CS-525V:
Building Effective
Virtual Worlds
Travel

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Overview

- **Travel**
  - Getting from one place to another

- **Wayfinding**
  - Means knowing
    - Your current location (here)
    - The location of your destination (there)
    - A (partial) route for getting there from here

- **These are related, but are really two large separate problems**

Travel: Key Research Problems

- ☐ Limited physical space, possibly infinite virtual space
  - ■ Think Holodeck

- ☐ Different types of travel
  - ■ Walking, running, turning, side stepping, back stepping, crawling, quick start/stop, ...

- ☐ Need to do other things while traveling
  - ■ Usually, travel is not the goal of your current task

- ☐ It is very easy to get (cognitively) lost in virtual reality

Support for General Walking

□ Multi-sensory cues
- Visual
- Auditory
- Tactile
- Kinesthetic
- Vestibular
- Cognitive

□ Each technique used for travel has more or less support for each of these
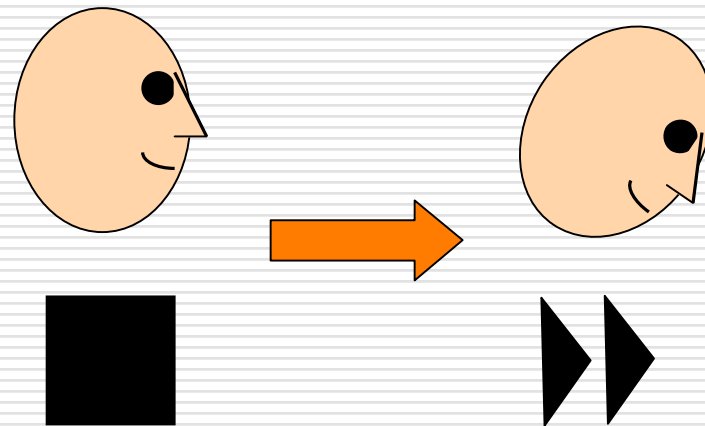
Overview of Travel Approaches

- ☐ Gestural
  - ■ Hand
  - ■ Head
  - ■ Foot (walking in place)
  - ■ Body (real walking, re-directed walking)
- ☐ Device
  - ■ Hand-held devices (joystick, gamepad, 2D mouse)
  - ■ Platforms
    - ☐ Passive (tilt, pressure, VirtuSphere)
    - ☐ Active (treadmills, steppers, CirculaFloor)

Gestures for Travel

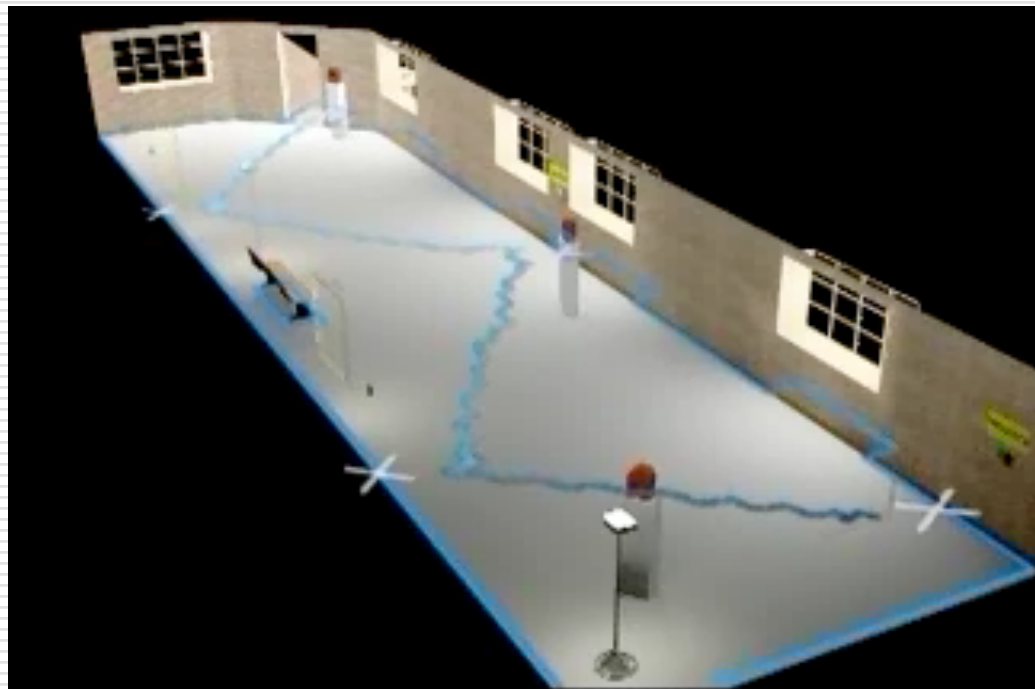□ Hand typically…
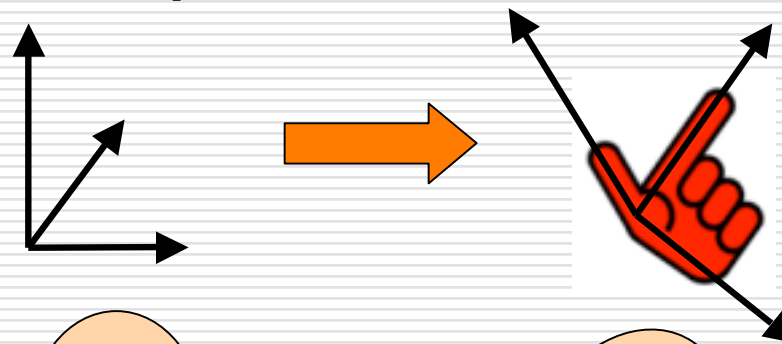
□ Head…

Gestures (cont.)

- ☐ Walking in place (Gaiter [Templeman])
  - ■ Forward/backward/side-step gestures
  - ■ Go prone, run, small real steps

Gestures (cont.)

☐ Redirected walking (UNC-CH)

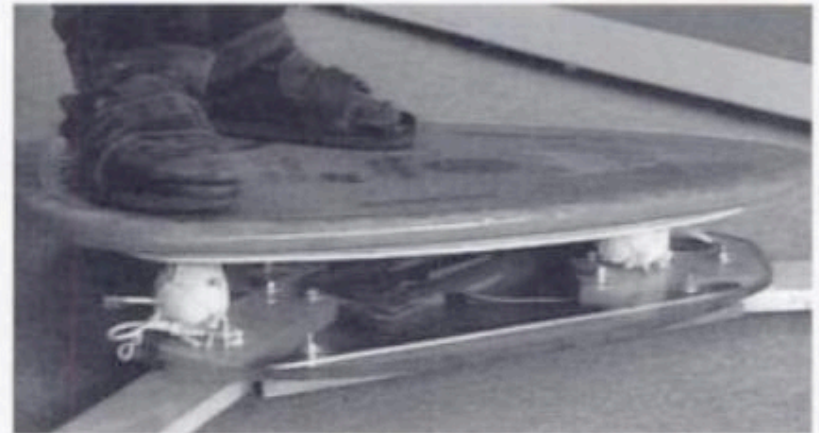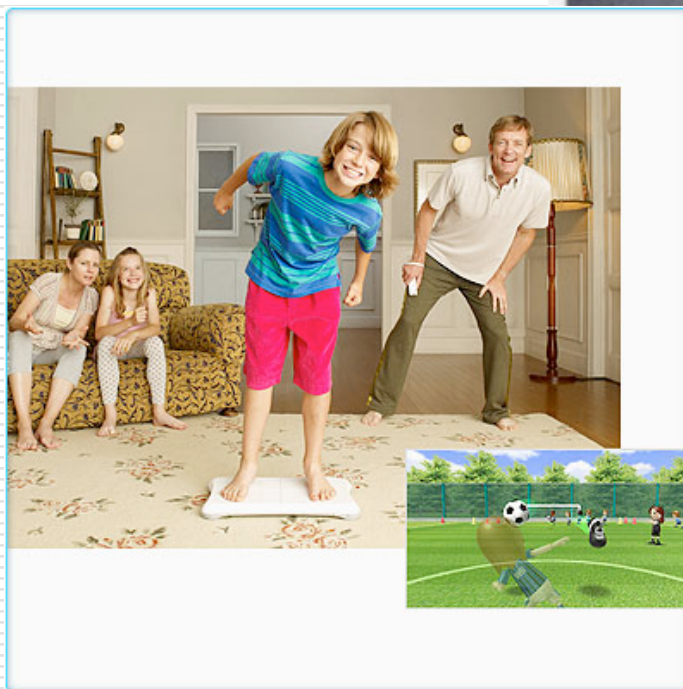(movie)

Devices

- Hand-held
  - Mouse, joystick, gamepad, Wiimote, etc.

Platforms

- ☐ Passive
  - ■ Tilt boards
  - ■ Wii Fit

Platforms (cont.)

☐ VirtuSphere

(movie)

Platforms (cont.)

☐ Virtual Perambulator (Iwata 1996)

(movie)

Platforms (cont.)

☐ Torus Treadmill
(Iwata 1999)

(movie)

Platforms (cont.)

- GaitMaster

(Iwata 2000)

Platforms (cont.)

☐ Powered Shoes
(Iwata 2006)

(movie)

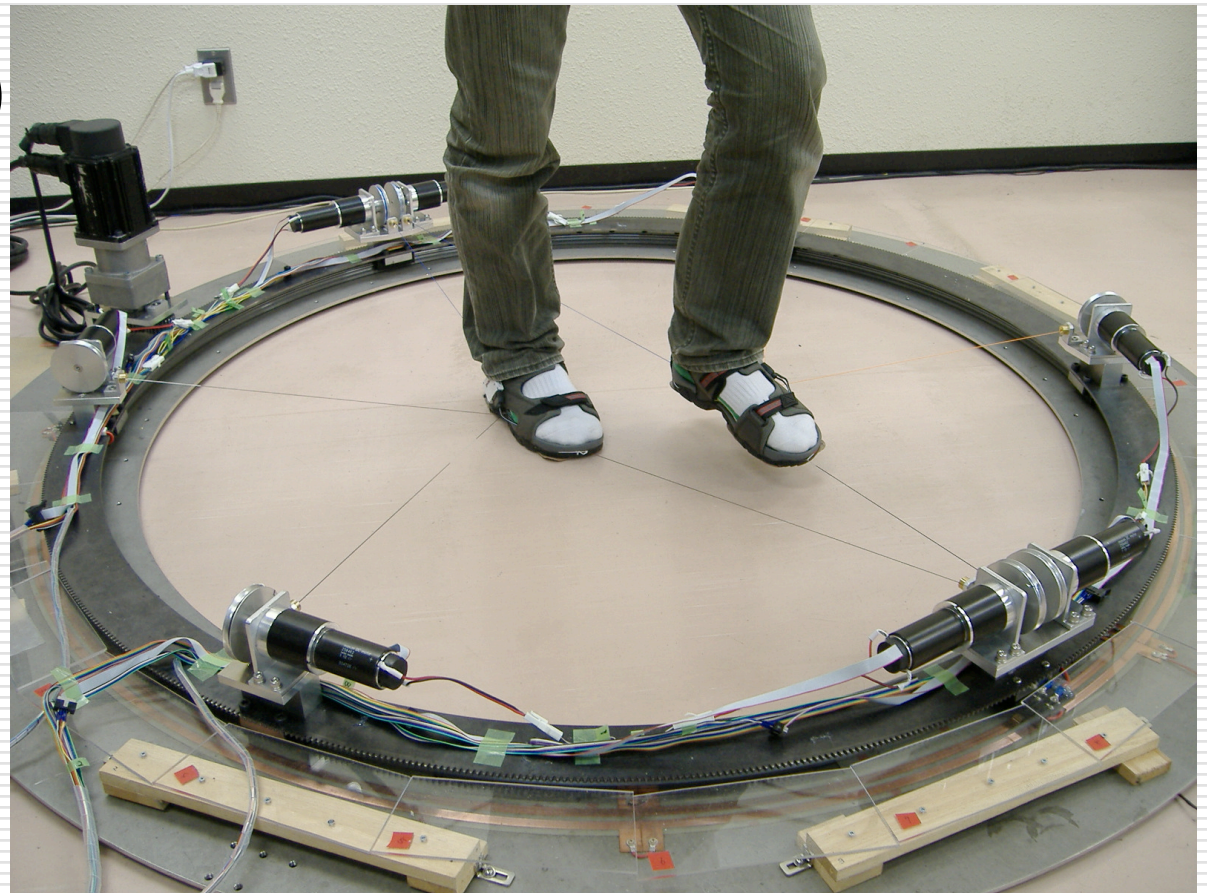# Platforms (cont.)

□ String Walker

(Iwata 2007)

(movie
was too
big!)

Platforms (cont.)

☐ CirculaFloor
(Iwata 2004)

(movie)