

# Perceptive Assistive Agents in Team Spaces

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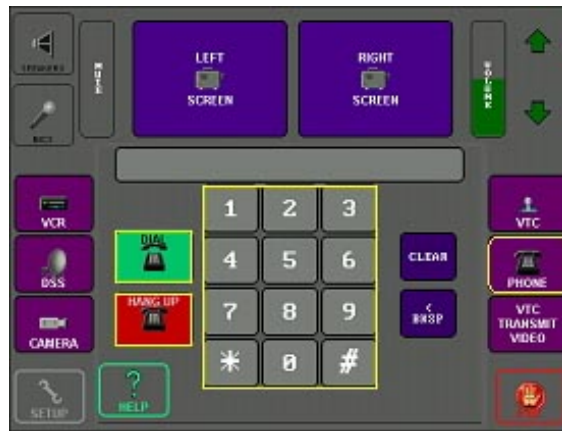
MITRE Sponsored Research



# Problem

- **“System complexity may be reversing the information revolution” (Ron Brachman, Zach Lemnios, DARPA IPTO)**
  - **Greater demands on the user**
  - **Users must adapt to system interfaces**
  - **Systems more rigid and fragile**
  - **Productivity and effectiveness are not keeping up!**

# Background



- 8 screens
- 174 buttons
- ~30 devices / room
- ~5000 users
- 75 VTC / team rooms
- 60-70% capacity

**MITRE**  
**conferencing**services

While researchers and engineers are creating new devices and making advances in HCI, most users can't keep pace and their lives aren't really getting easier



# Objective

- **Leverage perceptual information available from the physical environment to enhance the effectiveness of assistive agents in team spaces**
- **Provide an experimental foundation for which to evaluate sophisticated HCI concepts in the C2 Vision of the Future – specifically, to assess the potential benefits of perceptive assistive agents**

# Activities

- **Biometrics**

- **Authentication & Identification**

- **Extend ETR conference room services with automated human recognition and occupancy awareness**
- **Initial tracking services, occupancy state management (Environmental model)**

- **Geolocation**

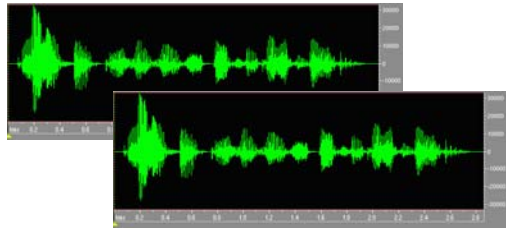
- **Installation of COTS sensors to locate/track people and things (Ubisense Ultra-wideband)**

- **Human-Computer Interaction**

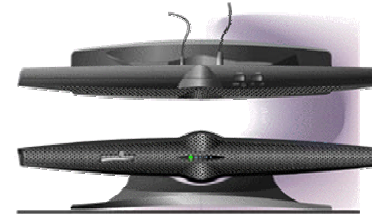
- **Dialogue-driven *fleximodal* interaction**

# Highlight

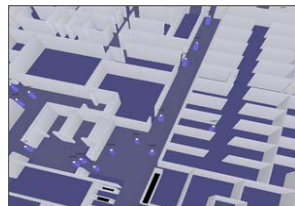
Speech



A/V Infrastructure



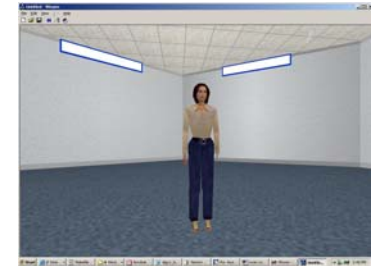
Biometrics



Wireless and  
Geolocation Tracking



User Interfaces



Dialogue

Head images are created with help of *LIFESTUDIO:HEAD®*  
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# Demonstration

**Dialogue-Manager Guided  
Conversational Interface**

**Fleximodal (speech/GUI) Control  
of Team Room and VTC**

**Embodied Perceptive  
Agent in a Team Space**

**Enhanced Team  
Room Services**

**Wireless Tracking of  
Participant Location**

**Face-Recognition-  
Based Registration of  
Participants**

# Impacts

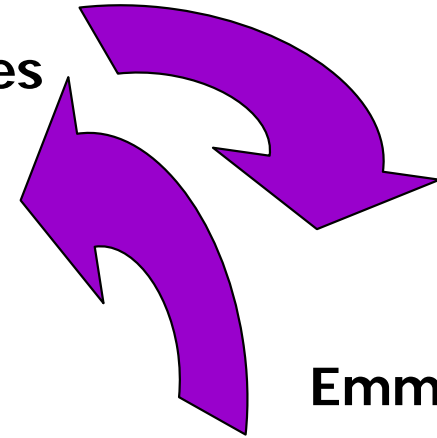
- **2-Gen perceptive assistive agents, developed and tested to operate in both stable workspaces and less stable, distributed command post environments**
- **Tangible, demonstrable artifacts to support the FFRDC's C2 vision**
  - **Range of military and intelligence sponsors striving toward next generation interfaces and workspace environments**
- **Insights and technology transfer**
  - **For commercial vendors of HCI, collaboration, and workspace equipment**
  - **To support Section 508 of the Rehabilitation Act (universal access; vision, speech, hearing, mobility, etc.)**
  - **For ISIS in procuring and maintaining MITRE's workspaces**

# Future Plans

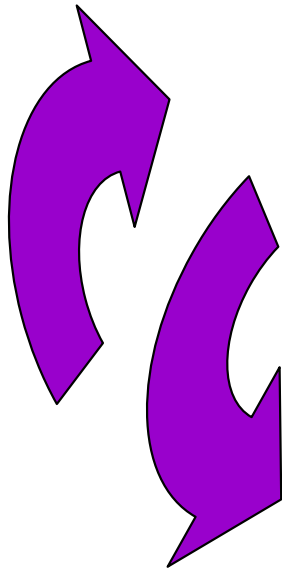
Real World (ground truth)



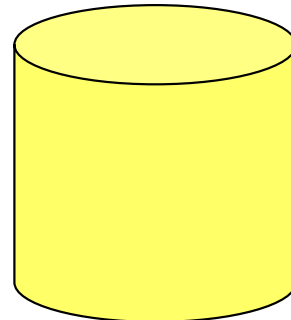
Info. Resources  
Networks  
Sensors  
Devices  
People  
Facility



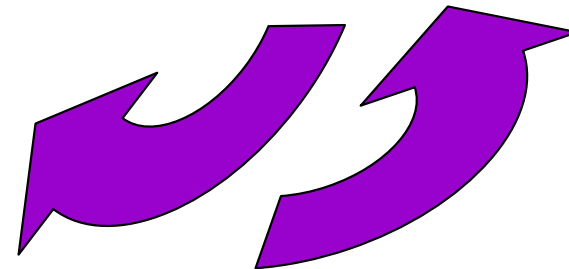
Emma



Environment Model  
(partial reconstruction  
of the real world)



Who?  
What?  
Where?  
When?



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