

## **Title of Presentation**

Conference Navigation and Communication Assistant for the Deafblind  
based on Tactile and Acoustically Amplified Augmented Map Information  
for the 14th Deafblind International World Conference

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## **Description**

We have developed a portable electronic navigation assistant for the deafblind that facilitates independent navigation even in new and complex environments, such as large conference sites. The device includes a keyboard, loudspeaker and small Braille display, allowing deafblind users to communicate with anyone capable of typing.

## **Augmented Map Information**

Our system is based upon maps that incorporate architectural objects like rooms, doors, elevators and stairways [2]. These maps are further enhanced with information about lecture halls, exhibit booths, and conference schedules.

## **Working the System**

Navigation and communication result from the integration of several component parts. We utilize a lightweight, ultra-mobile PC with a touch screen and an additional layer of tactful orientation strips. Connected to this computer are a GPS and a 3D inertial sensor, affording precise navigation of up to one step accuracy, even in the absence of GPS signals. A map of the area around the user's current position is displayed on the touch screen. By tapping on the screen, users receive localization data, such as room number, as well as other pertinent information. Descriptions of nearby architectural objects, such as intersections and restrooms, and warnings about potential hazards are provided acoustically or over a small Braille display. Searches for specific rooms or specific related information can be accomplished using either a conventional or a small Braille keyboard. Two different navigation modes are possible: one is for real tracking, the other for virtual explorations.

## **Use as Communication Aid**

Conversation partners can use the conventional keyboard to communicate with sensory impaired users, since text information can be transmitted acoustically, visually, or on the Braille display.

## **Towards an International Navigation Network for the Sensory Handicapped**

With navigation devices such as the one presented here, it is possible to envision a worldwide navigation system for the blind and deafblind. This goal depends upon the mutual efforts of groups and individuals committed to completing the necessary extensive mapping, updating existing maps, augmenting maps with information such as public transportation schedules, restaurant menus, store directories, etc., optimizing map formats so that future changes can be easily recorded, and establishing a network of map servers to coordinate all this information.

Obviously, this project will need the help of sponsors to cover the significant costs. To organize and coordinate the efforts of interested groups and individuals, Blindnavigation International, a non-profit organization has been founded [1]. In time it is hoped that these systems will also be made available for people in developing countries.

## **Summary**

Our navigation and communication assistant for the deafblind is available for demonstration at the 14th Deafblind International World Conference, providing users with detailed and information-enhanced maps of the conference environment. Application of our device to this conference is only one example of how communication and navigation opportunities for deafblind users can be expanded to every area in the world where adequate mapping has been done.

## **References**

- [1] Blindnavigation International.  
<http://www.blindnavigationinternational.org>
- [2] Hub, A., Diepstraten, J., Ertl, T. Augmented Indoor Modeling for Navigation Support for the Blind. *In Conference Proceedings: CPSN'05 - The International Conference on Computers for People with Special Needs*, Las Vegas, NV, USA, 54-59, 2005.