WP7
Service design, Exploitation, and Dissemination

D7.1: Dissemination Report Year-1

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Abstract (for dissemination)	This document states the goals for project-wide information dissemination, identifies the major target groups describing appropriate means for targeting them. The process for the cluster with other projects is to be found in deliverable 7.7
Keywords	Dissemination plan, dissemination actions, concertation

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1   Introduction

BrainAble project's main objective is to help to improve the quality of life of people with disabilities by overcoming the two main shortcomings they suffer - exclusion from home and social activities. This will be achieved using an ICT-based human computer interface (HCI) composed of BNCI sensors combined with affective computing and virtual environments, developed in the duration of BrainAble.

This deliverable provides information about the project-wide scientific and non-scientific information **dissemination strategies** and on major collaboration approaches[1]. In addition to these project-wide activities, the document is aimed **to report on the information disseminated through activities** of individual partners, or groups of partners, focusing on specific technical developments **carried out within the first year of the project**.

The goals of information dissemination identified and addressed by this document are to promote the BrainAble approach and results (as they become available) to the widest possible audience, as well as to try to identify opportunities for generalisations of this integrative approach to other users, and to promote its use in other domains.

2   Target groups for dissemination

At this moment, and according to the project's objectives and goals, several target groups were already identified. Combined with these groups, the target specific markets build the ecosystem that will be complementary tackled by the Sponsoring Programme[2].

The next subsections describes the *target groups* for information dissemination, categorised as *clients* (telecom companies, health care services and product providers, insurance companies…), *peers* (study participants and end-users organisations), and *observers* (eHealth and e-Inclusion research communities). For each target group, specific means of information dissemination are detailed.

2.1   BrainAble *clients*

2.1.1   Telecommunication Companies

These companies are present, virtually, everywhere. They provide services considered fundamental for a modern society. Taking advantage of their proximity to the client and the client's home (they already "enter" in our homes, everyday) these service providers will be able to add value to and increase the range of their products with the adoption of the concepts of Ambient Assisted Living, Independent Living and e-Inclusion in their offer.

Goal: gain as customers

Suggested actions:

- Direct contacts, for instance, at exhibitions having vendors attendees, or from a list resulting of a market research

- Product presentations

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[1] Specific collaboration with other sibling projects (Project Clustering) has been described in Deliverable D7.8. This collaboration serves several goals: first, it helps leveraging the achievements of other projects for improving and accelerating progress within BrainAble. Second, it can foster the uptake and further development of BrainAble results by making them accessible to others. And third, coordination with other initiatives can be needed to reach common goals, or pursuing common dissemination goals. In order to manage the expected number of collaborations and requests for collaboration, an appropriate process have been described in the mentioned deliverable.

[2] Details on the Sponsoring Programme and exploitations strategies are to be found in deliverable D7.7 (Sponsoring Programme)

- Live shows of prototypes

Time: When appropriate results available

2.1.2 Health Care Services and Products Providers

Not focusing in providing, per se, a health care product, but as a part of a service, for example, in a package. With the latest advances in technology these service providers' prominence is constantly growing. These companies seek to deliver the best range of products and/or services (from simple and more economical to more complete) to persons, companies or institutions as final users, trying to differentiate themselves from the competitors. The BrainAble system will add value to and increase the range of their offer.

Goal: gain as customers

Suggested actions:

- Direct contacts, for instance, at exhibitions having vendors attendees, or from a list resulting of a market research
- Product presentations
- Live shows of prototypes

Time: When appropriate results available

2.1.3 Insurance Companies

Insurance companies look forward to provide health care solutions that are able to provide "security feelings" and ease of mind to the costumer, and services that can guarantee that their costumer's health is maintained through, for instance, social inclusion.

Also, with the improvement of the user's independence, care providing costs can be significantly reduced.

Goal: gain as resellers

Suggested actions:

- Direct contacts, for instance from a list resulting of a market research
- Product presentations
- Live shows of prototypes

Time: When appropriate results available

2.1.4 R&TD Institutions

The technological developments achieved in the BrainAble project, in its various forms, can be a starting point or a component for new and existent products or services or for new and existent projects and research activities.

In BrainAble we will further investigate communication standards for combining BCI technology with AmI, VR and social network technology.

Goal: gain as technology licensee

Suggested actions:

- Direct contacts
- Technical development presentations
- Live shows of prototypes

Time: When appropriate results available

2.1.5   Videogames Industries

The current evolution to more immersive and user centred user interfaces in the video games industries provides another possible application for the technical developments of this project.
And also, users and developers are always looking for the next (best) way of interaction with the offered interfaces.

Goal: gain as technology licensee

Suggested actions:

- Direct contacts, for instance, from a list resulting of a market research, or at exhibitions having vendors attendees
- Technological developments presentations
- Live shows of prototypes

Time: When appropriate results available

2.1.6   Advertising and Brand Promotion

The entertainment features and the capability to provide immersive interaction to the users can also be used to advertisement and brand promotion. More lifelike and immersive interaction can provide a better connection between the user and the brand.

Goal: gain as technology licensee

Suggested actions:

- Direct contacts, for instance, from a list resulting of a market research or at exhibitions having vendors attendees
- Live shows of prototypes

Time: When appropriate results available

2.1.7   Home Automation and Control Companies

Providers of this type of services are interested in providing the best user interface for each user, and that applies to users with any type of disability.

Goal: gain as costumers or resellers

Suggested actions:

- Direct contacts, for instance at exhibitions having vendors attendees, or from a list resulting of a market research
- Product presentations
- Live shows of prototypes

Time: When appropriate results available

2.2   BrainAble *peers*

2.2.1   Study participants

Users and other study participants (family members, control groups) are directly affected by the results of BrainAble. It is good ethical practice to inform them in a clear and understandable manner on the goals and status of BrainAble in a way that avoids both

unnecessary fears and exaggerated hopes. These people may not have access to the internet or be able to speak English.

Goal: Basic understanding of what BrainAble can and cannot do.

Suggested actions:

- Users information sheets (translated into patient's residence countries language)
- Special pages on web site (maybe translated into languages of the 2nd study country: Spanish and Catalan), newsletters by mail or email
- Indirect by providing clinicians with extended background information

Time: Beginning of validation process.

2.2.2   End-users organisations

Patient/users organisations are a way to reach a broader audience of affected people. They may help to better understand the fears of users and to address a general public.

Goal: Understanding the users

Suggested actions:

- Direct contact by letter or e-mail

Time: Beginning of validation study

2.3   BrainAble observers

2.3.1   e-Health / e-Inclusion research communities

Examples are researchers focused on BCIs, Electrooculogram (EOG), Electromyography (EMG), Virtual Reality, Ambient Intelligence or affective computing sensors. We assume in this document that individual partners through the scientific dissemination of their own results will address these communities. Only if important sub-communities are identified which should be addressed specifically and additionally to individual partners' activities, should the work package 7 define specific actions.

Goal: Understand potential impact, uptake of approach

Suggested actions:

- Overview presentations on targeted conferences
- Overview articles in selected publications

Time: Focus on the second half of the project duration

2.3.2   Nursing Home Services / National Health Care Systems

The project outcome will largely increase of the independency of the patients. This can provide a major reduction of the need of personal to accompany those patients. By accomplishing that, the global costs with care providers can be largely decreased. With the adoption of the BrainAble concept, private and public institutions that are responsible to provide assistance to this type of patients will be able to reduce staff costs.

At the same time, an improvement in the quality of life and social inclusion of patients will be achieved. This is important to modern society.

Goal: Understand the potential impact of large scale implementation. Gain as costumers.

Suggested actions:

- Project presentation, focusing in the specific needs and benefits for these institutions.
- User validation results presentations

Time: When appropriate results available

3 Information dissemination channels

There are a large number of ways (or *channels*) to reach the different audiences. In the following, we list and characterise some of them that are in principle suitable for our purposes. We can broadly classify these channels into dissemination events and materials.

3.1 Dissemination events

- *Traditional scientific channels:*

  o *Journal & conference papers & presentations.* This is the usual way of (scientific) dissemination, and will certainly be used by the project members even without an explicit dissemination plan. However, explicit selection of key conferences and journals already planned will help to ensure presence.

  o *Organisation of special workshops*. Focussed attention, but must make sure to reach the key participants

- *Paramedical fairs*. The audience is likely to be less specific than for workshops, but potentially larger. This may be a good option when there is already a working system, because there is opportunity to show demos. Some conferences also have vendor exhibits that serve a similar role and have a more focussed audience.

- *Competitions and challenges*, for instance computations of benchmark problems. This will mainly interest either researchers trying their methods or potential users of those methods.

- *Publications in non-scientific media*, such as (science supplements of) newspapers, or even popular science spots in television. These channels will reach a large number of people, but are very unspecific. In order to successfully follow this path, support material for these journalists will be required, such as press packages including fact sheets, long-term goals and prospects, use-case scenarios/narratives and images. Science-oriented television transmissions may reach a large audience and provide a good public understanding of the ideas underpinning BrainAble. However, they may be very costly to produce: this may be a case for having several projects collaborate.

- *Announcements* to online forums, such as newsletters, online community portals or news groups. This is a cheap and effective way to raise awareness of BrainAble. However, one must avoid being perceived as spamming by posting too often or to only marginally appropriate forums, hence, a central coordination of these actions is necessary.

- *Direct contact* by phone, email or letter. This will be possible only for a small number of persons or institutions. A first time contact should be personalised enough in order not to be perceived as spam.

3.2   Dissemination materials

- *Flyers, posters, presentations, templates*. They support project partners in presenting the whole of BrainAble at some event in a consistent and attractive way.

- *Web site*. Our project web site is an important and powerful medium for dissemination, because it can give access to all kinds of data through a single portal. It is kept up-to-date, else the impression will be that of a dead project. Some work needs to be invested to ensure proper visibility. The central web site has been complemented by BrainAble web pages at the individual partners' web sites.

- *Journal articles, public deliverables, other publications* can be made available through the project web site.

- *Demos* like movies, screen captures with a narrative explaining flow of actions. They can be reused often and may achieve much greater understanding and positive feedback than "simple paper", especially for dynamic things like graphic interactive tools, and may ideally come close to a live demonstration, while having the potential to reach a much larger audience.

- *Educational material*, via the website for E-learning or to support teaching / tutorial events.

- *Downloadable data*, for instance, benchmark cases and results.

4   Dissemination support material

4.1   Corporate identity

A logo has been designed, which is used on the BrainAble web page and all BrainAble project-wide publications, such as deliverables, project presentations and posters.

Templates have been designed to be used in all project dissemination activities and materials.

Figure 1:   The BrainAble logo

4.1.1 Web page

The BrainAble web page (www.BrainAble.org) was set up by February 2010 (see Figure 1:), including news track, general project explanations, and introduction to the different project participants. It will be complemented by a searchable repository of dissemination activities and information directed specifically to study participants

Figure 2:   The BrainAble web page

4.1.2 Support and background material

A number of dissemination activities will require project members or even outsiders (journalists) to talk or write about topics about which they are not experts. Therefore, a project of the scope of BrainAble requires some strategy to support those activities. Examples for support materials and activities are:

- Posters and Flyers, already available in the website.

- Image repositories, with detailed background on meaning, creator, copyright, clearance for publishing. Efforts are joined to create visually appealing and meaningful pictures.
- Presentations: Overview and specific topics, accompanied with background explanations. These will be updated on a regular basis.
- Background texts or summaries for non-experts.
- Summaries of statistical data (studies results).

5   First year specific dissemination actions

Dissemination activities in the first reporting period (see below for a complete list) include the release of the project web site in addition to a number of overview and specialised researched-based presentations and publications.

In the next reporting period, we aim to continually extend the project-wide dissemination material and background information in order to optimally support project partners in presenting the project as a whole. This has already proven to be quite a challenge in the project due to the number of technologies involved in BrainAble.

5.1   Past activities – Overview table

This table lists only events. A complete list of associated publications and presentations is included in the sections that follow this table.

Date	Title / Type	Audience	Countries Addressed	Partners Involved
01/2010	Arab Health/ exhibition and talk	Medical Community	World	G.TEC
02/2010	www.BrainAble.org (Website Release)	General Public	World	BDCT
02/2010	TOBI Workshop 2010	BCI Community	World	BDCT, TU-GRAZ, UPF, G.TEC
03/2010	CeBIT 2010 /exhibition and talk	ICT Community	World	G.TEC
03/2010	Graz Workshop /demonstration	BCI Community	World	G.TEC
03/2010	RAVE 2010	VR Community	World	TU-GRAZ, G.TEC
03/2010	life science success 2010/ Award for g.tec cooperation with Universities	Research	Austria	G.TEC
05/2010	BDigital Global Congress	ICT Community	World	BDCT
06/2010	4th International BCI Meeting	BCI Community	World	TU-GRAZ, G.TEC
06/2010	Research 2010	R&TD Community	Austria	TU-GRAZ
12/06/2010	InterBrain 2010 / BCI workshop	Signal Processing	World	G.TEC
17/06/2010	Digital Lifestyle Event	ICT Community	Portugal, Spain	METI

Date	Title / Type	Audience	Countries Addressed	Partners Involved
20/06/2010	Beyond BMIs Workshop	BCI Community	USA	TU-GRAZ
06/2010	39th Neural Interface Conference	BCI Community	USA	TU-GRAZ
09/2010	AEC Festival/exhibition	General	World	G.TEC
09/2010	Future BNCI Conference	BCI Community	World	TU-GRAZ
09/2010	ICT 2010 Exhibition	ICT Community	World	BDCT, TU-GRAZ, G.TEC
10/2010	1st International AEGIS Conference	Accessability Community	World	METI
10/2010	ICABB – 1st International Conference on Applied Bionics and Biomechanics	Bionics and Biomechanics Community	World	TU-GRAZ
10/2010	Joint Virtual Reality Conference 2010/exhibition	Virtual Reality	World	G.TEC
10/2010	BMT 2010 - 44 DGBMT /exhibition	Biomedical Engineering	World	G.TEC
25/10/2010	Cidade Tecnológica 2010	ICT Community	Portugal	METI
11/2010	AMI-10 - 1st European Conference on Ambient Intelligence	AmI Community	Europe	BDCT
11/2010	Neuroscience 2010	Neuroscience Community	World	TU-GRAZ, G.TEC
11/2010	Medica 2010/exhibition	Medical Community	World	G.TEC
16/11/2010	Workshop on ICT & Ageing	ICT, AAL and IL Community	World	METI
12/2010	TOBI Workshop 2010 II	BCI Community	World	TU-GRAZ, G.TEC

In addition to the listed events, the BrainAble consortium gave **over 20 project presentations**, announcing the project to various groups, such as: PT-Inovação, Portuguese Knowledge Society Agency, Blizzard Entertainment, T-Systems DE, Portuguese Computer Graphics Center, among others.

5.2 Published Results

The following publications with Framework Programme 7 (FP7) acknowledgment have been produced within the 12 month reporting period:

Author	**Brunner C, Allison B Z, Krusienski D J, Kaiser V, Müller-Putz G R, Neuper C, and Pfurtscheller G**
Title	**Improved signal processing approaches for a hybrid brain-computer interface simulation**
Format	Article
Event / Publication	Journal of Neuroscience Methods

Expected date	1st February 2010
Comments	published

Author	**Pfurtscheller G, Allison B, Bauernfeind G, Brunner C, Solis-Escalante T, Scherer R, Zander T, Müller-Putz G, Neuper C and Birbaumer N**
Title	**The hybrid BCI**
Format	Article
Abstract	Nowadays, everybody knows what a hybrid car is. A hybrid car normally has 2 engines, its main purpose being to enhance energy efficiency and reduce CO_2 output. Similarly, a typical hybrid brain-computer interface (BCI) is also composed of 2 BCIs or at least one BCI and another system. Such a hybrid BCI, like any BCI, must fulfil the following four criteria: (i) the device must rely on signals recorded directly from the brain; (ii) there must be at least one recordable brain signal that the user can intentionally modulate to effect goal-directed behaviour; (iii) real time processing; and (iv) the user must obtain feedback. This paper introduces some hybrid BCIs which have already been published or are currently in development or validation, and some concepts for future work. The BCIs described classify 2 EEG patterns: One is the event-related (de)synchronisation (ERD, ERS) of sensorimotor rhythms, and the other is the steady-state visual evoked potential (SSVEP). The hybrid BCI can either have more than one input whereby the inputs are typically processed simultaneously or operate 2 systems sequentially, whereby the first system can act as a —brain switch‖. In the case of self-paced operation of a SSVEP-based hand orthosis control with an motor imagery-based switch it was possible to reduce the rate of false positives during resting periods by about 50% compared to the SSVEP BCI alone. It is shown that such a brain switch can also rely on hemodynamic changes measured through near-infrared spectroscopy (NIRS). Another interesting approach is a hybrid BCI with simultaneous operations of ERD- and SSVEP-based BCIs. Here it is important to prove the existing promising offline simulation results with online experiments. Hybrid BCIs can also use one brain signal and another input. Such an additional input can be a physiological signal like the heart rate but also a signal from an external device like, an eye gaze control system.
Event / Publication	Frontiers in Neuroscience (www.frontiersin.org)
Expected date	Published on the 6th of April 2010, Volume 2, doi: 10.3389/fnpro.2010.00003
Comments	Published; available for download at www.brainable.org

Author	**Ortner R, Guger C, Prueckl R, Grünbacher E, Edlinger G**
Title	**SSVEP based Brain-Computer Interface for Robot Control.**
Format	Proceedings Paper
Abstract	Abstract. A brain computer interface (BCI) using steady state visual evoked potentials (SSVEP) is presented. EEG was derived from 3 subjects to test the suitability of SSVEPs for robot control. To calculate features and to classify the EEG data Minimum Energy and Fast Fourier Transformation (FFT) with linear discriminant analysis (LDA) were used. Finally the change rate (fluctuation of the classification result) and the majority weight of the analysis algorithms were calculated to increase the robustness and to provide a zero-class classification. The implementation was tested with a robot that was able to move forward, backward, to the left and to the right and to stop. A high accuracy was achieved for all commands. Of special interest is that the robot stopped with high reliability if the subject did not watch at the stimulation LEDs and therefore successfully zero-class recognition was implemented.
Event / Publication	Proceedings of ICCHP
Expected Date	14-16 July 2010
Comments	published

Author	**Ortner R, Prueckl R, Gruenbacher E, Holzner C, Guger C**
Title	**Classification accuracy of a P300 speller during different periods of event related potential**
Format	Proceedings Paper
Abstract	When talking about Brain-Computer Interface (BCI) controlled spelling devices for disabled people, P300 based sys-tems are the preferred ones, as they provide a high information transfer rate and low training time. In a previous study measurements on 100 subjects were performed, to find out how many people are able to control a P300 based BCI. Be-neath these results we present the classification accuracy of some single periods of the event related potential such as components occurring around 100 ms, 200 ms and 300 ms after stimulus onset. The data proves that a high spelling ac-curacy can be achieved with the P300 BCI system, with needing only about 5 minutes of training time. When looking at specific periods it is not surprising that the component around 300 ms is best suitable for discriminating between target and non-target stimuli, although for some "bad performers" a window around 200 ms seems to deliver even a higher accuracy.
Event / Publication	Proceedings of BMT 2010
Expected Date	05-08 October 2010
Comments	published

Author/s	**Scherer R and Pfurtscheller G**
Title	**Brain-Computer Interfacing and Virtual Reality**
Format	Workshop/Special session
Abstract	Brain-Computer Interface (BCI) technologies provide a novel way for humans to interact with machines. BCIs are not dependent on actual movements; instead, BCIs process the user's intent directly and translate the corresponding brain activity into control commands for devices. Historically, BCIs were developed with biomedical applications in mind, such as restoring communication in completely paralyzed individuals and replacing lost motor function. More recent applications have targeted nondisabled individuals by exploring the use of BCIs as a novel input device for entertainment and gaming. Virtual Reality (VR) can be an efficient and powerful tool for studying and enhancing BCI technology. BCI users who use immersive Virtual Environments (VEs) make fewer errors, report that BCIs are easier to learn and use, and state that they enjoy BCI use more. These benefits may occur because VEs enhance vividness and mental effort, which may lead to more distinct brain patterns and improve the pattern recognition performance. Therefore, there is an unmet opportunity to further enhance BCI usability by engaging virtual reality (VR) or augmented reality (AR) for BCIs. This half-day workshop aims to bring together an interdisciplinary team of researchers in order to review the current state-of-the-art in non-invasive BCIs and VR, and to identify novel approaches, applications and possibilities offered from the combination of these technologies. Representatives from academia and industry will provide invited talks on these and related issues that impact further BCI and VR development.
Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October, 2010 / accepted

Author/s	**Faller, J., Leeb, R., Pfurtscheller, G. and Scherer, R.**
Title	**Avatar navigation in virtual and augmented reality environments using an SSVEP BCI**
Format	Workshop paper
Abstract	This work reviews software steady-state visual evoked potential (SSVEP) BCI systems that integrate stimuli within desktop-based virtual reality (VR) and augmented reality (AR) environments. SSVEPs are brain signals that allow for high information transfer rates (ITR) within brain—computer interface (BCI) systems while requiring only minimal training. Generating SSVEP stimuli within 3D computer graphics makes it easier to implement motivating training paradigms and more realistic simulations of real-world applications. EEG measurements on seven healthy subjects within three VR scenarios (Button, Slalom, Apartment, AR Slalom) and on three healthy subjects within an AR scenario showed that software generated stimuli are suitable to elicit SSVEPs. This research direction could lead to vastly improved immersive VEs that allow both disabled and healthy users to seamlessly communicate or interact through an intuitive, natural, and friendly interface.
Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October, 2010
Comments	Paper for workshop "Brain-Computer Interfacing and Virtual Reality"

Author/s	**Scherer R, Chung M, Lyon J, Cheung W, and Rao PNR**
Title	**Interaction with Virtual and Augmented Reality Environments using Non-Invasive Brain-Computer Interfacing**
Format	Workshop paper
Abstract	In electroencephalogram (EEG) based BCI systems, evoked potentials provide a relatively accurate way of selecting between a large number of classes but rely on external stimuli. Mental imagery (e.g. motor imagery), on the other hand, does not require external stimulation and allows real-time control but the detection of induced EEG patterns can be error-prone. In this paper we propose a scalable, user-adaptive BCI that combines the advantages of imagery and evoked potentials. Users utilize imagery to teach the BCI new commands, which are then made available for selection using evoked potentials (e.g., the P300).
Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October, 2010
Comments	Paper for workshop "Brain-Computer Interfacing and Virtual Reality"

Author/s	**Pfurtscheller G, and Scherer R**
Title	**Brain-Computer Interfaces used for Virtual Reality Control**
Format	Workshop paper
Abstract	Brain-Computer Interfaces (BCIs) are non-muscular channels for sending messages and commands to the external world. Historically, BCIs were developed with biomedical applications in mind, such as restoring communication in completely paralyzed individuals and replacing lost motor function. More recent applications have targeted nondisabled individuals by exploring the use of BCIs as a novel input device for entertainment, gaming and virtual reality (VR). This paper acquaints readers with the necessary background knowledge on BCIs and outlines the usefulness of VR to enhance BCI.

Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October, 2010
Comments	Paper for workshop "Brain-Computer Interfacing and Virtual Reality"

Author	**Brunner C, Allison B Z, Altstätter C , and Neuper C**
Title	**A comparison of three BCIs based on ERD, SSVEP, or a hybrid approach using both signals**
Format	Article
Abstract	Brain-computer interface (BCI) systems rely on the direct measurement of brain signals such as event-related desynchronization (ERD), steady state visual evoked potentials (SSVEPs), P300s, or slow cortical potentials (SCPs). Unfortunately, none of these BCI approaches work for all users. This study compares two conventional BCI approaches (ERD and SSVEP) within subjects, and also evaluates a novel hybrid BCI based on a combination of these signals. We recorded EEG data from 12 subjects across three conditions. In the first condition, subjects imagined moving both hands or both feet (ERD). In the second condition, subjects focused on one of two oscillating visual stimuli (SSVEP). In the third condition, subjects simultaneously performed both tasks. We used band power features at sites and frequencies consistent with ERD and SSVEP activity, and subjects received real-time feedback based on their performance. Subjects also completed brief questionnaires.

All subjects could simultaneously perform the movement and visual task in the hybrid condition even though most subjects had little or no training. All subjects showed both SSVEP and ERD activity during the hybrid task, consistent with the activity in both single tasks. Subjects generally considered the hybrid condition moderately more difficult, but all of them were able to complete the hybrid task. Results support the hypothesis that subjects who do not have strong ERD activity might be more effective with an SSVEP BCI, and suggest that SSVEP BCIs work for more subjects. A simultaneous hybrid BCI is feasible, although the current hybrid approach, which involves combining ERD and SSVEP in a two-choice task to improve accuracy, is not significantly better than a comparable SSVEP BCI. Switching to an SSVEP BCI could increase reliability in subjects who have trouble producing the EEG activity necessary to use an ERD BCI. Subjects who are proficient with both BCI approaches might be able to combine these approaches in different ways and for different goals. |
Event / Publication	**Journal of Neural Engineering**
Expected date	??
Comments	accepted

Author	**Graimann B, Allison B Z, and Pfurtscheller G**
Title	**Brain-Computer Interfaces: A Gentle Introduction**
Format	Book chapter in "BRAIN-COMPUTER INTERFACES Revolutionizing Human-Computer Interaction", Graimann B, Allison B Z, and Pfurtscheller G (Eds.)
Abstract	N.A.
Event / Publication	Springer Heidelberg Dordrecht London New York e-ISBN: 978-3-642-02091-9, DOI: 10.1007/978-3-642-02091-9
Date	2010
Comments	http://www.springerlink.com/content/978-3-642-02090-2#section=802356&page=1 available for download at www.brainable.org

Author	**Allison B Z, and NEUPER C**
Title	**Could Anyone Use a BCI?**
Format	Book chapter (nº 3) in "Brain-Computer Interfaces, Applying our minds to Human-Computer Interaction"
Abstract	N.A.
Event / Publication	Springer Heidelberg Dordrecht London New York e-ISBN: 978-1-84996-272-8, DOI: 10.1007/978-1-84996-272-8
Date	2010
Comments	http://msilas.net/cs/stuff/brain_computer_interface/brain-computer-interfaces-applying-our-minds-to-human-computer-interaction.9781849962711.52337.pdf

Author	**Friedrich E, Scherer R and Neuper C**
Title	**The effect of distinct mental strategies on classification performance of EEG-based brain- computer interfaces**
Format	Paper
Abstract	Motor imagery is the most common used task to induce changes in electroencephalographic (EEG) signals for brain computer interfacing (BCI). In this study we researched the binary classification performance and brain patterns of distinct mental tasks (i.e. mental rotation, word association, auditory imagery, mental subtraction, spatial navigation, imagery of familiar faces and motor imagery) to optimize BCI control strategies. Eleven users participated in four sessions of multi-channel EEG recordings. Mental tasks resulting most frequently in good classification performance include mental subtraction, word association, motor imagery and mental rotation. No correlation of performance with the user's assessment of quality of imagery, task difficulty and enjoyment, and experience in task relevant domains was found. Our results suggest that a combination of "brainteaser" - tasks that require problem specific mental work (e.g. mental subtraction, word association) - and "pure imagery" - tasks that include dynamic imagination (e.g. motor imagery) - result in increased performance.
Event / Publication	Biological Psychology journal
Expected Date	¿?
Comments	submitted

Author	**Pfurtscheller, G., Leeb, R., Faller and Neuper C.**
Title	**Brain-Computer Interface Systems Used for Virtual Reality Control**
Format	Book chapter in "Virtual Reality" Jae-Jin Kim (Edt) InTech
Abstract	N.A.
Event / Publication	ISBN: 978-953-307-518-1
Date	January 2011
Comments	http://www.intechopen.com/articles/show/title/brain-computer-interface-systems-used-for-virtual-reality-control

5.3 Presentations

The following presentations have been given on BrainAble as a whole or on specific technical developments within the 12 month reporting period:

Author	**Guger C, Holzner C, Groenegress C, Mecella M, Edlinger G, Slater M**
Title	**Using a P300 Brain Computer Interface for Smart Home**
Format	Poster
Event / Publication	TOBI Workshop 2010
Date	03-04 February 2010

Author	**Miralles F** (BDigital)
Title	**BrainAble**
Format	Talk in a RoundTable
Event / Publication	TOBI Workshop 2010
Date	03-04 February 2010

Author	**Jin, J., Allison, B.Z., Brunner, C., Horki, P., and Neuper, C.**
Title	**Optimized P300 Stimulus Presentation pattern for an EEG-based Control System**
Format	Poster
Event / Publication	TOBI Workshop 2010
Date	03-04 February 2010

Author	Not specified (G.TEC)
Title	**BrainAble project**
Format	Poster
Event / Publication	**CeBIT,** Hannover, Germany (www.cebit.de), **Hall 09, Booth D02**
Date	02 March 2010

Author	**Grünbacher E, Guger C**
Title	**g.tec integrates Brain-Computer Interface (BCI) technology into patients' everyday life**

Format	Talk
Event / Publication	CeBIT 2010
Date	02 March 2010

Author	Edlinger G, Krausz G, Sellers E, Mecella M, Guger C
Title	How many people are able to use a P300-Based Brain-Computer Interface (BCI) for Control?
Format	Poster
Event / Publication	RAVE 2010
Date	03 March 2010

Author	Edlinger G, Krausz G, Sellers E, Mecella M, Guger C
Title	How many people are able to use a P300-Based Brain-Computer Interface (BCI) for Control
Format	Talk
Event / Publication	RAVE 2010
Date	03 March 2010

Author	Faller J, Allison B Z, Brunner C, Schmalstieg D and Pfurtscheller G
Title	A software SSVEP BCI integrating stimuli within motivating and immersive virtual and augmented reality environments
Format	Talk / slides (speaker: Josef FALLER)
Event / Publication	RAVE, Real Action Virtual Environments conference, Barcelona (www.raveconference.com)
Date	03 March 2010

Author	Guger C
Title	intendiX
Format	Talk
Event / Publication	Microsoft Innovation Day 2010
Date	03 May 2010

Author	Wilczynscki, M. and Allison, B.Z.
Title	Soft Targets: Brains and BCIs as Security Liabilities
Format	Poster
Event / Publication	4th BCI Meeting 2010
Date	May 31 - June 4 2010

Author	Guger C, Mecella M, Edlinger G, Krausz G
Title	How Many People are Able To Control a P300-Based Brain-Computer Interface (BCI)?
Format	Poster
Event / Publication	4th BCI Meeting 2010
Date	May 31 - June 4 2010

Author	Edlinger G, Krausz G, Sellers E, Mecella M, Guger C
Title	P300 and SSVEP based Brain-Computer Interface for a Virtual Smart Home Environment Control.
Format	Poster
Event / Publication	4th BCI Meeting 2010
Date	May 31 - June 4 2010

Author	Faller, J., Leeb, R., Allison, B. Z., Schmalstieg, D., and Pfurtscheller, G.
Title	SSVEP-based navigation using stimuli that are tightly integrated within a virtual feedback scenario
Format	Talk
Event / Publication	4th BCI Meeting 2010
Date	May 31 - June 4 2010

Author	Neuper, C., Brunner, C., Allison, B. Z., Solis-Escalante, T., Bauernfeind, G., and Pfurtscheller, G.
Title	Hybrid BCI Research at the Graz University of Technology
Format	Talk
Event / Publication	4th BCI Meeting 2010

Date	May 31 - June 4 2010

Author	**Miralles F, Ceccaroni L, Navarro A and Torrellas S** (BDigital)
Title	**BrainAble**
Format	Poster
Event / Publication	**ICT-2010,**Brussels-Belgium http://ec.europa.eu/information_society/events/ict/2010/index_en.htm **Future BCNI booth**
Expected date	27-29th September 2010

Author	**Allison B.**
Title	**Brain/Neuronal Computer Interaction (BNCI) Research**
Format	Networking session 3178
Event / Publication	**ICT-2010,**Brussels-Belgium http://ec.europa.eu/information_society/events/ict/2010/index_en.htm **Future BCNI booth**
Expected date	29th September 2010
Comments	Took place successfully. Partners from all FP7 ICT 7.2 funded project participated and discussed achieved goals and remaining challenges.

Author/s	**Faller, J., Pfurtscheller, G. and Scherer, R.**
Title	**Avatar navigation in virtual and augmented reality environments using an SSVEP BCI**
Format	Talks
Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October 14, 2010

Author/s	**Scherer R, Chung M, Lyon J, Cheung W, and Rao PNR**
Title	**Interaction with Virtual and Augmented Reality Environments using Non-Invasive Brain-Computer Interfacing**
Format	Talk
Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October 14, 2010

Author/s	**Pfurtscheller G, and Scherer R**
Title	**Brain-Computer Interfaces used for Virtual Reality Control**
Format	Talk
Event / Publication	First international conference on Applied Bionics and Biomechanics ICABB-2010 (http://www.icabb-iss.org/)
Expected date	October 24, 2010

Author	**Allison B Z**, **Brunner C, Grissmann S and Neuper C**
Title	**Toward a multidimensional "hybrid" BCI based on simultaneous SSVEP and ERD activity**
Format	Talk in Program No. 227.4. 2010
Abstract	The abstract can be downloaded through the conference website (via www.sfn.org) or is available on request.
Event / Publication	Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010 (http://www.sfn.org/am2010/)
Date	13-17 November 2010

Author	**Brunner C, Allison B Z , Altstätter C** and **Neuper C**
Title	**A hybrid brain-computer interface based on motor imagery and steady-state visual evoked potentials**
Format	Talk in Program No. 227.3. 2010
Abstract	The abstract can be downloaded through the conference website (via www.sfn.org) or is available on request.
Event / Publication	Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010 (http://www.sfn.org/am2010/)
Date	13-17 November 2010

Author	**Edlinger G, Prueckl R, Guger C**
Title	**Towards the realization of a hybrid Brain-Computer Interface**
Format	Poster
Event / Publication	Neuroscience 2010
Expected Date	13 November 2010

5.4 Special events

- ✓ **Science for the Public** – Event that provides a way to present information about BNCIs and BCI projects to the public at large in a friendly and engaging environment. On 17 January, Prof. Neuper from TU-GRAZ was the invited speaker, at a well-known public location in Graz. Over 100 people attended, and the question and answer session and resulting discussion lasted literally more than two hours after her talk ended. The event also established contacts with different people interested in working for TUG, participating as research subjects, or learning more about BNCIs and our projects.

- ✓ **Future BNCI Conference** Clustering activities. BrainAble staff participated in two workshops: one about BCIs at home, and the other focused on standards and guidelines.

- ✓ **Distinguished BCI Social Series** – TU-GRAZ coordinate three of these events in 2010. The events were attached to established conference, and intended to create an informal networking environment where key stakeholders could discuss issues relating to future directions in BCI research.

  - o Distinguished BCI Social Series I – The first event of the series occurred on the day preceding the 4th BCI Meeting 2010. Brendan Allison, PhD from TU-GRAZ participated in the Organizing Committee, and G.TEC was the main sponsor of the event. TU-GRAZ also heavily publicized the event. The event was a total success, with about 60 attendees, including numerous stakeholders.

  - o Distinguished BCI Social Series II – TU-GRAZ coordinated a larger event on 16th November 2010, as part of Neuroscience 2010 event. Again, G.TEC was a sponsor of this activity.

  - o Distinguished BCI Social Series III – Again, organized by TU-GRAZ, this event was held in Rome, as part of TOBI Workshop II 2010. G.TEC provided sponsorship for this event.

5.5 Ph.D. and Master Theses

Not Applicable 2010

5.6 Press events, press releases, press articles and related items

This section lists events and publication not funded by BrainAble, but contributing to information dissemination for the project.

- ✓ In December 19th, thanks to the Institut Guttmann and the presentation done by our colleague Ursula Costa[3], BrainAble project technology was highlighted while the TV3 telethon* (TV3 is the primary television channel of Catalan public broadcaster Televisió de Catalunya). The funds raised by this combination of publicity, awareness-raising and entertainment (*called Marató) will make possible an important financial boost to promote -by competitive calls- research into acquired spinal cord and brain injuries, searching for the methods and techniques that can cure sufferers or significantly improve their quality of life.

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[3] Video [in Catalan] available at the following link: http://www.tv3.cat/videos/3275590

6   Anticipated opportunities for collaboration and technology uptake

Future collaborations are in a sense a "moving target", but some candidates for collaboration or uptake of technology developed in prior projects can already be identified. New candidates for collaboration will also be identified during concertation events organised by the EC.

It is emphasised that all collaborations will need to undergo the processes described in deliverables D7.7 (Sponsoring Programme) and D7.8 (Project Cluster with sibling projects) before being officially endorsed by the BrainAble consortium.

Some events already foreseen for 2011:

- ✓ Two sessions of Future BNCI – organized by TU-GRAZ.
- ✓ 5th International BCI Conference 2011, September 22-24, 2011, Graz, Austria (http://bci.tugraz.at/BCI2011/index.html)

7   List of Key Words/Abbreviations

AAL	Ambient Assisted Living
AmI	Ambient Intelligence
BCI	Brain Computer Interface
BNCI	Brain/Neuronal Computer Interface
HCI	Human Computer Interface
ICT	Information and Communication Technology~
IL	Independent Living
VR	Virtual Reality