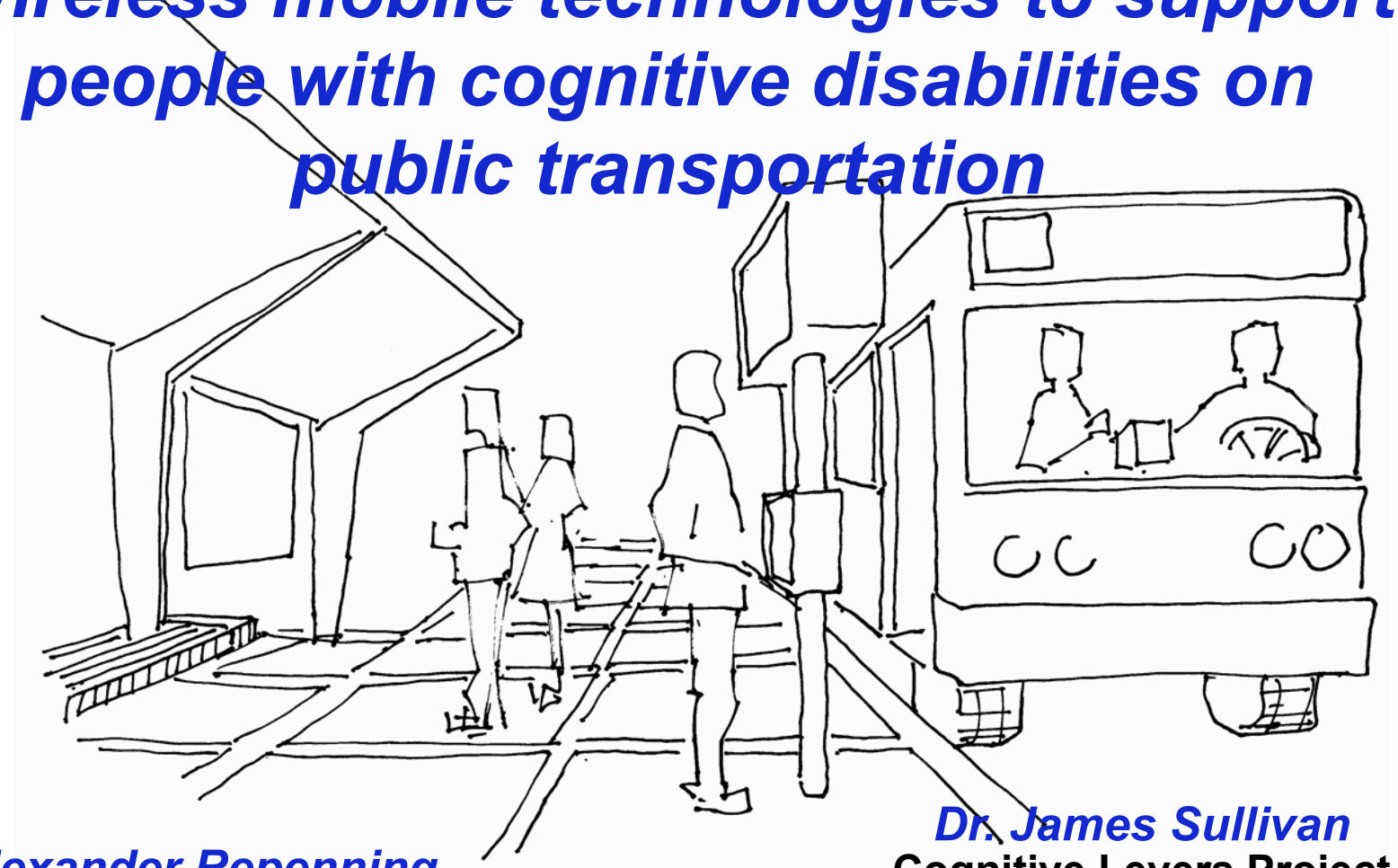
Wireless mobile technologies to support people with cognitive disabilities on public transportation



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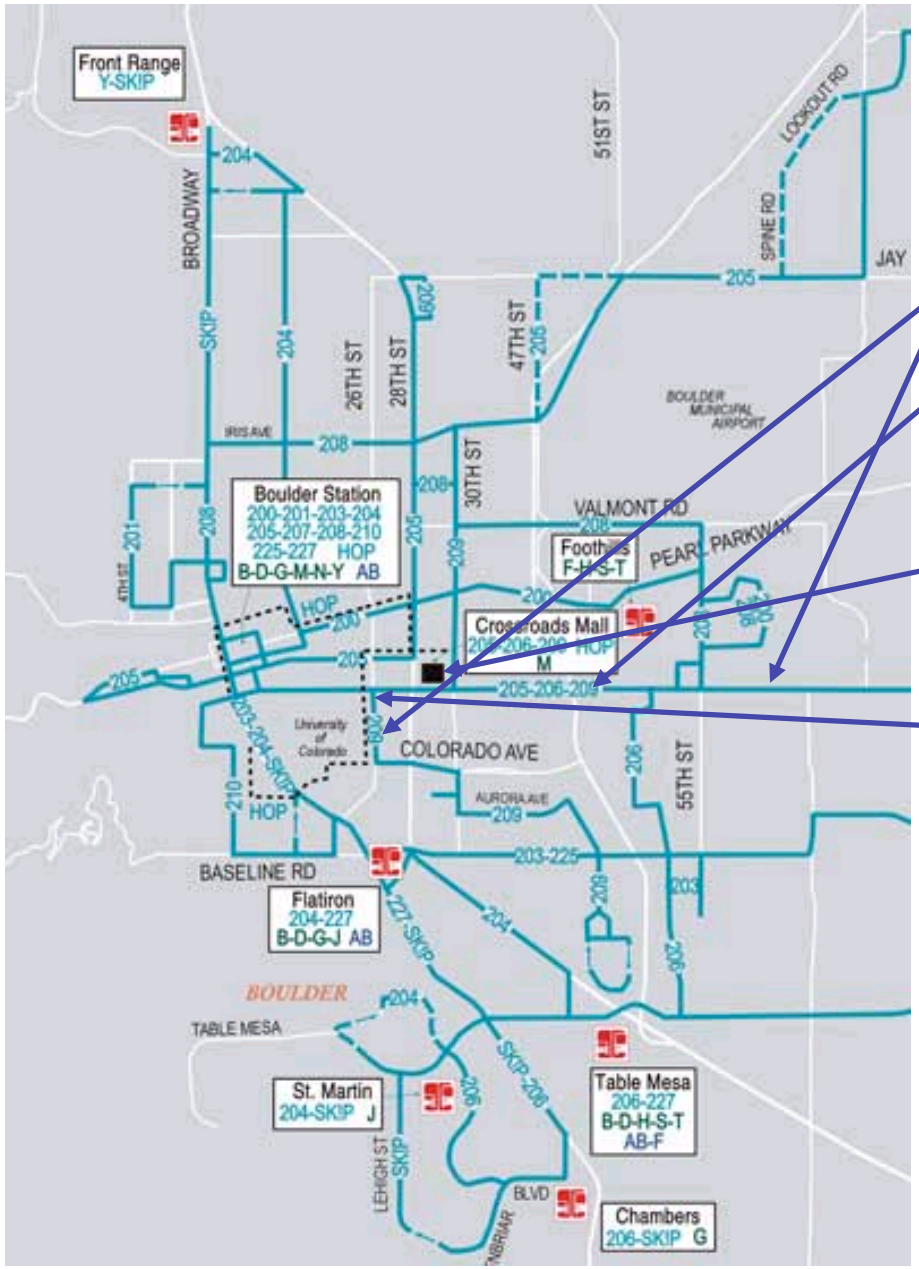
AgentSheets®

coleman institute
for Cognitive Disabilities
University of Colorado System

motivation

- 8% of US population is cognitively disabled
- over past 30 years: movement from institutions to communities
- public transportation:
  - key to mobility
  - independence

Old approach: "fit the user into the system"



"Here is your ***map*** ….

You live ***here*** …

Your destination is ***here*** …

Your bus will have this ***label***…

When you see this ***landmark***, remember to ***pull the cable*** on the bus so the driver knows you will get off at the next stop.

This is where you will ***get off***…

*Don't forget your **backpack**!*

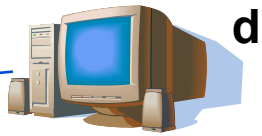
*OK, now let's talk about the **schedule** …. do you know how to read a **clock**? … "*

Mobile architecture

transportation systems

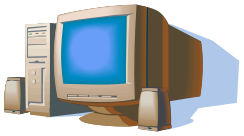
wireless networks

mobile internet



data servers

internet backbone



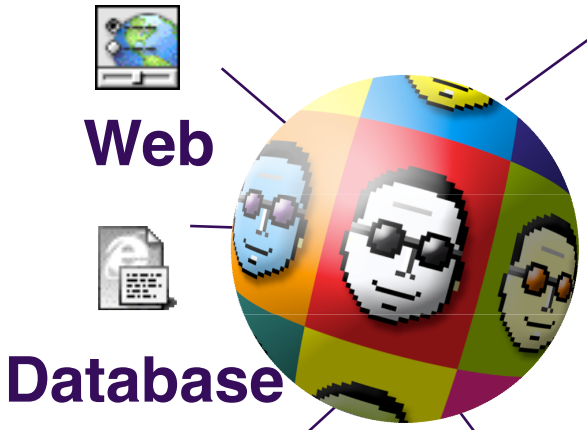
mobility agents

mobile users

support communities

agent-based wireless computing

Information in the world



Web

Database

Sensor (e.g,. GPS)

Keyboard

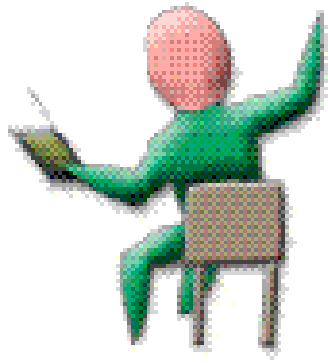
Mouse

Speech synthesis

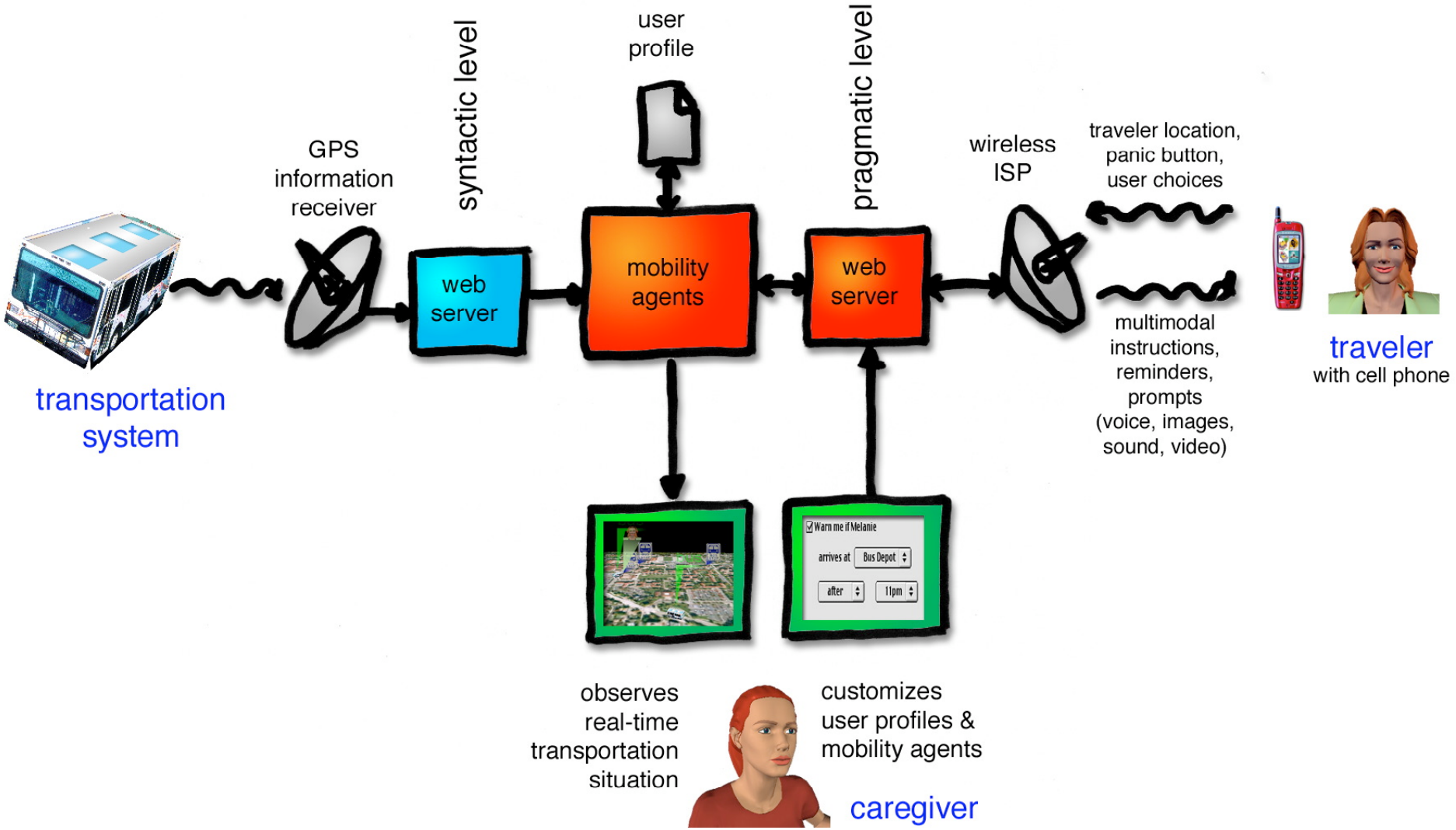
Sound

Speech recognition

PITA board`



mobility agent architecture



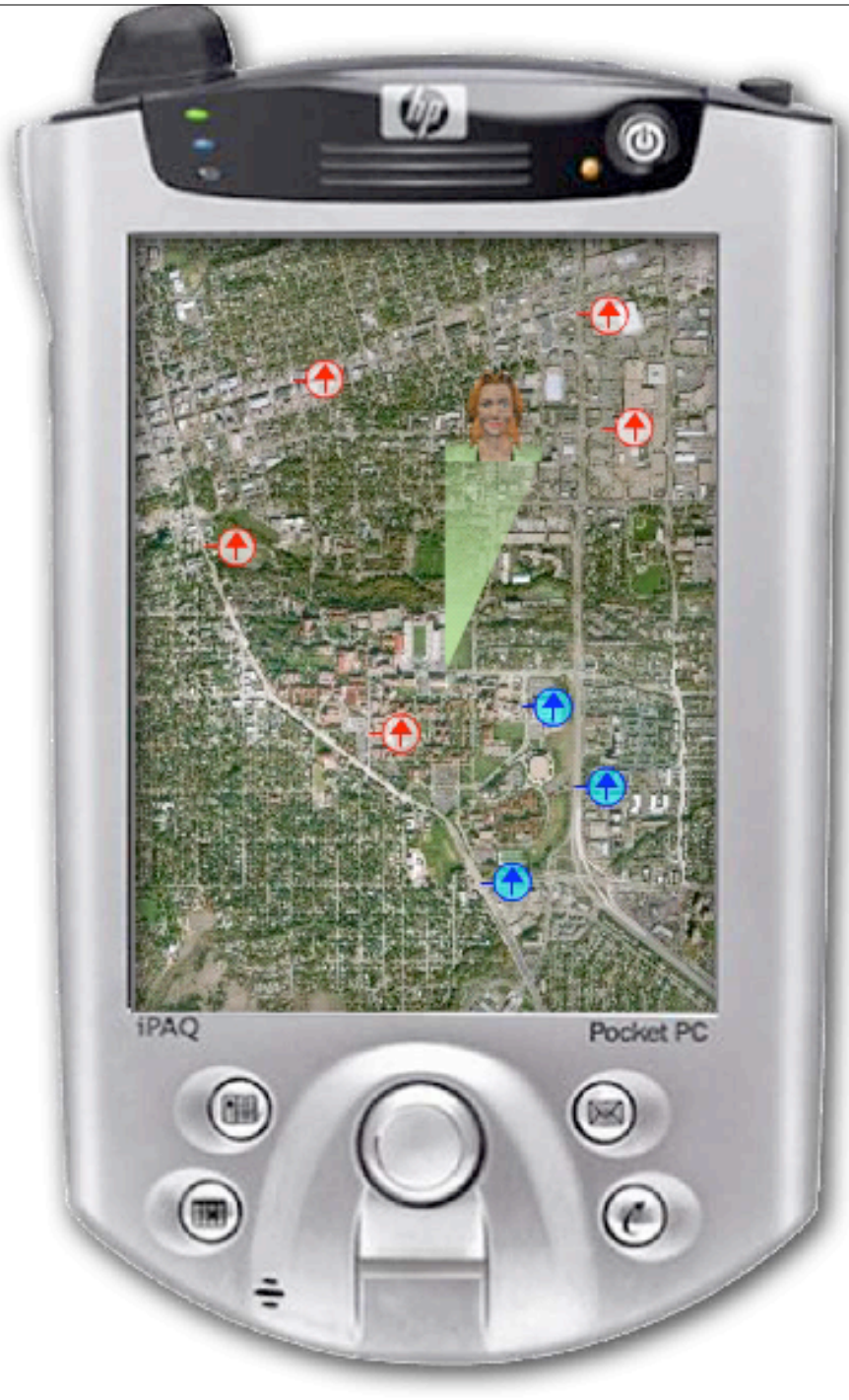
demo

research challenges

- ***Dealing with the Unknown Deductive Tracking***
  - ***technology does not always work (GPS not tracking, battery dead, network slow)***
  - ***=> sensor fusion*** **+** minimalist common sense Artificial Intelligence
- ***Challenge 2) Support Individuals Customization***
  - ***=>end user development***
- ***Challenge 3) Universal Access Hardware Incompatibilities***
  - ***=> Collaboration with Hardware Companies***
- ***Challenge 4) Absorbing Technological Change***
  - ***=>Flexible Architecture***
  - ***=> use portable technologies that can work one tomorrows platforms (cell phone, PDA, hand held game console)***

you are
waiting outside
for **your** bus...

your bus pulls
up and stops...



thank you

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demo: http://agentsheets.com/about_us/documents/mobility-agents.html

AgentSheets Info:
www.agentsheets.com

Thought Amplifier

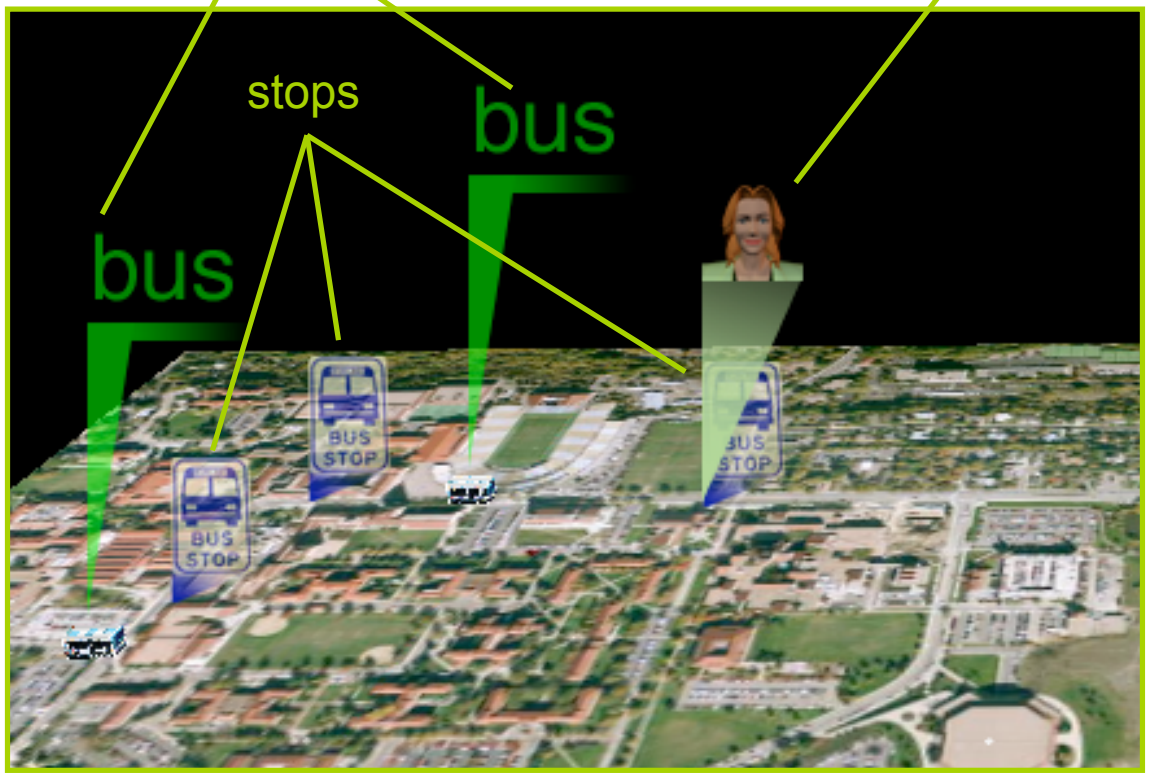
AgentSheets®

Mobility-for-All prototype components

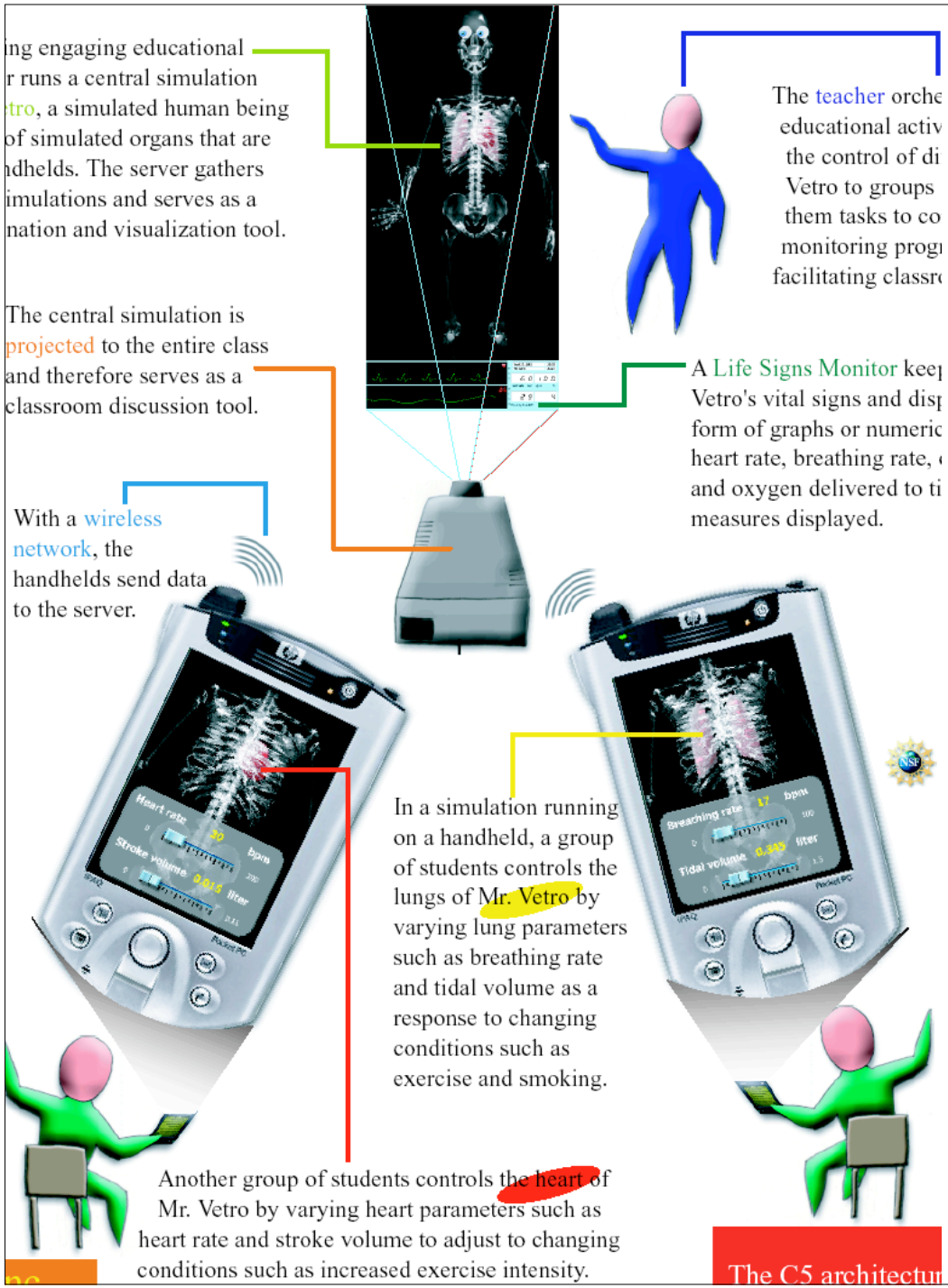
mobile prompting device

real-time tracked buses

simulated person



remote caregiver display



distributed simulation

immersion:
students + PDAs
become organs =>
role play to
experience
interacting
complex systems

MFA architecture

wireless networks

mobile internet

internet backbone

internet backbone

data servers

- telemetry data
- user profiles
- shared itineraries
- performance data
- user status

smart vehicle technologies

- GPS: telemetry data
- mobile wireless WAN and LANs
- I/O displays: support communications between operators and users

mobility agents

- sense location of users, buses, stops, destinations, etc.
- detect/compute global constraints and instructions
- "hand-off" data and instructions to mobile devices
- report performance data
- detect breakdowns → notify support community

mobile user devices

- sense user location and detects objects in complex environments
- compute/display personalized prompts, choices, & reminders; collect user selections; detect errors/breakdowns
- personalized to suit user abilities and needs
- facilitate communications (voice, text, video, etc.) with support communities

support communities

- plan, monitor, assess, and assist users
- available by computer, phone, or PDA

Prototype technologies

private mobile WAN

900mhz (115.2 kbps)

GPS data server

internet backbone

GPS & WAN data transmitter

prototype wireless bus I/O device with wireless LAN (BlueTooth; 802.11, etc.)

commercial or private mobile WAN

mobility agents & data servers

mobile LAN network

- Commercial:
  - Cellular Digital Packet Data (CDPD) (19.2kbps): exs: PocketNet, Teletype.com, AutoDesk
  - Analog cellular (AMPS, etc)
  - GSM/GPRS
- Private: (ex: Intuicom 115.2 kbps.)

internet backbone

support communities

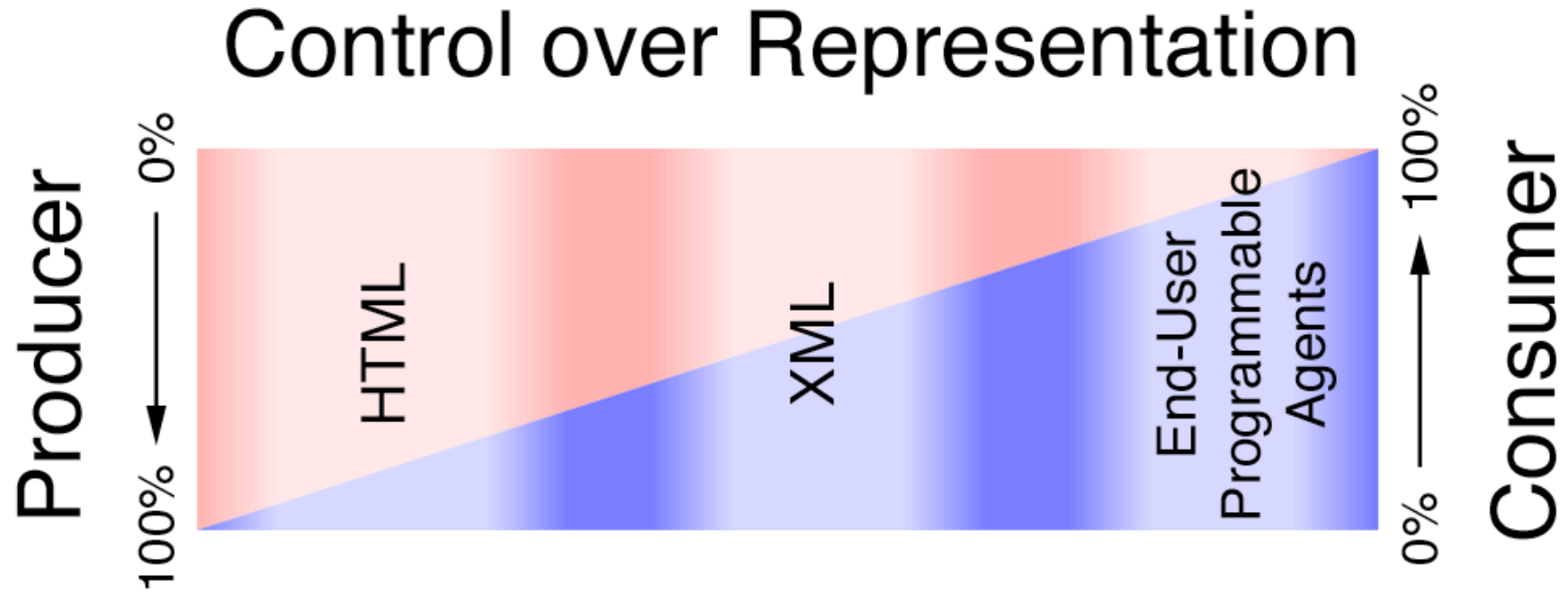
prototype mobile user device

- CPU & I/O device (PDA or laptop)
- GPS receiver
- Cell phone
- Mobile WAN (CDPD, AMPS, GSM/GPRS, etc.)
- Mobile LAN (BlueTooth, 802.11, etc.)
- 'SmartTag' sensor

cell phone & PDAs:
- internet capable
- support email or simple message service (SMS)

Email, phone, VoIP alerts

The Pragmatic Web



The Syntactic Web

The Semantic Web

The Pragmatic Web