

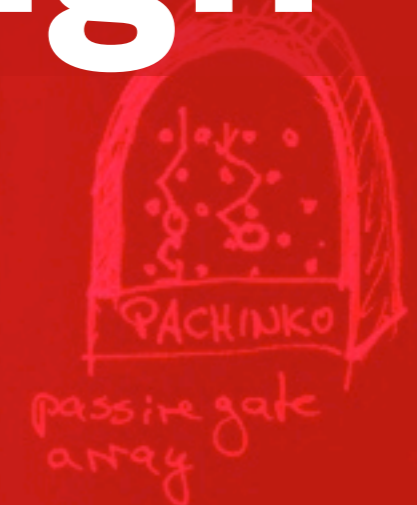
Information Design

Scott Klemmer
Autumn 2009



Alan's idea:
attach the wires to
the middle tubing

Bill: copyright



Scott: a gate that shows
who walked through it best
Bill: a gate that measures
ceremonial gates

Form Me To You And Back Again



Small Multiples

- Economy of line
- Many similarities enable us to notice differences



The person is gray... just enough to tell us there is a person. The important thing is that they are holding lights and what they are doing with the lights (the important information is bright - red & yellow)

Japanese book for children on t-shirt colors that match

SMALL MULTIPLES

International Women's Day



Echeverria, Heriberto 1971
March 8 - International Women's Day



Diaz, Estela 1974
March 8 - International Women's Day

Cuban Poster Art Gallery, <http://www.sims.berkeley.edu/~lcush/GenCat.html/>

Small multiples convey the important information:

multi-racial society & everyone is included (same exact form - the only data is the different colors!)

The woman is the same - but different professions. A woman can be anything she wants! Everyone is included.

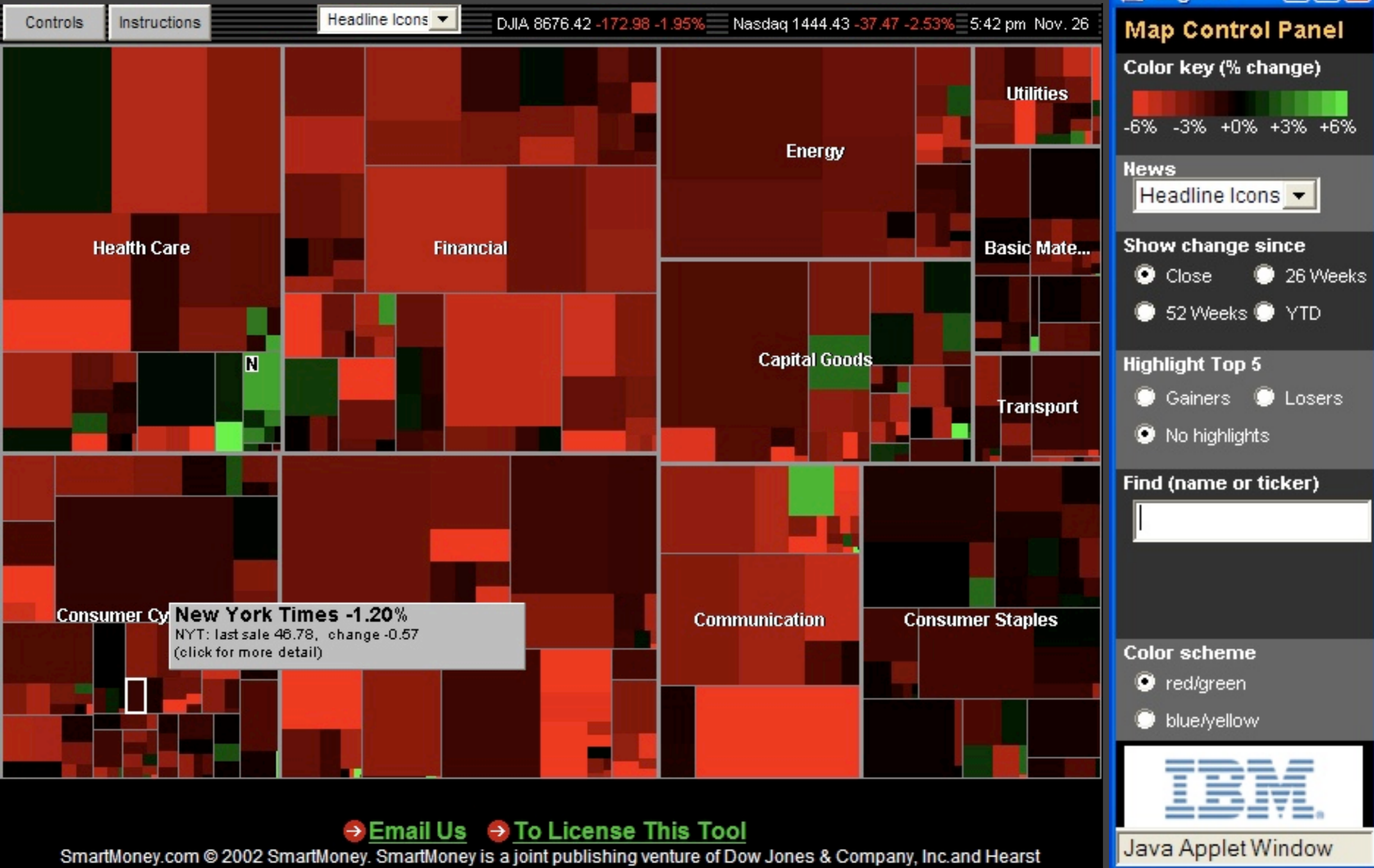
SMALL MULTIPLES

Reid Miles, Blue Note Cover



Small multiples for a visual pun. Tina Brooks is blue like all of the squares.

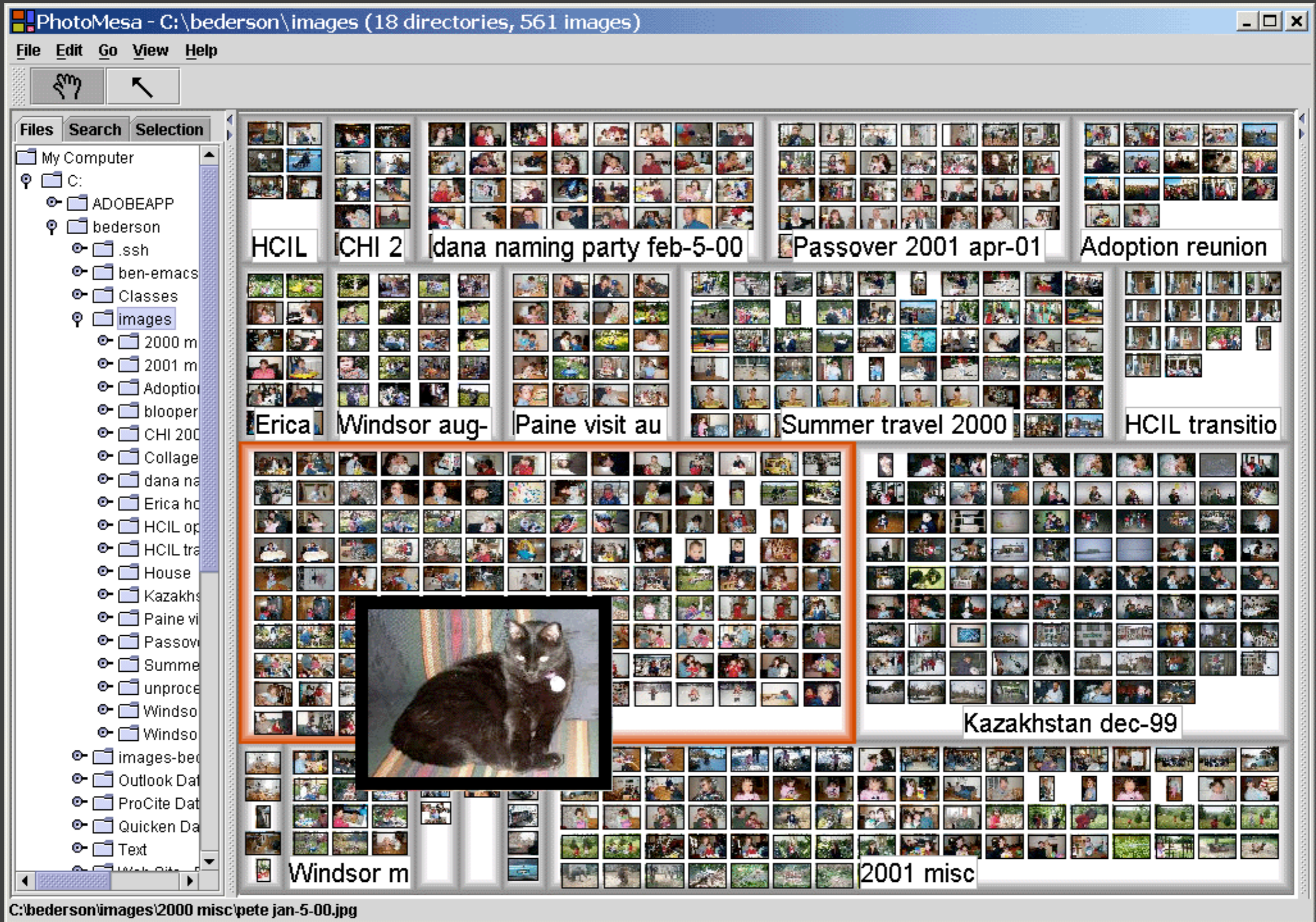
Tree Maps (SmartMoney)



Information visualization is big app for visual design on computers (less common on paper outside of cartography)

Ben Schneiderman's Tree Map (U. of Maryland)

Tree Maps (PhotoMesa)



Same technique.

Design Galleries

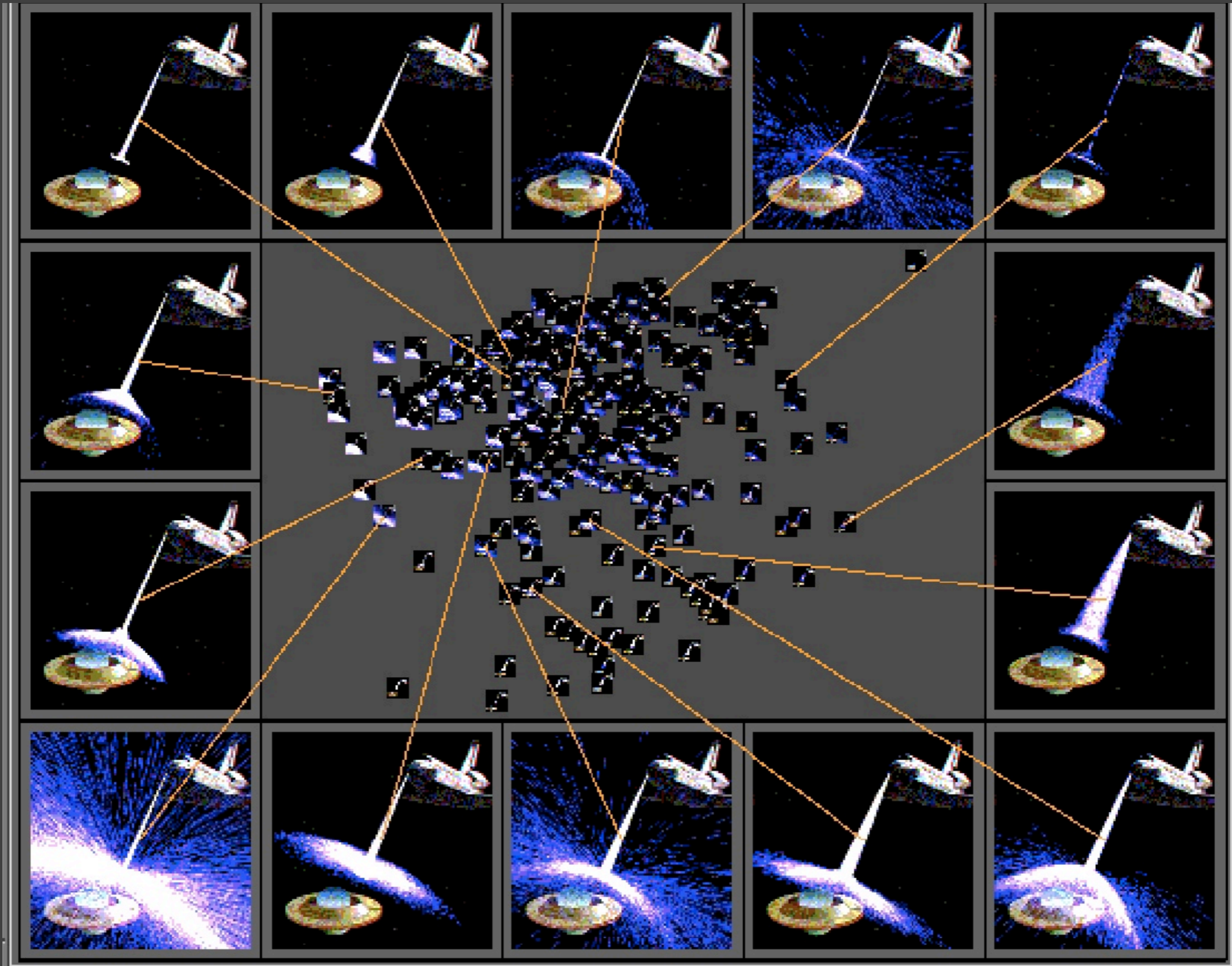


Figure 15: A DG for a particle system.

From Mitsubishi Research. If I use a slider, most systems give me no idea of what that control will do.

Design galleries let me preview the possible changes (a few examples large, lots of examples small).

Design Galleries

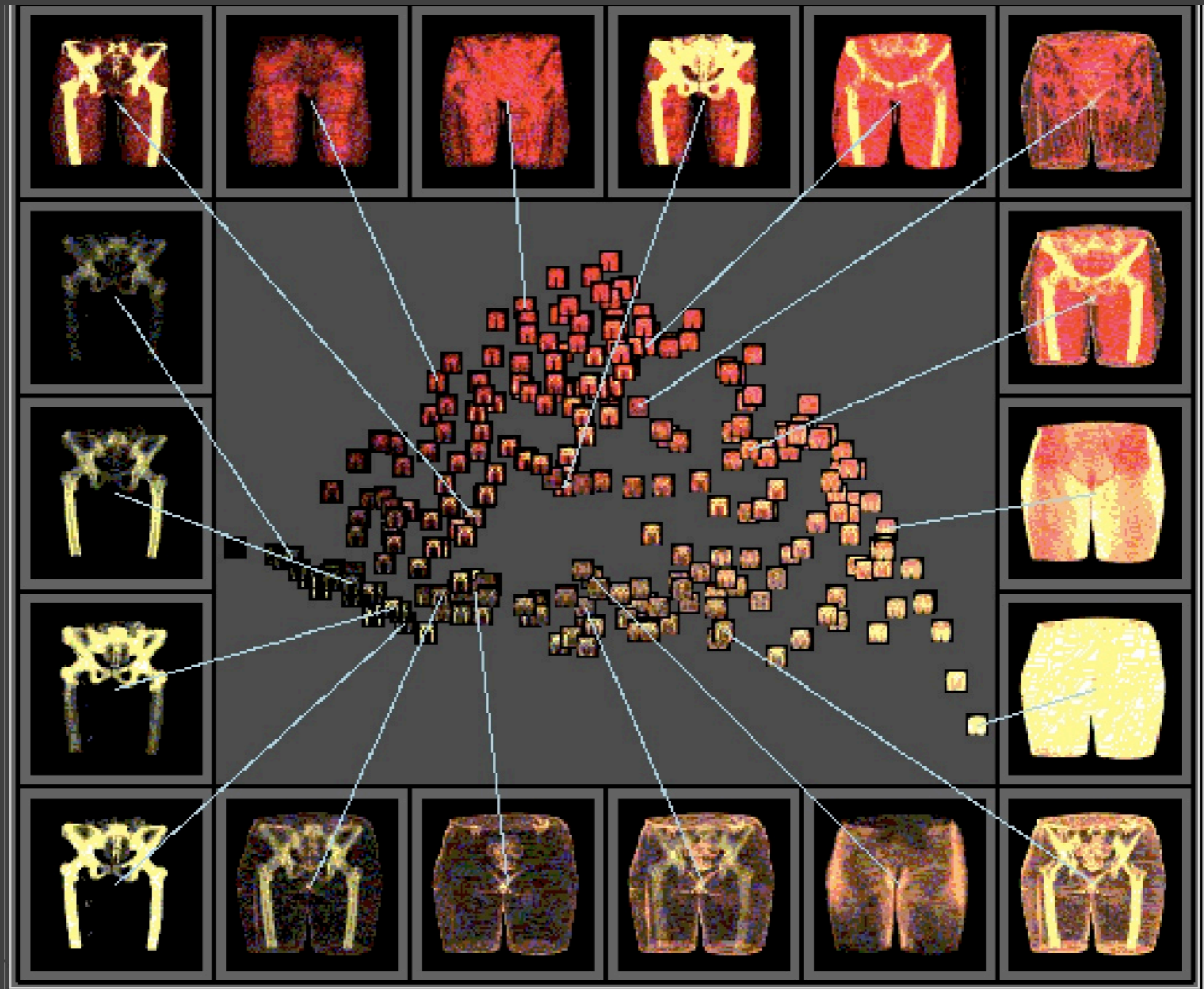


Figure 13: A DG with different opacity transfer functions.

Medical visualization

- a doctor where I want to see both the bones & the muscles. What colors should I apply to the data coming off the CAT Scan?

One tennet. Whenever you can explain something with a picture, it is better than text. When you can explain it with both, it is even better.

Basics of info. viz.

- Overview first
- Zoom and filter
- Details on command

(Shneiderman)

CHALLENGER



Challenger Disaster

HISTORY OF O-RING DAMAGE ON SRM FIELD JOINTS

1169

Oct 30, 1985

85-

4-

AFT

SRM No.	Cross Sectional View			Top View		Clocking Location (deg)	
	Erosion Depth (in.)	Perimeter Affected (deg)	Nominal Dia. (in.)	Length Of Max Erosion (in.)	Total Heat Affected Length (in.)		
61A LH Center Field**	22A	None	None	0.280	None	None	36° --66°
61A LH CENTER FIELD**	22A	NONE	NONE	0.280	NONE	NONE	338°-18°
51C LH Forward Field**	15A	0.010	154.0	0.280	4.25	5.25	163
51C RH Center Field (prim)***	15B	0.038	130.0	0.280	12.50	58.75	354
51C RH Center Field (sec)***	15B	None	45.0	0.280	None	29.50	354
41D RH Forward Field	13B	0.028	110.0	0.280	3.00	None	275
41C LH Aft Field*	11A	None	None	0.280	None	None	--
418 LH Forward Field	10A	0.040	217.0	0.280	3.00	14.50	351
STS-2 RH Aft Field	2B	0.053	116.0	0.280	--	--	90

*Hot gas path detected in putty. Indication of heat on O-ring, but no damage.

**Soot behind primary O-ring.

***Soot behind primary O-ring, heat affected secondary O-ring.

Clocking location of leak check port - 0 deg.

OTHER SRM-15 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY AND NO SOOT NEAR OR BEYOND THE PRIMARY O-RING.

SRM-22 FORWARD FIELD JOINT HAD PUTTY PATH TO PRIMARY O-RING, BUT NO O-RING EROSION AND NO SOOT BLOWBY. OTHER SRM-22 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY.

1 of 13 pages of material faxed to NASA by Morton Thiokol

BLOW BY HISTORY

SRM-15 WORST BLOW-BY

- 2 CASE JOINTS (80°), (110°) ARC
- MUCH WORSE VISUALLY THAN SRM-22

SRM 22 BLOW-BY

- 2 CASE JOINTS (30-40°)

SRM-13A, 15, 16A, 18, 23A 24A

- NOZZLE BLOW-BY

HISTORY OF O-RING TEMPERATURES (DEGREES - F)

<u>MOTOR</u>	<u>MBT</u>	<u>AMB</u>	<u>O-RING</u>	<u>WIND</u>
DM-4	68	36	47	10 MPH
DM-2	76	45	52	10 MPH
QM-3	72.5	40	48	10 MPH
QM-4	76	48	51	10 MPH
SRM-15	52	64	53	10 MPH
SRM-22	77	78	75	10 MPH
SRM-25	55	26	29 27	10 MPH 25 MPH

1 of 13 pages of material faxed to NASA by Morton Thiokol

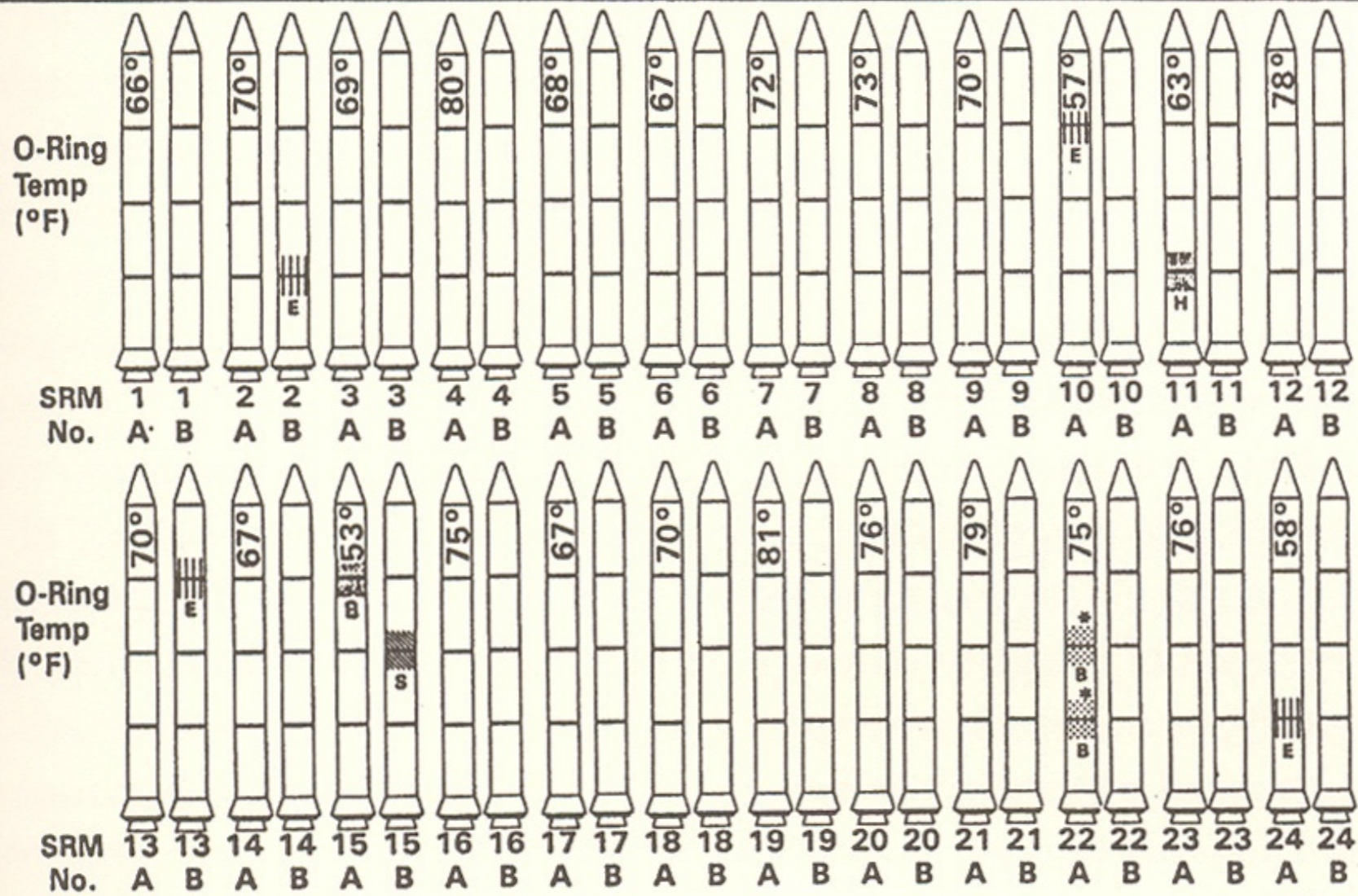
Shows only two of the launches (SRM 15 and SRM 22) where there were problems with blow-by..

In both cases there were problems, but the problems were worse in SRM 15






Conclusion - shouldn't launch at low temps... (faulty - what about the rest of the data? What about things besides blow-by?)

Point - should always be careful to include evidence of failures *and* successes... The differences are the important part!

History of O-Ring Damage in Field Joints (Cont)



Code

-  = Heating of Secondary O-Ring
-  = Primary O-Ring Blowby
-  = Primary O-Ring Erosion
-  = Heating of Primary O-Ring
-  = No Damage

MORTON THIOKOL, INC.
Wasatch Operations

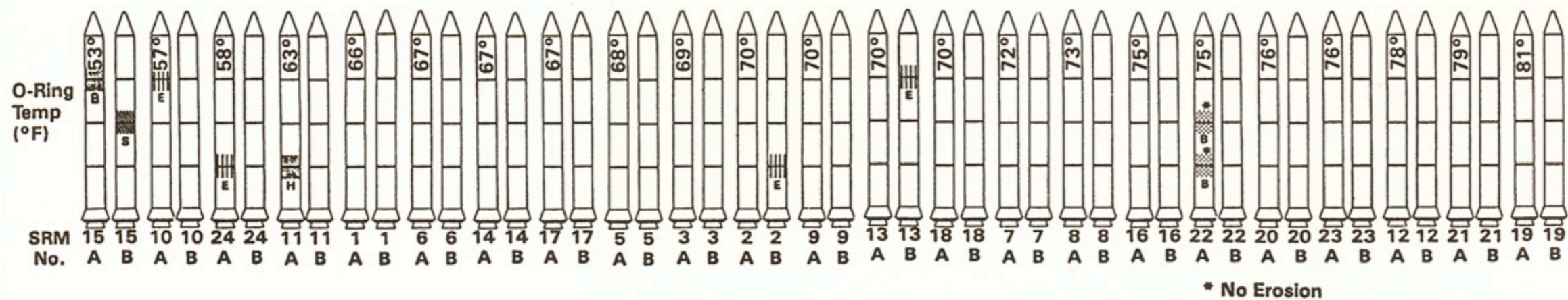
* No Erosion

00400-14

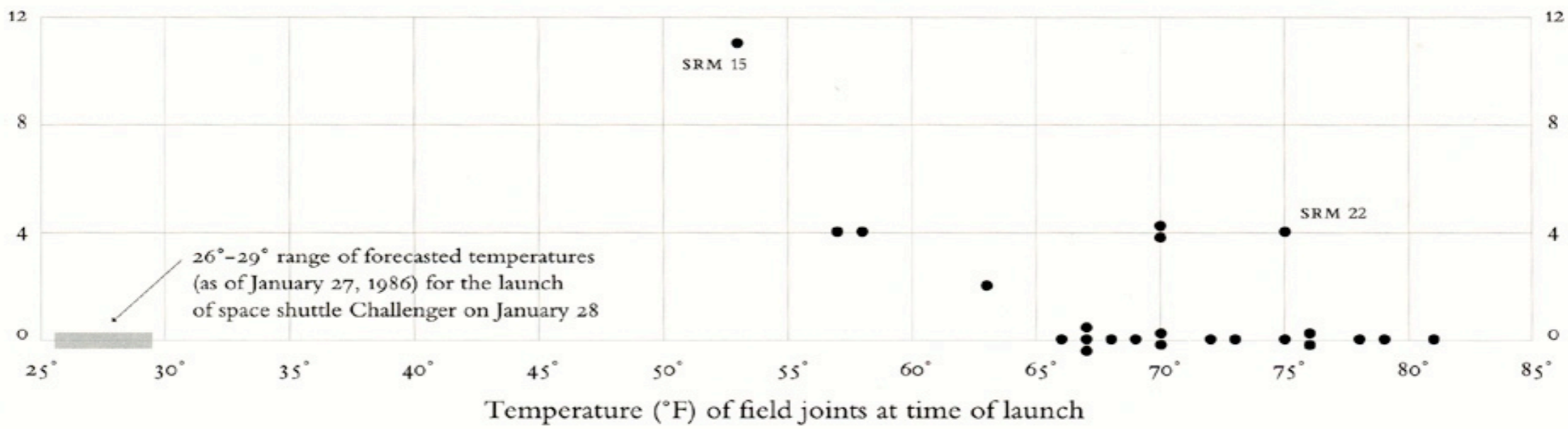
INFORMATION ON THIS PAGE WAS PREPARED TO SUPPORT AN ORAL PRESENTATION AND CANNOT BE CONSIDERED COMPLETE WITHOUT THE ORAL DISCUSSION

E. Tufte, pp. 46-47, Visual Explanations

- Problems:
- chartjunk
- Order the o-ring problems by temperature
- Show both problems and non-problems
- Extend the scale to make the point that the launch was much colder than all the previous launches



O-ring damage index, each launch



Redrawn by E. Tufte, p. 49 , Visual Explanations

Functions of visualizations

Communicate information to others

Make a point

Tell a story

Make decisions

Support analysis and reasoning

Answer a question

“One image = One diagnosis”

To explore and discover; encourage creativity

Look at things in a new way

“The purpose of computing is insight, not numbers” [R. Hamming]

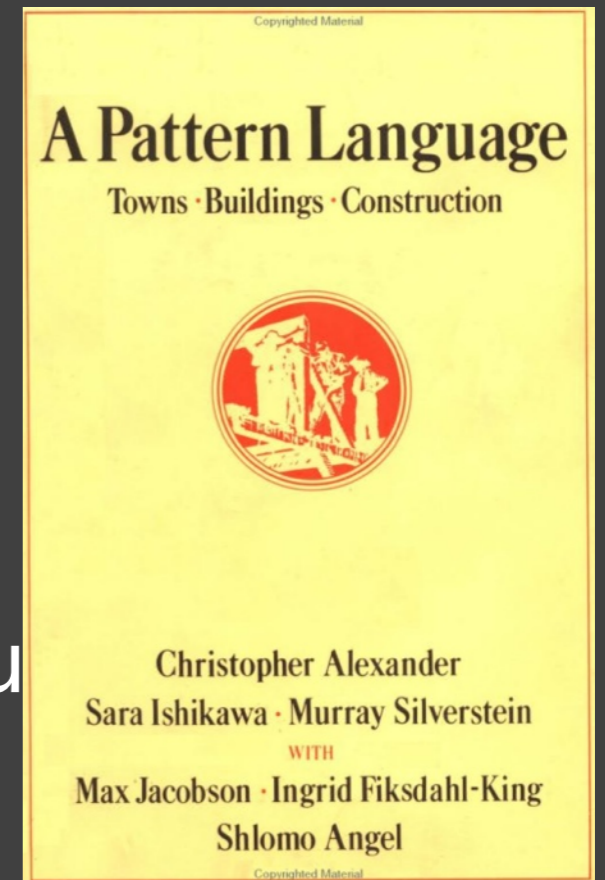
Inspire

The Purpose of Data Visualization is to
Help People Think and Communicate

The Importance of Patterns

Key options

- Design patterns
- Designing by example
- Users will work well with UI's that build on concepts that they are familiar with



Web Design Patterns

- Web patterns important and persistent(!)

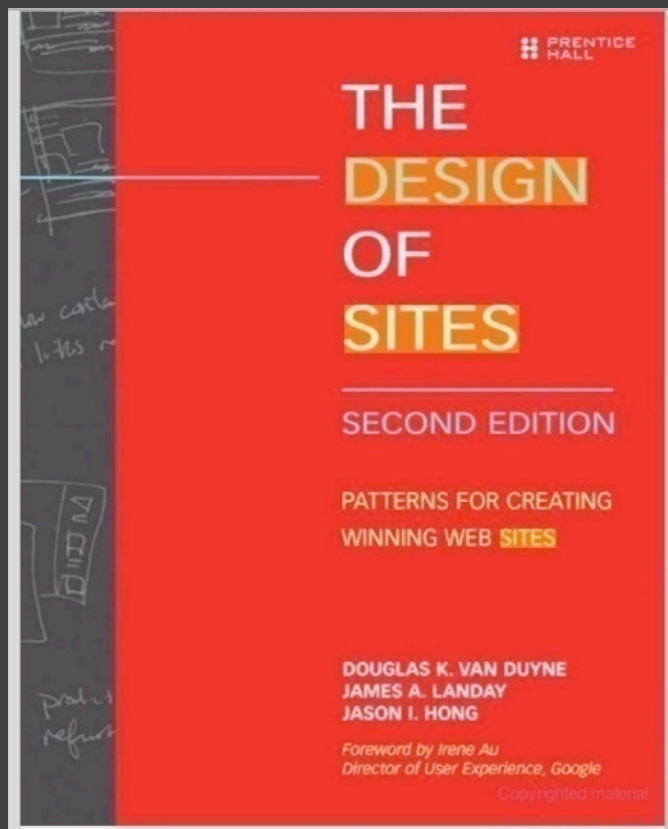


Figure 2.10

These screen shots illustrate the evolution of the home-pages of CNN, MSN, Yahoo!, and Google from 2001 to 2006. Note that the core structure and the underlying design patterns used by these Web sites have not changed over the years. For the most part, the only major change to these Web sites has been an increase in information density.



A1 PERSONAL E-COMMERCE



Figure A1.1

L. L. Bean gives customers a sense of familiarity because the categories on the site (left) are similar to what they find in L. L. Bean's physical stores and catalogs. The bright colors, clean layout and navigation, and picture in the center work together to draw people in.

A1.1

(www.llbean.com, February 2, 2002)

WBC@MSNBC Search Updated: 3 hours ago MSN Home Home Sign In **msn**

MSNBC TV | TODAY SHOW | NBC NIGHTLY NEWS | DATELINE NBC | MEET THE PRESS

MSNBC

'DOING GREAT'
10-month-old conjoined twin girls successfully separated
Video

EMERGENCY IN IRAQ

- U.S. death toll in Iraq reaches 2,500
- New al-Qaida leader in Iraq is ID'd
- House, Senate begin debate on Iraq

ALSO MAKING HEADLINES

- Ocean sanctuary planned | • Images
- 'Today': Spears lashes out | • Video
- Mickelson eyes 3 in a row | • Scores

Bob Photo: / Children Hospital Los Angeles

IN THE NEWS

- 10,000 coalition troops begin Afghan offensive
- Early-morning earthquake rattles Northern California
- NBC poll: 'Baby bounce' in Bush approval | Video
- Fight over boy's circumcision goes to court | Video
- Wall Street rallies on good earnings, data | Video
- Mickelson seeks 3rd major in a row | Scoreboard

NBL NEWS HIGHLIGHTS Radio headlines

- First Read: Partisan, mature debate on Iraq war
- Are the Palestinians on the brink of civil war?
- U.S. acc spur breast-feeding debate | Video

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INSIDE MSNBC.COM

- Bus blast kills 62 in Sri Lanka; rebels suspected
- Bush apologizes for mocking journalist's 'shades'
- NBC: Stolen computer server spurs ID theft fears

ALSO ON MSNBC.COM

- Connections
- Take 3 magazine

SHOPPING

- Shopping
- Jobs
- Dating with Match.com
- Autos
- Real Estate with HomeAdvisor.com

Most Popular

MSNBC Classifieds

Shopping

Jobs

Dating
with Match.com

Autos

Real Estate
with HomeAdvisor.com

Figure C1.1

MSNBC gives readers a broad selection of topics to explore, while highlighting news of general interest. With its clearly distinguished links, customers need only a quick glance to see how to navigate the site. Subsections highlighted in the navigation bar show more detailed areas of interest. Readers can customize the news by entering a zip code to get local news.

The screenshot shows the homepage of 1-800-flowers.com. At the top, there's a navigation bar with links for home, flowers, plants, gift baskets, sweets & food gifts, baby showers & more, and birthday gifts. A search bar and account options are also present. Below the navigation, there are several promotional banners and product listings:

- Florist Designed:** A large bouquet of yellow and pink flowers in a glass vase, priced at \$59.99.
- Fresh From Our Growers Weekly Special:** A bouquet of red and yellow roses, with a "BUY 24 GET 24 FREE" offer, priced at \$29.99 - \$49.99.
- Father's Day Sale:** A banner announcing a "SAVE UP TO 20%" on select flowers & gifts, with Father's Day on Sunday, June 18th.
- What's Hot:** A list of featured items including Father's Day bouquets, Summer bouquets, Same Day Delivery, Happy Hour, Grower's Specials, Luxury Flowers & Gifts, Sunsets, \$30 Bouquets, With a Backyard Makeover, Day Parties and SAVE!, and Gifts under \$50.
- Birthday:** A list of items including Bouquets, Gift Baskets, Food Gifts & Sweets, and Teddy Bears & More.
- Occasions & Sentiments:** A list of items including Anniversaries, Birthday Gifts, Congratulations, Get Well, Graduation, Last Bouquet, Love & Romance, New Baby, Plans, Sorrowful, Thank You, and Wedding Flowers and Gifts.
- Flower Type:** A list of items including Carnations, Dahlias, Lilies, Orchids, Roses, and Sunflowers.
- Designer Flowers:** A list of items including Dryston Casey, Jane Carré, John Muligan, Jane Harper, Nico De Smet, and Designer Flowers.
- Sympathy & Funerals:** A list of items including Funeral Flowers, Funeral Plants, Funeral Services, and View All.
- Summer Rose Mosaic:** A bouquet of yellow roses in a patterned vase, with a "DOUBLE POINTS!" offer, priced at \$59.99.
- Gardenia in a Basket:** A basket of gardenias, with a "SAVE 10%" offer, priced at \$34.99 - \$38.99.
- Cheryl & Co. Father's Day Golf Bag:** A gift basket containing a golf bag and other items, priced at \$49.99.
- Send a Birthday surprise!** A button with a birthday cake icon.
- Happy Hour Bouquet Same-day delivery:** A button with a bouquet icon and a "Click here" link.
- FRESH logo:** A circular logo with the word "FRESH" and "Style - Variety" around it.
- YOU COULD WIN A \$5,000 Backyard for Dad!:** A banner with a "ENTER NOW" button.
- Luxury Flowers & Gifts:** A banner with a "Shop Now" button.
- enter your email:** A form field for entering an email address, with a "submit" button.

At the bottom of the page, there is a footer with various links and contact information.

Figure G1.1
1-800-flowers.com highlights several kinds of featured products, including "Florist Designed," as well as specials like "DOUBLE POINTS!" and "SAVE 10%." The attractive photographs also give the flowers a seductive quality.