

Dangerous Idea: box
Safe Idea: cylinder
or
Wand = User Interface

Harry Potter's digital wand
Larry Rudolph

Good use for Boxes

- A box is a good shape for storage
 - people
 - shoes
 - circuit boards

Poor use for boxes

- hard to hold a box
- fingers like to curl

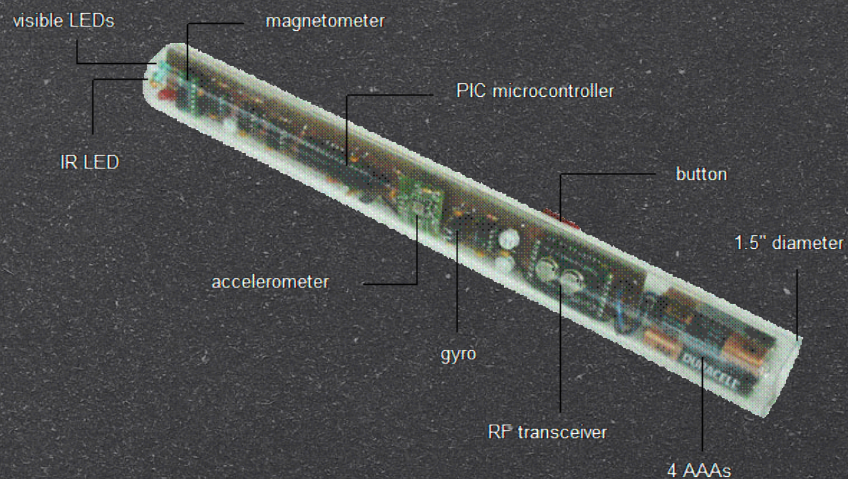
Mobile Device Form

- Wand, stick, staff, cylinder
 - Gandalf's Staff
 - Harry Potter's Wand
 - James Bond's Pen

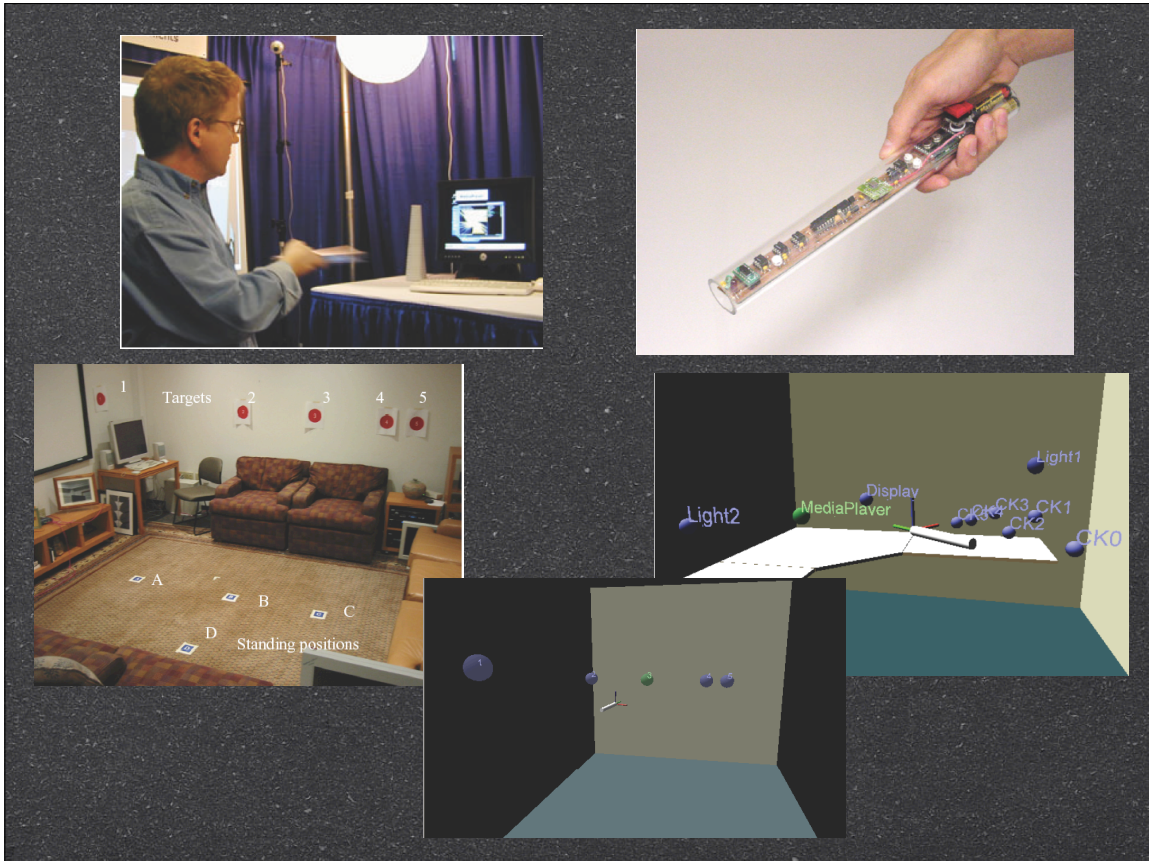
The computer science of Harry's wand

- Point it at something, then shout some Latin-like command
 - Location, Object, Speech recognition
 - camera, microphone, ghost sensors
- Torch, Zapping, Images
 - lasers and electricity

XWand



- Andrew Wilson (Microsoft Research)
- UI for Intelligent Spaces



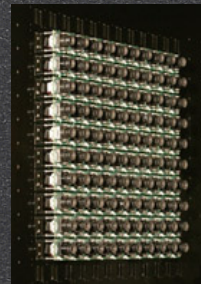
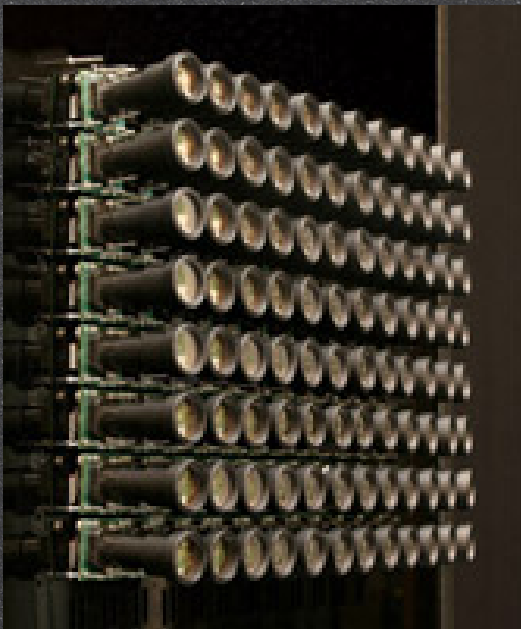
Critique of XWand

- Need to be in an immersive, instrumented space
- Does not work everywhere, e.g. on trains such as the “hogwarts express”
- Why not simply use a hand with better camera tracking algorithms?

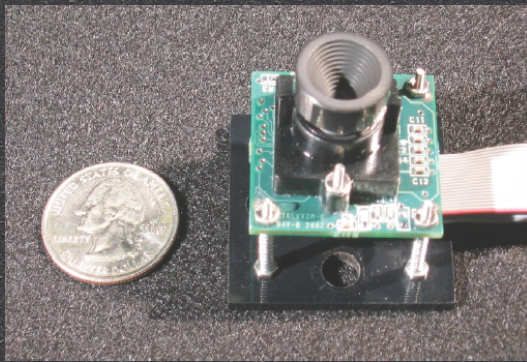
Bring your own environment

- Environment should have lots of
 - input sensors
 - output actuators
- Cylinders are nice form factors for arrays of sensors & actuators

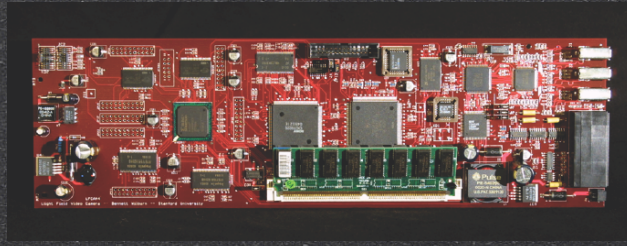
Camera Arrays



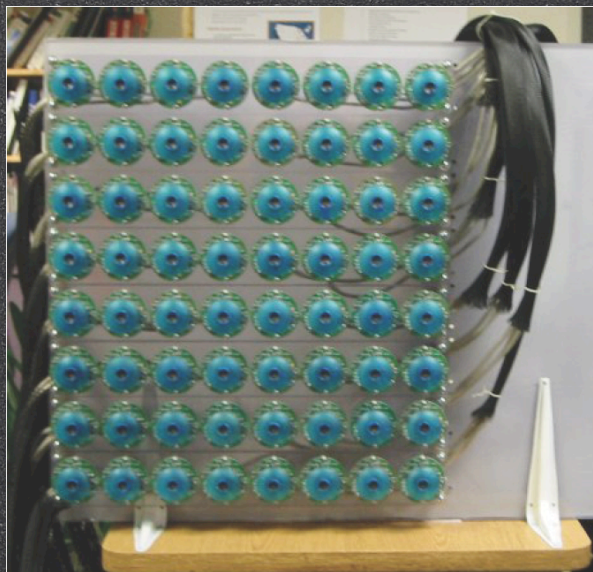
Camera Array



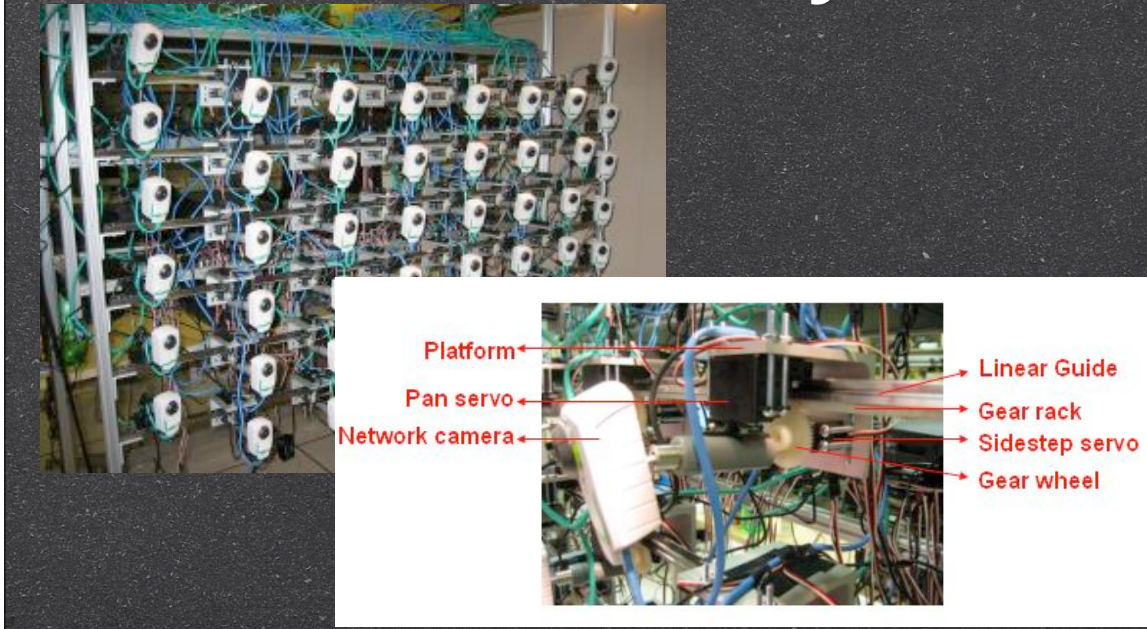
- Camera's are small, say 1 square inch
 - a dozen per foot
- Processing: if we wait .. will be ok



We have (had) one too



Self-reconfigurable Camera Array

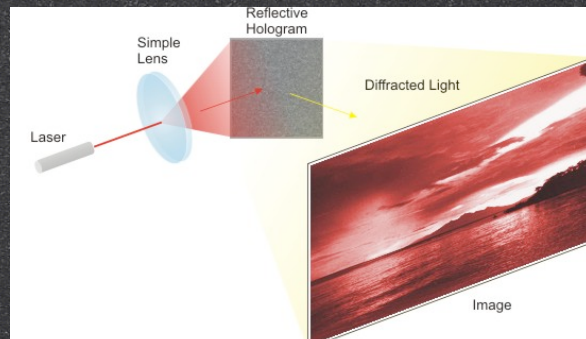
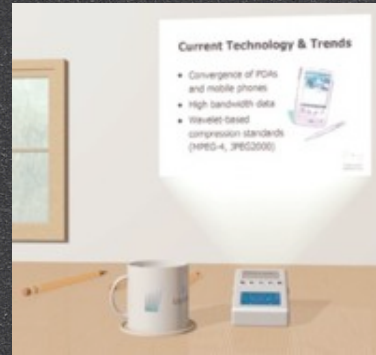


Array of projectors

- Need small ones
- Need ones with low power
- Lasers!

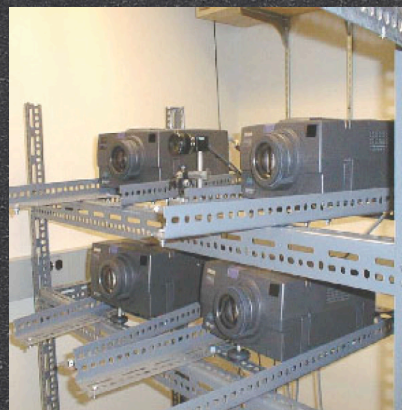
Display Holograms

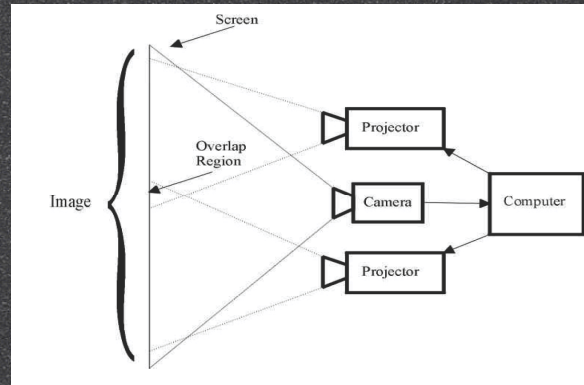
- Blue-Optics (start up)
- laser, lens, hologram on chip
- key insight, reduce noise variation, not noise
- array output?



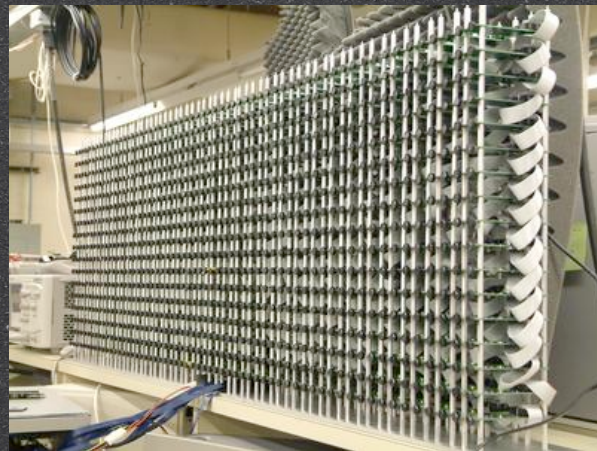
Scalable self-calibrating display technology for seamless large-scale displays

- MIT thesis by Rajeev Surati (under TK)
- Projector array
- Self-calibration via camera





Microphone Array



- < camera
- CSAIL & others
- Need fixed, large spacing
- Virtual microphone(s) placed anywhere

Speaker Array

- Virtual sound placed anywhere
- Many for personal use
 - home theater
- Yamaha (CES'05)
 - 42 speakers



Laser Array

- LIDAR (laser array accurately detect objects in front of autonomous car)
- Laser's within all pointing forward. Mirror deflects then outward -- hologram Lens have them all forward focused
- Parallel communication
 - My favorite: two ships passing at sea



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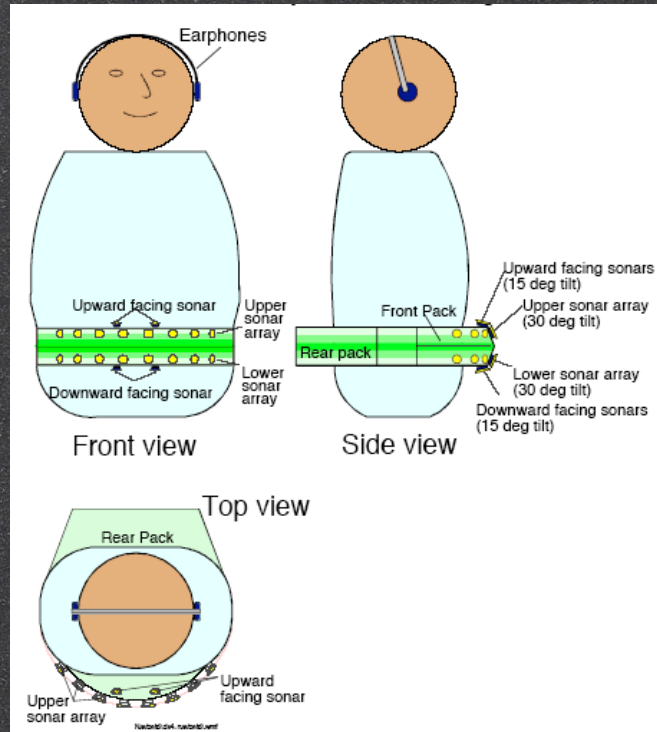
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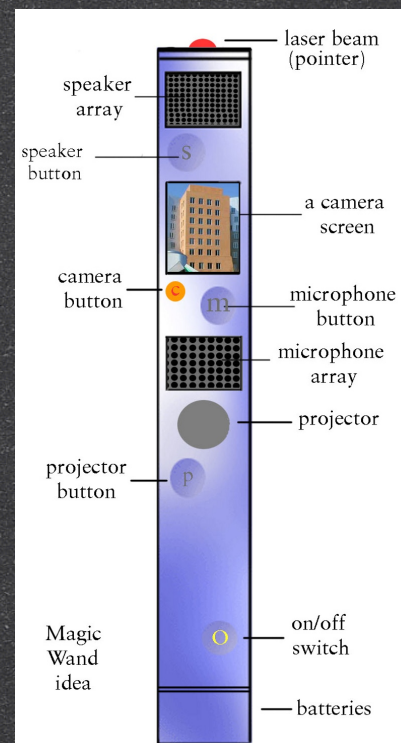
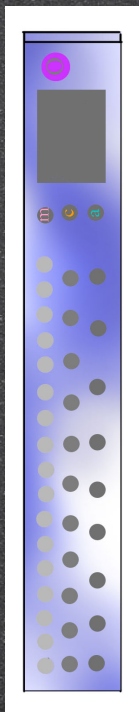
Sonar Array

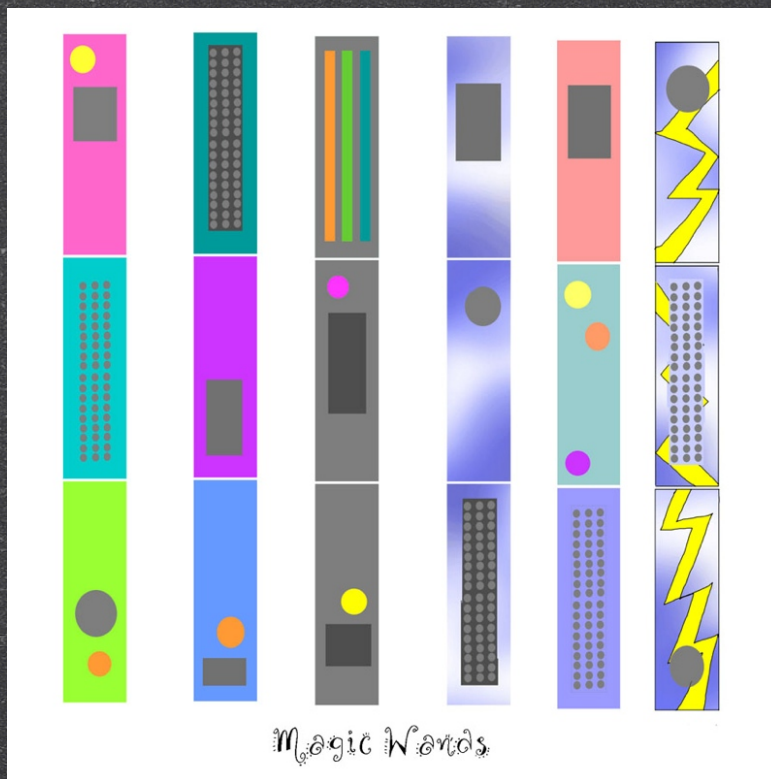
Multi-sensor travel aid for the blind (Borenstein)



Put it all together

Sally O'Lee's visualization initial view





If I had a cylinder,
I'd ...

- Talk long distances wirelessly
- Burn through walls with laser's
- Shock my enemies with static elect.
- Wave it around in a field to recharge
- Play DDR by opening it up & lay flat for 2-d array

Dimensions

- Size:
 - Pen (is there enough spread?)
 - Wand (will it get too hot?)
 - Staff (my choice; interleaved spiral arrays)

Discussion

- Please attack my 1/2 baked proposal
- Would like to form study group
 - array sizes (optimal numbers)
 - processing needs
 - heat & power requirements
 - can we build a prototype?
- Maybe transform mouses into mice?

tk's comments

- what about keyboard or buttons
- what about handwriting
- he wants a pen with ink, phone, buttons.