Visualisation d'informations (4)

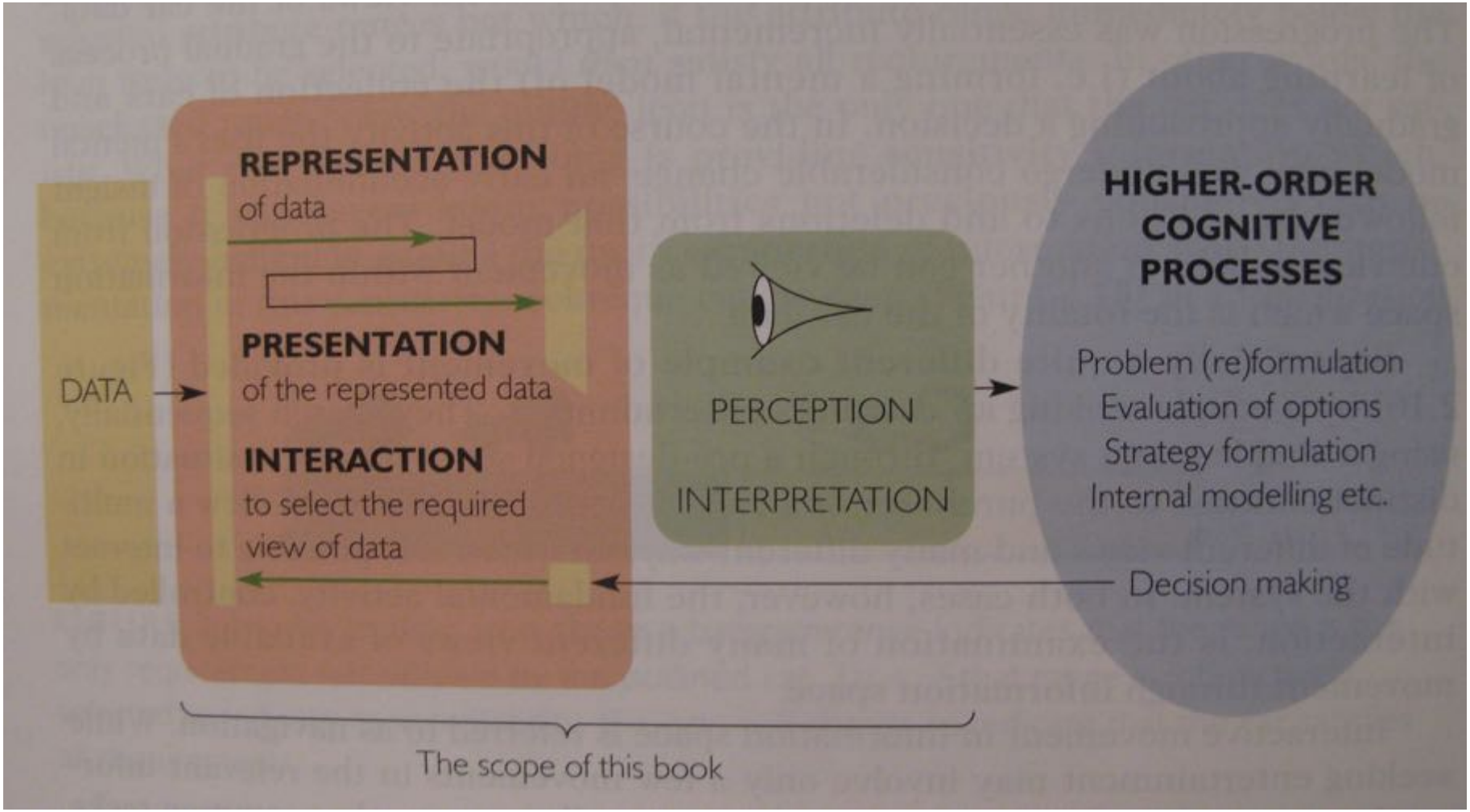
Interaction

Pierre Cubaud <cubaud@cnam.fr>

janvier 2021

le cnam

(rappel cours#1)



[Spence] p.26

(rappel cours#1)

There are many visual design guidelines but the basic principle might be summarized as the Visual Information Seeking Mantra:

Overview first, zoom and filter, then details-on-demand
Overview first, zoom and filter, then details-on-demand
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Overview first, zoom and filter, then details-on-demand
Overview first, zoom and filter, then details-on-demand
Overview first, zoom and filter, then details-on-demand

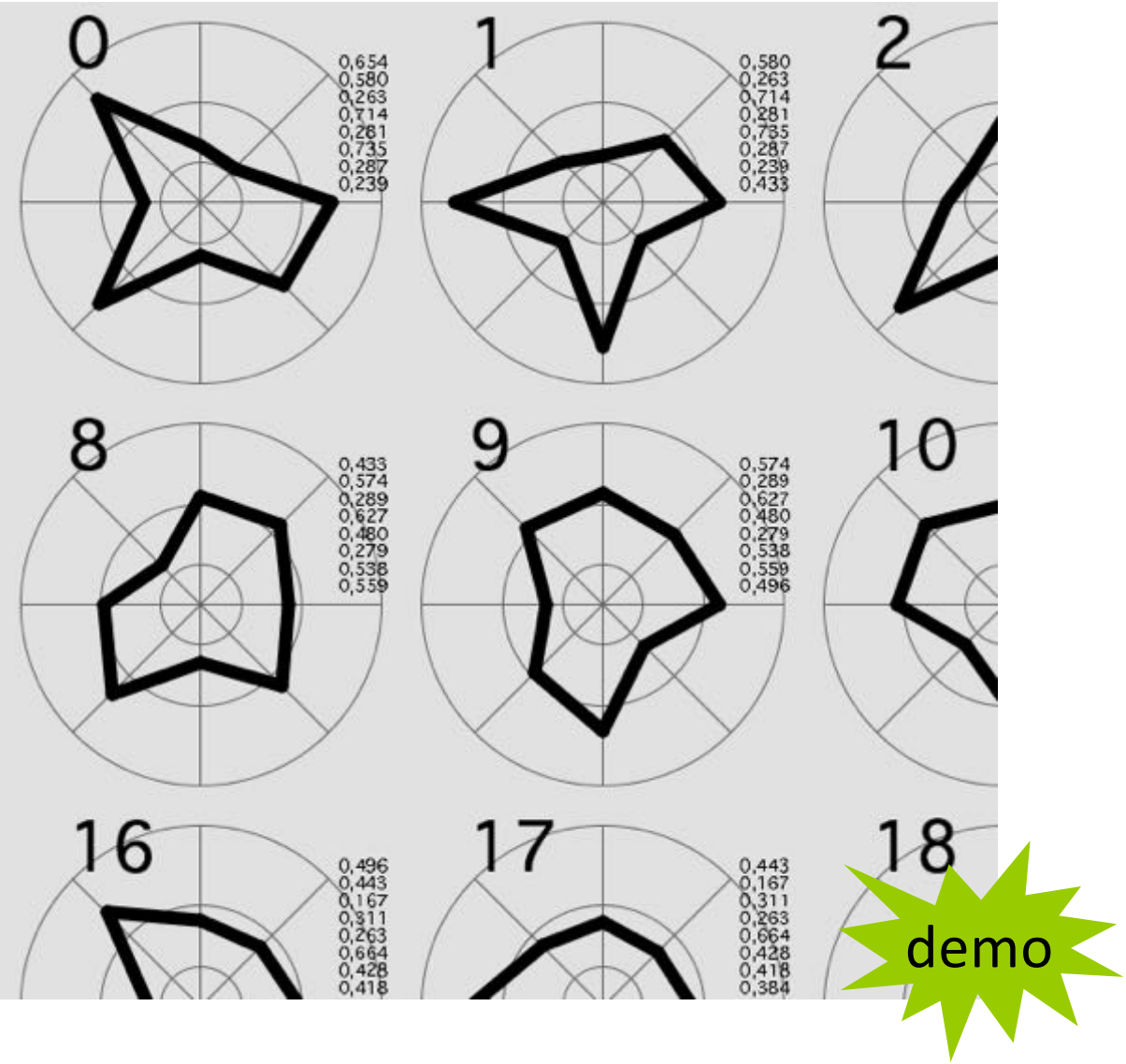
Shneiderman "The eyes have it : a task by data type taxonomy for information visualizations"

The seven tasks are at a high level of abstraction. More tasks and refinements of these tasks would be natural next steps in expanding this table. The seven tasks are:

Overview: Gain an overview of the entire collection.
Zoom : Zoom in on items of interest
Filter: filter out uninteresting items.
Details-on-demand: Select an item or group and get details when needed.
Relate: View relationships among items.
History: Keep a history of actions to support undo, replay, and progressive refinement.
Extract: Allow extraction of sub-collections and of the query parameters.

Shneiderman "The eyes have it : a task by data type taxonomy for information visualizations"

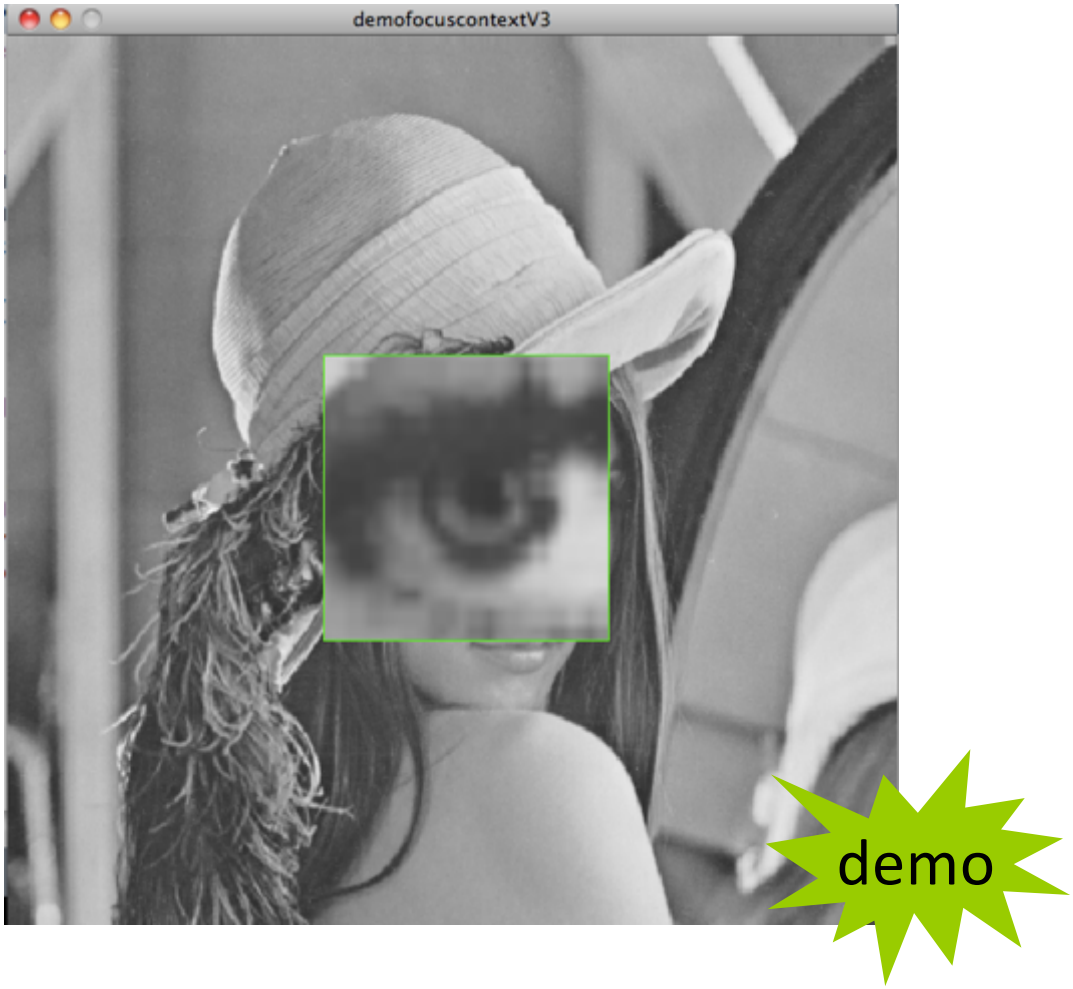
Simulation du principe overview-zoom-filter



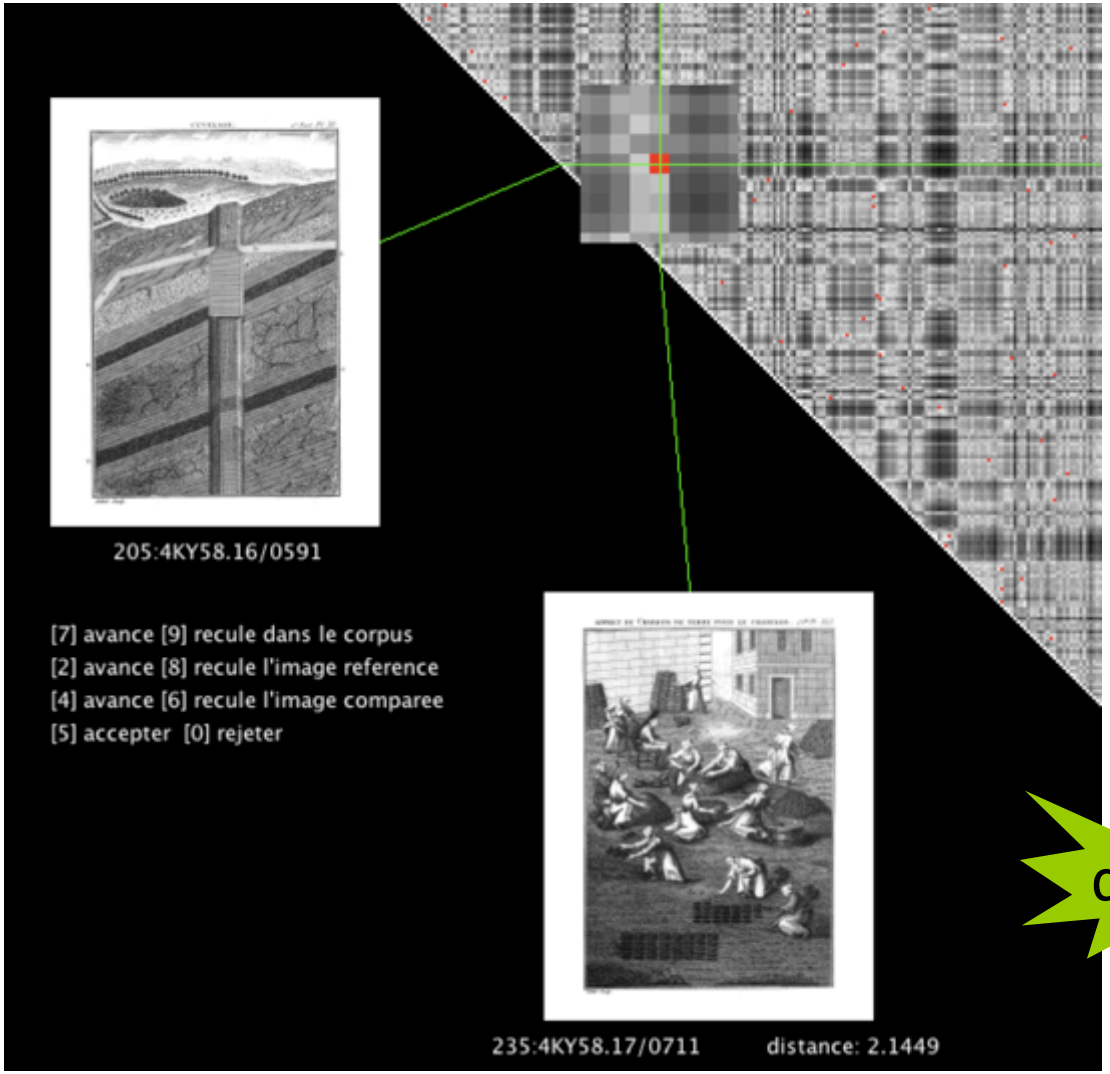
Plan de la suite de l'exposé

1. Vue globale et détail
2. Navigation par zoom et pan
3. Distorsion
4. Filtrage et mise en relation
5. Dispositifs d'affichage

comment faire co-exister vue globale et détail ?

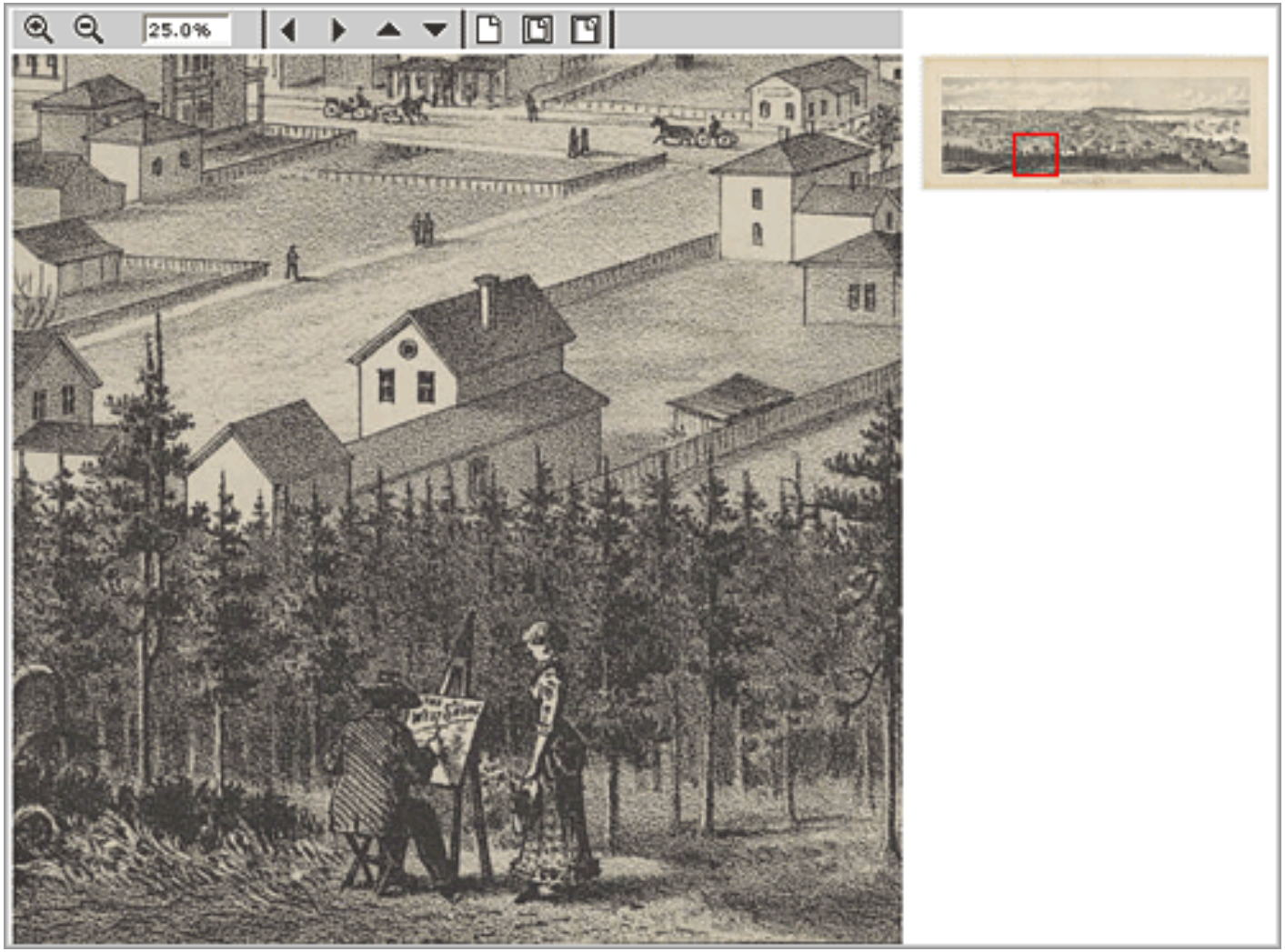


Application : explorer une matrice de similarité entre images



demo

La vignette (et le chemin de fer)



http://www.oclc.org/americalatina/es/contentdm/about/displaying/seattlemap2.gif

Petit exercice : citer 5 logiciels qui emploient cette technique

#1 : acrobat reader (page courante + miniatures sur le côté)

#2 :

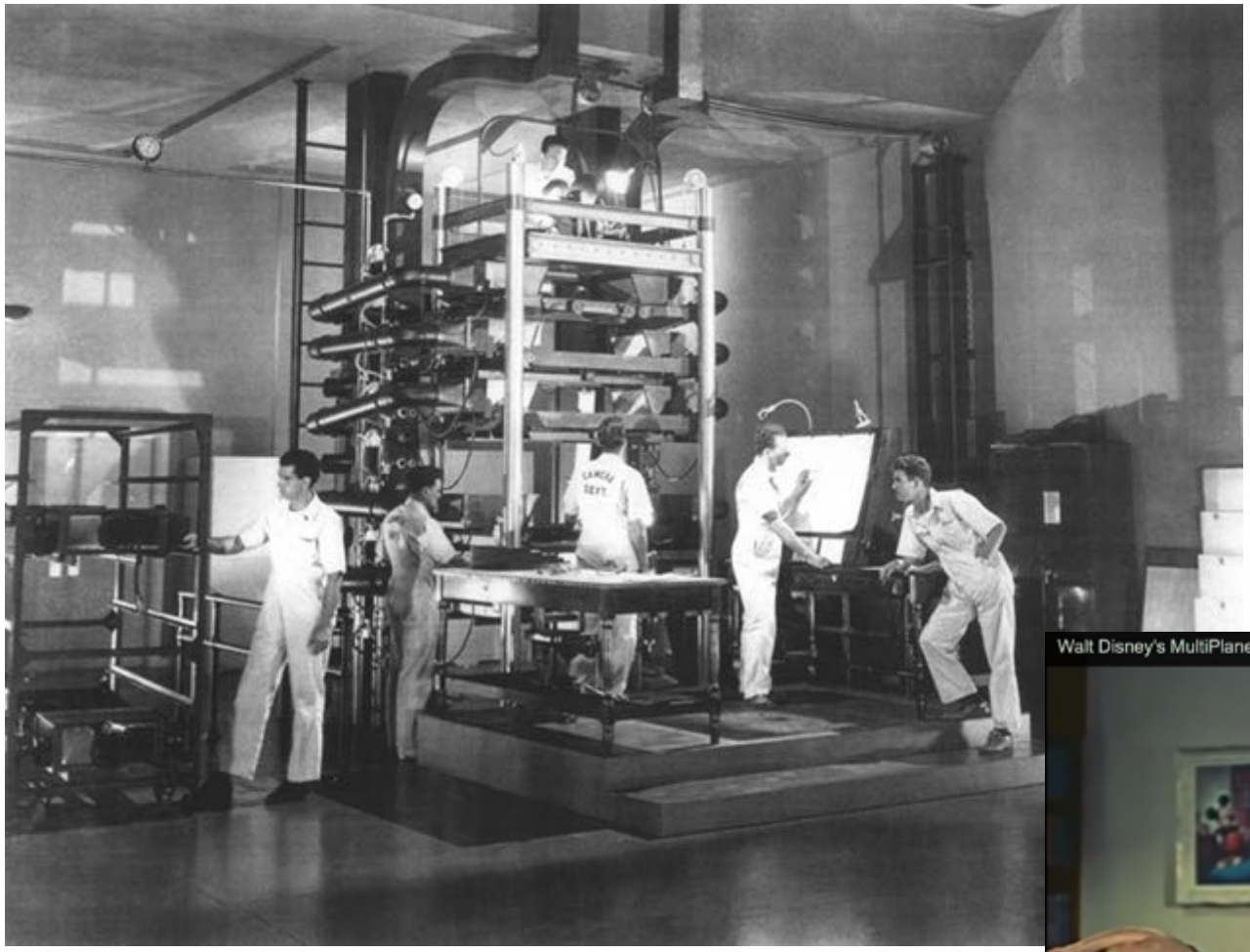
#3 :

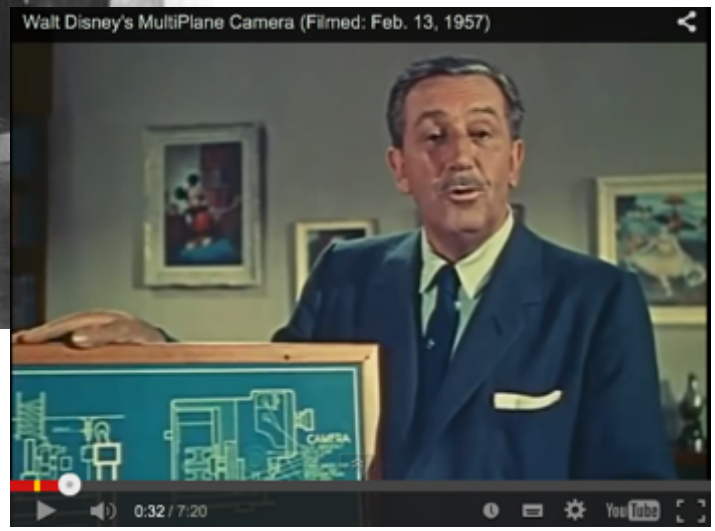
#4 :

#5 :

2. Le zoom (et le pan)

La caméra multi-plans de Disney (1937)





http://www.waltdisney.org/content/multiplane-camera

http://community.digitalmediaacademy.org/tag/walt-disney-multiplane-camera

DAC-1
(1959 et suiv.)
General Motors et IBM

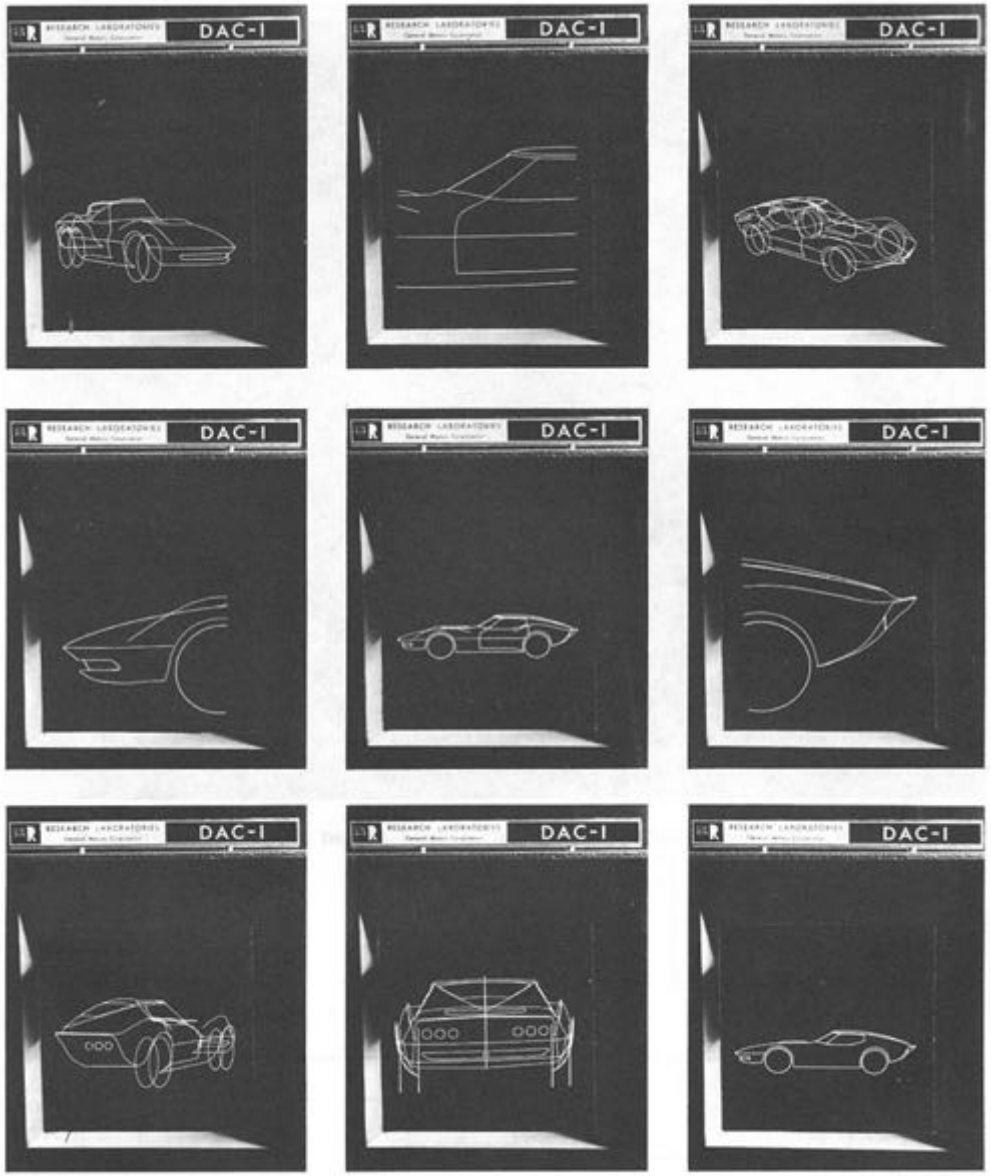


FIG. 1–8 Scale expansion, rotation, and partial views in a DAC-1 design exercise.

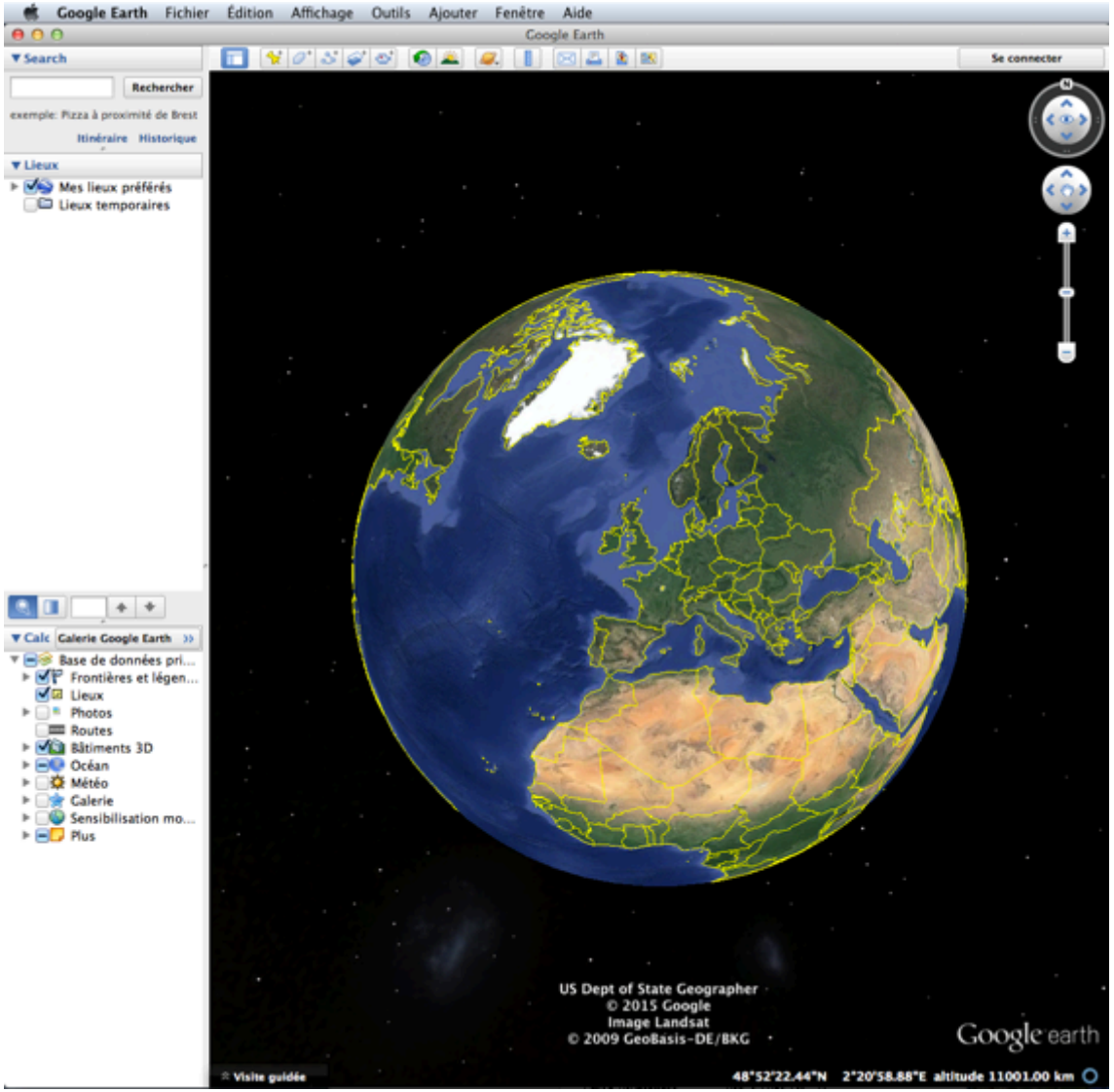
https://design.osu.edu/carlson/history/lesson3.html

Les premiers SIG (uk : GIS)

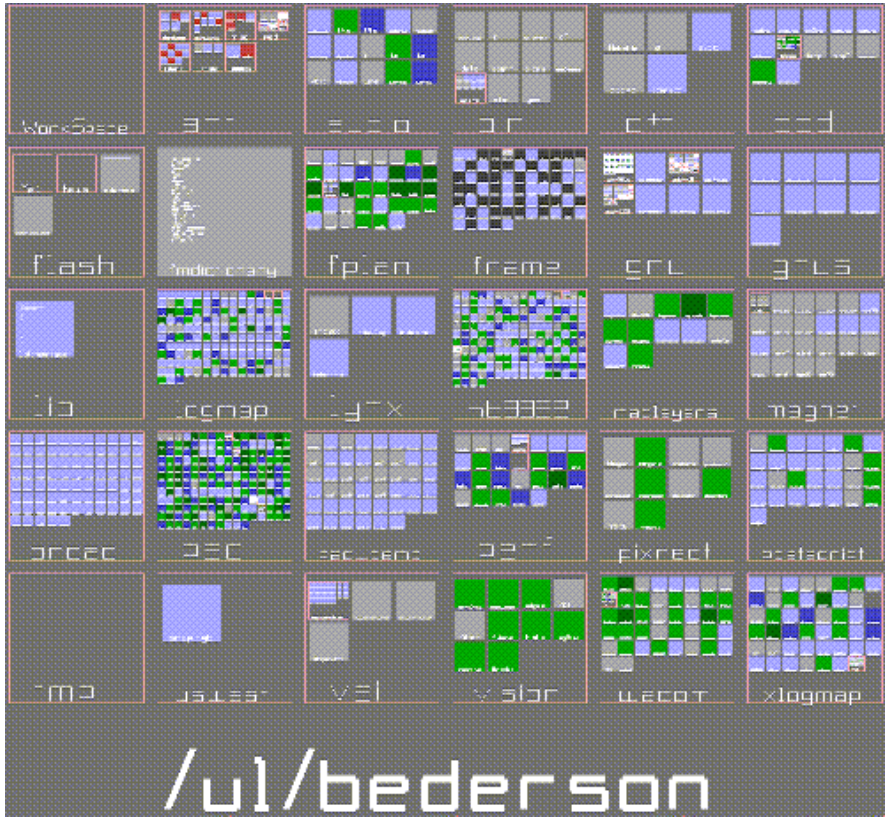
le CGIS et Roger Tomlinson :
film "data for decision" de 1967

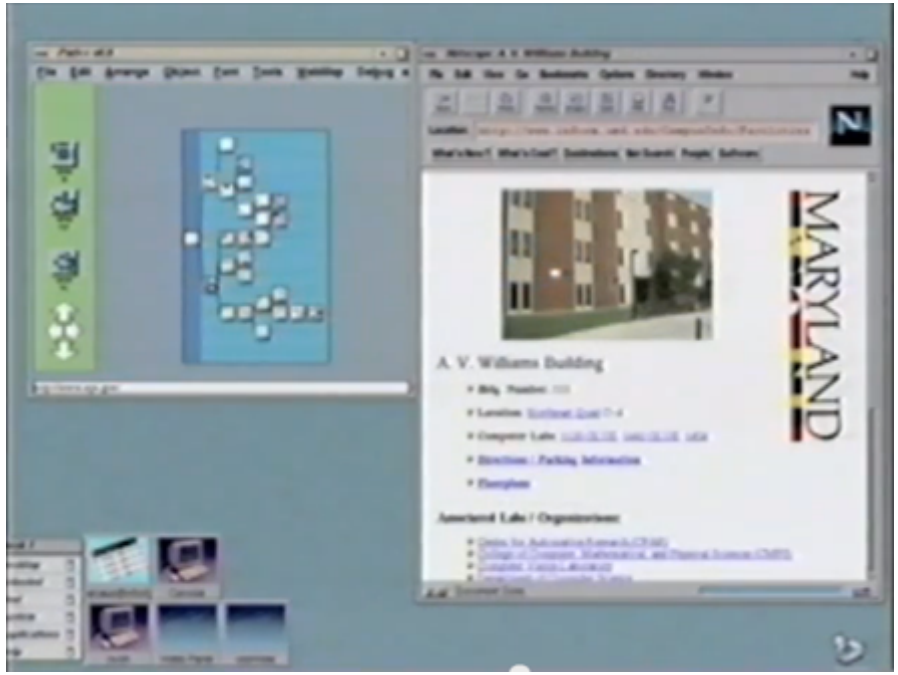
http://gisandscience.com/2009/01/25/data-for-decision-42-years-later/

Google Earth (2005, ex "earth viewer" de Keyhole)



Les ZUI : pad++ (Bederson, Stead, Hollan CHI'1994)



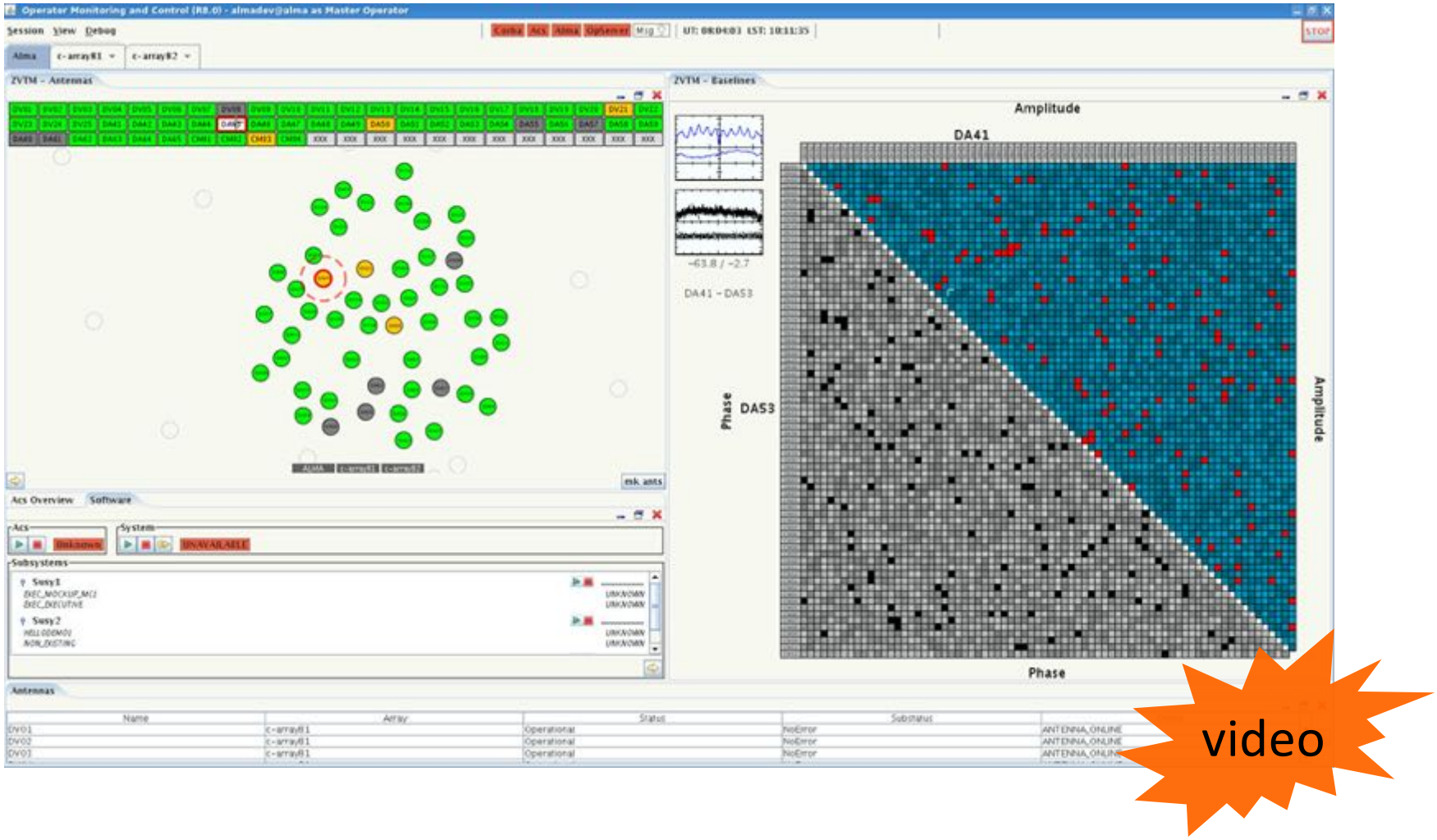


https://www.youtube.com/watch?v=62KcJ09k7cE

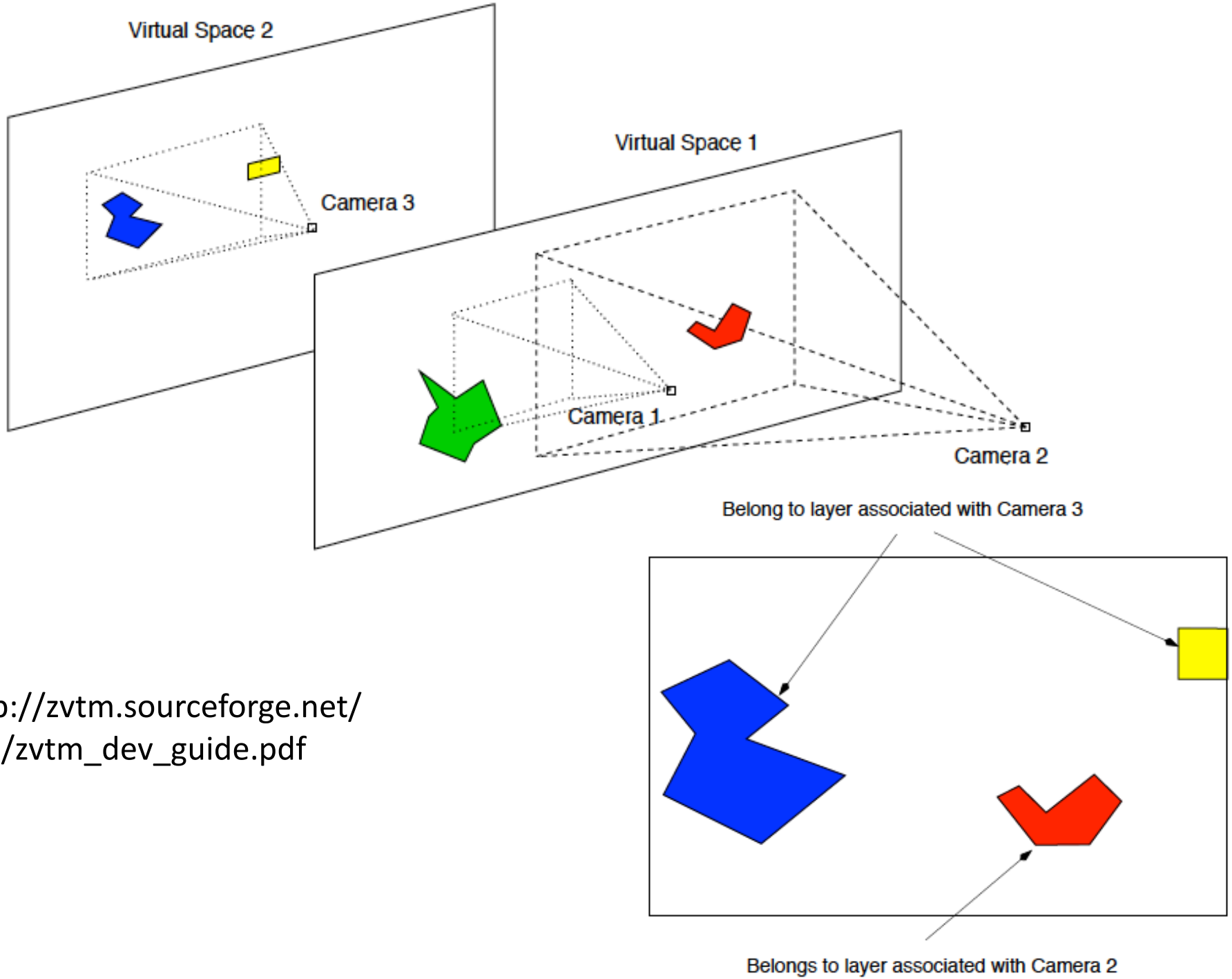
https://www.cs.umd.edu/hcil/pad++/papers/chi-94-pad/index.html

un autre plus récent : ZVTM (E. Pietriga et al., INRIA)

http://zvtm.sourceforge.net/



utilisation pour le radio-téléscope Alma

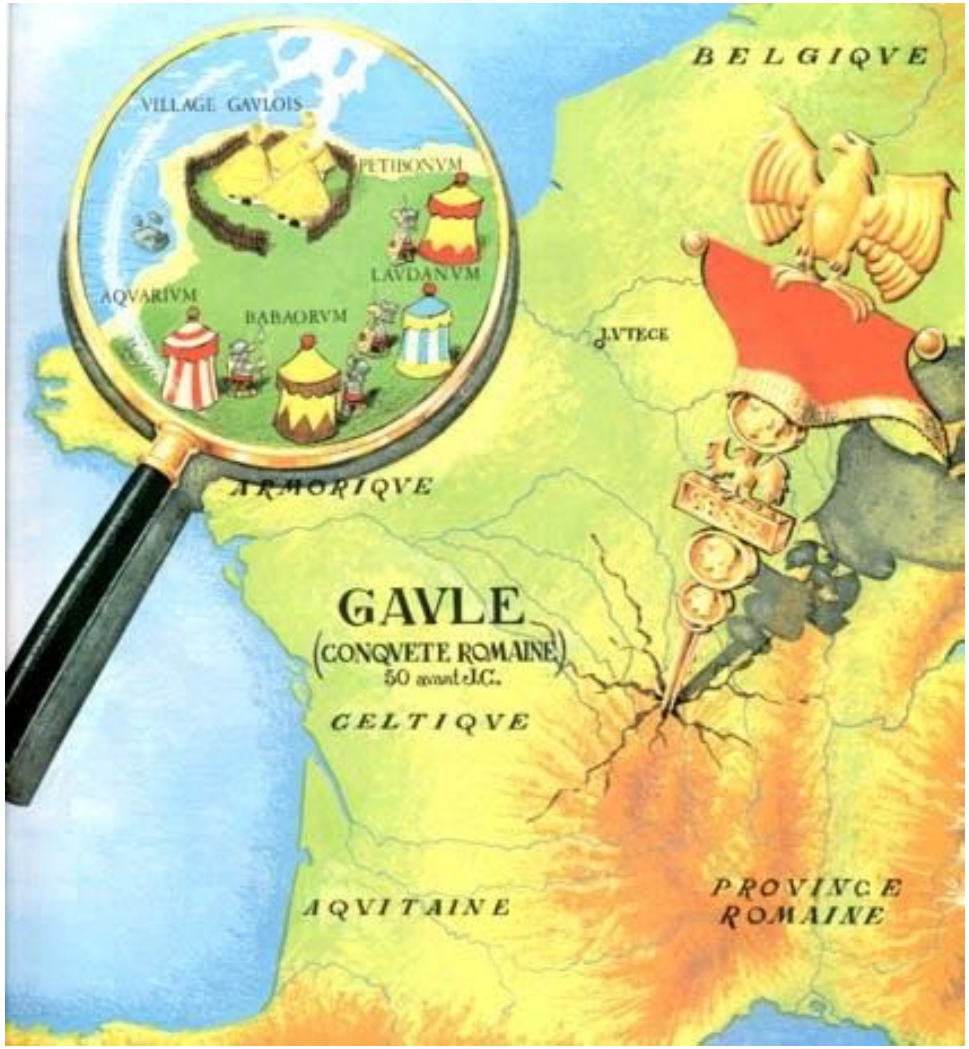


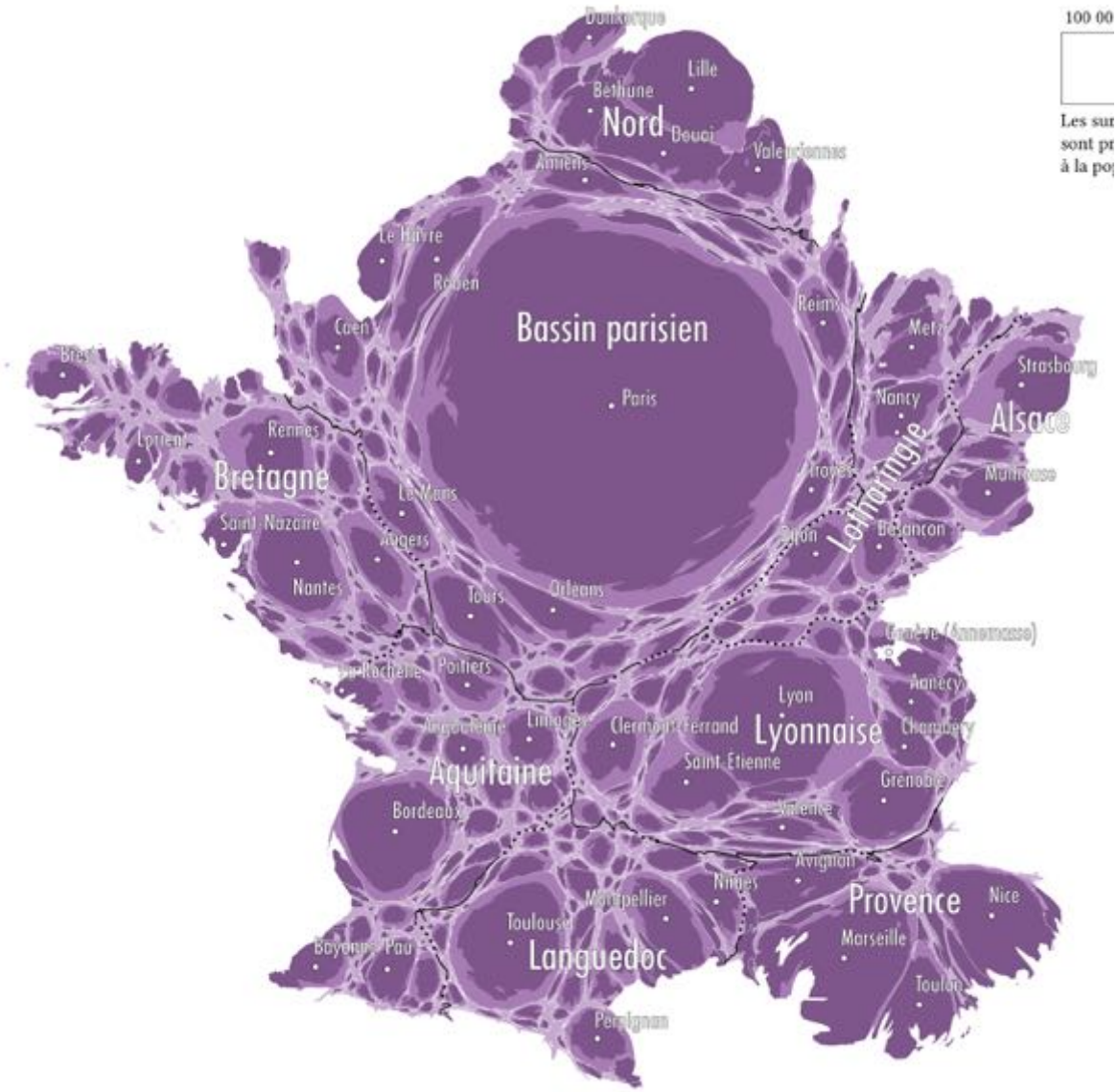
http://zvtm.sourceforge.net/doc/zvtm_dev_guide.pdf

mur d'images (500 Mpix)

CNAM/CEDRIC - projet FUI "Demat-Factory" 2009-11

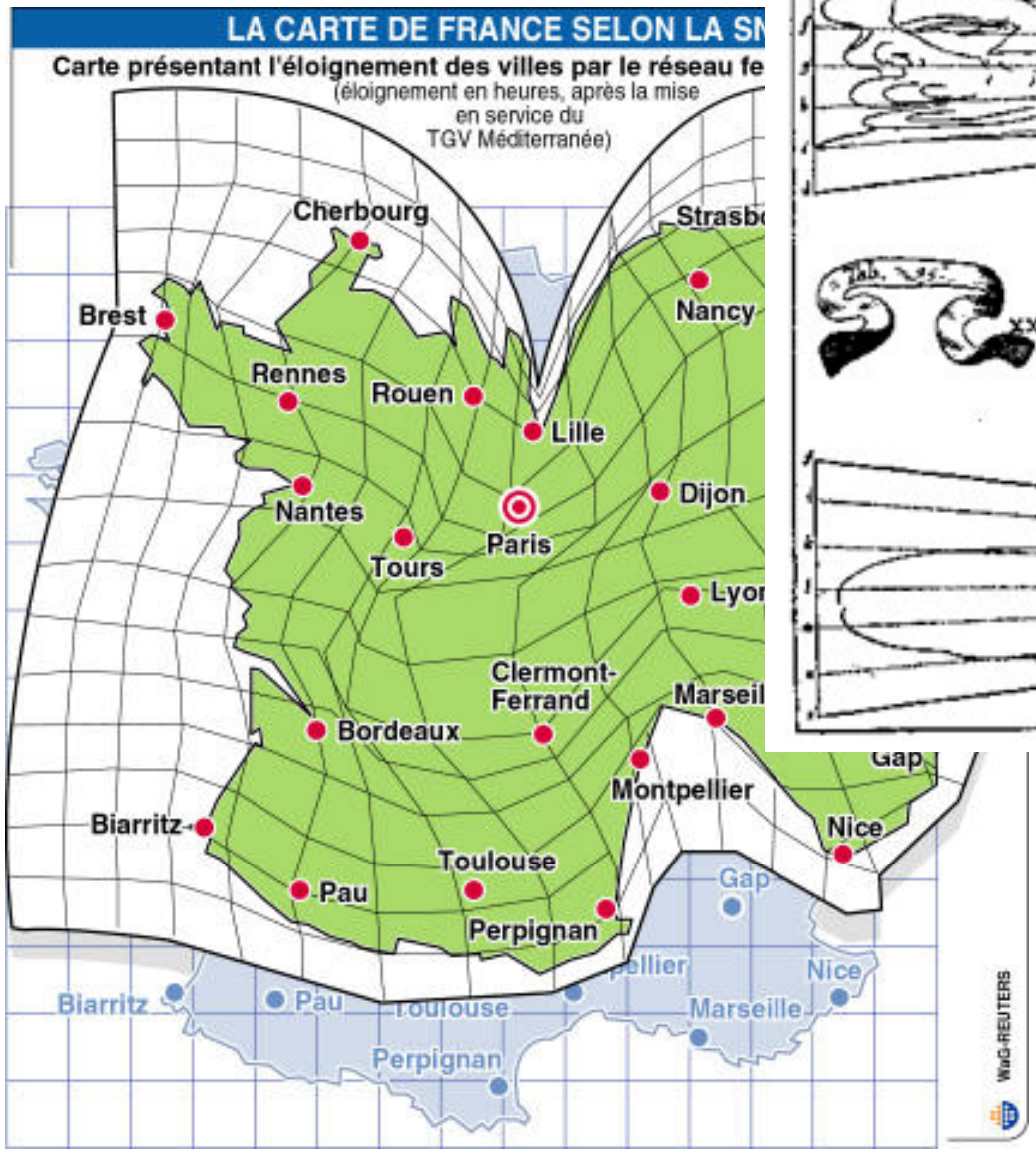
3. Distorsion

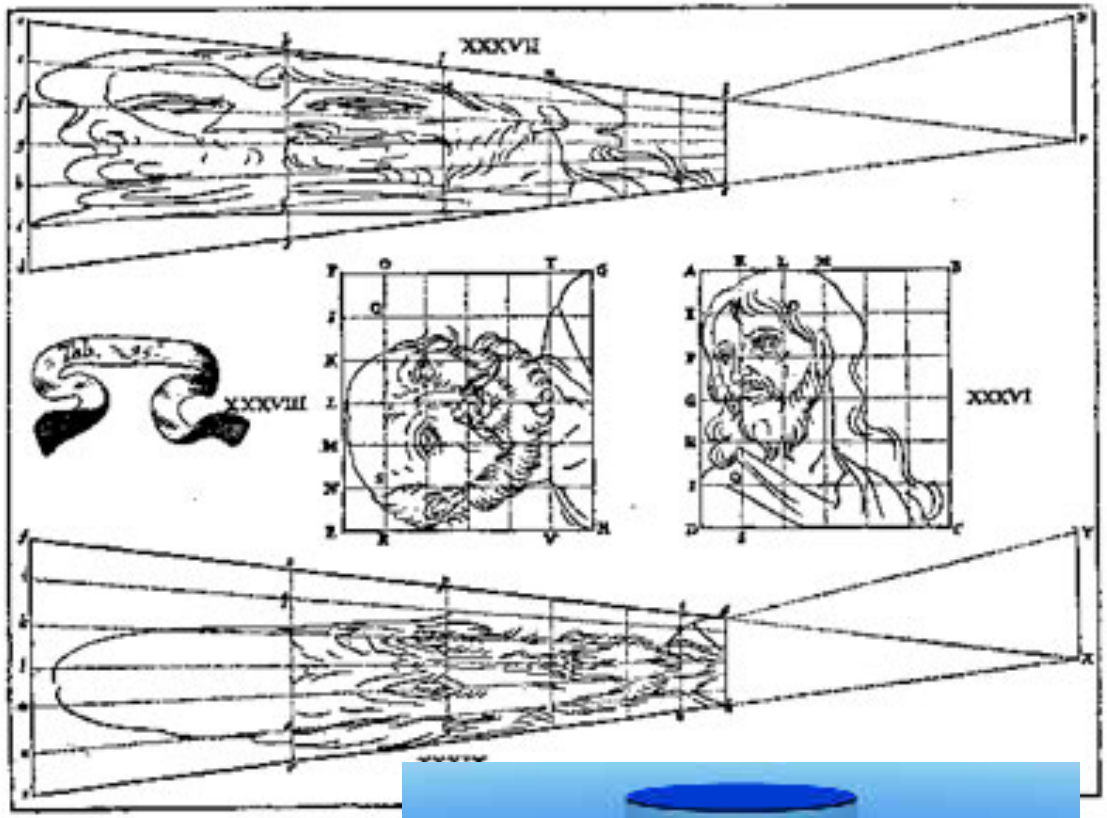

VILLAGE GAVLOIS
PETIBONVM
LAVDANVM
AQVARIVM
BABAORVM
BELGIQVE
LVTECE
ARMORIQVE
GAVLE
(CONQVETE ROMAINE)
50 avant J.C.
CELTIQVE
AQVITAINE
PROVINCE ROMAINE

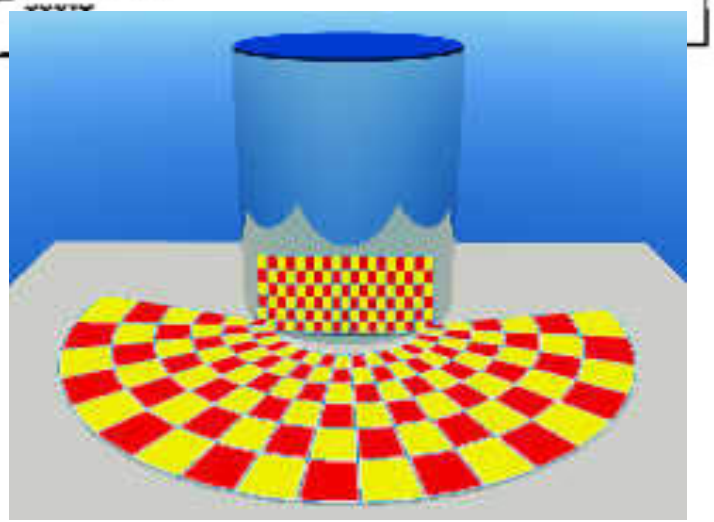


(extrait de http://choros.epfl.ch/)

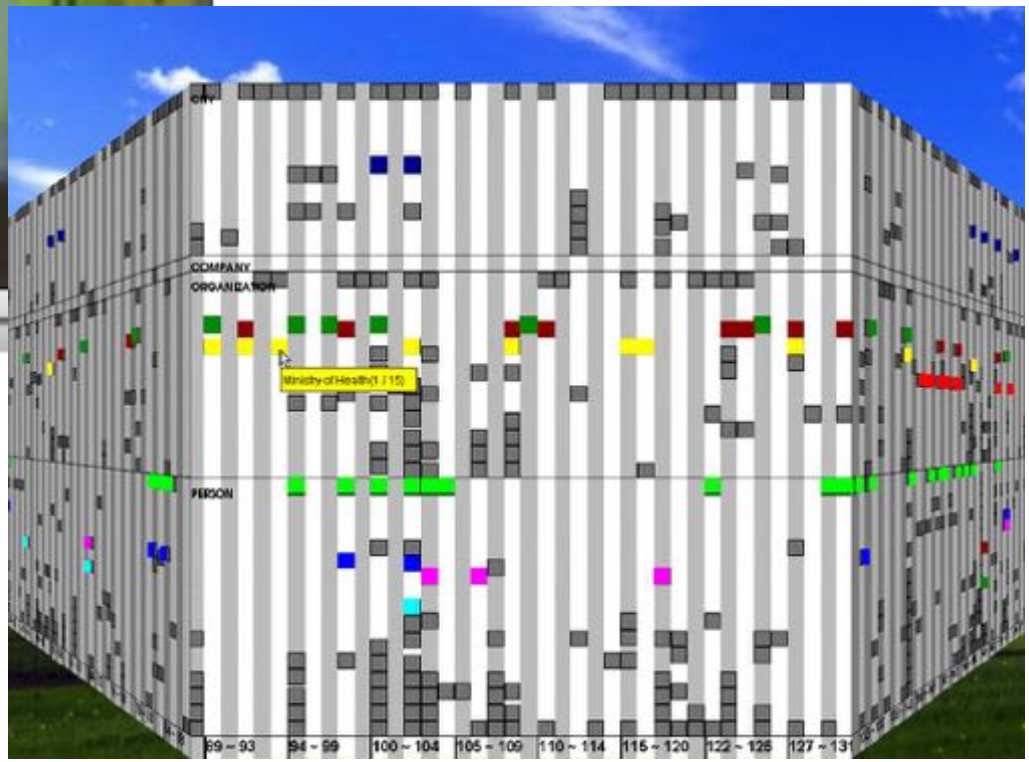
Lien avec les anamorphoses (géographiques ou autres) ?







Bifocal display
(Spence et al., 1980-2)



Perspective wall (Mackinlay et al. 1991)

Principe

A Review and Taxonomy of Distortion-Oriented Presentation Techniques

Y. K. LEUNG
Swinburne University of Technology
and
M. D. APPERLEY
Massey University

One of the common problems associated with large computer-based information systems is the relatively small window through which an information space can be viewed. Increasing interest

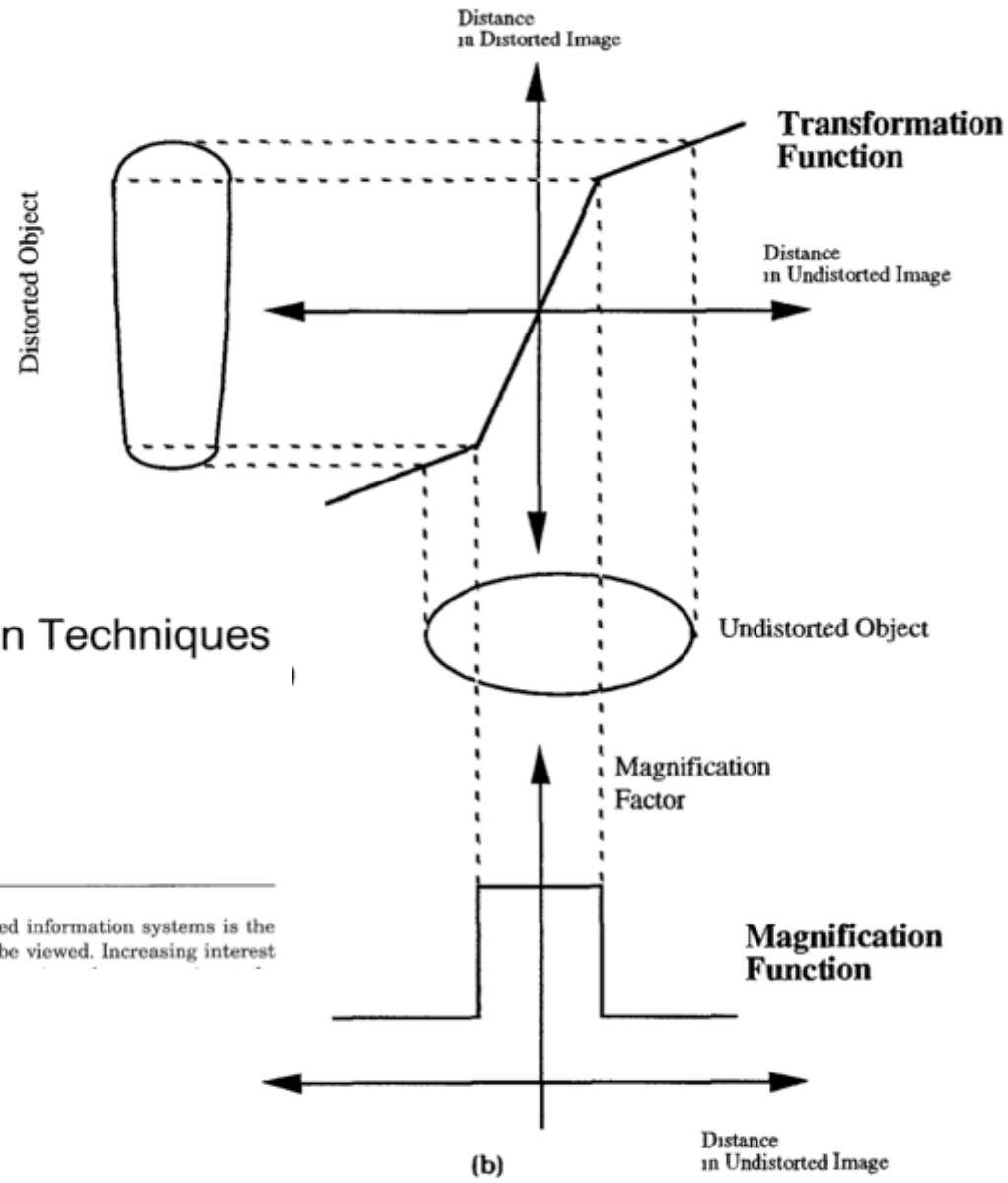


Fig. 3. (a) The transformation of an elliptic object by applying the transformation function of a Bifocal Display in one dimension; (b) the corresponding magnification function of the Bifocal Display.

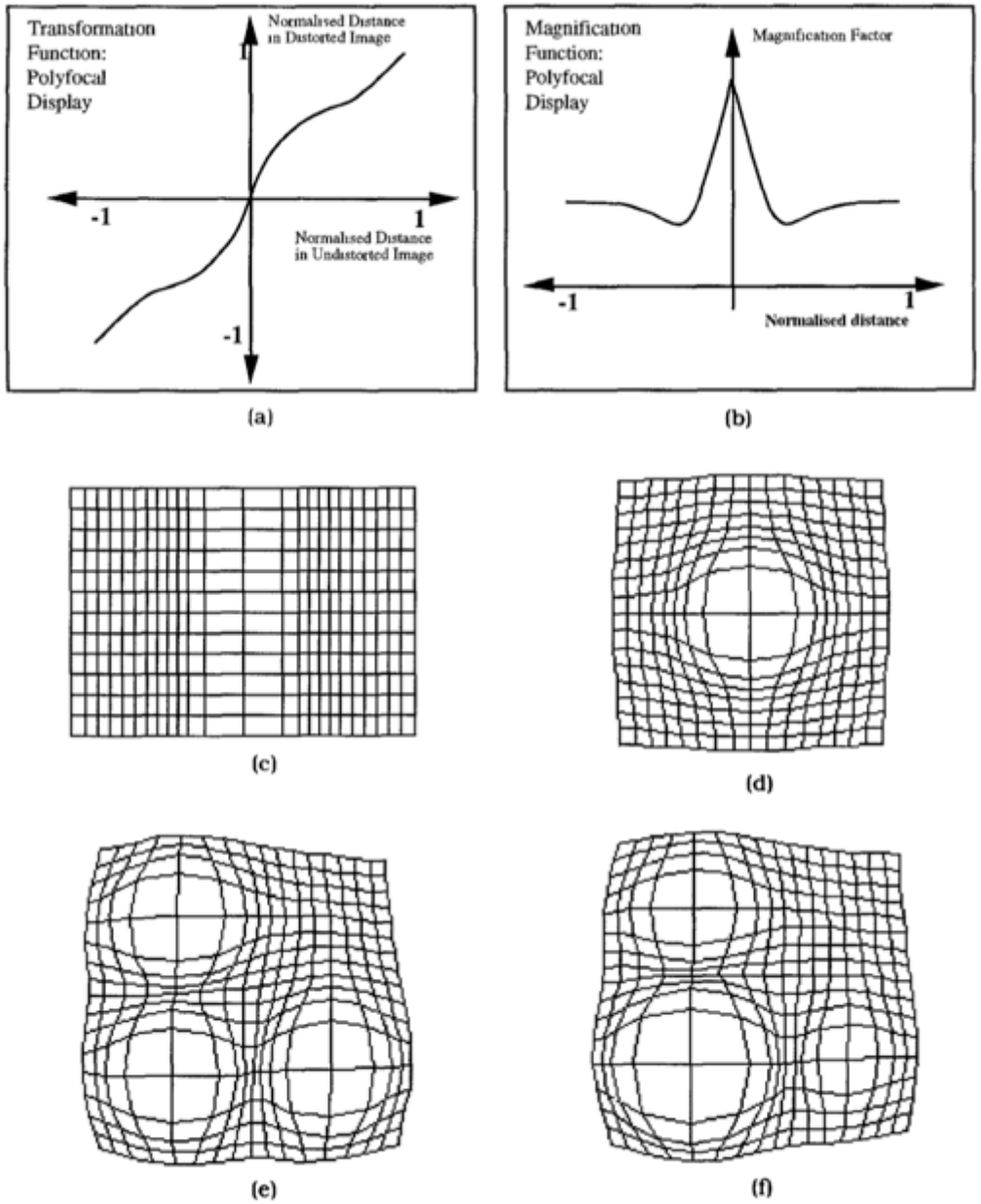
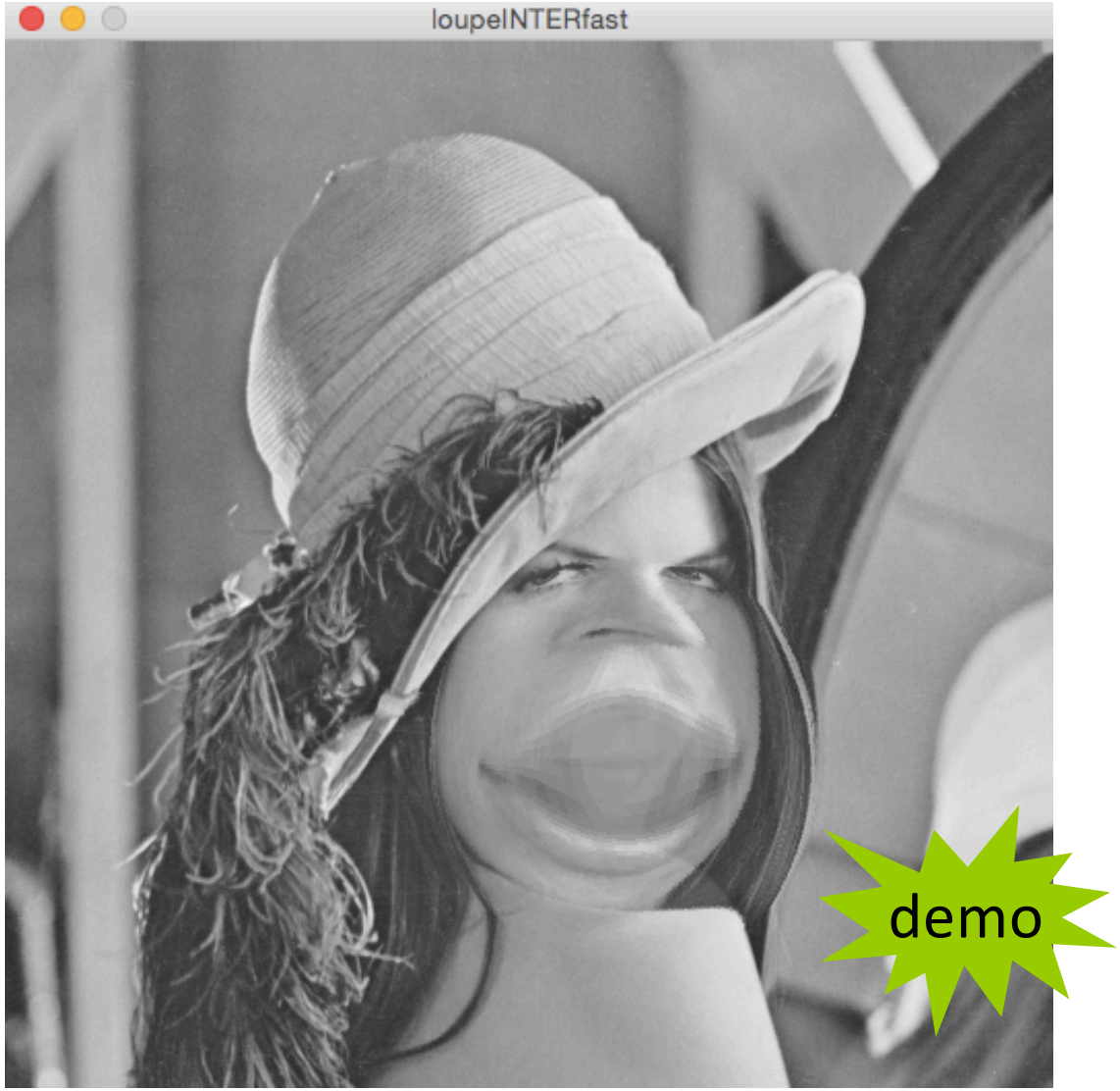


Fig. 5. The polyfocal projection: (a) a typical transformation function of a polyfocal projection; (b) the corresponding magnification function; (c) the application of the projection in one dimension; (d) the application of the projection in two dimensions; (e) a multiple-foci view of the projection using the same parameters for each focus point; (f) a multiple-foci view using different parameters.

Lenna revue...



Application aux dessins de graphes

Graphical Fisheye Views

Manojit Sarkar and Marc H. Brown

Department of Computer Science
Brown University
Providence, Rhode Island 02912

CS-93-40
September 1993

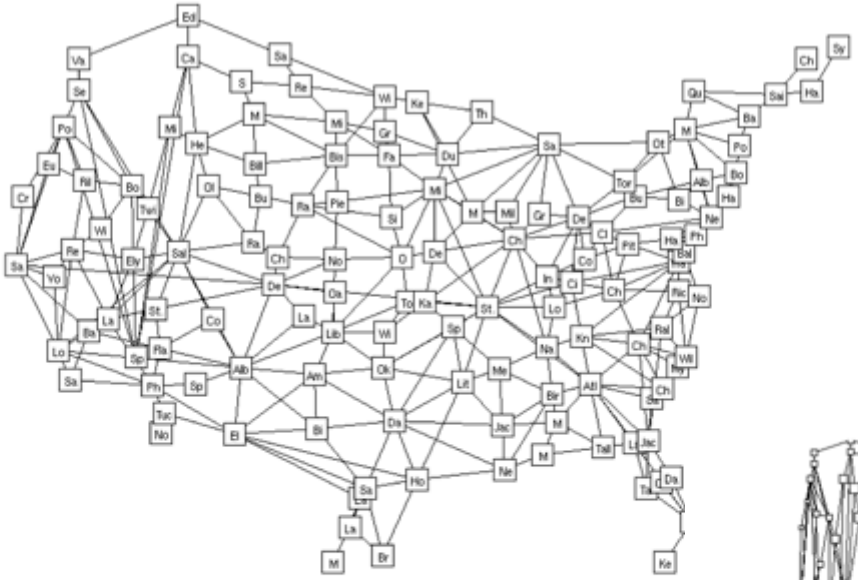


Figure 1: A graph with 134 vertices and 338 edges. The vertic
in the United States, and the edges represent paths between neigh
the edges would be annotated with the distance and driving ti
The *a priori importance* value assigned to each vertex is proport
population of the corresponding city. Fisheye views of this graph

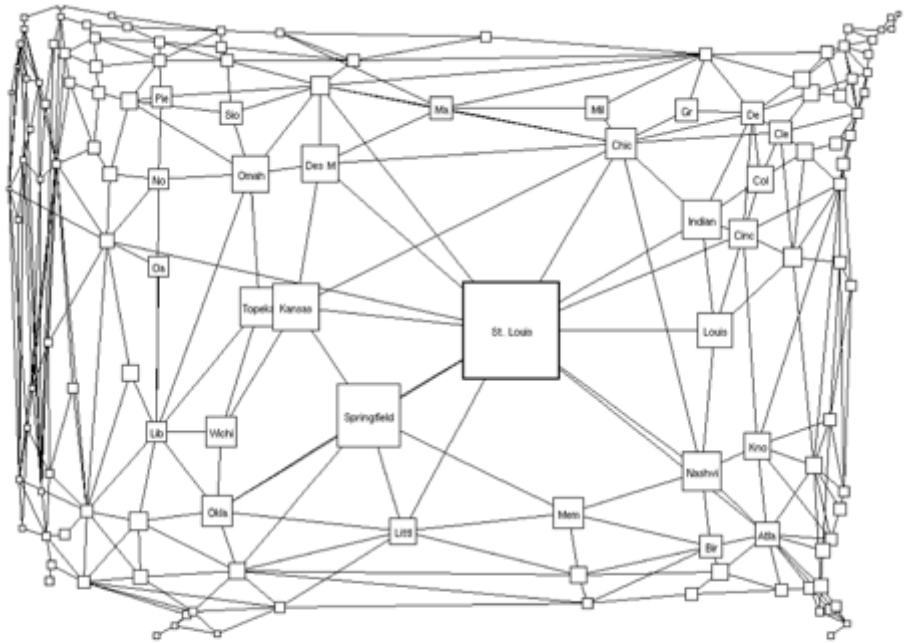
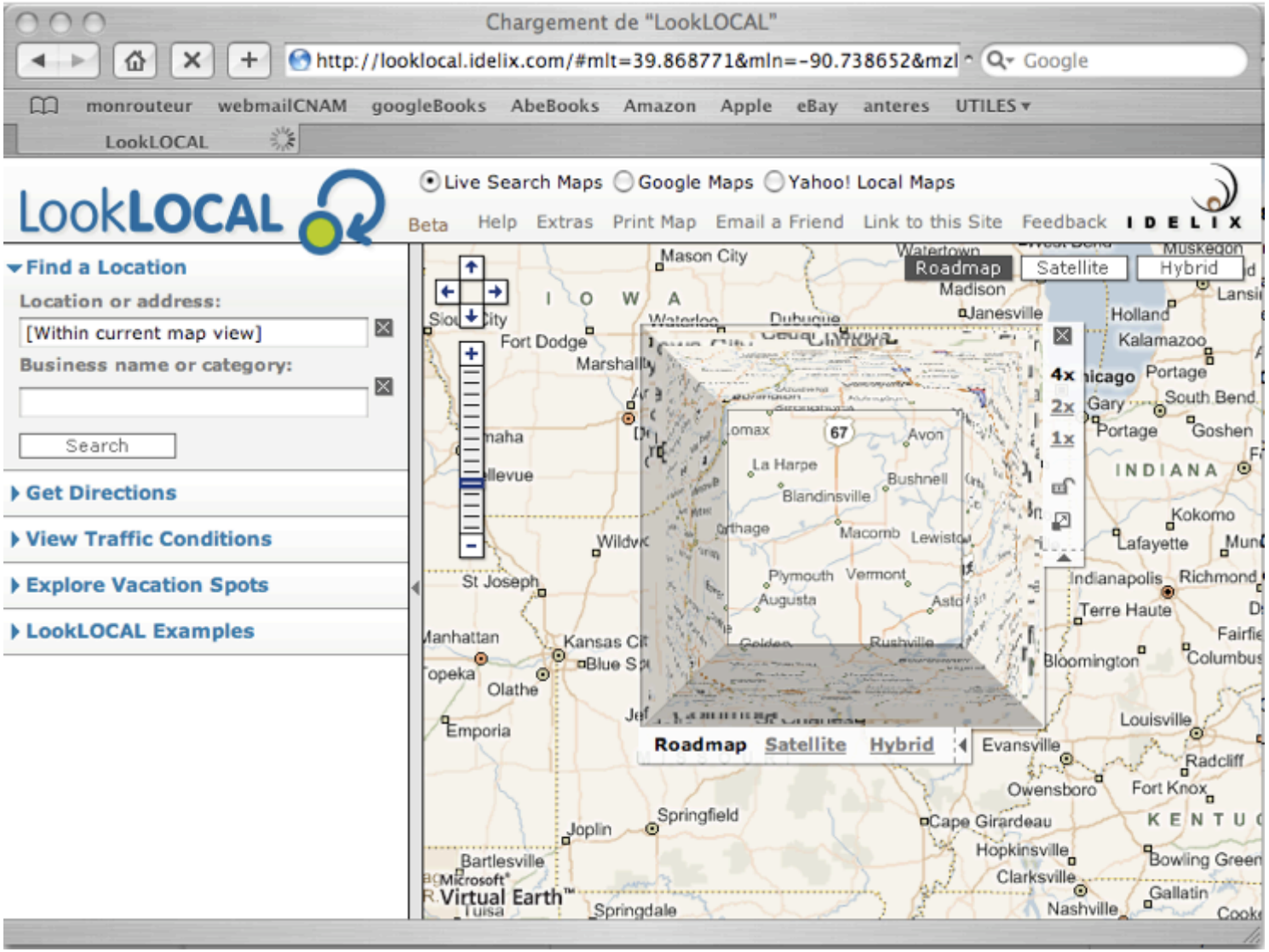
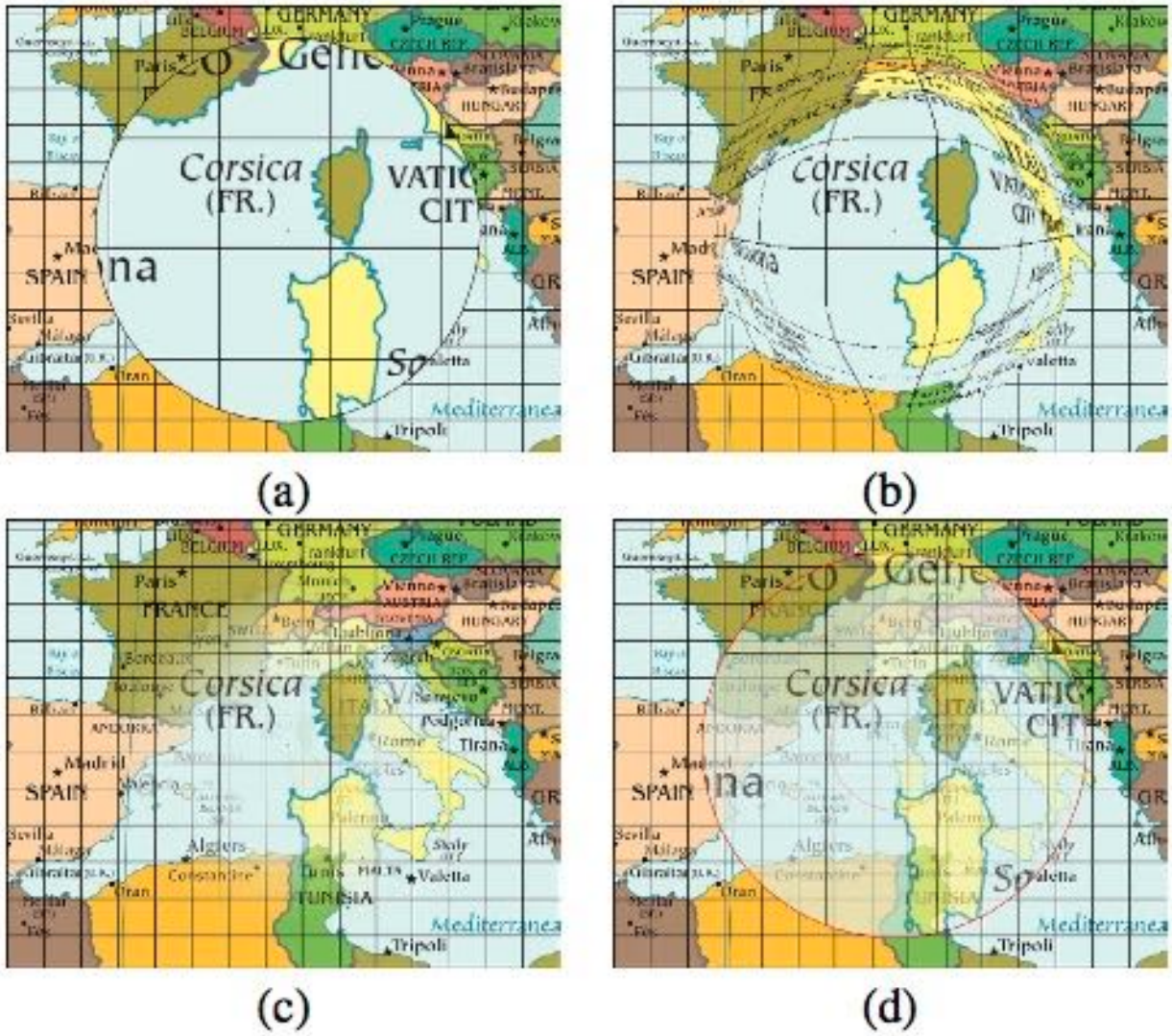


Figure 2: A fisheye view of the graph in Figure 1. The focus is on St. Louis. (The values of the fisheye parameters are $d = 5, c = 0, e = 0, VWcutoff = 0$; the meanings of these parameters are explained in Sections 4 and 6.)

Application aux cartes

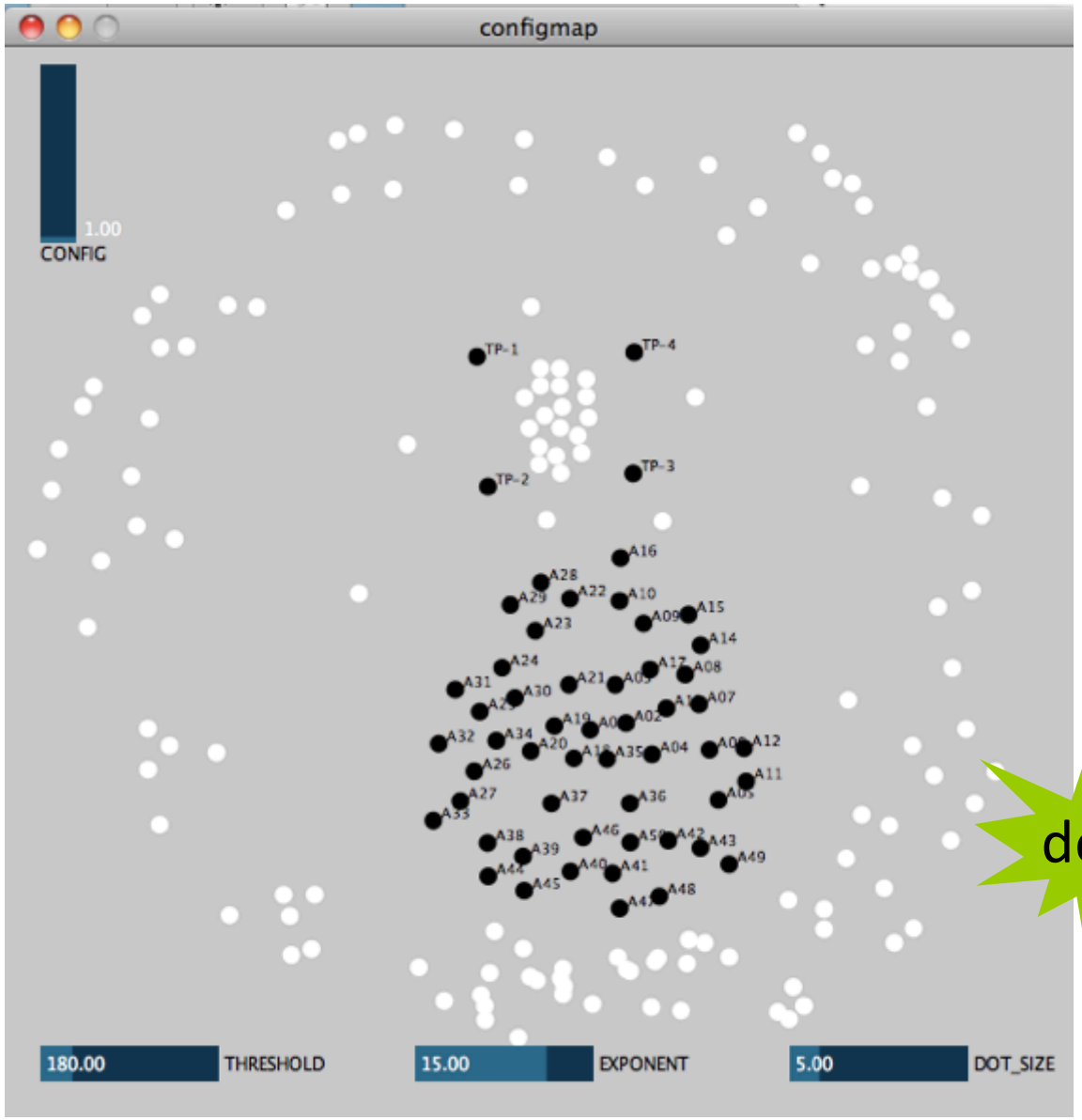


IDELIX : Application de cartographie sur le web (ou PDA)



E. Pietriga et C. Appert "Sigma Lenses: Focus-Context Transitions Combining Space, Time and Translucence" ACM CHI'2008

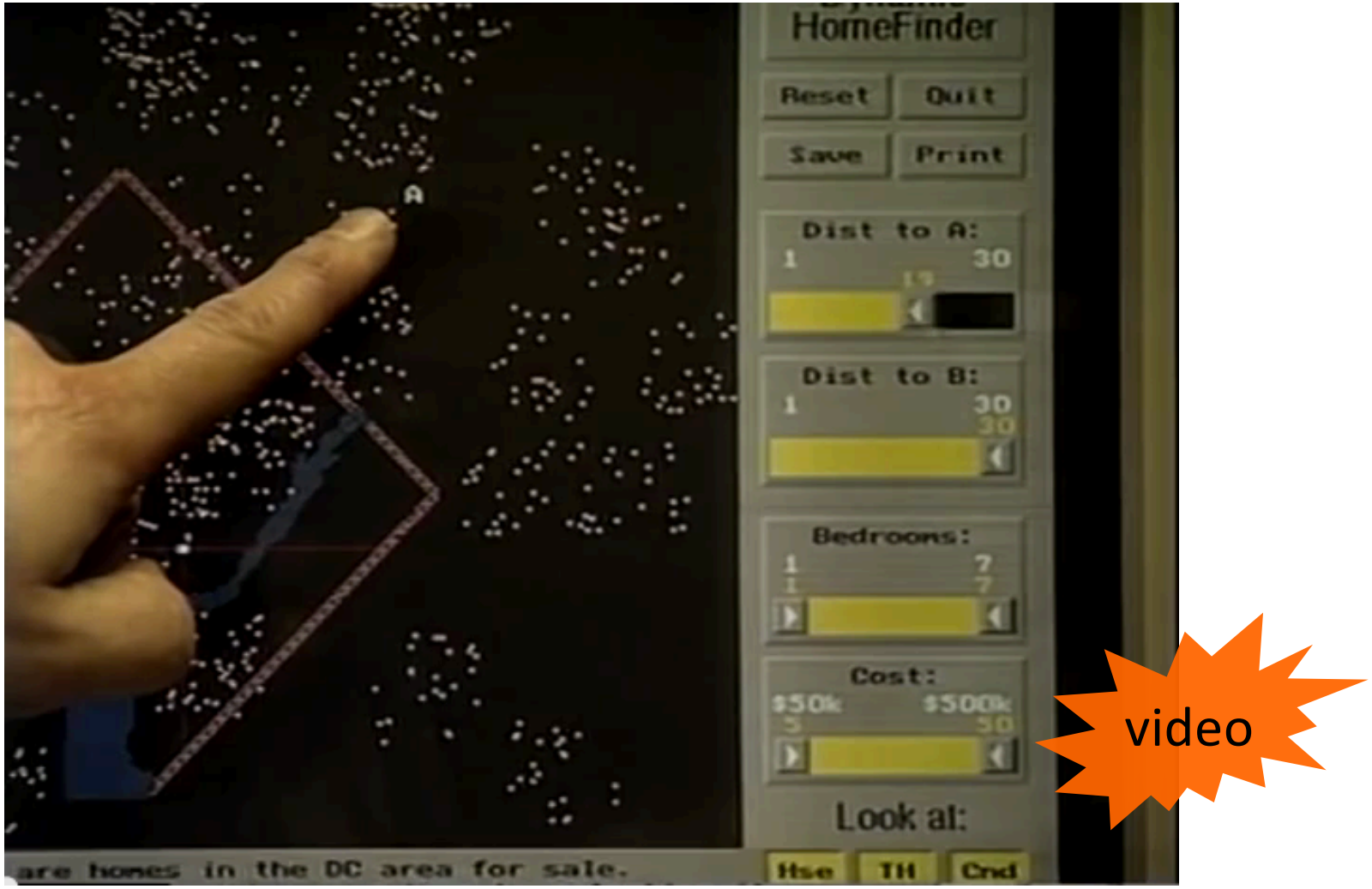
Exemple : Carte des antennes Alma



demo

4. Filter - Relate

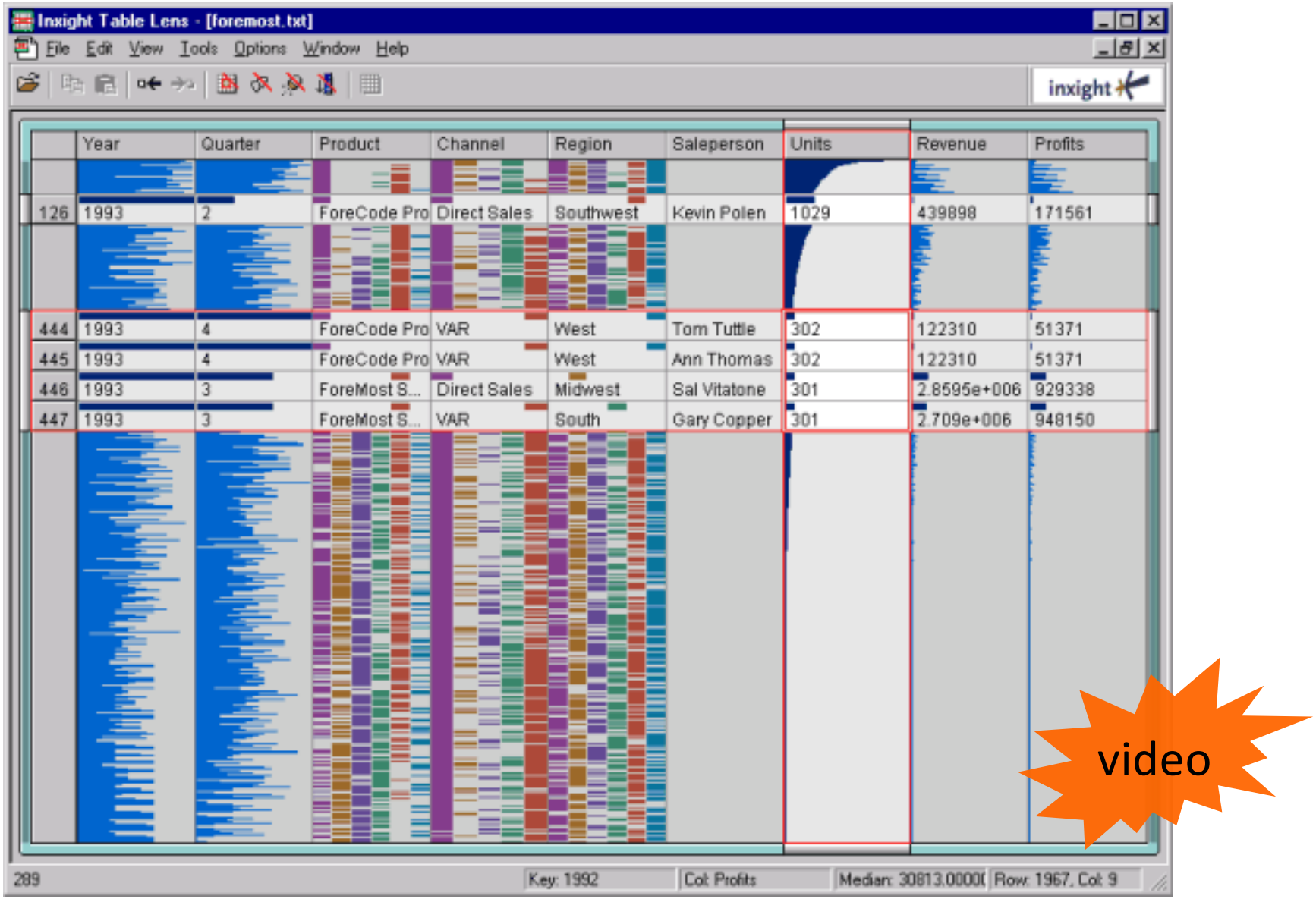
Dynamic Queries
(1993 University of Maryland UIS Broadcast)



video

https://www.youtube.com/watch?v=5X8XY9430fM

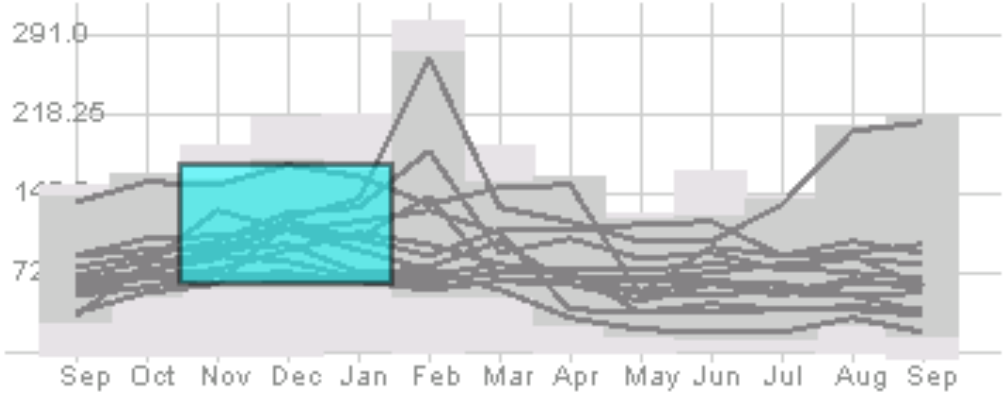
Table lens (Rao, Card CHI'1994)



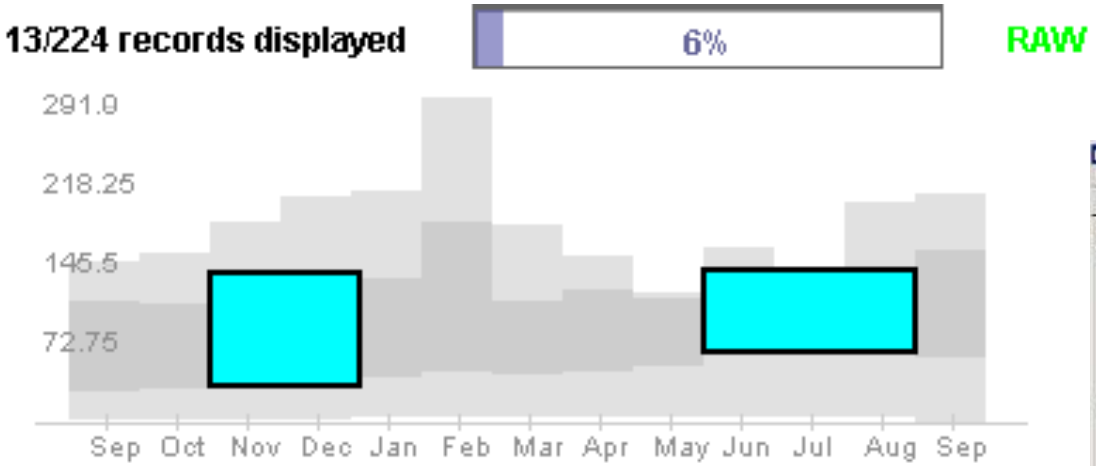
video

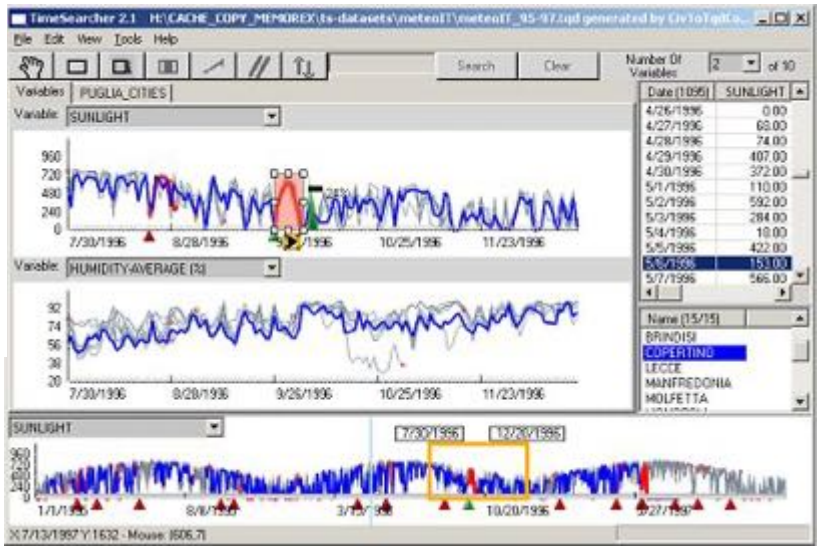
https://www.youtube.com/watch?v=qWqTrRAC52U

exemple de TimeSearcher (HCIL, 2001-7)



"brushing" : le changement d'un item impacte sur la vis. d'un autre





http://www.cs.umd.edu/hcil/timesearcher/

Suppression (filtrage)

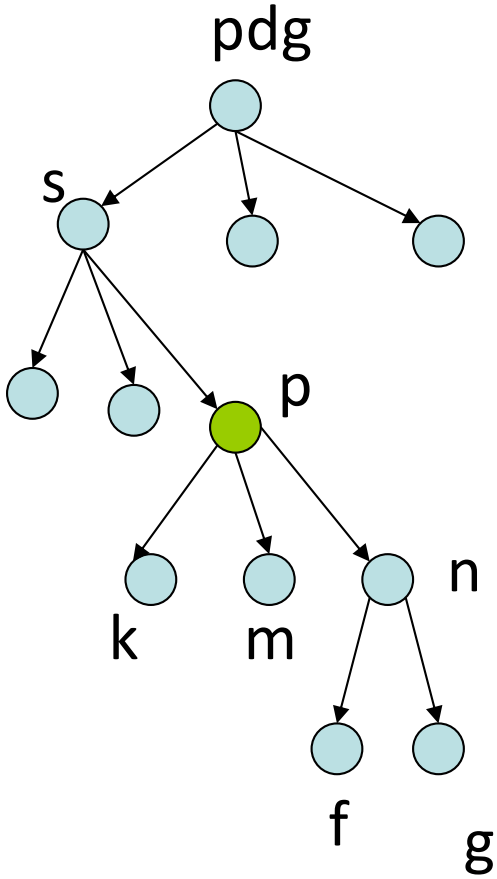
Furnas : generalized fish-eye views (CHI' 86)

Degree of interest (DOI) = Fonction de
- a priori importance (API)
- distance au focus courant (D)

Saul STEINBERG
View of the World from 9th Avenue, 1976.
Ink, pencil, colored pencil, and watercolor on paper, 28 x 19".
Cover drawing for The New Yorker, March 29, 1976.

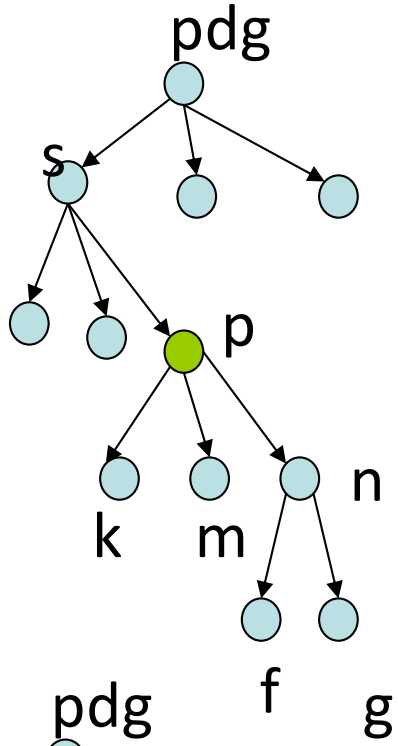
http://www.saulsteinbergfoundation.org/gallery_24_viewofworld.html

Exemple sur un arbre

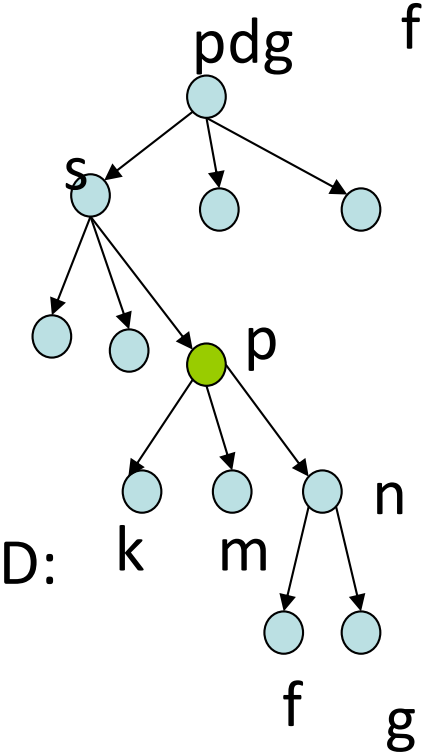


Focus en p

API :



D:



API-D = ?

5. Dispositifs d'affichage (afficher en grand)

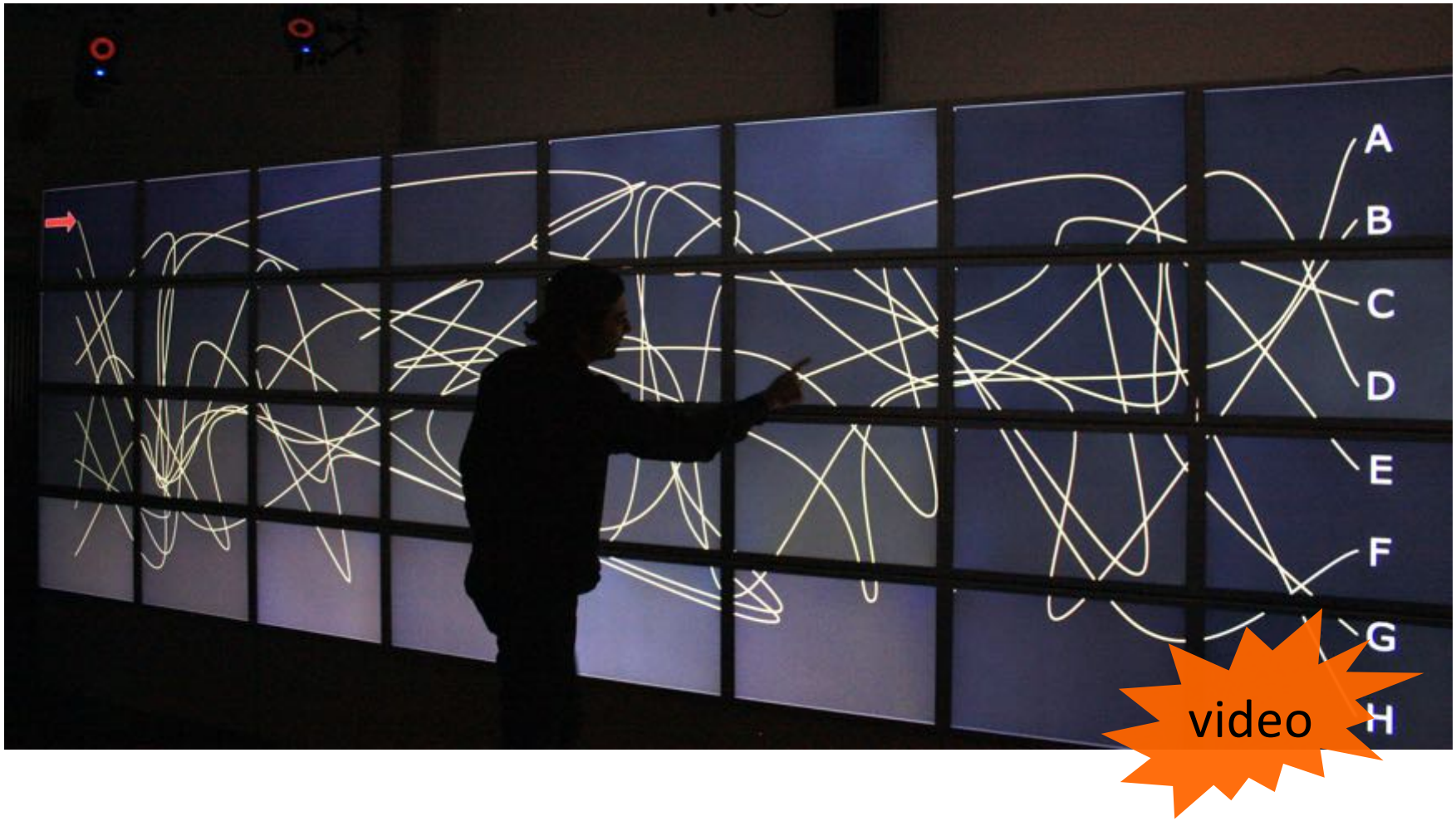
CAVE (U. Illinois, 1996)

http://en.wikipedia.org/wiki/Cave_automatic_virtual_environment

P. Baudish - Ecran Focus-contexte (UIST'2001)

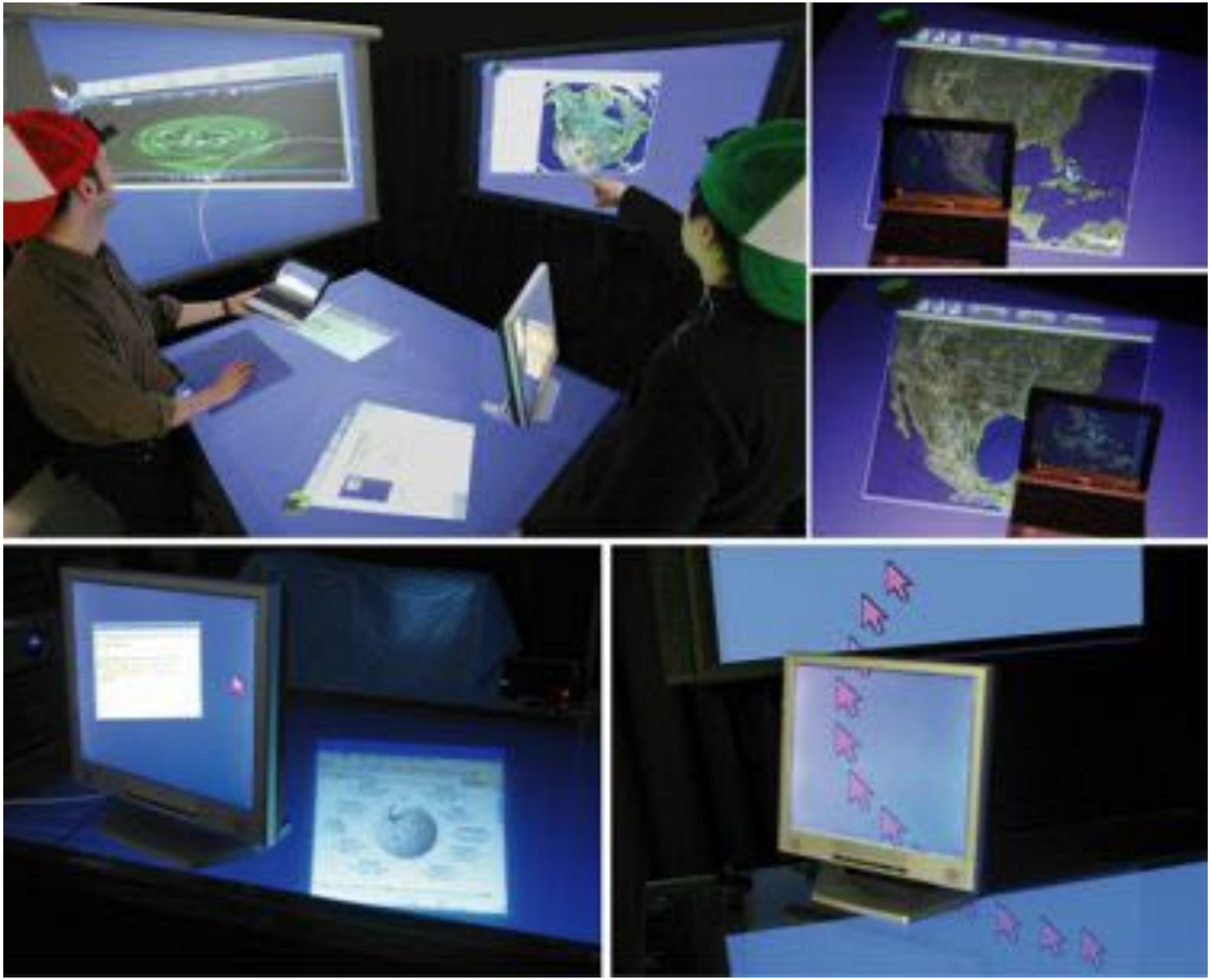
http://www.patrickbaudisch.com/projects/focuspluscontextscreens/index.html

Mur d'écrans WILD (INRIA Saclay ≥ 2009)



- 8 x 4 = 32 écrans LCD 30" => 5.5m x 1.8m and 131 Mpix
- cluster de 16 macpro avec 16 x 2 nvidia 8800GT
- capture mouvements video IR VICON (e<1mm, 200 Hz)

Synchronisation entre dispositifs d'affichage



E-conic
Nacenta
et al.
UIST'2007

http://www-human.ist.osaka-u.ac.jp/CI/MDE/

Au-delà de l'écran ...

http://www.aviz.fr/phys

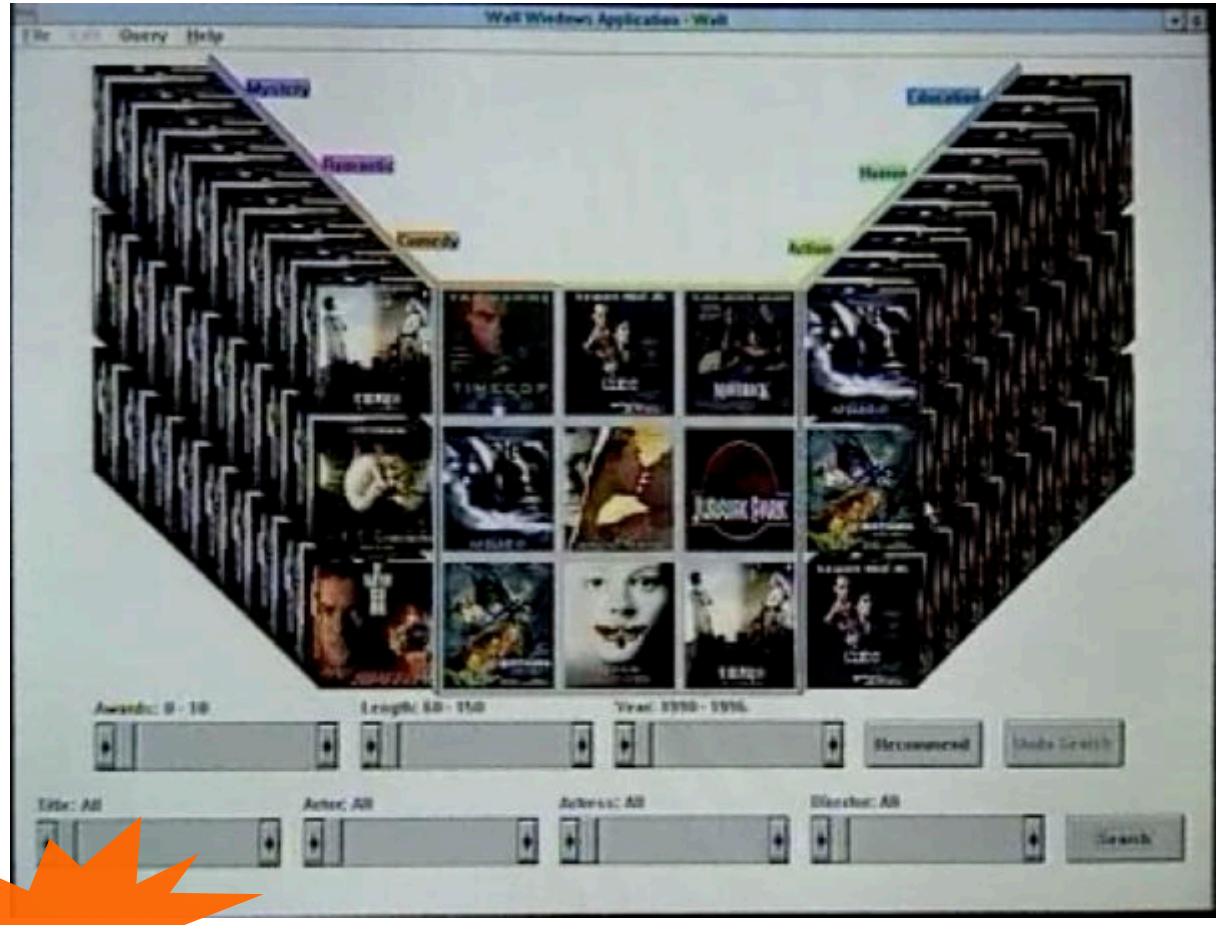
http://tangible.media.mit.edu/project/relief/

Remplacer l'espace par le temps

Rapid Serial Visual Presentation (RSVP)

0.1s / image

[Spence, video #21]



video