehabilitation personnel,
- technology studies and market surveys within rehabilitation technology industrial sectors with a certain emphasis on user involvement,
- development of new future oriented aid concepts with regard to socio-economic aspects as well as human, medical and psychological items,
- advice of elderly people and people with handicaps concerning technical aid and accessibility,
- demonstration of new technical opportunities towards the practise,
- education and qualification of professionals, advisers and peer counsellors,
- functional test of available technical solutions,
- investigation of modern technologies for rehabilitation purposes and their adaptation, further development with respect to rehabilitation and practical investigations of useful applicability.

As "assistive technology centre for elderly people and people with disabilities, NRW", FTB is responsible for the stimulation of networking and conceptual set up of advice services on technical aids in the federal state Nordrhein-Westfalen. In addition FTB organises workshops for technology training, information exchange for users, rehab staff and external interested people and give advice for AT for individual users.

In the framework of research FTB follows a user centred approach. All R&D activities are connected with activities close to the end-users. User involvement is implemented in various ways and all the phases of the R&D process. However FTB considers this approach still containing much potential for improvement. This was the actual reason for FTB to initiate the FORTUNE project.

***Examples of testing***

In addition to their work in R&D the Forschungsinstitut Technologie-Behindertenhilfe (FTB) is i.e. commissioned by producers and distributors of aids either to assist in the development of new products, to assess aiding devices before their introduction to the market or to test such aids already being available for the end user.

A typical example of an assessment process of a product already being distributed may be: the testing of a aid for activities of daily living (ADL) e.g. pulling up socks and stockings, produced by a Swedish company, distributed by a German reseller. This consultancy was commissioned by the distributor, so that it is assured that the assessment was carried out independently from the producer himself. The ADL aid in question was tested by different disabled users, so that the users' requirements directly founded the basis for the evaluation.

Another example of technology assessment is the testing of a ceiling-rail-mounted lifter built by a Swedish company, which was then distributed by a German enterprise and modified according to the customers' wishes and needs. The lifter was tested by FTB on commission of the latter firm both by various kinds of users and purely mechanically according to current standards. Users with different kinds of disabilities tried to handle the system together with assisting and nursing persons. Furthermore, all tests took place regarding the degree of the user's disability, the user's age and, finally, also considering the user's opinion concerning the usability (handling), the design and the conveniences of the lifter. After these tests a written account of the testing was produced and, after all, suggestions for general and specific improvements were made. For these suggestions, models were built at FTB and tested right away. Some of these suggestions were then taken over and applied to the product.

An example of the testing and evaluation of yet-to-be-introduced products, is the evaluation of the functionality and design of a programmable sanitary tap:

The fitting in question was tested by users at three different locations within the Evangelische Stiftung Volmarstein, these being a shower for elderly people, a shower for adults and, after all, in a bathroom for adults who need assistance. After the installation of the tap, an introducing and training phase for the users followed, for which a small special manual was produced. In a first meeting between staff and users, which took place after this training phase, a first exchange of impressions and further questions could take place. A testing period of two months was to follow during which the probationers (users and staff of the test sites) were interviewed for several times. These interviews (which were to take place in the manners of an unguided / free interview) were only structured according to several criteria (like design, shape, placement, operating elements, shape of these, colours, trouble shooting, handling problems etc.) being relevant for the assessment itself, but not being explicitly mentioned towards the interviewed. Parts of the interview took place at the test site where the users demonstrated their experiences with the device.

The users' summary produced of the results of the above interviews was then presented to the users again, after which each user had the opportunity to give individual remarks and to provide a ranking of the importance of the single criteria of their own.

The results gained by this assessment process led to the proposal of several specific improvements of the sanitary appliance.

***Project COBRA-3 (Cooperation within Bureau, Research and Administration)***

Institutions involved:

- Fraunhofer Institut für Graphische Datenverarbeitung IGD, Darmstadt
- Several research institutes (i.e. Forschungsinstitut Technologie- Behindertenhilfe der Evangelischen Stiftung Volmarstein)
- Industrial partners

The COBRA-3 project was set up by the Fraunhofer Institut für Graphische Datenverarbeitung, IGD to test and realise multimedia and cooperative teleworking systems.

Due to the improvement of multimedia and telecommunication networks for private users, it is likely that multimedia-homesupport teleservices will be gaining an ever growing importance.

One kind of such applications can be a virtual supermarket, a catalogue or shopping environment, which is released as a CD. A supermarket on CD- ROM makes it currently still faster (thus cheaper) than any internet-based approach on the same topic because network transfers are reduced to a minimum. Only orders and updates have to be transmitted over the line.

A demonstrator version of the different tele-services was tested by 16 users with various impairments at FTB. These users were asked to answer a questionnaire for each application and to report about their experiences and thoughts about the usability and usefulness of the single electronical services. By this method FTB was able to have a direct comparison between three approaches:

- Web-based catalogue (example: virtual railway-museum)
- CD-based shopping catalogue
- CD-based virtual supermarket.

All three applications could also be operated hands free by speech- and headcontrol facilities.

One of the findings of the tests is the fact that the users involved had great doubts about the usefulness of such shopping systems. In their opinion tele-shopping cannot compete with the quality of a real shopping-tour. This is not only a quality-of-media problem, it is also a social one. People meet each other while shopping. The social contacts thus cultivated are especially important for many elderly and handicapped people.

***Project TEDIS (TEleworking for DISabled People)***

Institutions involved:

- GMD- Forschungszentrum Informationstechnik GmbH
- Forschungsinstitut Technologie- Behindertenhilfe der Evangelischen Stiftung Volmarstein
- Siemens- Nixdorf

The main objective of the project is to develop a prototypical teleworkstation for end-users with special needs such as people with severe disabilities, which should be easily and cheaply reproducible by industry and be of use for a large group of handicapped people.

Within the proceedings of the TEDIS project the German National Research Center for Information Technology (GMD) commissioned FTB to carry out a field study on the technical evaluation and the investigation of social criteria of home-based telework.

During the field study both a computer surface allowing general accessibility to the Internet (and its usage for communication purposes) developed by GMD and the layout of a generally accessible teleworkstation were to be tested and evaluated.

Additionally, the project was focussed on investigating the social significance of home-based telework.

Two severely disabled persons (both are wheelchair-users) were involved, in order to carry out telework from home. The potential teleworkers are living in a common house-hold and support each other in all matters of daily life.

One task in the context of carrying out telework was to create an exhibition catalogue on technical aids being available and demonstrated at FTB.

One of the teleworkers being better in word processing concentrated on writing the text entries of the database, the other one being better in the processing of graphics and images chiefly worked on the pictures which were combined with the entries.

The assessment process itself was carried out by structured usability-interviews, which took place at the test site. In this context, technical aspects of teleworking and further information about the social environment of the two teleworkers, their self-awareness, their expectations towards vocational life as well as their attitude towards telework was gathered and evaluated by means of questionnaires.

The project partners gained an important amount of experiences concerning home-based telework for handicapped people in carrying out the field study.

#### *2.6.2.2 Examples of training*

***Fachhochschule Frankfurt am Main, Fachbereich Pflege und Gesundheit***

The Advanced Technical College Frankfurt am Main, faculty of nursing care and health, will set up a training centrum for domestic nursing care, adaption of housing and technical aids in the winter semester 1998/99.
This centre will be part of the interdisciplinary study and development centre for gerontotechnology.

***Dias GmbH, Hamburg***

The DIAS GmbH offers all kinds of individual electronic data processing courses for sight, visual, cognitive impaired and blind people.
The courses are directly held at the place of work. Subjects of the courses are e.g. the introduction in standard-and special software applications, administration and office work for people with special needs.

***Forschungsinstitut Technologie-Behindertenhilfe (FTB) der Evangelischen Stiftung Volmarstein (ESV)***

In addition to the work in R&D the Forschungsinstitut Technologie-Behindertenhilfe organises workshops for technology training, information exchange for users, rehab staff and external interested people and gives advice in the field of AT for individual users.

If special courses are required, e.g. in the field of rehabilitation technology, they can be organised easily. The courses include a practical training by using various technical aids.
A demonstration and test laboratory with a smart house demonstration is an important component by realising such activities.

## *2.6.3 Annex*

### 2.6.3.1 Survey carried out by the BAGH

***Introduction***

Letters were sent to manufacturers of products in the field of technologies for people with disabilities, focusing on:

- User involvement in the field of research and development of products in the field of telematic applications and other technologies for people with disabilities, FORTUNE project

After introducing the project and its aims and intentions, the companies were asked to give a statement to the follwing questions:

1. Give a definition of your understanding of the problems concerning the user in the field of R&D
2. Analyse and specify the user involvement in R&D projects in the different stages
3. Development
4. Standardisation
5. Tests with users
6. Media about user involvement

We also asked, which criteria were used in selecting users and to give a short report about the experiences made in practise.

In order to give the addressees the opportunity to learn more about the project, they were given the URL http://www.fernuni-hagen.de/FTB/fortune/ , where they can find detailled information.

The target group of this survey is found below. The feedback was very low as mentioned before. Although two reminders were sent out and telephone contacts took place, no answers came in written form. Only three manufacturers gave feedback by telephone, informing us that no written report would be submitted.

This can be seen as an indication that a systematic involvement of users in the field of Research and Development does not happen at the moment. The answers also showed that some manufacturers tried to involve users more but gave up, because there was no common qualification of the users in this process. It was signalised *that, if qualified users were in place this would be highly welcomed and it could be a good help in providing on the needs oriented products.*

***Institutions contacted for the survey***

| **Name** | **Street** | **Post C.** | **Town** |
|---|---|---|---|
| ABP - Gesellschaft für angewandte Kybernetik mbH | Uellendahler Str. 488 | 42109 | Wuppertal |
| Ato Form, Orthop. Geräte | Haibacher Str. 61b | 63768 | Hösbach |
| Bentronic, Ges. für Medizinelektronik | Kreillerstr. 56a | 81673 | München |
| Blanco GmbH&Co. KG | Flehingerstr. 59 | 75038 | Obererdingen |
| Camy, med. u. orthop. Geräte GmbH | Postfach 20 | 99518 | Bad Sulza |
| Closomat Deutschland GmbH | Ratiborweg 1 | 40231 | Düsseldorf |
| Communica Kommunikationskonzepte | Dorfstr. 69 | 17111 | Hohenbollentin |
| Computer für Behinderte, Ing. Büro Dr. E. Seveke | Georg-Schumann-Str. 10 | 01187 | Dresden |
| evosoft Softwarevertrieb | Marienbergstr. 80 | 90411 | Nürnberg |

| | | | |
|---|---|---|---|
| Frank Audiodata | Kriegsstr. 13-15 | 68794 | Oberhausen-Rheinhausen |
| hedo Software u. Systeme | Klausner Ring 18 | 85551 | Kirchheim/Mchn. |
| HGT Hörgeschädigten Technik | Siemensstr. 13 | 48341 | Altenberge |
| Humantechnik GmbH | Käppelinstr. 10 | 79576 | Weil a. Rhein |
| Invacare Deutschland | Dehmer Str. 66 | 32549 | Bad Oeynhausen |
| Ludwig Becker, Elektr. Inform. Systeme | Schulstr. 6 | 76889 | Gleiszellen |
| Meyra, Wilh. Meyer GmbH | Meyraring 2 | 32591 | Vlotho |
| Modie-Trans GmbH | Jungstr. 1 | 35232 | Dautphetal |
| Novacare GmbH | Philip-Krämer-Ring 13 | 67098 | Bad Dürkheim |
| Novotech GmbH | Kaltbrunner Str. 24 | 78476 | Allensbach |
| Ortopedia GmbH | Salzredder 30 | 24149 | Kiel |
| Otto Bock Firmengruppe | Max-Näder-Str. 15 | 37115 | Duderstadt |
| Papenmeier, F.H. GmbH | Talweg 2 | 58239 | Schwerte |
| RCN Medizin- und Rehatechnik | Hauptstr. 4 | 55471 | Sargenroth |
| Rebotec Rehabilitationsmittel GmbH | Artlandstr. 18 | 49610 | Quakenbrück |
| Reck Maschinenbau GmbH | Rechstr. 1 | 88422 | Betzenweiler |
| Reha-Com-tech | Von-Kellenbach-Str. 14 | 56076 | Koblenz |
| Reinecker Reha-Technik GmbH | Sandwiesenstr. 19 | 64665 | Alsbach-Hähnlein |
| RMT RehaMed Technology | Waldstr. 23 | 63128 | Dietzenbach |
| RTB GmbH | Am Vorderflöß 6 | 33175 | Bad Lippspringe |
| Siemens Nixdorf Informationssystem AG | Vorgebirgsstr. 49 | 53119 | Bonn |
| Technik für Menschen GmbH | Münsterstr. 5 | 59065 | Hamm |

| | | | |
|---|---|---|---|
| Thomashilfen GmbH&Co | Walkmühlenstr. 1 | 27432 | Bremervörde |
| Vita Roll GmbH | Am Hahnenbusch 17 | 55268 | Nieder-Olm |

### 2.6.3.2 Inventory of relevant players

| Organisation/ Institution | Contact Person |
|---|---|
| D.I.A.S. GmbH<br>Daten, Informationssysteme und Analysen im Sozialen<br>Neuer Pferdemarkt 1, D-20359 Hamburg<br>Phone: +49 40 431 875 0<br>Fax: +49 40 431 875 19 | Mr. Lilienthal |
| Fraunhofer Institut für Graphische Datenverarbeitung IGD<br>Abteilung Kognitives Computing & Medizinische Bildverarbeitung<br>Rundeturmstraße 6, D-64283 Darmstadt<br>Phone: +49 6151 155 488<br>Fax: +49 6151 155 499 | Mr. Malkewitz |
| Forschungsinstitut Technologie-Behindertenhilfe (FTB) der Evangelischen Stiftung Volmarstein (ESV)<br>Grundschötteler Straße 40, D-58300 Wetter<br>Phone: +49 2335 9681 0<br>Fax: +49 2335 9681 19 | Prof. Dr. Bühler |
| Fachhochschule Frankfurt am Main<br>Fachbereich Pflege und Gesundheit Limescorso 3, D-60439 Frankfurt am Main<br>Phone: +49 69 1533 2852<br>Fax: +49 69 1533 2857 | Prof. Dr. Kraushaar |
| GMD<br>Forschungszentrum Informationstechnik GmbH<br>Institut für Angewandte Informationstechnik<br>Schloß Birlinghoven, D-53754 Sankt Augustin<br>Phone: +49 2241 14 2018<br>Fax: +49 2241 14 2065 | Dr. Pieper |