

**Visual Interactions
for Information Sharing,
Collaboration and Sensemaking**

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Context: Sensemaking in C2

To make sense of the situation requires that we are able to quickly bring to bear

- (1) Information from many sources, including new sources,
- (2) a wide variety of expertise and perspectives (to understand, filter, and integrate the available information and knowledge), and
- (3) synchronized effects over multiple domains.

- Alberts & Hayes, Power to the Edge, Page 99, DoD Command & Control Research Program

Motivation / Background

Computer-Posted Wall Display:

The large wall display and its associated systems are relevant, of course, to **symbiotic cooperation between computer and a team of men**. Laboratory experiments have indicated repeatedly that informal, parallel arrangements of operators, **coordinating their activities through reference to a large situation display, have important advantages** over the arrangement, that locates the operators at individual consoles and attempts to correlate their actions through the agency of a computer.

- J. C. R. Licklider, DARPA, 1960

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Motivation / Background

Information Presentation through Default Displays

- Develop integral representations of graphic design principles and information assimilation measures from human factors studies for determination of effective visualization formats
- Develop information representations for generating graphic displays automatically for users unversed in computer graphics technology

- **Gnanamagari, Ph. D. Thesis,
University of Pennsylvania, 1981**

[This work was partly supported by DARPA (Grant #MDA903-80-C0093) & The PI: Dr. Howard L. Morgan, The Wharton School]

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Motivation / Background

Multiple Simultaneous User Interface Technologies [MSUIT]

- Untethered Simultaneous Access via Multi-Voice & Multi-Pointers
- Coordination of User Pointers with their Voice Commands
- Multiple User Verification Methods:
 - Voice Profiles of Users for Authentication
 - Application specific Heuristics
 - Laser Pointer Patterns
- **An SBIR Project, InfoValley, 1999-2002, Supported by AFRL**

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Motivation / Background

Team Computer Interface [TCI] Technologies

Enabling BMC2 team members to

- simultaneously access a large display wall
- present & share information, including multi-media, and work together in real time collaborating on a task
- use own applications / computing systems located anywhere on the network
- interact using coordinated voice commands and laser pointers

An SBIR Project, InfoValley, 2002-2006, Supported by MDA

Scenario

Situational Awareness & Decision Making

- DataWalls / InfoWalls / KnowledgeWalls / ...
- Staff members working in the Network Centric Warfare
- Commanders / Decision Makers – Using Laser Pointers to point something on the displaywall and discuss with staff while Sensemaking

Capabilities

Untethered Interactions:

- Coordinated Laser Pointer and Voice Commands
- Multiple Simultaneous User Interactions
- Application Sharing
- Annotate / Sketch / Relate / Interact / ...

In NCW Environment

- Ability to select applications to view & share on the Wall
- Interact with any displayed application
- Simultaneous Access to Applications
- Simultaneous interactions for two commanders

Applications

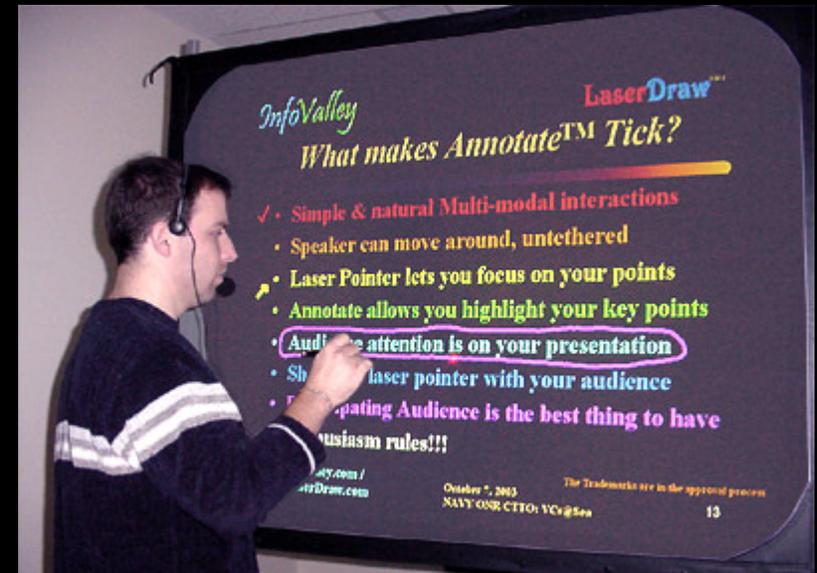
- Briefings / Presentations
- Electronic / Virtual WhiteBoarding
- Placing visual objects / Stamping – Logos, Symbols, Custom objects, ...
- Map/Situation – based planning

Capabilities in a Nutshell

- Simple, Novel, effective and attractive Human Computer Interactions with a Large Display Wall
- Simultaneous Multi-User Interactions
- Interactions among members of a team – **sharing information and collaborating** to understand and accomplish the task

Examples

Map Annotation

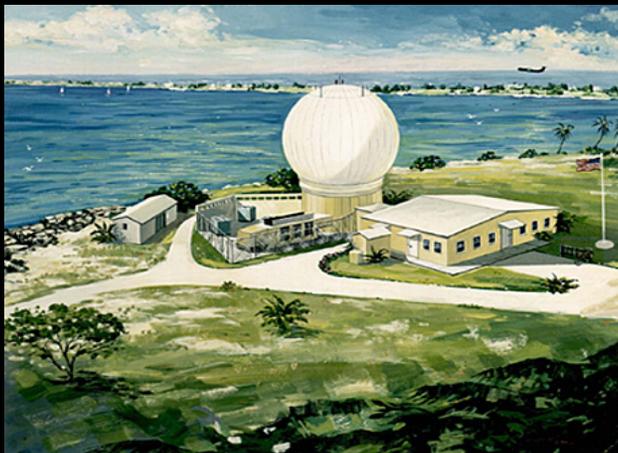


Briefing

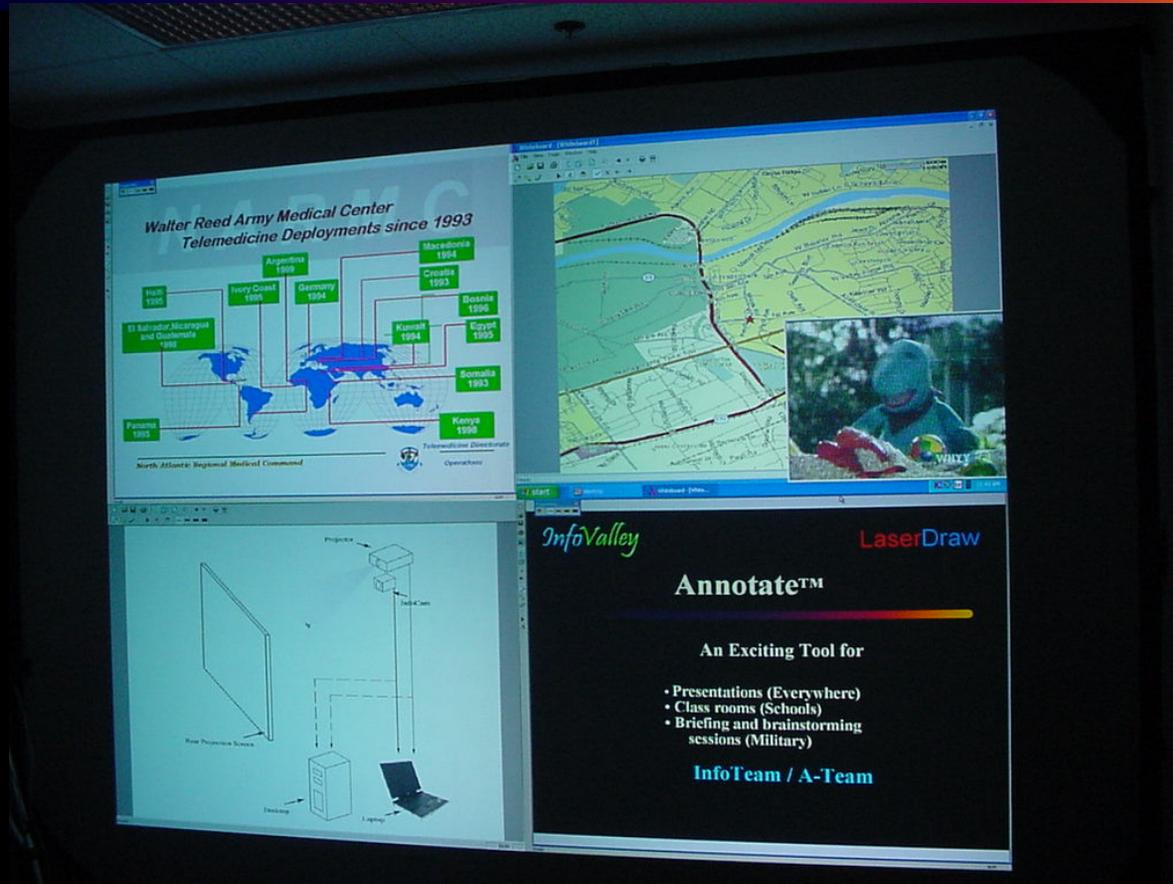
An Example – 4 Applications



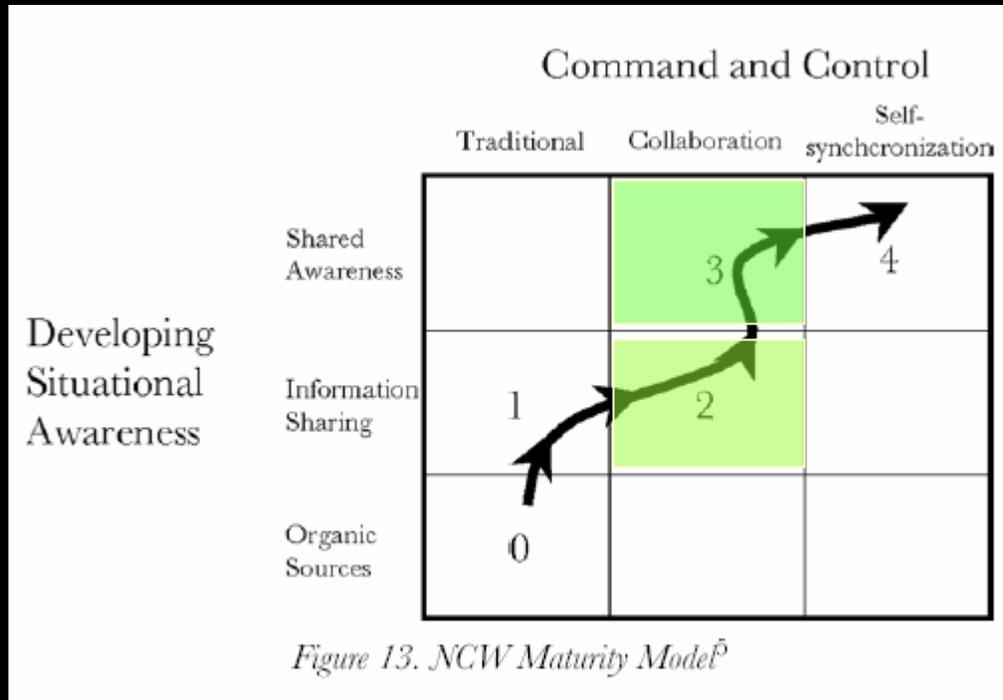
Battle Management / Command,
Control, & Communications



Interactive InfoWall™ - A Snap Shot



Interactive InfoWall™
& Sensemaking in Information Age

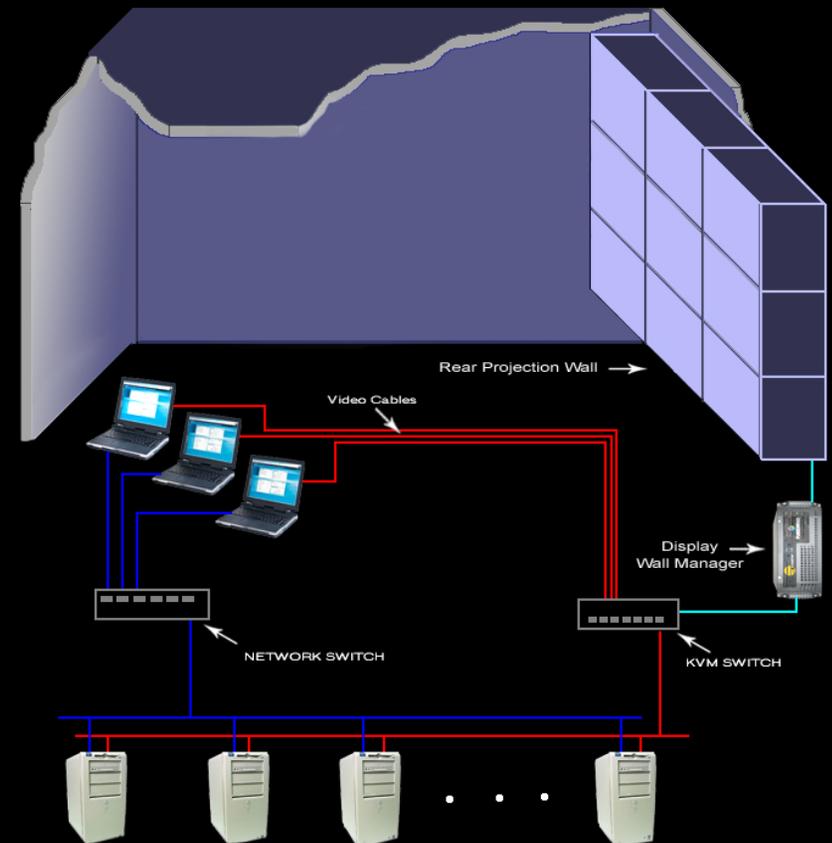


Alberts & Hayes, Power to the Edge, Page 109

Integration Possibilities

Typical Setup:

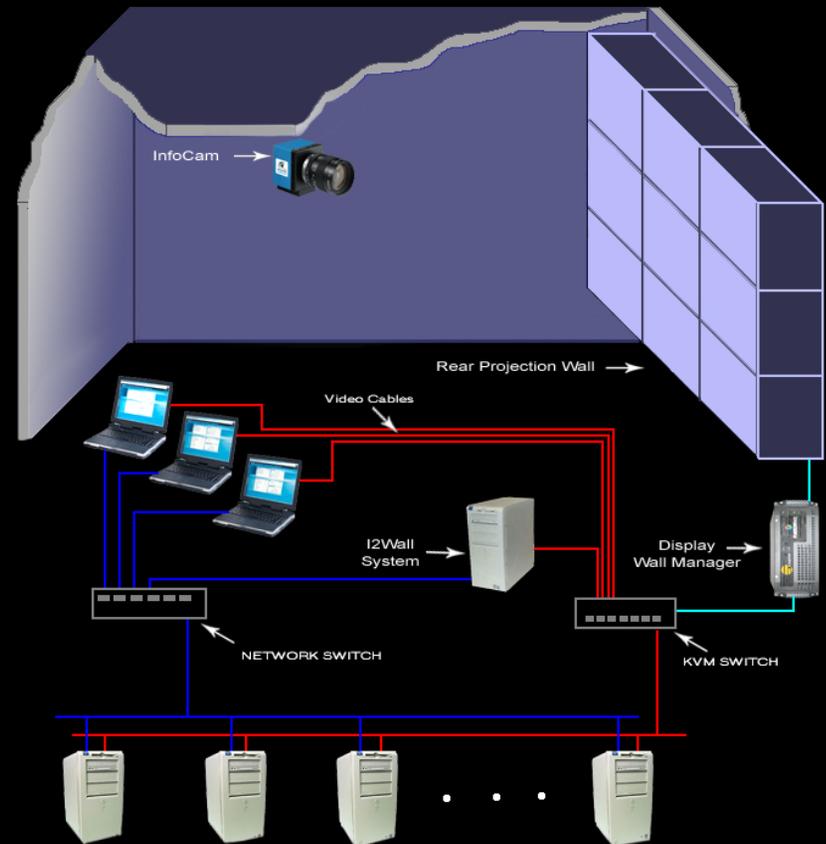
- Projected Display Walls
- Display Controllers
- Desktops / Laptops
- Laser Pointers / Remotes



Integration with I2Wall

Existing Setup + I2Wall System

- Projected Display
- Display Controller
- Desktops / Laptops
- Laser Pointers / Remotes
- InfoCam™
- Software



Transition and Integration

Interactive CORTEX:

- Technology Demo at SBBL on USS Coronado
- ONR and C3F wanted to acquire the capabilities of I2Wall for the experimentation by the Warfighter
- Interactive CORTEX was developed and integrated at C3F HQ new WarRoom

Challenges Associated with Transition

- Limited resources of a small business – people, funds, infrastructure, and contacts
- Difficult to convince large companies to sign on to new technologies that are not developed at their place – NIH (Not Invented Here) syndrome
- Interested DoD personnel do not have a simple way to acquire state of the art tools, no matter how impressed they are and what level of command / authority they have

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2006 CCRTS

Thank you

InfoValley Interactive InfoWall™

I2Wall