



Introducing a vocal and tactile maritime navigation software for blind sailors

In 1983 H. Decker, alone on board his sailboat "Dark Star", arrived in San Francisco having traveled from Hawaii (1800 nautical miles). Nothing about this seems extraordinary, except that this guy had been totally blind since 1982! The sailor used tactile maps, a Braille compass and vocal computer to inform him of his position.

Many instances show that blind people enjoy sailing. Bruno, a blind French sailor says he likes the liberty that the wideness of the maritime ways provide. Not a lot of blind sailors want to navigate alone though... we understand that it can be frightening. That is why the Orion association, in Brest (France), permits blind people to find a place in a crew.

They can helm the boat and rule the sails, because they are able to sense and feel the wind. They also realize the benefits of cartographic navigation in using both paper tactile maps and vocal synthesis software connected to GPS.

This latest technology allows them to ask for different pieces of information from the desk: bearing, speed, bearing for waypoint, left

distance to reach the way point, and coordinate position.

However, blind sailors have difficulties knowing where they really are, because they have to rely too heavily on geometric information to report their position on the paper map.

Another inconvenience about this system is that it is not possible to include every piece of maritime information on a tactile paper map. For instance, the depth is much too complex and cannot be represented on the map alongside buoys, coastlines, rocks, etc...

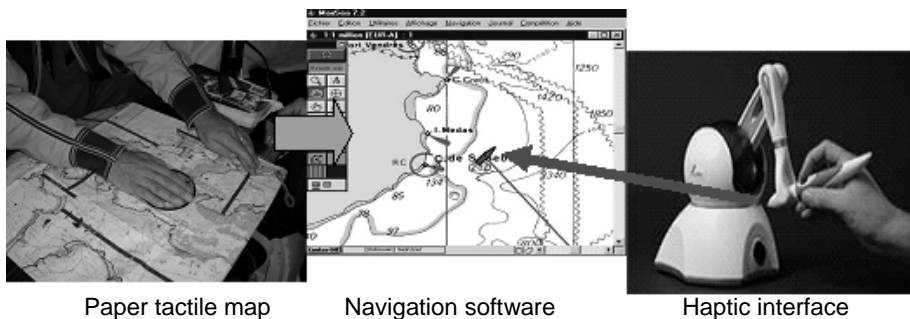
Since the end of 2004, my doctoral thesis in psychology taking place in the *European Center for Virtual Reality (CERV)* in Brest with the participation of *CECIAA* enterprise has been about spatial representation amongst blind sailors.

The project consists of working with informatics technicians in order to develop vocal and tactile maritime navigation software connected to GPS. This should permit blind people to set the ship itineraries and control it during voyages. In order to do that, we use a force

feedback haptic interface, the PHANTOM Omni from *SensAble* (see picture).

Next summer, experimentation will begin. Blind people will explore a virtual map of “the rade of Brest” by touch. The main purpose is to find how to represent the different elements of navigation charts most intuitively.

Eventually both sighted and blind people will be able to dream together about feeling the streams’ flow, the movements caused by the swell, and one day perhaps in this virtual environment we will all be able to touch a shoal of fish swimming sixty feet under the boat!



Paper tactile map

Navigation software

Haptic interface

The touch of the sea will be soft and sliding, the earth will be rough and high, the sailboat will be a mobile triangle, the depth will speak when you click on it, etc... Only blind sailors can tell us what works and what does not.

If anyone would like to hear more about my work or think they could contribute by offering advice, please contact me at the email address below

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The FORCE Foundation

An appeal from Holland for help and information

Based in The Hague, The Netherlands, the FORCE Foundation was founded in 1998 with the purpose of supporting libraries and resource centres for the print disabled in developing countries. Using funds raised in The Netherlands, Germany and the UK, projects are carried out in

South East Asia, Latin America, Africa and the former Soviet Union.

Where there are existing library infrastructures, FORCE assists them to make the library facilities accessible to visually and print impaired readers through the provision of

production facilities for alternative format books. In addition CCTV and text to speech equipment can make most books accessible. But in countries where there are few public libraries the concentration has to be on education.

The less developed countries have few special schools and in many cases the production of educational materials has relied on a small number of Braille typewriters. The FORCE Foundation has been able to supply training and equipment to set up Braille production units in many countries.

Because many of these countries have been limited to the production of accessible text, students have been restricted in the subjects they can study. The introduction of computers and Braille presses have revolutionised the supply of learning materials in such developing countries and it has been possible to introduce scientific and mathematical Braille. This requires the training of transcribers, teachers and learners in the special codes and takes time.

But these schools have little or no access to anything graphical or pictorial. It does not take much imagination to understand how much of modern textbooks are still inaccessible to visually impaired readers. They have no expensive technology, they cannot afford special capsule-papers and frequently

they have no reliable electricity. Even where they have Internet the connections are often so fragile that downloading documents or images is not practical.

The problem facing these special schools is how to make tactile maps, mathematical and technical diagrams using only those materials that they would be likely to find locally. They have access to fabrics and plastics, string and rubber bands and the usual range of glues. What are needed are ideas.

The FORCE Foundation, which has already produced guidance materials on making tactile materials for young blind children, is proposing a publication on tactile diagrams schools in developing countries. Anyone with ideas on ways of using available materials to make such learning materials is invited to send a description (and a photograph if possible) to FORCE where it might be included in the electronic publication which will be available free to everyone.

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Guidelines for tactile graphics: *in development*

Lucia Hasty alerts us to a forthcoming useful resource

Through a joint project, Braille Authority of North America (BANA) and Canadian Braille Authority (CBA) will soon publish official guidelines and standards for production of tactile graphics.

The document has been developed after extensive review of relevant research, including Graphics Research and Standards Project (GRASP) 2003, and a review of best practices used in production of tactile graphics in North America.

The *Guidelines* cover graphics for all subject areas typically included in curriculum for grades K-12. The current BANA official standard for math diagrams, *Guidelines for Mathematical Diagrams 1983*, has been incorporated and expanded in the new *Guidelines*.

The new *Guidelines* also includes over 40 examples of

tactile graphics produced in thermoform, capsule paper, and computer-designed and embossed production methods.

Highlights include Criteria for Production, Design Principles, Planning and Editing, Production Techniques, Format and Layout, Graphics Produced in Supplement form, and Proofreading.

The Appendix includes examples of braille fonts, standard keys for labels, texture palettes for computer graphics and other frequently requested information.

Watch this publication for more details and release date, projected for 2006.

For further information, contact Lucia Hasty, chair, BANA Technical Committee on Tactile Graphics.

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Shouldn't we be sharing?

A proposal for an international catalogue of tactile images

Though a wealth of high quality tactile diagrams, images and maps (and so on) is available, it often proves very difficult to find an apt tactile diagram if you need one!

The chance of success is biggest when you ask your own library or resource center for a certain illustration from a specific book. This often – if it exists – is retraceable.

But almost anything else is difficult to find. Where should you look for it? How? It has to be produced anew, which is very costly and time consuming.

Currently, our national library for the blind in The Netherlands is doing away with thousands of drawings. Some are older diagrams, that no longer meet modern standards. Many of them are illustrations from school-books that are not current any longer, others were diagrams

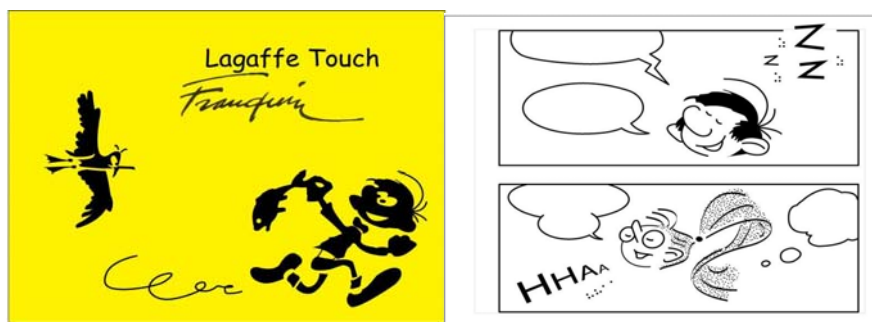
made for single use.

Shouldn't we think of:

1. Creating a database and a (fairly 'intelligent') search engine, that can find and select apt tactile diagrams you want for a specific target, age, situation?
2. Working towards a Europe wide catalogue of tactile educational material?
3. Working towards a way of producing books, diagrams and other materials, that allow easy translation? This can simply be done by separating the image and Braille (apart from single letters or numbers to refer to explanation if necessary)?

This way we can do so much more with the money and time available. Anyone with questions or ideas - please share them!

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A nice example of point 3 is "Lagaffe Touch" : 1 tactile book with an audio-cd per language (now French, English and Dutch) explaining comics and picture language to the blind; and many drawings made for T3.

What's Going On (2): Tactile Activity- Country Reports (N-Z)

Updates from the following countries summarise participant reports delivered at the meeting of the commission held at ICC2005 A Coruña, Spain. If you have more recent or additional information about what is going on in your country, or if your country does not appear here and you have something to report, please supply Jonathan Rowell with an update and your news will appear in a forthcoming issue.

Poland

Working in conjunction with the Polish Association for the Blind, Magdalena Polak, Izabella Krauze-Tomczyk & Justyna Karpinska (Head Office of Geodesy and Cartography, Poland) announced the publication of the School Atlas of Poland presented in the poster session at ICC2005.

In addition to generating maps with vector graphics, the use of colour makes the microcapsule paper atlas inclusive. At school blind and partially sighted students can use the atlas alongside their sighted friends. The atlas was subsequently placed 3rd in the Globes and Atlas category of the ICA Map Exhibition awards.

Current research activity centres on designing a tactile globe, and the group are about to embark on a new project producing a tactile street atlas of Warsaw.

Ewa Blum (Agricultural University of Wroclaw) reported that a project involving the substitution of tactile maps with sonic devices for visually impaired children was complete. Though not evaluated properly it will be included in an education programme in Poznan in the near future.

Spain

With over 20 years experience producing tactile graphics and

adapting books for readers with visual impairment, Fernando Garcia & Pedro Ruiz Prieto (ONCE) have recently begun a new tactile map project in Spain.

They hope to create an up-to-date geographic atlas of Europe; a development they anticipate will take about four years. Though this will be produced in tactile form, their intended use of both colour and large print should make it accessible to the largest number of possible users.

Physical and political tactile maps of the five continents will follow, and a more detailed atlas of Spain is also planned. The first stage of the process has involved a period of preparation, searching for relevant references to make sure the atlas is designed properly. In adopting such an approach Spain leads by example.

Sweden

Gunnar Jansson (Uppsala University) did not feel in a position to report recent activity in Sweden. However he did make one of the more telling remarks at the ICA commission meeting, and one from which we could all learn.

GJ advised people not to reinvent the wheel each time they come to produce new tactile maps, but recommended that they refer to the work of their predecessors in

this field.

Both Polly Edman and Yvonne Eriksson (also from Sweden) for example, have drawn on extensive experience to publish research that should inform the process of tactile design wherever it's undertaken.

Turkey

According to Servet Ozagac (General Command of Mapping Turkey) the tactile maps of Turkey on display in the map exhibition are the only ones that the country has produced thus far. However given their design used an innovative computerized method combined with GIS, described in his presentation at the ICC2005, many more tactile maps are expected to appear in future.

UK

Chris Perkins (University of Manchester) explained his interest remained one that addressed the social context of mapping, particularly the role of the user in the cartographic process.

His interest reflects important developments in ICA at A Coruña where there was renewed interest in map use. A new working group on map use and user issues was tentatively named and established at conference.

Though conceived as a group that will look at overall issues relating to map use, as a commission we have the ability to influence and make major contributions to this working group concerning the role of map use and the user as integral to the map making process. We might also consider providing useful input regarding

methodological approaches to measuring and evaluating map use.

Other UK news was previously reported in the Commission report that appeared in two slightly different versions in TacNews (4) June 2005, and the ICA Newsletter June 2005.

US

Matt Rice (UCSB) explained that he was aware of funded research projects in the US at University of California Santa Barbara (UCSB), and University of North Carolina investigating haptic devices and tactile maps.

As part of Haptic Soundscapes project, MR is involved in tactile cartography research evaluating force feedback technology using off the shelf devices. More information about this research can be found at : (<http://soundscapes.geog.ucsb.edu/>)

MR also brought the work of Joshua Miele at the Smith Kettlewell Institute for Eye Research in San Francisco, California to our attention.

For people interested in using new technologies to create tactile maps, JM has recently been promoting Tactile Map Automated Production (TMAP) using GIS to automatically generate raised-line street maps.

More details and examples of maps produced by this interesting project are available at (<http://www.ski.org/tmap/>).

The Braille Authority of North America & the Canadian Braille Association have recently been working on a joint project to produce tactile graphic guidelines

that they hope to release shortly (see p. 4).

Reg Golledge (RG) and Jim Marston (UCSB) have been working on combining GPS/GIS technology and auditory location beacons to improve wayfinding for blind and partially sighted people.

Reg Golledge is now on a 4th/5th revision of a personal guidance system providing mobility information through headphones. MR recommended visiting the web page of RG (Research Unit of Spatial Cognition and Choice) to catch up with the latest developments.

(<http://soundscapes.geog.ucsb.edu/ruscc/ruscc.htm>)

Amy Lobben (University of Oregon) added she has recently received significant funding from National Science Foundation (NSF) for major projects involving tactile map users. Amongst other things AL will address the needs of tactile mapmakers and the use of FMRI.

Comment on activity:

In the context of current tactile activity two themes are immediately identifiable. The first with its origins firmly though not exclusively in North America, is the need to look at the provision of spatial information for visually impaired people in a many faceted way.

Tactile maps though potentially valuable tools when used independently are not the only method available for accessing graphic material. Indeed conventional tactile maps would be

better served if used in conjunction with other multimodal devices that provide alternative sensory inputs.

The thinking here is that an approach that combines methods, is more likely to help user's build a complete picture of different environments. Particularly when you consider the numbers of people whom for whatever reason, are not map literate.

The second theme is not entirely unrelated. In some European countries a trend towards inclusiveness is beginning to emerge. Here people are encouraged to use all possible senses to gather spatial information, though via a different set of processes to those in North America.

Evidence of the use of colour in both Poland and Spain suggests that focus now seems set on designing maps that can be used by people who are both partially sighted, making use of any residual vision that might exist, and blind.

As we know that a majority of potential tactile map-readers never intend to use them for independent travel purposes (1), using a graphic that can also be visualized, means the tactile map experience can be shared with sighted companions.

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(1) Jonathan Rowell & Simon Ungar (2005). *Feeling our way: tactile map user requirements- a survey*. *Proceedings of the XXII International Cartographic Conference, A Coruña, Spain*

Editors note - This truly international edition has returned to the original 8 page format to make production more manageable. As a result, the contents list has been omitted and the font on pages 6-8 has been reduced in order to include as wide a variety of articles as possible. We hope this doesn't spoil your enjoyment of TacNews.