WILD

Wall-size Interaction with Large Datasets

Michel Beaudouin-Lafon

A UNIQUE PLATFORM

- Wall display
- Interactive table
- Motion/Object tracking
- Mobile devices
- Visualization cluster

WALL DISPLAY

- 32 monitors, 30” each, 5m50 x 1m80 (18 x 6 feet)
- about 20 000 x 6500 pixels, or 130 million pixels

INTERACTIVE TABLE

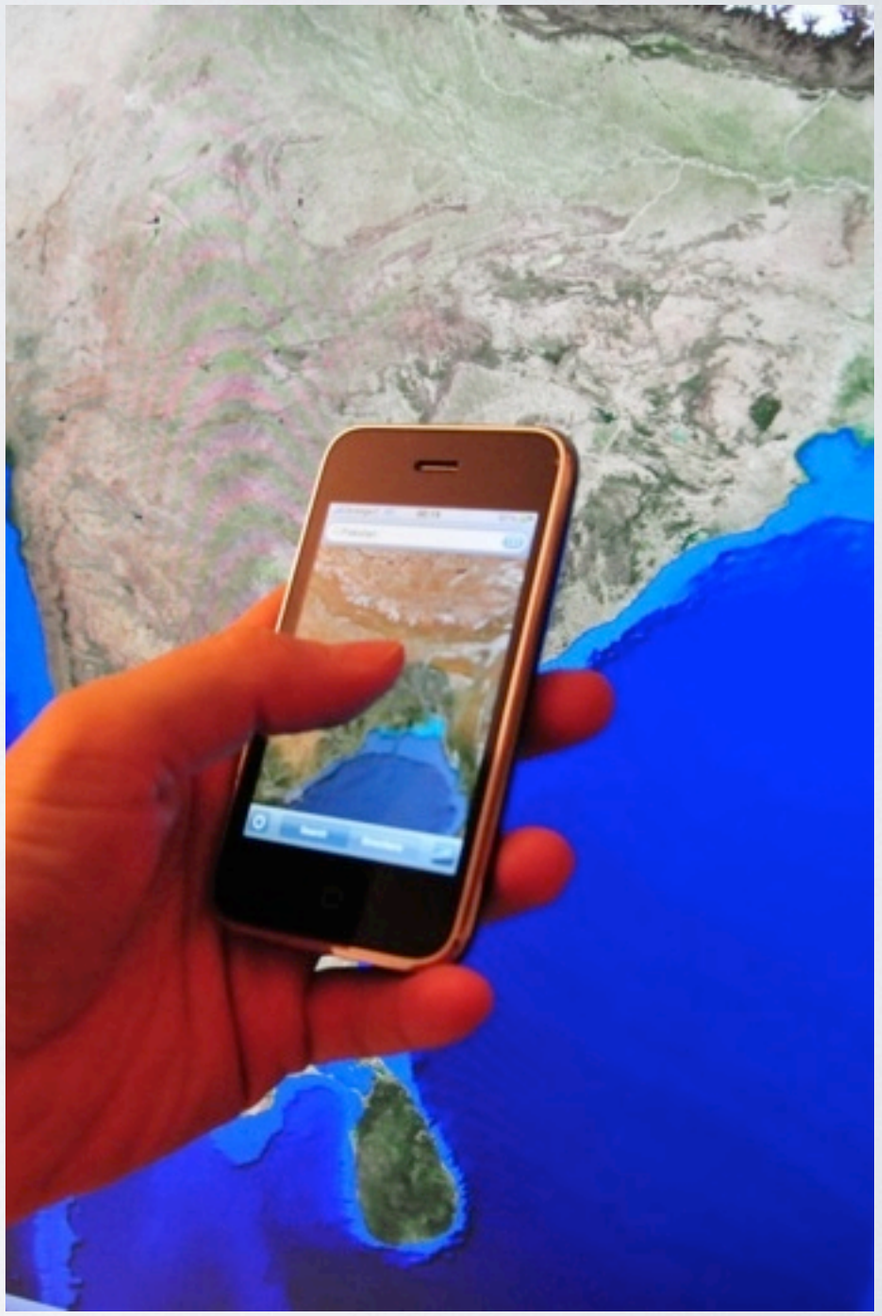
- Multitouch table
- 1280 x 1024 resolution
- FTIR technology
- RFID tag reader

MOTION/OBJECT TRACKING

- 10 camera VICON system
- .5 mm resolution across the whole room
- Object tracking, People tracking, Gesture tracking, ...

MOBILE DEVICES

- iPod Touch, iPhone, iPad
- Gyroscopic mouse
- Custom-made devices
- Wifi or Bluetooth

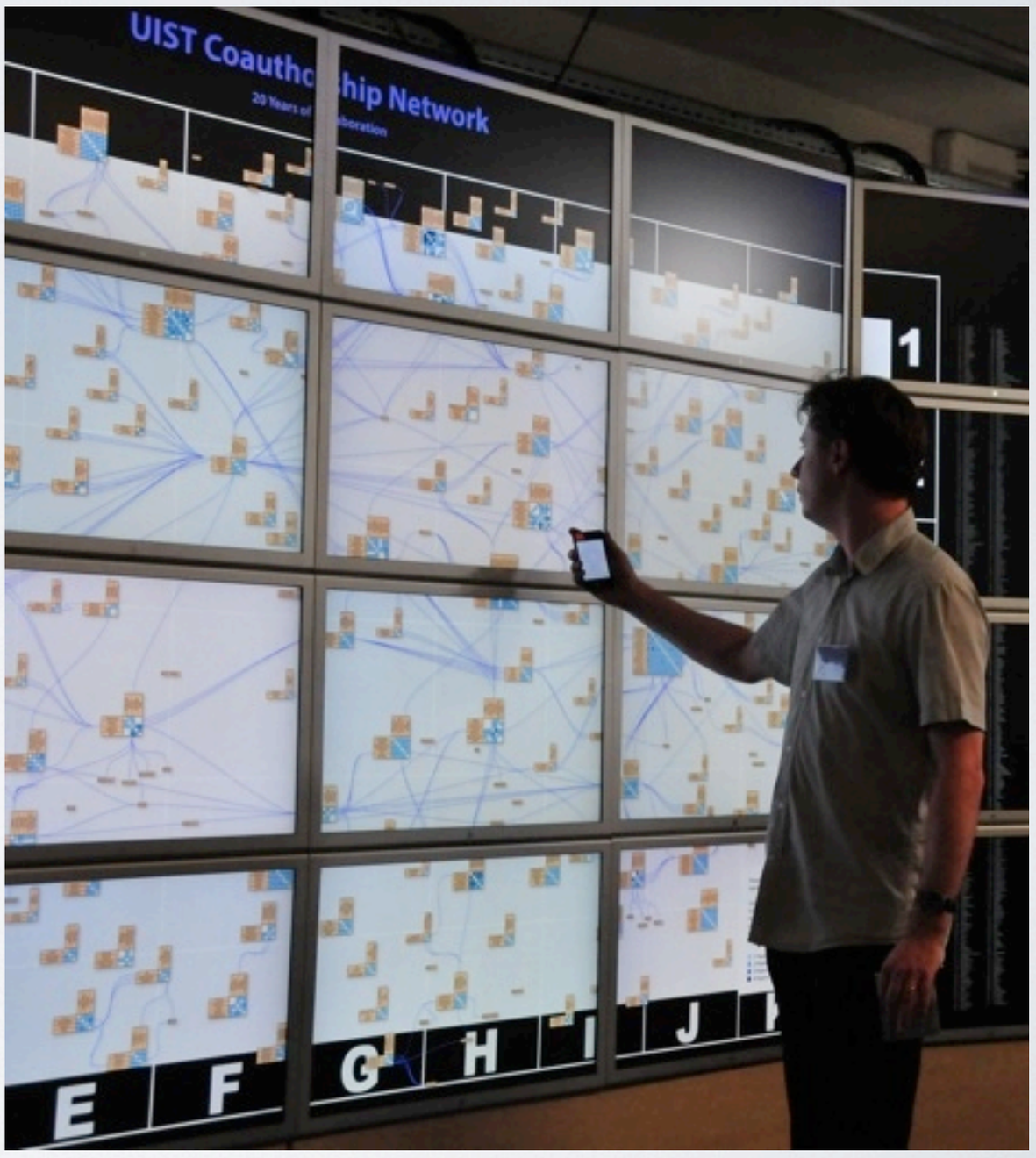


VISUALIZATION CLUSTER

- 16 computers + 2 front-ends, Mac OSX/Linux/Windows
- 2 graphics cards, 10 Gb RAM, 2 Tb hard drive per computer
- Gigabit network
- Connected to a computational cluster

WHY?

- Very large size
- Ultra-high resolution
- Multiple surfaces
- Interaction
- Collaboration

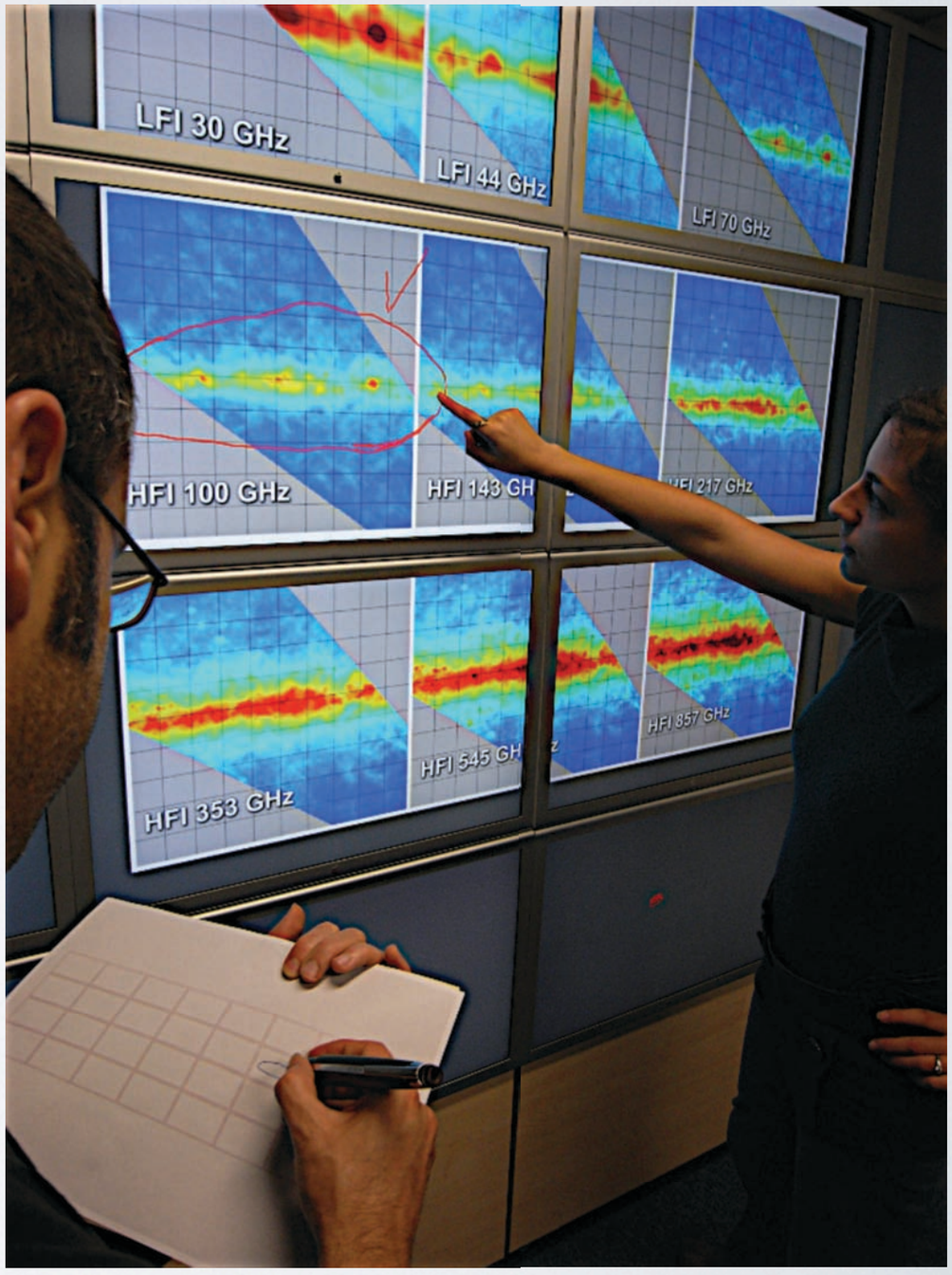


MULTISURFACE INTERACTION

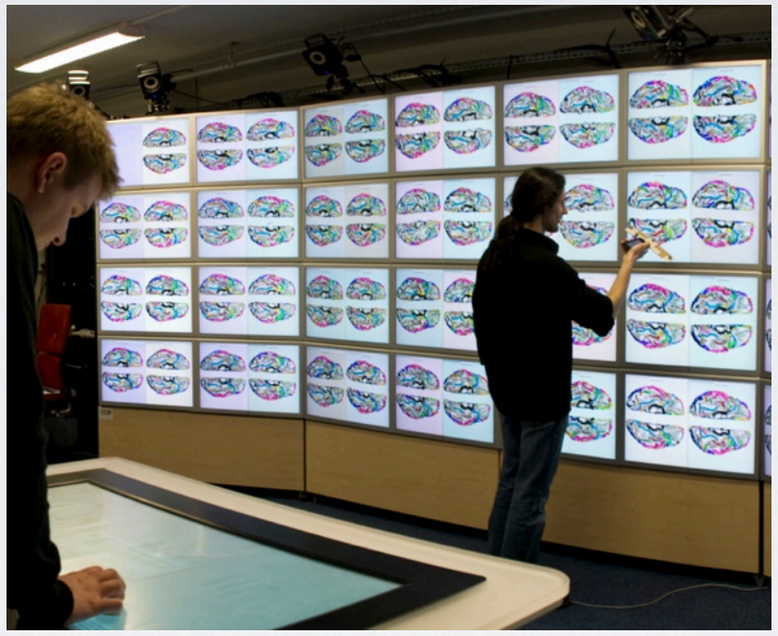
- Interact across multiple input and output surfaces: wall display, table, laptop, iphone, paper, ...

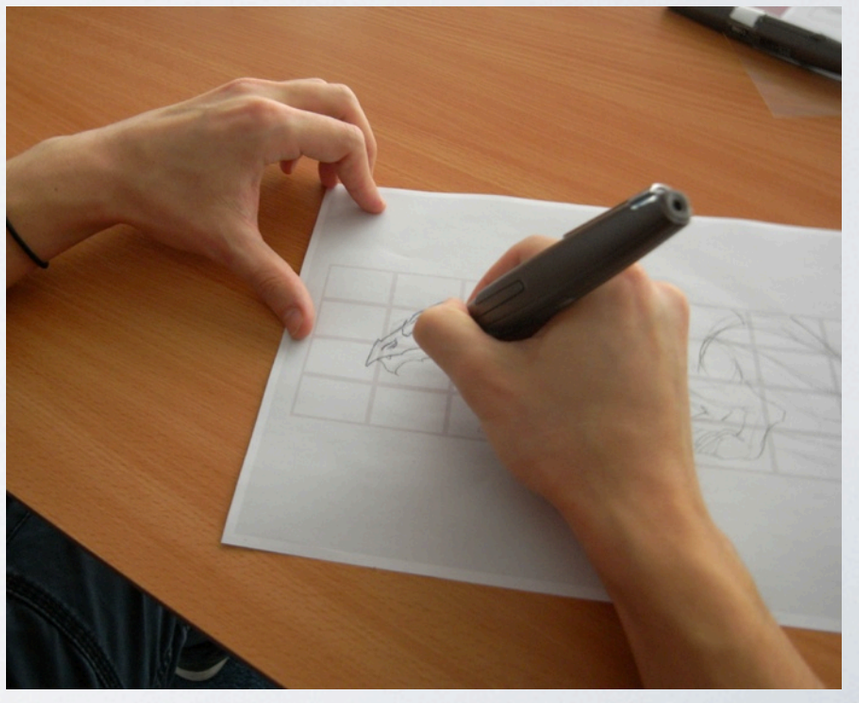
- Move content seamlessly

- Use devices as instruments



MULTISURFACE INTERACTION

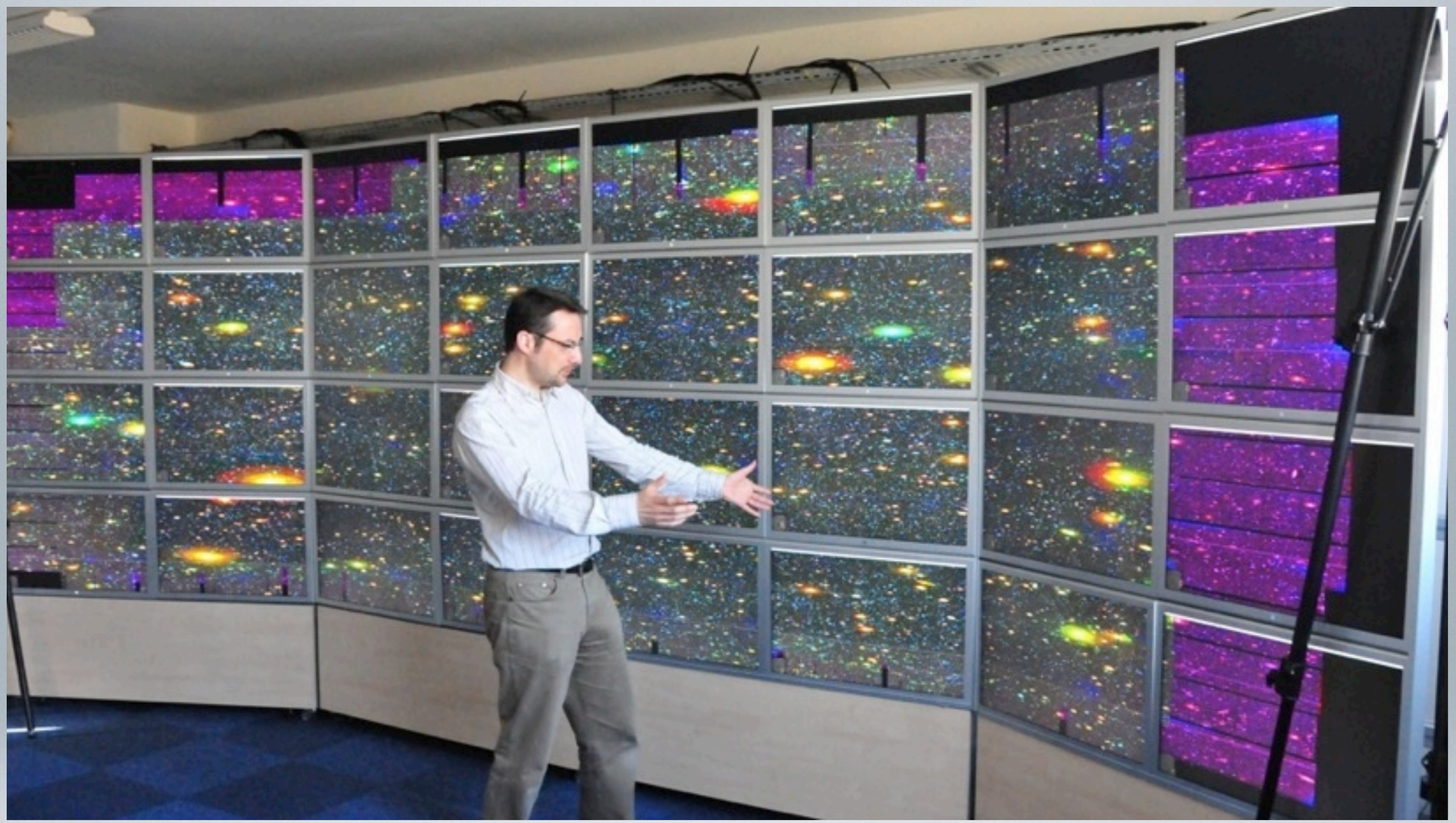




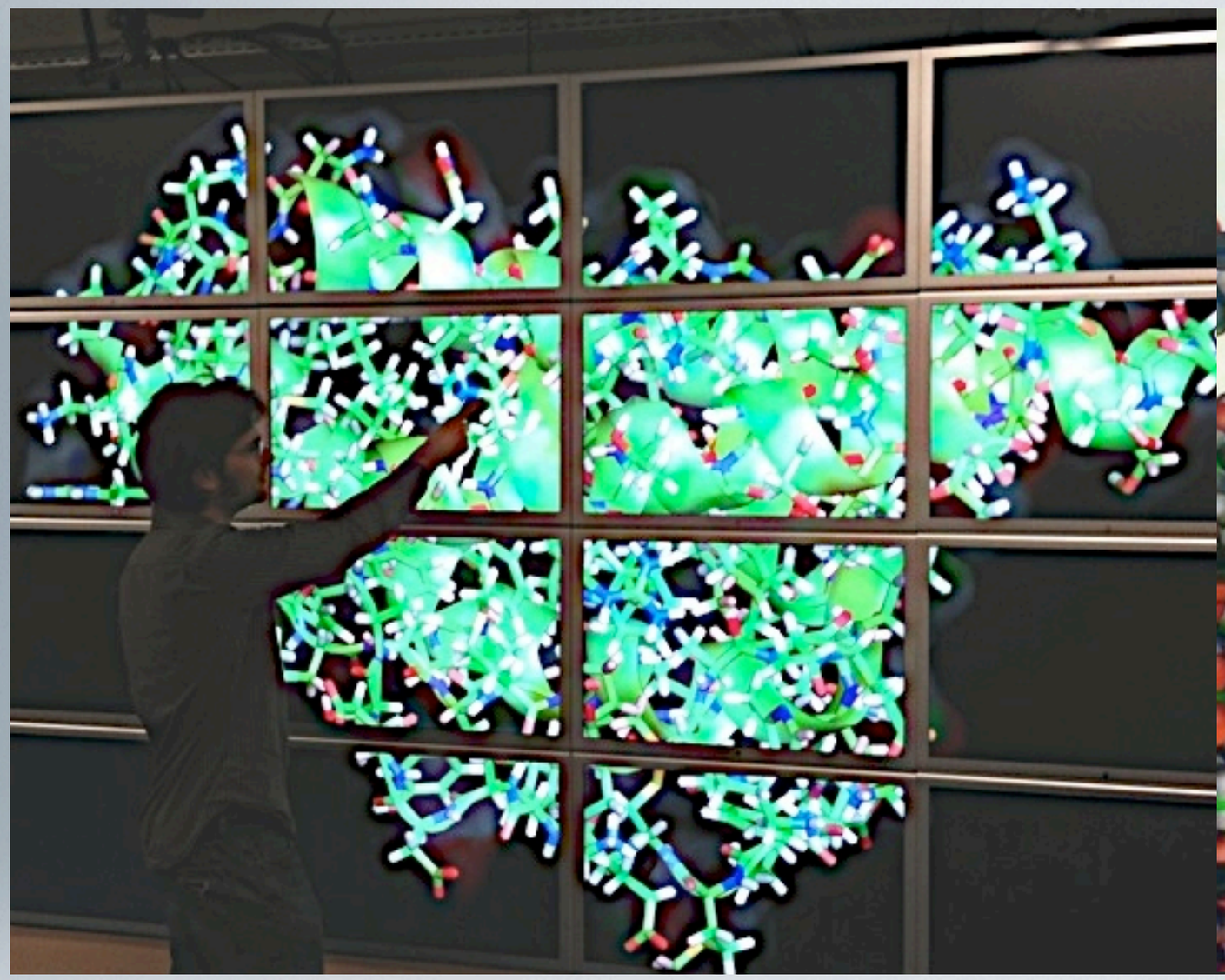
APPLICATION : SCIENTIFIC DISCOVERY

- 8 partner labs
- Help scientists better explore complex data

- IAS - astrophysics
- IBBMC - biochemistry
- ICMMO - chemistry
- IGM - biology
- LAL - particle physics
- LIMSI - mechanical eng.
- MAS - simulation
- Neurospin - neuroimagery



IAS - astrophysics (Hervé Dole)

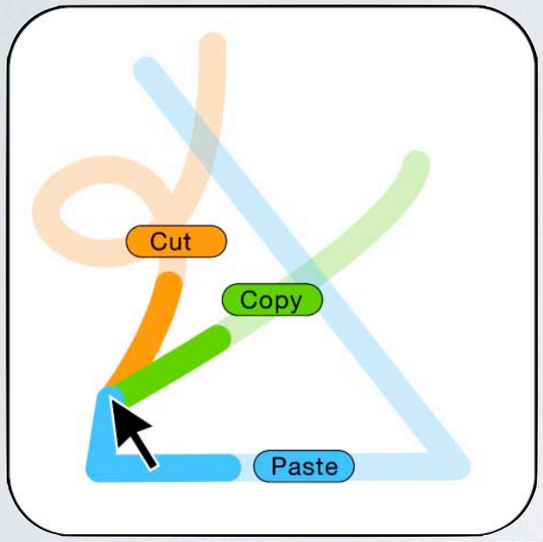


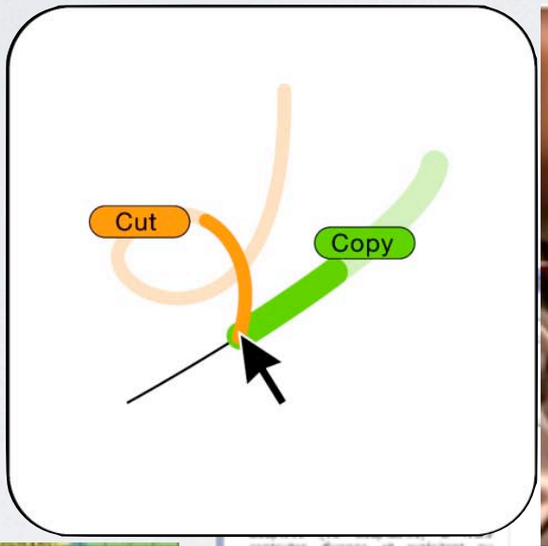
PyMol : molecules

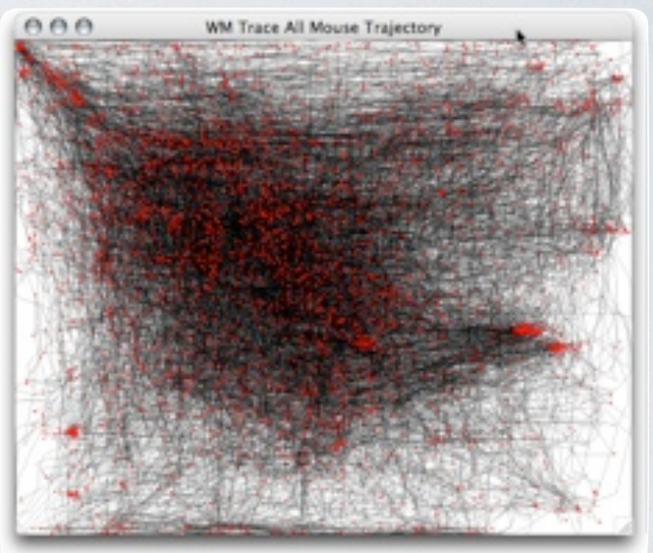
Neurospin : brain scans

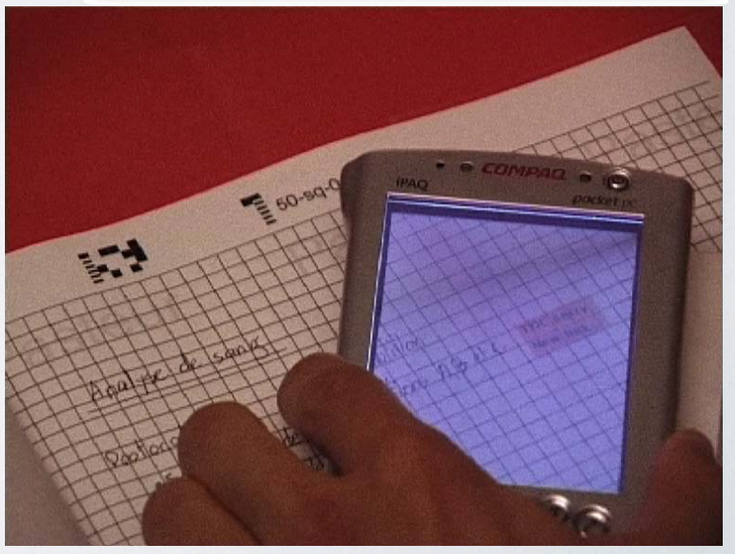
OUR GOAL

- Use computer to enhance/augment/expand human capabilities









PARTICIPATORY DESIGN

- Create new ways to interact with complex data

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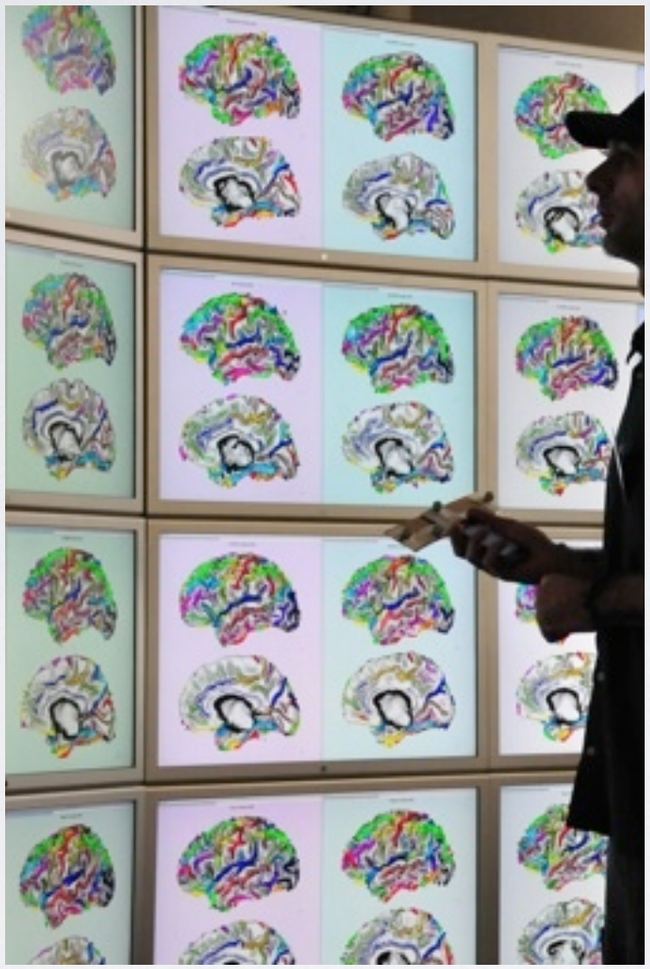
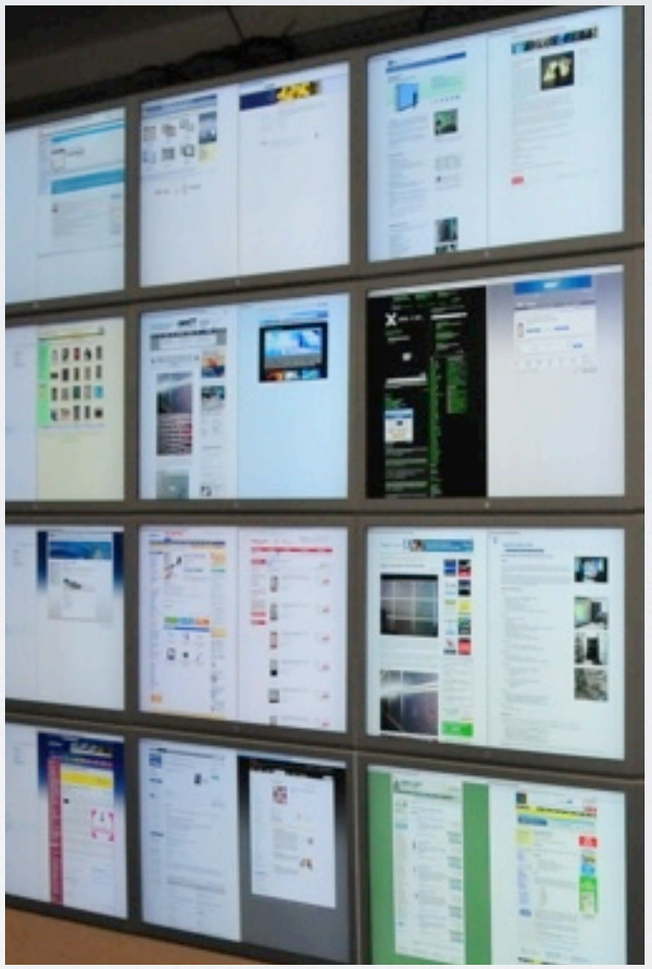
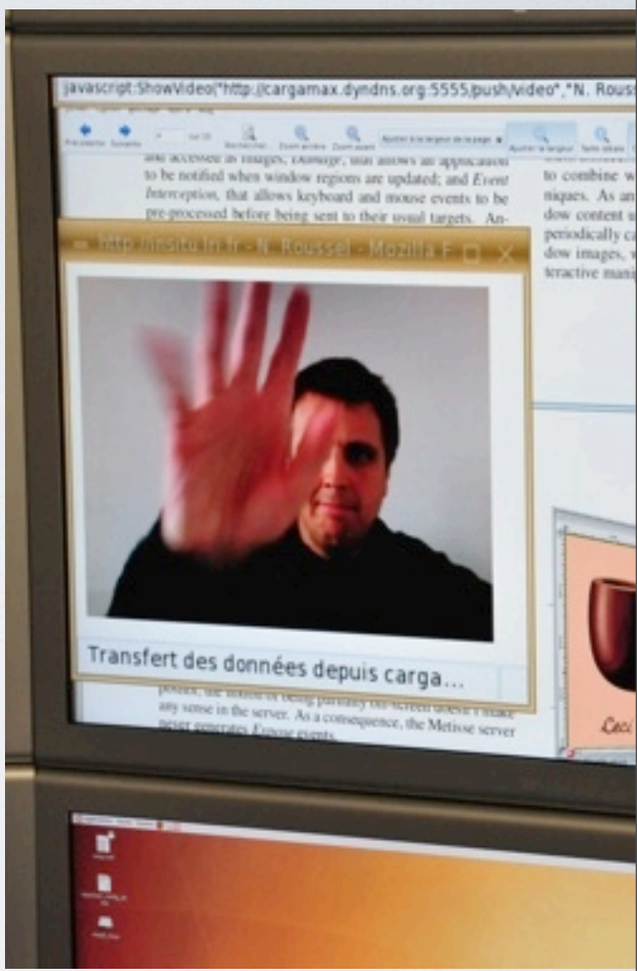
Prototyping with Neurospin

INTERACTING WITH COMPLEX DATA

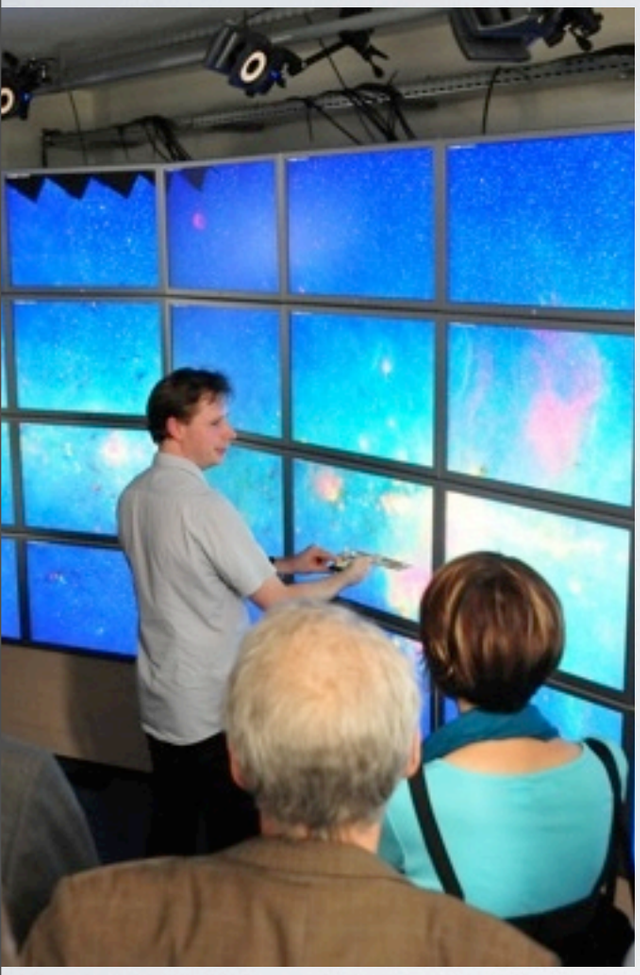


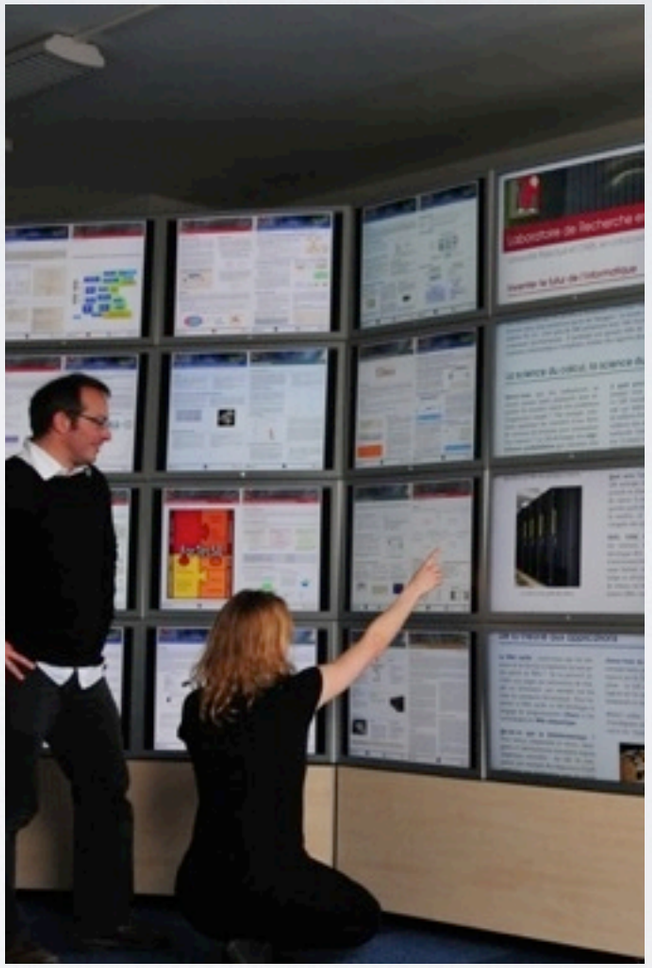




Navigate Compare Aggregate Communicate

INTERACTING WITH COMPLEX DATA






Navigate Compare Aggregate Communicate

WHAT WE HAVE DONE (SO FAR)

BASIC INTERACTION: POINTING

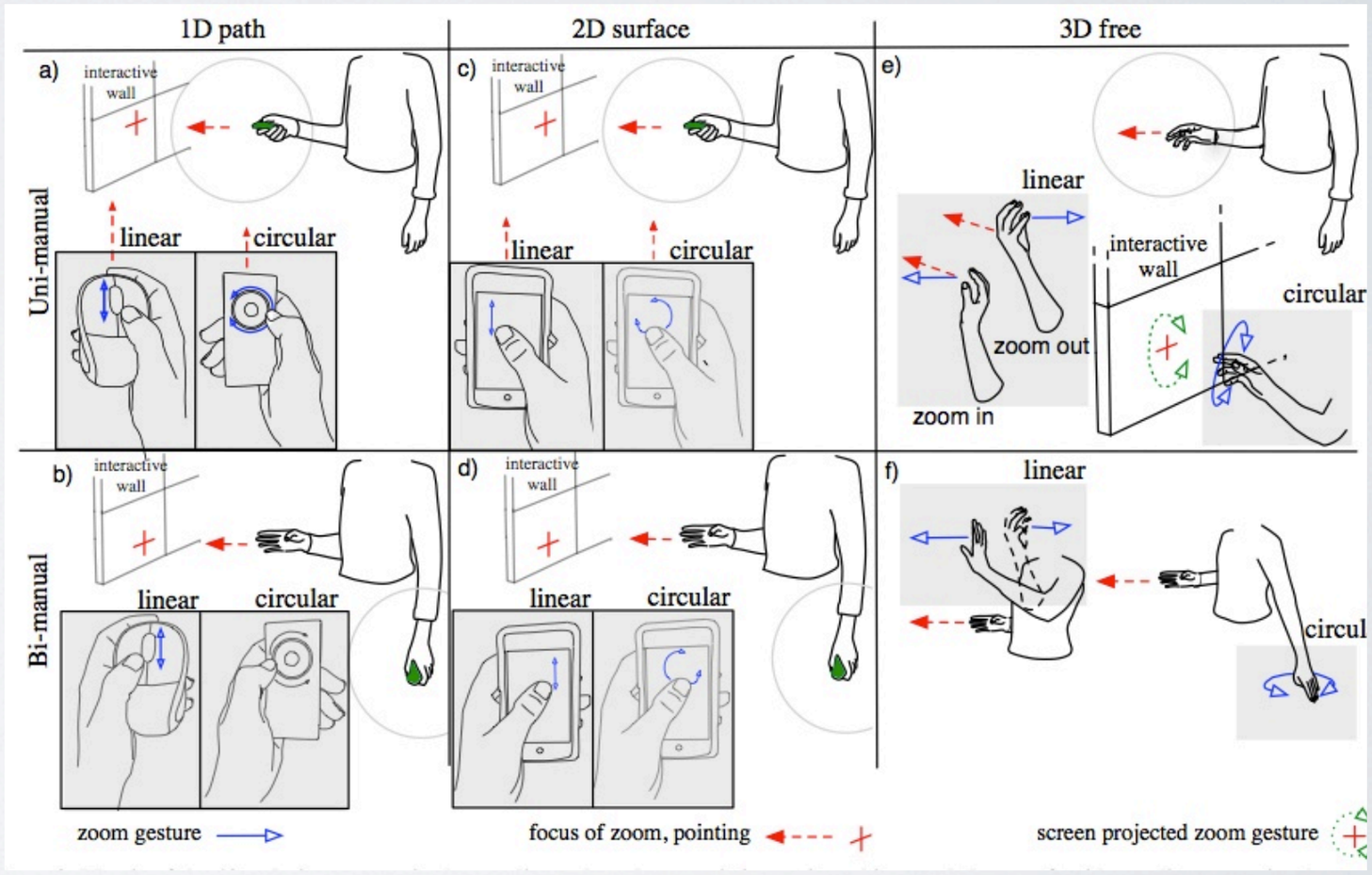
- Pointing at a distance
- Combine large size and ultra-high resolution
- Dual-mode techniques: absolute mode (coarse) + relative mode (precise)

(source: OpenStreetMap.org)

Lower Manhattan, New York

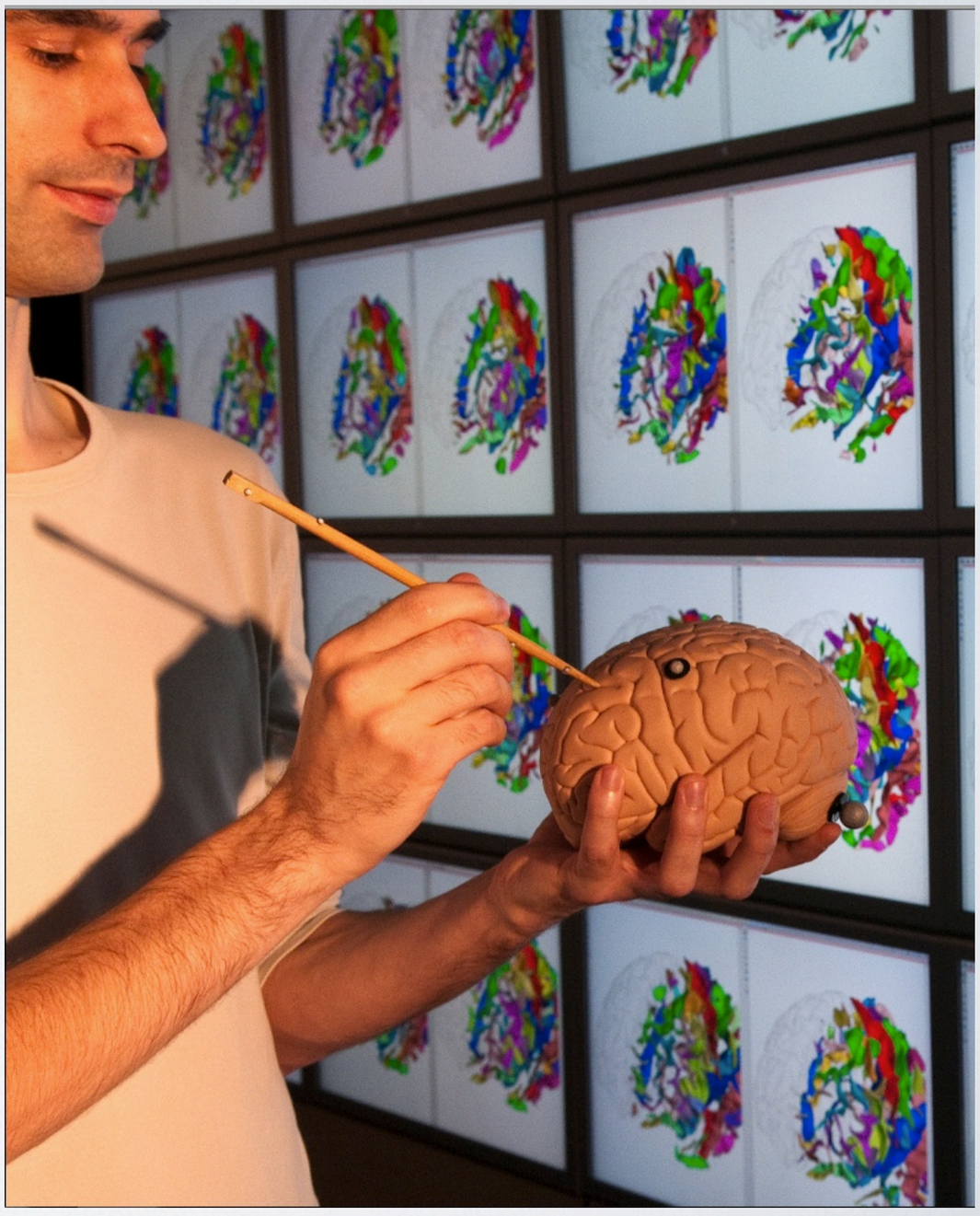
BASIC INTERACTION: NAVIGATION

- Compare 12 interaction techniques
- Free-hand vs. device, one-hand vs. two-hand, linear vs. circular gestures
- "Minority Report" looses



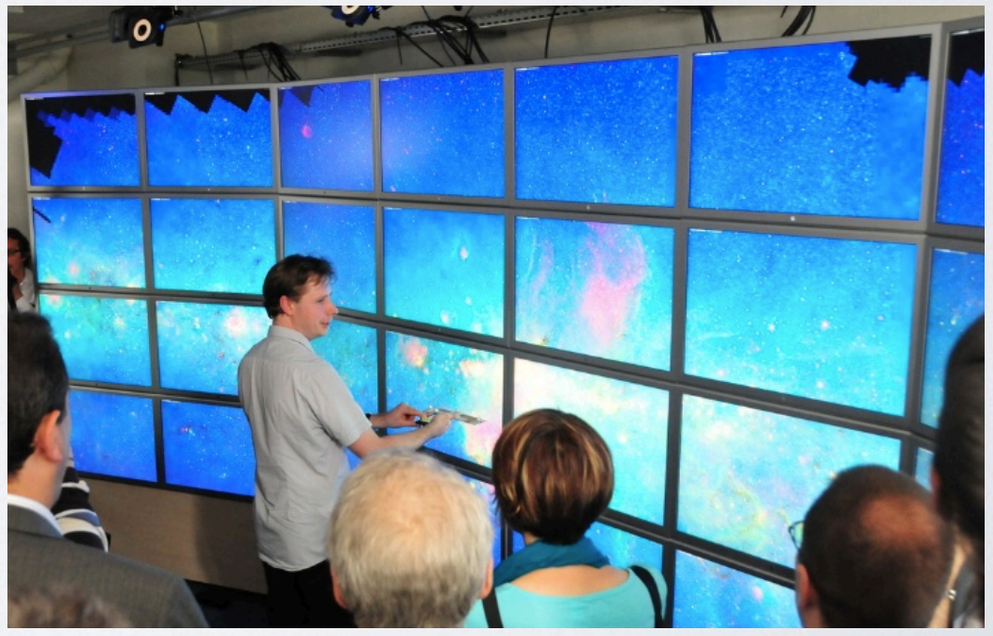
SOFTWARE:
WILD INPUT SERVER

- Aggregate input from multiple devices, e.g. touch input on iPhone + 6D position of iPhone
- Easily reconfigure input
- Uses the OSC protocol



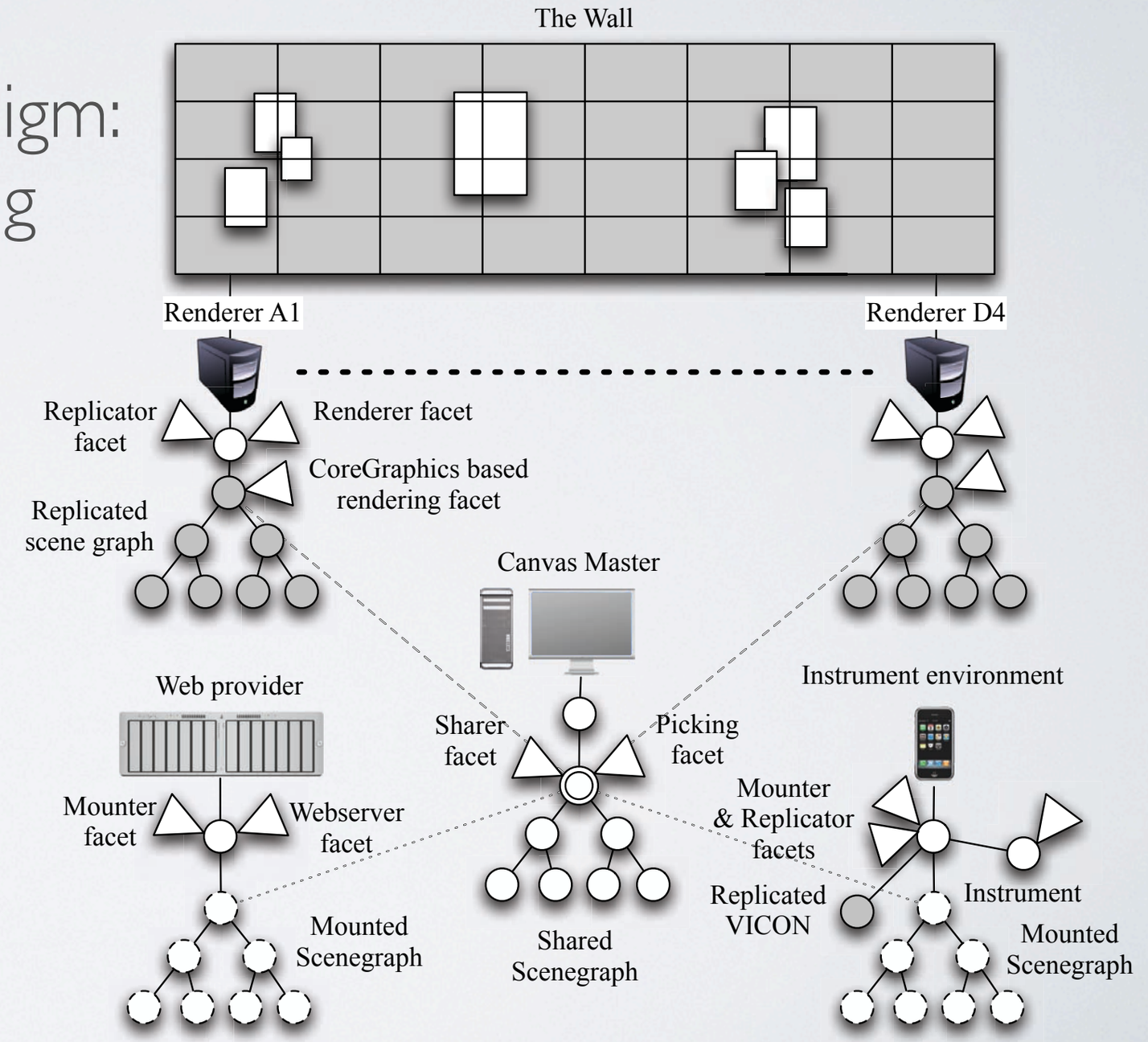
SOFTWARE: ZVTM

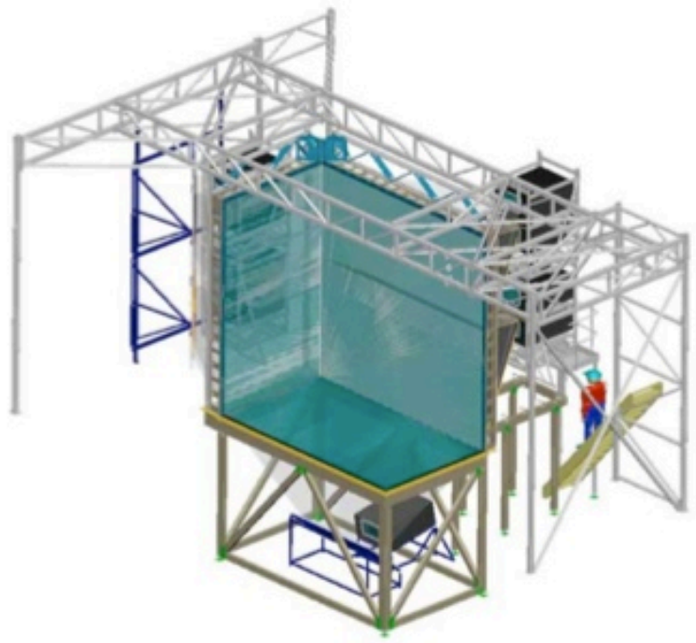
- Zoomable User Interface toolkit
- Distributed over the cluster
- Manage gigapixel images and complex multiscale scenes in real time

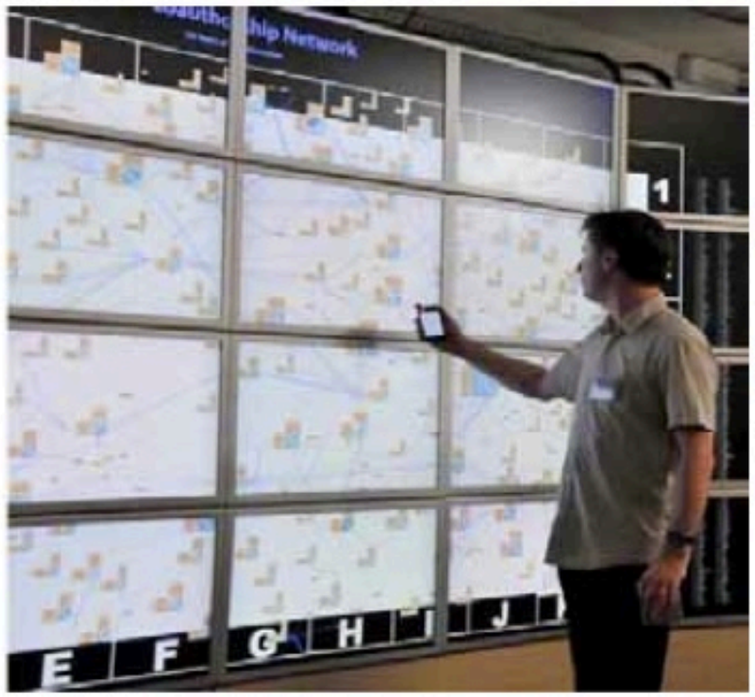


SOFTWARE: SUBSTANCE

- Novel programming paradigm: data-oriented programming
- Separate data (nodes) from behavior (facets)
- Sharing nodes and facets: replication or mounting
- Multisurface instrumental interaction







NEXT STEP: DIGISCOPE

- Network of 9 rooms interconnected by a telepresence system

MY INTERESTS

- Understanding interaction (not interfaces)
- Creating novel interaction techniques
- Supporting mediated communication
- Creating tools, toolkits, and computational models

http://insitu.lri.fr/Projects/WILD

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