Publishable summary: Future BNCI periodic report 1 Jan – 31 Dec 2010

This document i a publishable summary of progress during the first year. It reflects completion of part 3.1 of the "Guidance notes on project reporting" and follows the structure required therein. The four section headlines (shown in ***bold and italic*** text) reflect the different subsections required therein.

I. *Summary description of project context and objectives*

Future BNCI is a Coordination and Support Action within Theme !CT-2009.7.2. Informally, we are part of the "BNCI Cluster", a group of ten European projects devoted to BNCI research that were funded during calls 2 and 4 of Challenge 7.2. Our project focuses on coordinating and supporting activities of this cluster, as well as advancing the BNCI research community in other ways.

Our overall project objectives include:

- **A thorough literature review of relevant academic references and commercial developments** to consolidate existing knowledge and establish what is known and not known;
- **Targeted discussion with the top academic and commercial stakeholders through email, informal discussion, and the mechanisms shown below** to establish a common framework on which a community can be built;
- **Organisation of events including a conference, workshops, and special sessions** to encourage participation, disseminate the findings of the targeted discussions, and stimulate further discussion;
- **Establishment of electronic resources such a single centralized website** with definitions, a database of key articles and research groups, relevant news from businesses and the popular media, a discussion forum, lists of relevant conferences and other events, a Wiki, materials from classes about BCIs and related topics, and a research blog to provide a starting point for a common EU BNCI community and engage stakeholders and the public at large;

(Source: Description of Work)

II. *Description of the work performed since the beginning of the project and the main results achieved so far*

The work performed is presented in terms of our objectives for the first year. During 2010, the first year of this two year project, our objectives and relevant work included:

- **A thorough literature review,** reflected through our reports for D1.1, D2.2, D3.2, and D4.2, including supporting documents listed therein, as well as publications including:
- **Targeted discussion with the top academic and commercial stakeholders,** reflected through various mechanisms including the events listed below, interaction with our Advisory Board, etc.
- **Organisation of events,** including our conference in September, a networking session and BNCI village at the Brussels ICT Expo, and three social events with major conferences.
- **Establishment of electronic resources such a single centralized website**, which went online April 2010 with all of the elements required, and is frequently updated (see our reports for D2.1, D3.1, D4.1, and D5.1).

We have addressed the first objective (the literature review) – in fact, we produced four articles, some of which reflect targeted discussion with key stakeholders. The first article below is a literature review

aimed at the general public. The next two articles include a literature review and commentary about key issues. The last reference is an example of a publication from the FBNCI consortium that reflects targeted discussion and addresses major issues in BNCI research.

Graimann, B., Allison, B.Z., and Pfurtscheller, G. A gentle introduction to brain – computer interface (BCI) systems, In: *Brain-Computer Interfaces: Revolutionizing Human-Computer Interaction*, editors: Graimann, B., Allison, B.Z., & Pfurtscheller, G. Springer Verlag, Berlin Heidelberg, 1-28.

Allison, B.Z. Toward ubiquitous BCIs. In: *Brain-computer interfaces: Revolutionizing Human-Computer Interaction*, editors: Graimann, B., Allison, B.Z., & Pfurtscheller, G. Springer Verlag, Berlin Heidelberg, 357-387.

Allison, B.Z. and Neuper, C. (2010). Could anyone use a BCI? In: *Applying our Minds to Human-Computer Interaction*, Tan, D.S. and Nijholt, A. (Eds.) Brain-Computer Interfaces. Human-Computer Interaction Series, Springer Verlag, London, 35-54.

Nijboer, F., Clausen, J., Allison, B.Z., and Haselager, P. Researchers' opinions about ethically sound dissemination of BCI research to the public media. *International Journal of Bioelectromagnetism, in press.*

Nijboer, F., Clausen, J., Allison, B.Z., and Haselager, P. The Asilomar Survey: researchers' opinions on ethical issues related to Brain-Computer Interfacing. *Neuroethics, in review.*

We have a lot of additional work that reflects progress toward our objectives; please see our other management or contact us for further details. We have also included some images to show progress on the last three objectives. The top two figures below show materials we developed and disseminated during the first year. All five images in these two figures were developed in collaboration with a professional graphic designer. The third figure shows three events that FBNCI hosted in 2010. Additional images and details are posted on our website. Larger images, and/or additional images, are available on request.

Figure 1: These two images help to promote our project and cluster. The left image is the logo for our project. The right image is the logo for our cluster, which we developed through discussion with our cluster partners and the EC.

Figure 2: These three images further illustrate project accomplishments. The left image is a screenshot from our website in April. Since then, we have made many changes to our page, including upgrading the look and feel and expanding the number of news items in the top right from five to eight. The middle image presents our poster, which doubles as our project flyer. The right image shows the front page of our Future BNCI Powerpoint template.

Figure 3: These three photographs present three major events that the Future BNCI project organized and hosted. The left image is from Networking session 3178, and the middle image is from our stand in the BNCI Village, which we shared with BrainAble and other cluster partners. Both images are from the Brussels ICT Expo 2010. The right image shows most participants at our Future BNCI conference. All three events occurred in September 2010.

We also made the appropriate progress toward two major deliverables due at the end of the project: a book with Springer publishing and roadmaps. As required in M5.2, we have a book contract with Springer publishing and sent invitations to authors. We have divided the book into four sections, corresponding to WPs 2-5, and decided on chapters and authors in each section. We have begun working on three of the chapters. The roadmap status is similar. We have a framework, table of contents, agreement on who completes which section, commitments from specific people to help with different aspects, and some text developed (currently about 60 pages). TUG committed to hire two students with some business experience to help with commercial aspects of the roadmap.

III. Expected final results and their potential impact and use (including the socio-economic impact and the wider societal implications of the project so far)

The vision of Future BCI is to establish and support a thriving, efficient, well-connected BCI community. This vision entails the following **goals**:

- Develop clear standardized terminology;
- Identify specific opportunities and roadmaps;
- Encourage discussion and collaboration among key academic and commercial stakeholders;
- Disseminate knowledge and strategic objectives to established and new groups and to the public at large.

(Source: Description of Work)

This statement of vision and goals has not changed; they still reflect our expected final results. We still expect to have the impact we promised. We have not yet fully developed the work required in the top two bullet points (terminology and roadmaps), since they are not due until the end of the project. We have certainly made considerable progress on the last two bullet points. Again, please see our other reports of contact us for additional details of our first year accomplishments.

The text below summarizes our expected impacts.

Expected impact of Objective ICT – 2009.7.2	Future BCI impact
More efficiency and higher impact of RTD through common strategic visions and roadmaps on research priorities between relevant stakeholders in the relevant areas	There are presently no standards for BCIs nor BNCIs, poor acceptance of either term, and widespread disagreement over what constitutes one. These problems significantly reduce efficiency and potential impact. Future BNCI will define terms and standards, and develop strategic visions and roadmaps, through analysis and discussion within the consortium, as well as through stakeholder involvement via numerous online resources, a conference, workshops, and cooperative publications and dissemination. The consortium has excellent contacts with relevant stakeholders across different disciplines and sectors and will actively involve them.
Strengthened global position of European industry in assistive technologies.	This project will create EU standards, roadmaps, publications, and other disseminables that industry partners in the EU and elsewhere will follow. Collaboration with non-EU colleagues will further ensure that these and other deliverables reflect recent global progress and are updated, informed, durable, and distributed around the world.
Enhanced ability to seize new market opportunities driven by technologies that augment human capabilities for persons with disabilities.	WP3 will identify different user groups and how to best develop BCIs that meet their needs and desires. WP3 will explicitly focus on conventional BNCI users (persons with severe motor disabilities), persons with less severe motor disabilities, and persons in need of rehabilitation of other disorders. Spill-over to healthy users will also be considered. Market opportunities and roadmaps will be developed, including cooperation between academia and industry.
Consolidating and boosting European excellence in BNCI systems engineering and in combination of advanced micro-bio-nano technology, neuroscience and bio-psychosociology.	Starlab has experts in micro-bio-nano technology, who will lead WP2, which is devoted to new sensors for BNCI research. TUG and EPFL both have experts in neuroscience and bio-psychosociology, including the Coordinator, and all consortium partners have experts in BNCI systems engineering. This knowledge will be leveraged to identify and consolidate key stakeholders and both academic and commercial research directions, boosting excellence in these fields.

(Source: Description of Work)

IV. Address of the project public website

The public project website is www.future-bnci.org. It includes contact information for the partners.