

**Active Environments:  
Sensing & Responding  
to Groups of Inhabitants**

Joe McCarthy



## Active Environments

Most environments are *passive* --  
deaf, dumb & blind --  
unaware of their inhabitants  
and unable to assist them in a meaningful way.

In contrast, an *active environment* is  
a **physical space**  
that can **sense** and **respond *appropriately***  
to the **people** and **activities** taking place  
within it

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# Sunset @ 200MHz



An interactive project for SIGGRAPH 97  
at Billboard Live on Sunset Boulevard

"Sunset"

Margaret Crane-Dale MacDonald-Scott Mirmann-Jon Wines  
Xerox PARC Artists In Residence Program (AIR)



# Public Information: Documents, Spectacles and the Politics of Public Participation

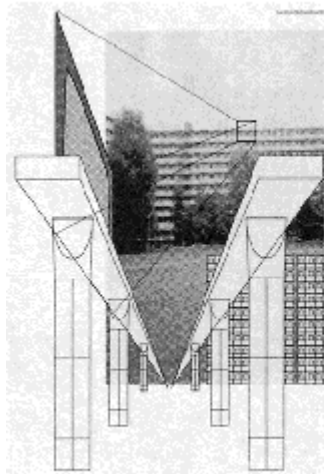
## “Sunset: 200 MHz in a 35mph Zone”

- Scott Minneman, Xerox PARC (CHI '98)
- Interactive fiction (“drive-by soap opera”)
  - 18 characters, 2700 pictures, theme music
    - looping, multi-layer vignettes
  - Billboard Live: Two 9'x12' Sony JumboTrons, 104.7 FM
  - Garage-door openers, alarm keyfobs: pacing, segues, next vignette
- Research issues
  - Public expectation (what to do & when)
  - Weak interaction (clicks)
  - Unpredictable exposure (6 seconds to 60 minutes)
  - Low resolution (92 x 44 pixels)

- Presence Project
  - Gaver & Dunne, Royal College of Art, London (CHI '99)
  - communicate attitudes: private --> public
  - “provocative awareness”
  - *psychogeography*: emotional topology of an area
    - Situationists
  - Goals
    - raise awareness, communication, presence
    - encourage subversion, local obsessions, play

- Cultural probes: “gentle provocation”
  - 6 maps
    - “if Bijlmer were a body...” + precut stickers
  - postcards
    - “tell us a piece of advice”, “why do we have politicians”
  - disposable cameras
    - “what you will wear today”
    - “something beautiful”, “something ugly”
  - photo album
    - tell us your story in 6-10 photos

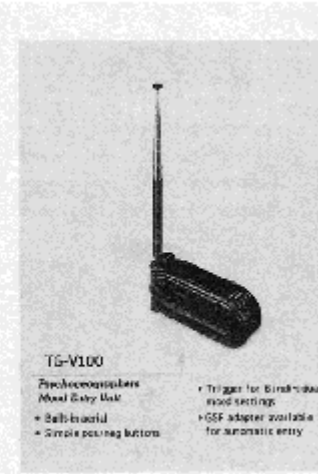
- **Public displays**
  - image boards along highways, railways
  - slogan furniture (benches with displays)
- **Linked security cameras & monitors**
- **Ventrovers**
- **Psychogeographic pagers**
  - fear / safety, boredom / interest



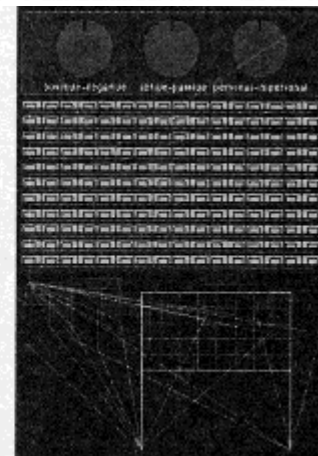
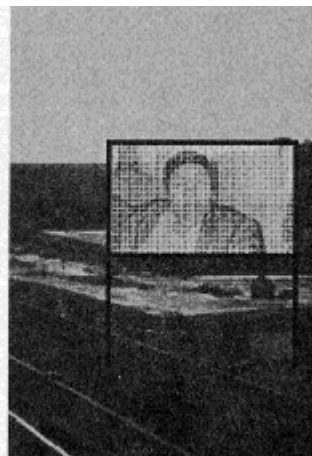
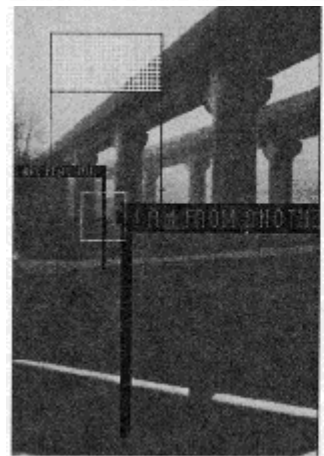
Early image board sketch



Vent rovers



Psychogeographic pager





# MusicFX



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MusicFX

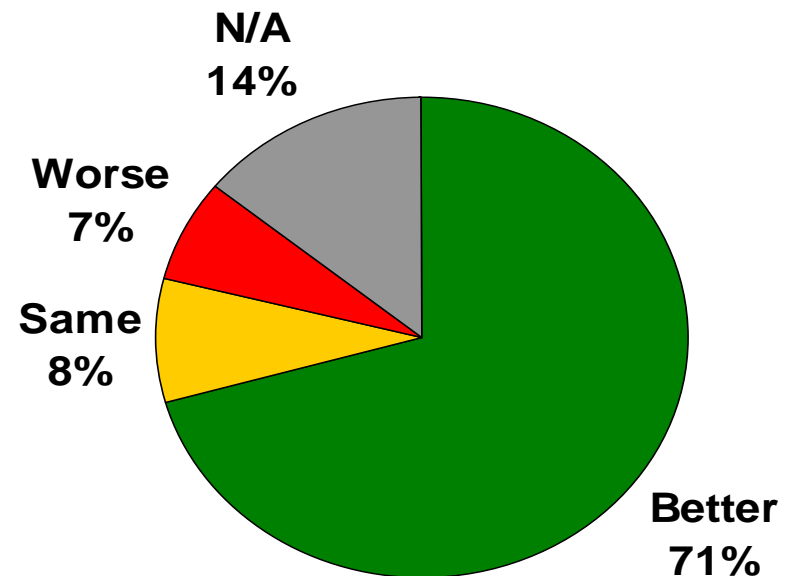
- An active environment for the workout place
  - CSCW '98, IAAI '99, CSCW 2000 (video)
  - Operational since November 1997
- Three components
  - Preference database
  - Group preference arbitration algorithm
  - Environmental “triggers”

<i>i</i>	<i>Genre</i>	<i>Person</i>	A	B	C	D	E	$GP_i$	$Pr_i$
1	Alternative Rock		2	2	0	2	2	68	0.48
<del>2</del>	<del>Hottest Hits</del>		<del>1</del>	<del>1</del>	<del>2</del>	<del>0</del>	<del>-2</del>	<del>38</del>	<del>0.27</del>
3	New Music		1	1	1	0	0	35	0.25
4	Hot Country		2	0	0	0	-2	28	0.00
5	Dance		2	-1	1	-1	-1	28	0.00
6	World Beat		0	1	-1	1	-2	23	0.00
7	Traditional Country		1	0	0	-2	-2	17	0.00
8	50's Oldies		0	0	0	-1	-1	14	0.00
9	Heavy Metal		-1	-1	-1	-1	-2	4	0.00
10	Polka		-1	-1	-2	-2	-2	2	0.00

- Daily operation since November 1997
- Poll results (after 6 weeks)

+ : increased variety,  
having some influence

- : abrupt changes,  
occasional “bad” music



- We often talk/hear about a world filled with displays
  - “Walls in our offices & homes will be reactive displays”
    - Andries Van Dam, CACM, March 2001 (The Next 1000 Years)  
“User Interfaces: Disappearing, Dissolving, and Evolving”
- What will such a world be like?
  - What kind of content would be put on such displays?
  - How will the content be affected by context?
- UniCast, GroupCast & OutCast
  - Three steps toward ubiquitous peripheral displays

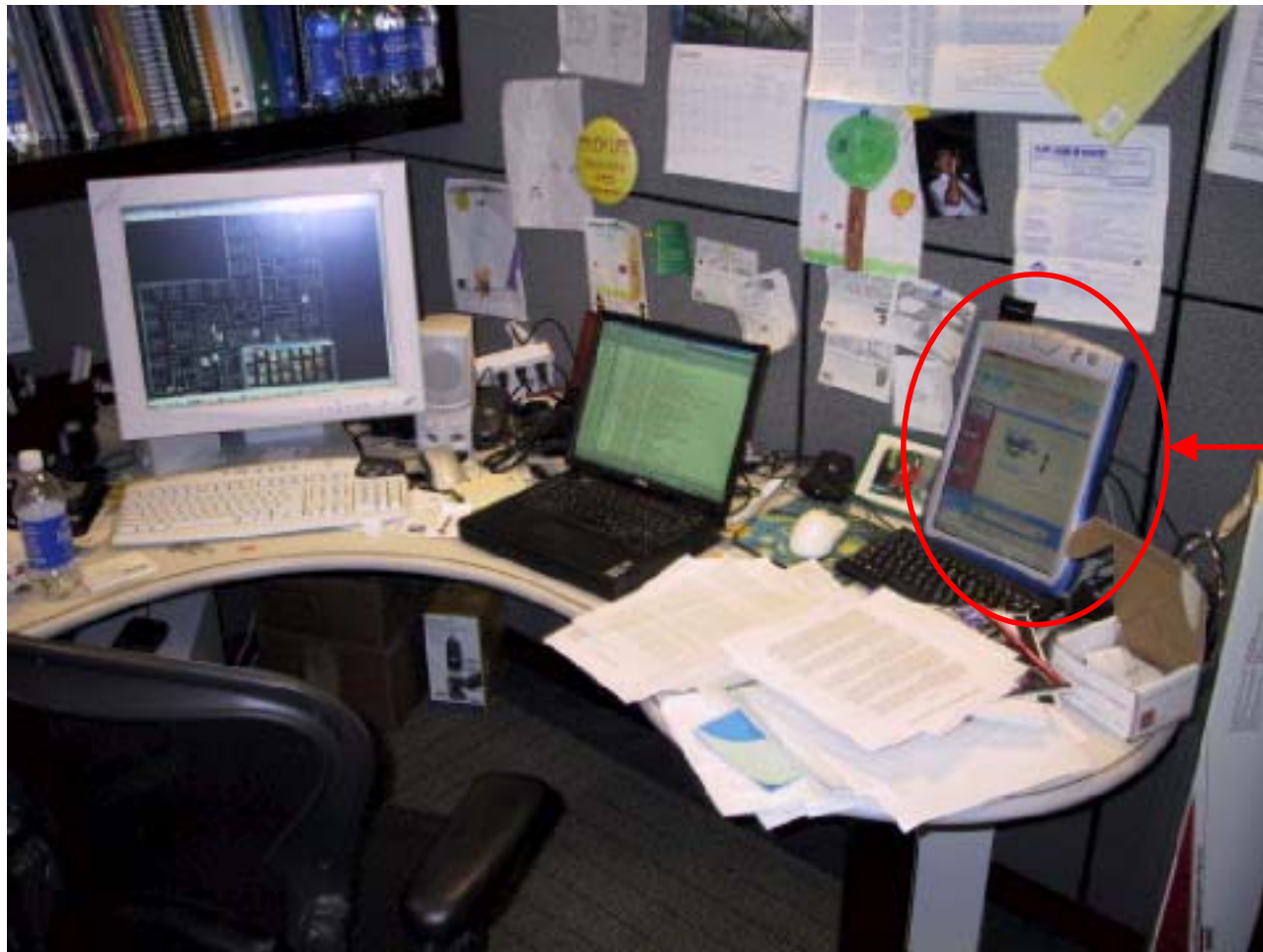
# accenture<sup>></sup> Peripheral Displays in 3 Contexts

- **UniCast**
  - Inside one's office
    - Interesting, non-urgent content
- **GroupCast**
  - In a public space
    - Conversation starters
- **OutCast**
  - Outside one's office
    - Content for visitors



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# UniCast in Context



UniCast

## User Profile

Joseph F. McCarthy

[Overview](#) . [Add Module](#) . [Remove Module](#)

Active Modules:

<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	ActiveMap
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Announcements
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	CSTaR Webcams
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Factoids
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Great Works of Art
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Headlines
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Reminders (Bread & Circus)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Reminders (Friday Seminar)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (media technology)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (technology)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (speech technology)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (biotech)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (nontech)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (new tech)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (b2b)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Stocks (indices)
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Weather
<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Deactivate</a>	Web Pages

Inactive Modules:

<a href="#">Config</a>	<a href="#">Test</a>	<a href="#">Activate</a>	Stocks (Technology)
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Update Arial ID:

Arial ID: 

Update Refresh Rate:

Refresh Rate:  seconds

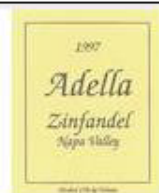




[AWESOME Deals! Click Here!](#)

## My Yahoo! Wine of the Day

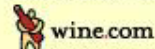
### 1997 Adella Zinfandel, Napa Valley, California



The addition of Sangiovese and Syrah to this Napa Valley Zinfandel gives the wine extra body, depth, and flavor. A big mouthful of a Zin that still offers supple smoothness and easy drinkability.

Adella is a brand-new winery, but these wines show the polish and deft touch of a veteran winemaker. The venture is the result of a collaboration between two former teammates at St. Clement Vineyards, Dennis Johns, a very talented winemaker, and Barbara Spelletich, now working together with their spouses. Each family has its own winery as well. Adella was created to keep a good team working together, and the results have paid off in spades. This wine makes you want to take a big gulp, but you're better off sipping to savor the nuances of this charming, lushly-packed beauty. The multi-faceted and sophisticated character of this Zinfandel showcases the considerable winemaking talent on this team. Adding Sangiovese and Syrah is a stroke of genius that gives the wine more depth and body, without taking it one degree off course. A perfectly targeted Zinfandel that hits the palate right in the bull's-eye.

Related Links from



- [Purchase this Wine](#)
- [More info about this wine](#)
- [Monthly Wine Clubs](#)

[Email this wine](#)

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# GroupCast in Context



- A system for the public display of content that is of mutual interest to passersby
  - Provide opportunities for conversation
    - Especially for conversationally-challenged (nerds)
  - Increase sense of “community”
    - Location matters -- what can we do for physically collocated workers?
    - Dynamic, project-oriented teams
  - Lay the groundwork for collaboration
    - More likely to collaborate with people I know



- Awareness system (IR badges & sensors)
- Profile of inhabitant interests (UniCast)
- Group Preference Arbitration algorithm
- Input / Output (sense / respond)

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# OutCast in Context



- What can we sense?
  - Who is this group?
    - detecting vs. identifying people
  - What do they want? (& how do we know?)
    - implicit vs. explicit
- How to respond appropriately?
  - ~~– Foreground?
    - Interactive TV?~~
  - Background
    - entertain (infotain?), provoke, present opportunities for interaction / understanding