Development of a Wearable Guide System for the Blind

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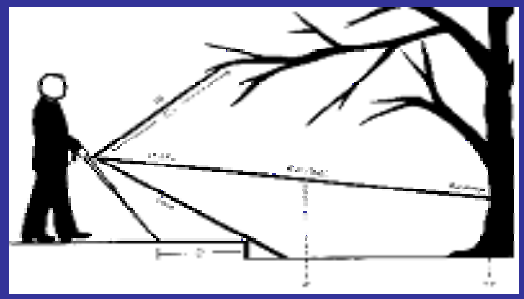
Assistive Devices for the Blind's Walking

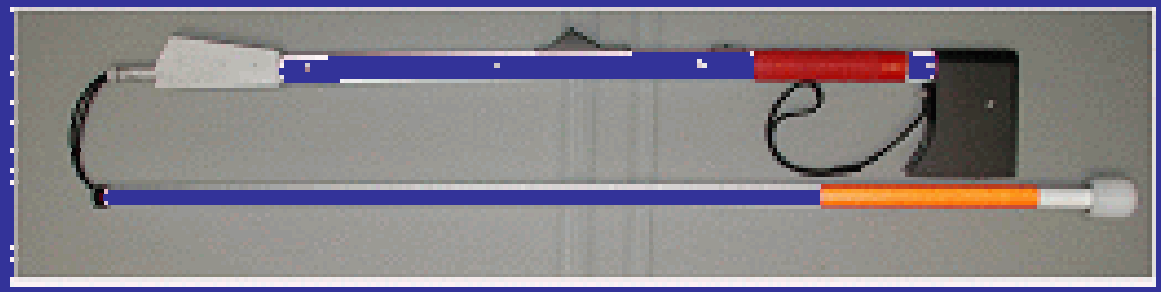
1) Whitecane

2) Guidedog

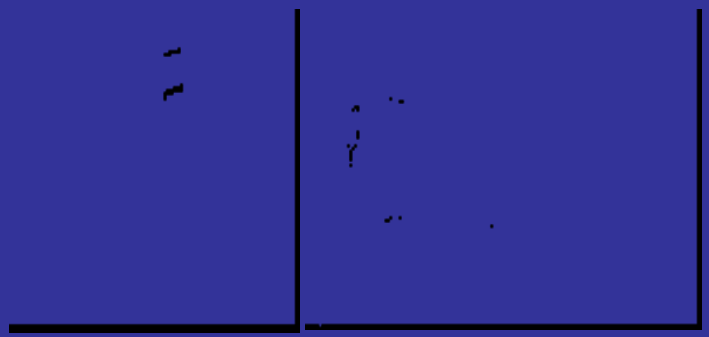
3) ETA (Electronic Travel Aid)

- Laser cane





- Mowat sensor



- SonicGuide & SonicVision

4) Guide Robot

- Meldog

- GuideCane

- NavBelt

Guiding robot

Use of the Assistive Device in Korea

- Hardly use the Electronic Devices

No information

Too expensive

Inconvenience

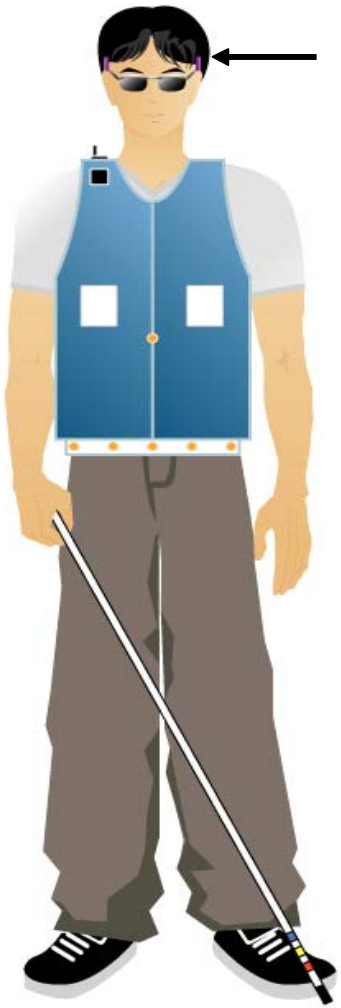
Very hard to be accustomed

Can’t hear the environmental sound

Requirements of the Walking Assistive Device

- Convenience
- Suitable cost
- Easy to be accustomed
- Can hear the other sound
- Cosmetic appearance

Propose a Wearable Guide System

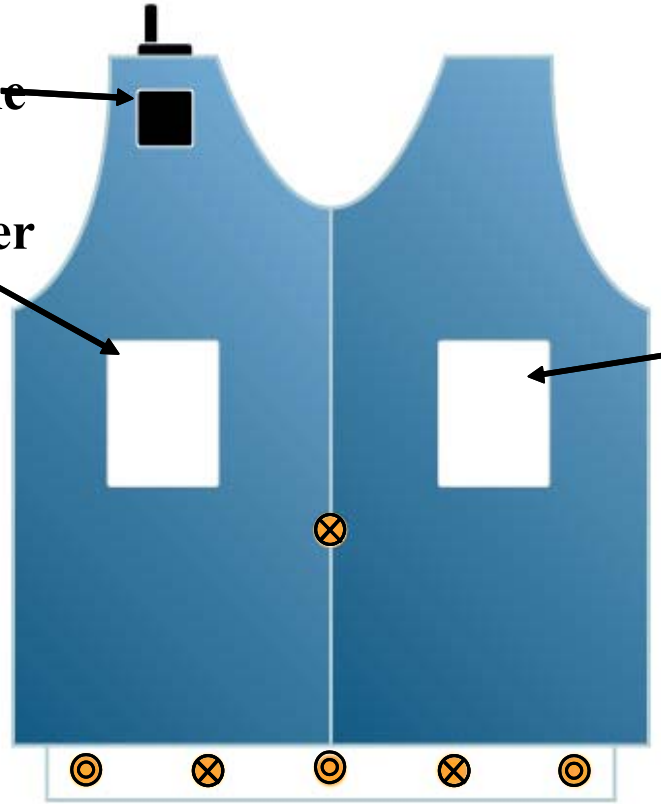


Bone stimulator

GPS Module

Main controller

PDA

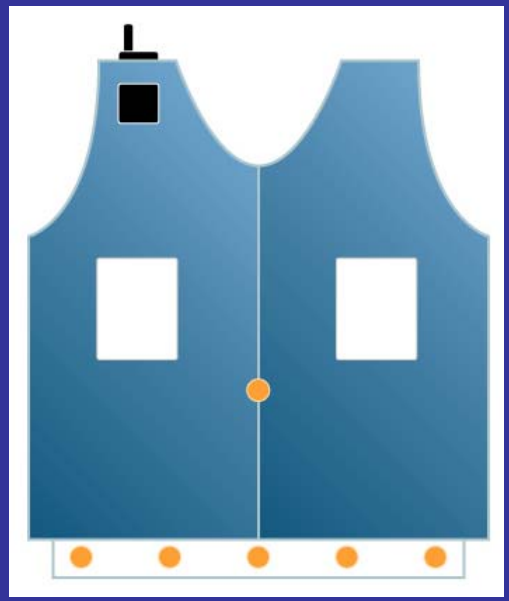


Ultrasonic Sensors

◎ : emitting

⊗ : receiving

System Composition

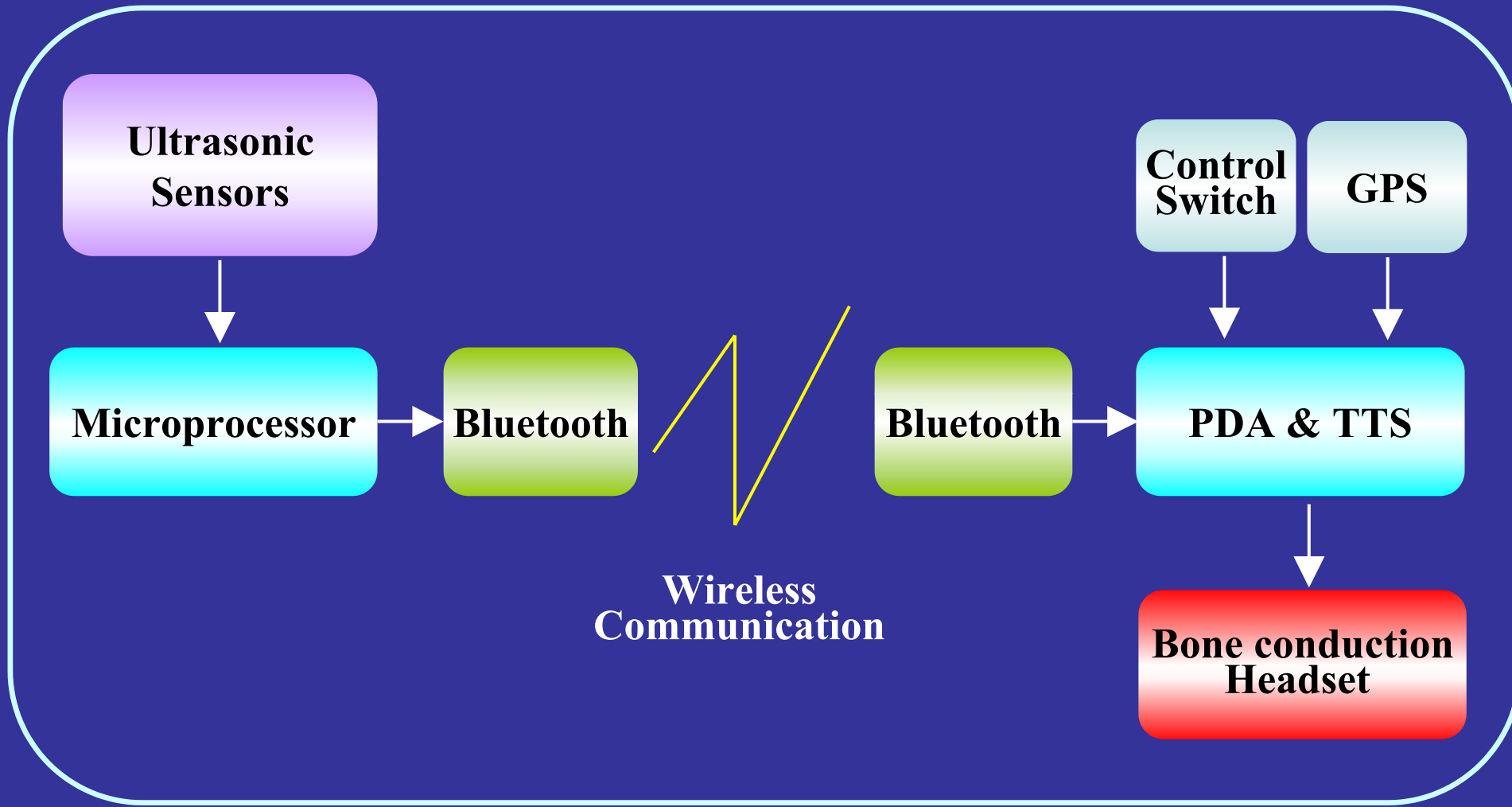


Ultrasonic obstacle detection & GPS

Bone conduction headphone

PDA

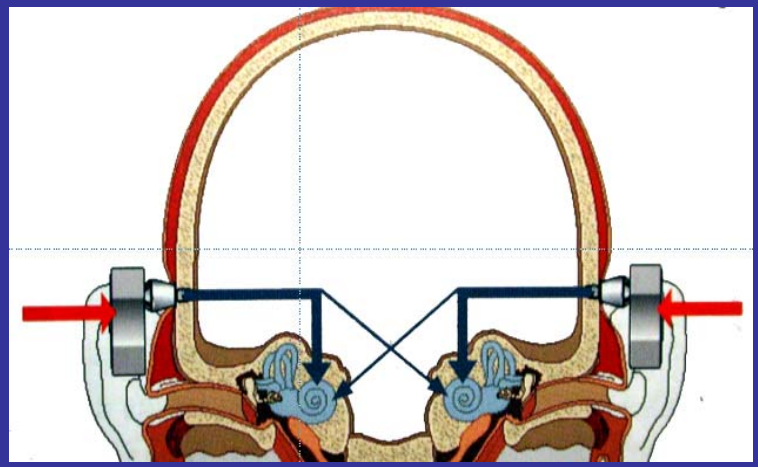
System Block diagram



Features of the Wearable Guide System

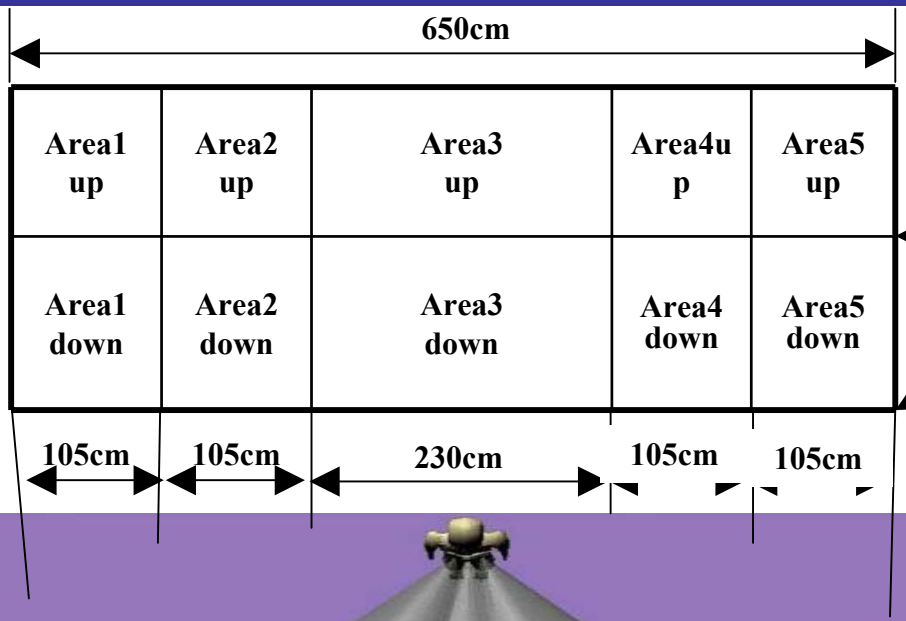
- Voice recognition & synthesis
- Bone conduction stimulation
- Ultrasonic obstacle detecting
- Beep sound warning & voice guide
- Hide the all components in the garment
- GPS

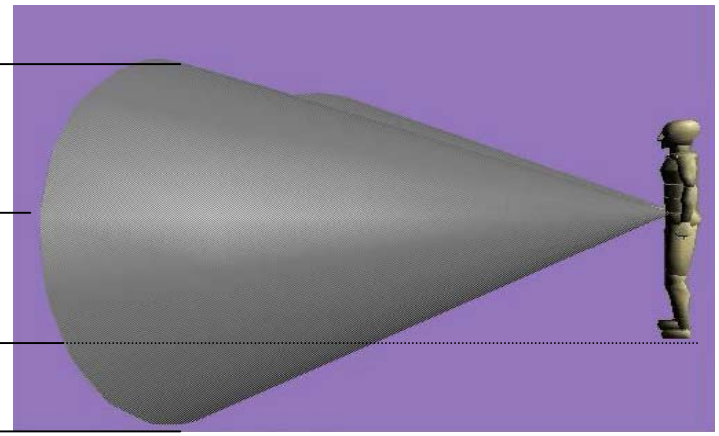
Stereo Bone Conduction Stimulation

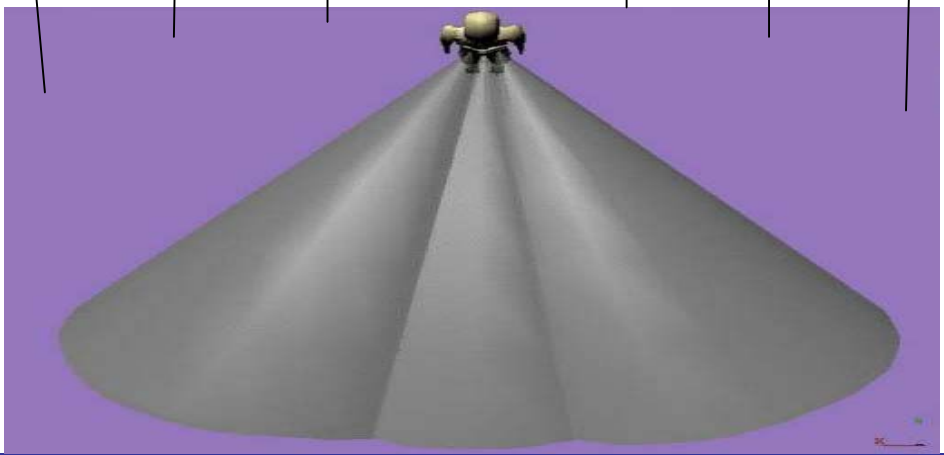


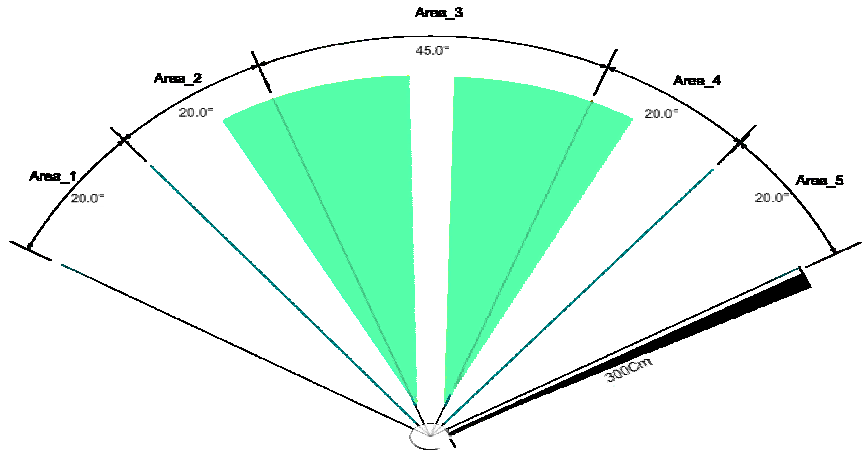
Stimulate the skull with bone vibrator
Remain the auditory canal open
Can hear both the alarm signal and the environmental sound

Ultrasonic Obstacle Detecting









User can control the detecting area

In case of indoor, only Area 3 is detected

Beep Sound Modulation

- Stimulation frequency by distance

  distance > 1.5m : 0.5 kHz

  distance < 1.5m : 1 kHz

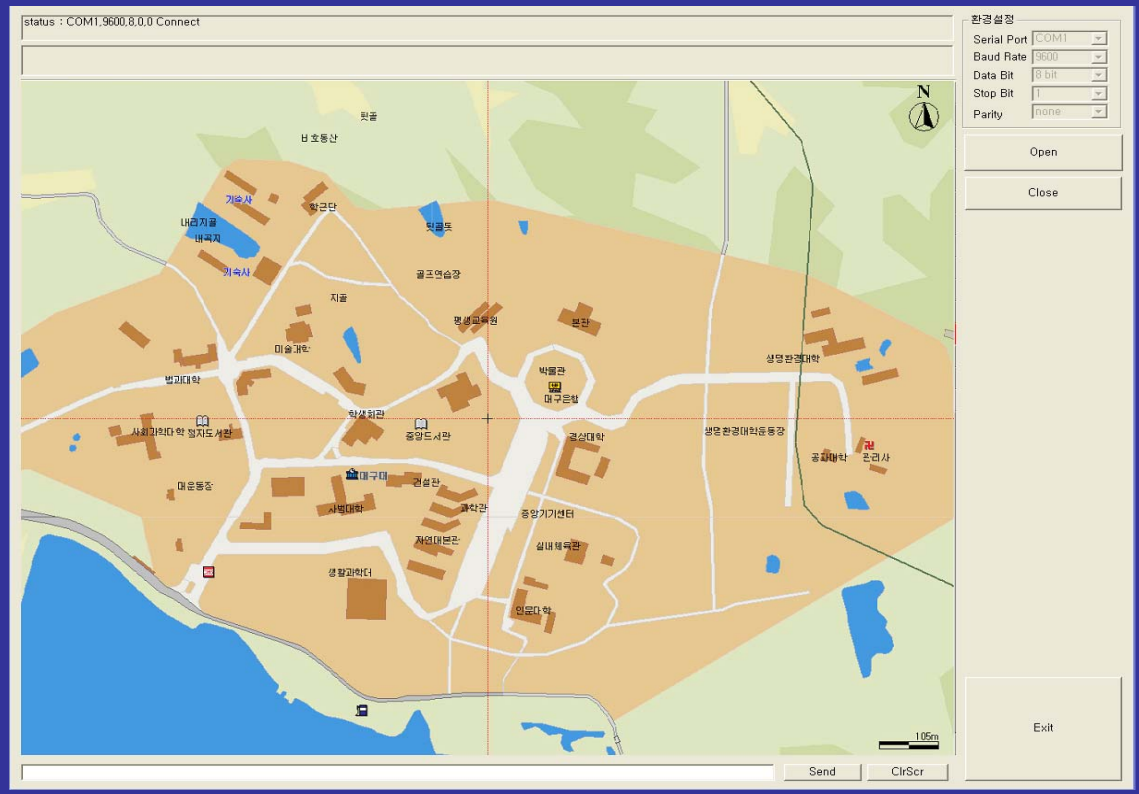
- Stimulation interval by height

  Height < 1m : 0.5sec

  Height > 1m : 0.2sec

- Stimulation intensity by direction (streo bone conduction sound)

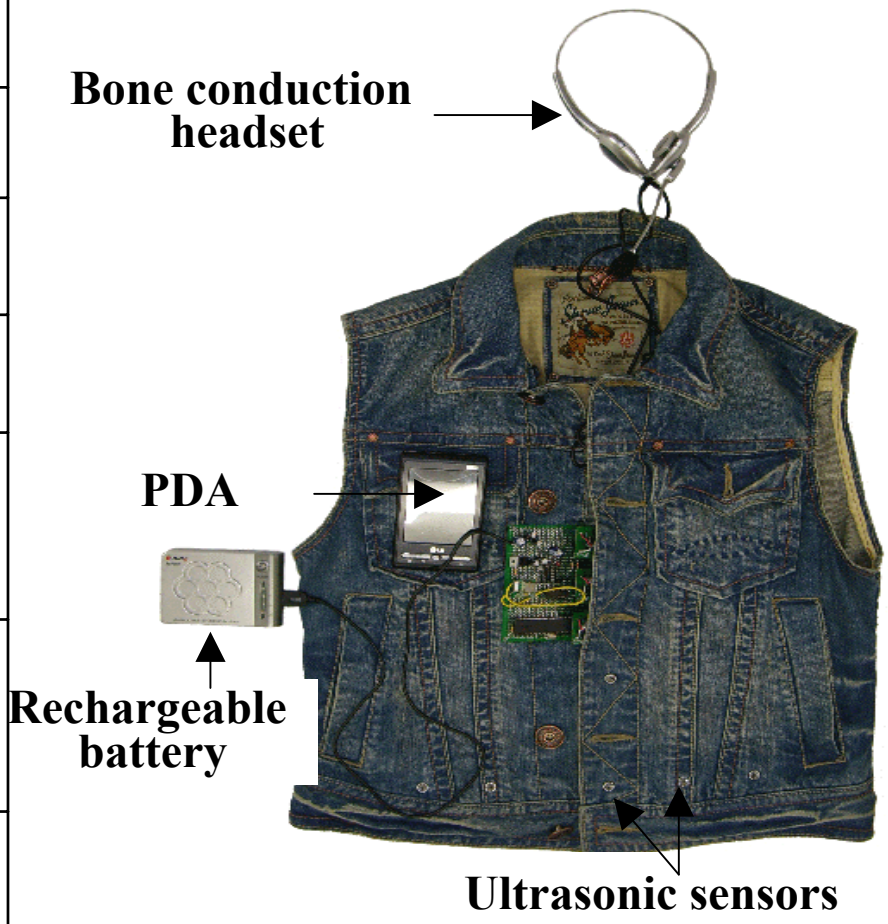
Guide Using GPS (under developing)



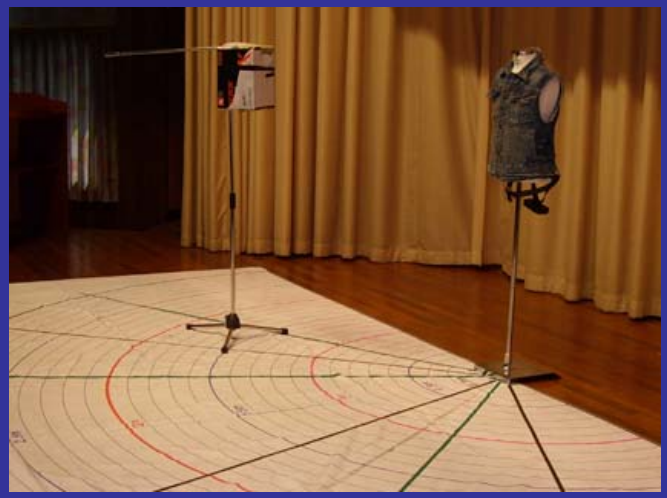
- **Current Status**
  - **Completed the campus map**
  - **Confirmation of location and direction**

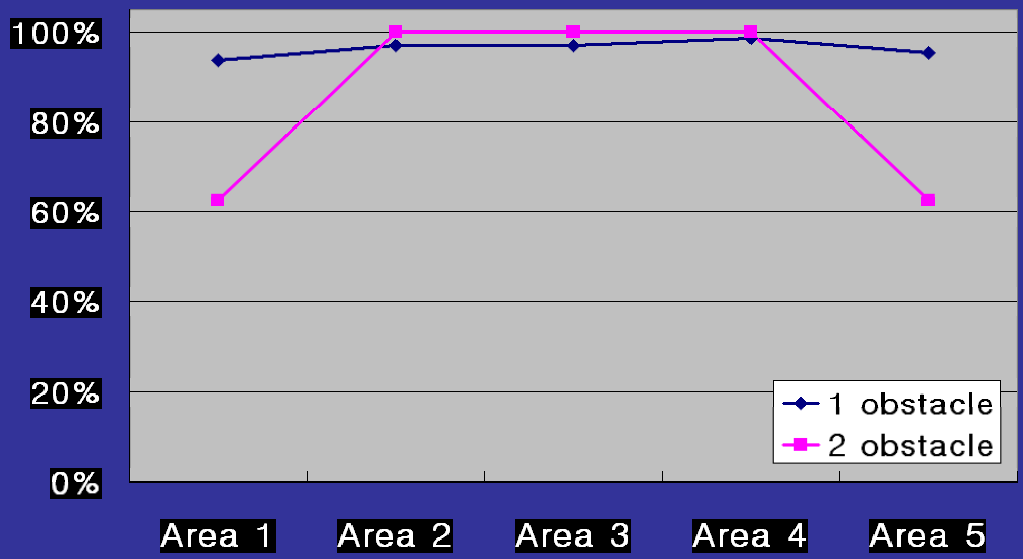
Implementation of a Vast Type Wearable Guide System

Detecting Range	Distance	300cm
	azimuth angle	125°
	Elevation angle	60°
Total weight	1.57kg (including a 800g vest)	
Current consumption	65mA	
battery	7.9Ah, 12V (Enin Universal Lithium Battery, LG)	
Continuous using time	147 Hour	



Obstacle Detecting Experiment





Road Test




Conclusion

Propose a Wearable Walking Guide System

- **Convenient due to voice ordering and guide**
- **Easy to be accustomed**
- **Can hear both the alarm and environmental sound**
- **Can hide the system in the garment**
- **Guide using GPS**

Development of a Wearable Guide System for the Blind

Thank you for your attention !!