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Web site:
www.hearcom.info
Timeline:
Started 1 Sept 2004 for 54 months
(IST call 2)
Budget:
Overall cost: 9.064.064 €
Maximum EC Funding: 7.500.000 €
Project partners:
- VRIJE UNIVERSITEIT MEDICAL CENTER AMSTERDAM – The Netherlands
- COCHLEAR EUROPE LIMITED – UK
- KATHOLIEKE UNIVERSITEIT LEUVEN – Belgium
- UNIVERSITAET ZUERICH – Switzerland
- FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. – Germany
- HOERTECH GGMBH – Germany
- HORZENTRUM OLDENBURG, GERMANY – Germany
- KURATORIUM OFFIS E. V. – Germany
- RUHR–UNIVERSITAT BOCHUM – Germany
- SIEMENS AUDILOGISCHE TECHNIK GMBH – Germany
- FRIEDRICH ALEXANDER UNIVERSITAET ERLANGEN NUERNBERG – Germany
- CARL VON OSSIETZKY UNIVERSITAET OLDENBURG – Germany
- DANMARKS TEKNISKE UNIVERSITET – Denmark
- GN RESOUND GROUP A/S – Denmark
- APIF MOVIQUITY S.A. - Spain
- NOKIA OYJ - Finland
- THALES COMMUNICATIONS S.A. – France

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**Setting the Scene**

Our society is strongly and increasingly communication-oriented. Focusing on sound and speech, many people experience severe limitations in their activities, caused either by hearing loss or by poor environmental conditions. In most cases these conditions only just meet the needs for adult native-language, and normal hearing people, but fall short for vulnerable groups like elderly, hard of hearing, young children, and second-language users.

The HEARCOM project aims at full participation in the modern communication society by reducing the limitations in auditory communication. The focus of HEARCOM is on:

- The identification and characterization of auditory communication limitations
- The identification, modelling, and evaluation of ambient conditions that limit auditive communication in everyday situations
- The development of standardized testing and evaluation procedures for hearing impaired persons.
- The development of rehabilitation and signal enhancement techniques that compensate adverse ambient conditions and personal disabilities
- The development of innovative assistive personal communication technology based on wireless communication links and assistive applications integrated in mainstream technologies
- The development of Internet services that assist individuals and professionals in the improvement and compensation of communication problems.

**Approach**

The HearCom project aims at reducing the barriers for full participation in the modern communication society. This will be achieved by mobilising and integrating the European high-level expertise on audiology, acoustics, speech technology, and ICT. The program will establish a cross-boundaries approach and will support essential areas for improvement by eServices. These are directed towards the individual (the end-user), the professional caregiver and the engineering community shaping our products and environment.

HearCom will structure the available knowledge of experts in audiology and communication acoustics, will acquire new
knowledge, and will make the knowledge accessible to various groups of users. The results will be disseminated in the form of models, software tools and demonstrations via Internet, both for the individual end user and for the professional.

For instance, telephone and the World Wide Web will be used to offer individuals the opportunity to learn about their own hearing ability, to self test their hearing (tele-screening), and to listen through simulated hearing devices. The professional audiologist can consult databases and demonstration programmes on standardised tests, and on the effectiveness of signal processing strategies. Professional acousticians and engineers are provided with models, software tools, and demonstrations to estimate the value of their acoustical design in terms of communication quality. Crucially, measures taken to remove the limitations for speech communication for the vulnerable groups will also be beneficial for the general public in terms of sound quality and more relaxed listening conditions.

The project will relate to the mechanisms that influence communication problems as well as the development of methods for screening, rehabilitation, and evaluation. These methods are developed for major European language areas with the goal to create a common European approach. Internet services will play a central role in providing information, procedures, and methods such that everybody can participate in the communication society.

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**Project partners (continued):**

- INSTITUTE FOR LANGUAGE AND SPEECH PROCESSING – Greece
- UNIVERSITEIT VAN AMSTERDAM – ACADEMISCH ZIEKENHUIS – The Netherlands
- ERASMUS MEDICAL CENTER ROTTERDAM – The Netherlands
- NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK – TNO – The Netherlands
- UNIWERSYTET IM. ADAMA MICKIEWICZA – Poland
- KUNGLIGA TEKNISKA HOEGSKOLAN – Sweden
- LINKOEPINGS UNIVERSITET – Sweden
- THE UNIVERSITY OF SOUTHAMPTON – UK
- THE ROYAL NATIONAL INSTITUTE FOR DEAF PEOPLE – UK
- UNIVERSITY COLLEGE LONDON – UK
The project is organized into five major interlinked sections with the following objectives:

**Evaluation and Modelling of Hearing Deficiencies**
- Development and evaluation of communication screening tests by means of the Internet and telephone network.
- Definition, development and standardisation within Europe of a concise set of audiological tests that will evaluate hearing performance under a large variety of acoustical conditions and that will result in a personal audiological profile.
- Definition and evaluation of tests of spatial hearing which is relevant for 3D listening and localization in daily life.
- Development and evaluation of communication screening tests by means of the Internet and telephone network.

**Models of Adverse Conditions in Acoustics and Telecom systems**
- Definition, and evaluation of a user-friendly model to estimate the quality of speech transmission for a wide variety of room acoustics and environmental conditions, including telecommunications networks. This model will enable predictions in the design stage, as well as verification by actual measurements after realization.
- Development and verification of a dedicated computational model that relates modelled speech transmission quality to speech intelligibility for various types and degrees of hearing impairment.
- Setting of normative criteria for speech transmission quality, that differentiate between the needs of vulnerable groups in our community: e.g., elderly, hearing impaired, young children in schools and second-language users.

**Rehabilitation and Signal Enhancement Methods**
- Definition and evaluation of relevant sets of environmental conditions for laboratory tests (type of interfering noise, reverberation, room acoustics), representative for daily life situations.
- Definition and evaluation of a set of representative signal enhancement approaches; The development and evaluation of new signal enhancement algorithms, that are adapted to an individual’s specific audiological profile (as developed before).
- Definition and evaluation of one or more sets of multi-lingual speech material including measuring procedures, which will lead to comparable data on speech reception across languages.
- Development and evaluation of rehabilitative procedures suitable for Europe-wide use and that include ambient acoustical methods.

**Assistive Technology for the Hearing Impaired**
- Specification of a Personal Communication Link suitable for hearing-aid users in adverse conditions, including descriptions of new services (theatre, public announcement systems, etc).
- Development of a Personal Communications System based on standard Personal Digital Assistant (PDA) that provides a platform based on a wireless personal communications link with hearing devices as above, which also has the capability to link to public information services (GSM, BlueTooth, WLAN, etc.).
- Definition and prototyping of applications such as mobile phone interaction, speech-text converters and rolling text displays.

**Internet Portal and eServices**
- Creation of an Internet portal for hearing and communications related tasks which is accessible for professionals as well as for end users.
- Development of a set of online services on hearing and communication that will allow the integration and evaluation of screening, diagnostics, and rehabilitation methods.
- Analysis of the performance of user trials on basis of the Internet services.