The Experiments in Art and Technology Datascape

This paper is base on the talk given by Christophe Leclercq and Paul Girard at the REWIRE conference, September the 29th 2011, the FACT Liverpool.

INTRODUCTION

Acknowledgment

First we would like to thank the Rewire committee since we would have never initiated the development of this work if we would have not been selected.

[SLIDE 0]

Experiments in Art and Technology (E.A.T.) was funded by the artists Robert Rauschenberg and Robert Whitman, and the engineers Billy Klüver and Fred Waldhauer in order to facilitate collaboration between artist, engineer and industry. The organization was primarily described by [SLIDE 1, 2, 3] Rauschenberg himself as “"ideally **a map of engineers, money, equipment,** and everybody run get some." But one have to admit that the very nature of E.A.T. remains confused because of the complexity of the organisation.

I. E.A.T. ARCHIVES

A- The Presently Existing Archives :

E.A.T. Bibliography : Documents and References

[SLIDE 4]

The E.A.T. archives had been classified and preserved first by Julie Martin and Billy Klüver themselves who sent a set of publications to different museums. Nowadays, the main E.A.T. archives are preserved by La Fondation Daniel Langlois in Montreal, and the Getty Research Institute in Los Angeles. These document had been distributed to major libraries in **New York,** Washington, D.C., **Paris, Stockholm,** etc. A bibliography written by Klüver and Martin was intended "to **provide an accessible and coherent source of information on the activities of Experiments in Art and Technology**[1]**"**. It is divided into two sections: a bibliography of documents and a bibliography of references. The documents section "includes **342 reports**, catalogues, newsletters, information bulletins, proposals, lectures, announcements, letters and reprints of major articles provided by E. A. T. in the course of its activities." ; the references section "includes **over 600 citations**: articles, books, catalogues and notices on E.A. T. or its activities". Whereas the 'documents' were produced by **E.A.T. actors** themselves, the reference are essentially newspaper articles written by external people, like art critics.

The researchers can be confused by the diversity of the ressources. The Fondation Daniel Langlois distinguished with the help of Julie Martin :

- The **Archive documents** include the following items: Correspondence, Letter, Manuscript, List, Inventory, File, Form, Budget, Grant application, Program, Advertisement document, Invitation card, Press kit, Press release, Communiqué / Memo, Note, Speech, Report, Memorandum
- the **Published Text Documents** : Book, Text in book, Periodical issue, Text in periodical, Proceedings, Thesis, Solo Exhibition catalogue, Group exhibition catalogue
- the **Media documents:** sound (interview) or visual documents (photography, film) or even digital document (CD-ROM, etc.)[2].

Nevertheless, this archive give only give us a scant account of the overall resources. Among the archive documents are also the Mc Bee Keysort Yellow and Blue-edged notched cards preserved at the **Getty Research Institute** and which where used to match artist and

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[1] Billy Klüver, *E. A. T. bibliography: August 12, 1965-January 18, 1980*, New York, Experiments in art and technology, 1980.

[2] Fondation Langlois

engineers, bringing together art, technology and... knitting[3]. But there is a lack of information about the results of the collaboration undertaken through E.A.T. matching service.

B- Toward an Activity-oriented Approach

We can now see two different organisation of this primary resources by Fondation Daniel Langlois and by the main E.A.T. member, Billy Klüver.

b.1. Thematic and Activity-Oriented Approaches

The Fondation Daniel Langlois proposes **an interesting thematic approach**, focusing on the following 18 important projects that E.A.T. realised **:** 9 Evenings: Theatre and Engineering, Technical Service Program, Technical Information, E.A.T Competition for Engineers and Artists, Lectures-Demonstration Series, Pepsi-Cola Pavilion Project, Anand Project, Telex: Q&A, American Artists in India, New York Collection for Stockholm, Multi-Dimensional Scaling, Projects Outside Art, Children and Communication, Artists and Television Projects, Projects in Central America, Paris-New York-Paris, Island Eye, Island Ear, United Nations Satellite Demonstration. One can then have access to the bibliography of each project. Two comments can be made. Firstly, some of the subdivision can overlap (for instance, “Children and Communication” is one of the “Projects Outside Art program”). Secondly, the thematic subdivision takes into account projects that can itself be subdivided into several activities so that it could be helpful to consider the possibility of considering E.A.T. at a macroscopic level as well as a microscopic level.

b.2. The [a] Story of Experiments in Art and Technology 1960-2001: Billy Klüver & E.A.T

“The Story of Experiments in Art and Technology 1960-2001” is another activity-oriented approach based on Klüver’s own point of view on the organisation. Klüver selected and mixed more or less thirty works and projects considered representative of E.A.T. activities, from Tinguely’s *Homage to New York* to the 9 evenings preservation project (film editing). By the end it is more *a* story of E.A.T. than *the* story of E.A.T. [SLIDE] For instance, Klüver omit to mention the winner of the E.A.T. Competition organized in 1968, Jean Dupuy and his piece *Heart Beats Dust*. We can also understand that he undermined the unrealized projects which are numerous and merit attention, as if he wanted to prove at all costs the success of the organization.

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[3] « Inventory of the Experiments in Art and Technology Records, 1966-1993 (bulk 1966-1973) Experiments in Art and Technology Records », Getty Research Institute, s. d. on line: http:// archives.getty.edu/

b.3. What is E.A.T. ? What is a collaboration ?

One has then not to be surprised that critical review by the past or nowadays focused - as a counterpoint - on the technical or communication problems encountered in the collaboration between artists and engineer and especially undermine the collaboration process. Eventually, these different approaches make E.A.T. an elusive organisation, alternatively considered as a success or a failure. **What is E.A.T. ? What is a collaboration ?** These are the two questions which lead our research and work in progress, an approach based on **facts** known as the 'WWWW' : "**Who, What, Where, When".**

C. Toward a datascape

to map complexity : to build and explore

When having to deal with a complex set of data, visualisations can help researchers handling complexity. Among the many data visusalisations technics, graph representations are a good tool to map social interactions such as collaborations.

[slide : actors-activities graph]

Although we think such representations can actually be great research tools, we want more for 2 reasons :
1- the very gain which bring such representations comes from the fact of building it. What need researchers is not a set of representations, but **a tool to build** the visualisation;
2- such maps will reveal their richness only when being explored. We mean by exploration, zoom in and out, filtering the data being represented, going from one facet of the data to another (from projects to actors, from gepography to time...). We need **a tool to explore**.

We try in this paper to descirbe this new kind of tool fo researchers to map complexity by building and exploring data visualisations of an archive. We call this tool a datascape.

What is a datascape

A "datascape" is a set of digital data methods and tools which fosters the use of exploratory data analysis (Tukey 1977) for social sciences research purposes (Latour and al. 2011). It is an Information System (backoffice, database, data engine, data visualisation) designed by a collaboration of social science researchers, IT engineers and information designers. It aims at providing a method to modelize information from archives in order to explore by navigating through data.

[slide : datascape schema]

Researchers are the targeted users of datascapes. They are required to achieve two tasks: data modelling (feeding the database) and data exploration (through data visualisations). Those two sequential actions are to be repeated in many successive iterations : harvest data from

the archive to feed the data models; explore the visualization automatically updated from the harvesting; get insights from the exploration process, detect patterns in the data structure; go back to the archive to check the patterns' origin; eventually correct the database when the pattern actually come from a modeling bias; go back to exploration...
The whole process is achieved by the researcher himself. For this reason it can create a virtuous cycle which by giving a way to exploit the archive through data harvesting and exploration, actually foster quality check behaviours on the coding work.

data modeling : the KISS principle

The KISS principle comes from Jonhson[4] keeping on saying to his engineers when designing an aircraft that one could repair on battefield with only a few tools available, "Keep It Simple, Stupid".
This moto was ours when designing the data model, i.e. the way we will prepare and store information.
When designing a database the natural reflex is indeed to draw a model which can handle all the corner cases by setting a special box to store them. This brings a complex schema which needs to predict the corner cases one would meet.
That's actually how we started our own model. But little by little we try to reduce complexity by finding a way to describe the same cases but with a simpler schema. Our data model, in extenso our system, has to propose the essential simplicity to maintain complexity. Complexity being thought as the diversity of the actors and projects, as the number and complexity of relationships between them.
This means that you would lost accuracy on the way. But the goal of our data model is not to replace the archive. The accuracy will remain in the archive documents which will always remain a reference to consult. Therefore we included specific items to indicates the archive documents from which the researchers had harvested the data.

Finally after many iterations between the Art Historian and the Information Technology Engineer, the final data model we created focused on 4 main items.

facts : the four Ws and H

The main items of the data model : Actors (the Who), Activities (the What), Phases (the When and How), Places (the Where).

relationships

3 links items : Actors_Actors links, Actor_place links, Activity_activity links

references to the archive

2 references items : the source item is a reference to archive document, the annotation give researcher the possibility to cite part of a document which illustrate a phase

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[4] "lead engineer at the Lockheed Skunk Works (creators of the Lockheed U-2 and SR-71 Blackbird spy planes, among many others)" according to Wikipedia

glossaries

6 glossaries : the glossaries are the codebooks of the system to tag the items

yet a manual task : entering data in the backoffice

[slide] admin actor Klüver
[slide] admin source "The story of E.A.T."

visualisation/exploration

Overview

The **overview** page is composed of a heat map of E.A.T. activities, a map of the different places, a visual representation of different tags linked to actors and activities (actors, type of actors, art, technology, type of activity and action).

An **heat map** has been produced, taking into account the projects and work described by Klüver in the Story of E.A.T. One can then easily identify an activity pick between 1966 and 1972, and consider later periods of weak activity. Heatmap sea level hidden activities like an iceberg.
[slide heat map]

Many categories can be selected, representing different possible entries in the site. The complexity is there rendering by tag clouds, tail of actors.

The "actor" view allow one to see the main actors of E.A.T., of course the 4 co-founders Billy Klüver, Fred Waldhauer, Robert Rauschenberg and Robert Whitman but also other organisation that are considered as actors itself: industries like Bell Laboratories, etc. [je ne vois pas la carte !] (some of the technology when the actor often referred - i.e radio for Rauschenberg - to it could also be considered as an actor). By clicking on it you can have access to the "actor page".
[slide] actors : " main actors pops up ", " maintaining complexity ", " organizations are actors"

The "actor profile" view make it easy to consider that artist are as well represented than engineers and to take into account the organisations and the often undermined actors like art critic, manager, etc. **[slide] actor profile : " artist = engineer ".**
By clicking on it, you could have access to a list of people belonging to the category described

The "art" view view shows the diversity of the art practices, not only painting and sculpture but also environment and performing arts (danse, etc.). **[slide] art : " diversity of art pratices"**
Here again, you could have access to a list of work belonging to the category described by clicking on it.

The "technology" view give access to technology tags that mainly comes from the blue edge notched card (1969) plus categories that appeared after this document (i.e. fog generating system realised for the Pepsi Pavilion at Osaka 70'). **[slide] techno : " blue card, main technology use"**

The "activity view" provides an overview of the diversity of activities: not only work of art exhibited but also lectures, demonstrations, publications, fundraising activities, etc. **[slide] activity type**

These information can be combined in a Gephi graphs of E.A.T.
On can export the informations in another format to do a specific analyse of what has been discovered through exploration.

An actor-project network can be processed and show the link between activities and actors so that one can easily see who did what. It is a way to produce a social network and make a "world of art" (Becker) emerge as well. **[slide] actor project network : "link between activities and actors : who did what ?", "link betwen actors: social network"**
By zooming on Klüver or Rauschenberg, one can see their neighborhood and position in the graph and especially their central position. **[slide] network detail on Klüver : "Klüver neighborhood and position on the graph"** + **[slide] network detail on Rauschenberg : "Rauschenberg..."**

All together this different views are considered as **a way of going deeper on projects details while maintaining complexity in order to better help people to understand what is E.A.T. through navigation.** (un mot sur le fait que l'on pourrait imaginer d'autres view?)

[slide] activity Oracle : WHEN and WHAT Phases, sources, WHO actors + legend, actor type tags, WHERE places
[slide] zoom period 1 : 1960 - 1970 :
[slide] open text annotation
[slide] open image annotation
[slide] mouse over a phase : who participates to this phase ?
[slide] mouse over an actor : with who this actor did collaborate on the project ?
transition : "let's move to the other life of Oracle"
[slide] zoom period 2 : 1970 - now : focus on Pompidou
[slide] action type / phase : " diversity of activities", " as design as production Selection Bias from Klüver EAT story"

explore an actor : Klüver

From one to another page
Advantage

explore a project : Oracle

4 facets
timeline, actors, places, sources
Restoration preceeds exhibition
Very different typology of work (HTNY)

feedback on experience

exploration and data edition interactions

phases definition : design & production ?

visualisation problems are modeling problems

actors' tag colors : map the complexity -> debate on tagging : tag of tags

archive - datascape interactions

from sources to database, from database to sources

modeling data, a research process

data model being opened, it's a live process to define by the research the guidelines of data edition to map his research question.

It is important to think of the datascape structure and modus operandi as a collaborative tool that allows both setting up a common classification and producing specific researchers' classification for research purposes. In order to do that, we must allow an extensive use of multiple glossaries to handle the complexity of the datasources. We should probably use quali-quanti approach merging qualitative description methods in a quantitative database system. Algorythmy should be used only in the data engine part of the datascapes and not in the coding decision that should be controlled by the researcher. It is probably important to devise a hybrid coding systems with both a "top-down" controlled vocabulary glossary (ontological style) and a "bottom-up" free multi-tagging system (web 2.0 style) using tag clouds and auto-completion techniques to allow
the coordination of the collaborative work. We don't claim that either "top-down" or "bottom-up" coding system would provide the solution, but we aim at designing a combination of the two which could overtake their opposition (Gruber 2007).

[slide] admin actor Klüver
[slide] admin source "The story of E.A.T."
[slide] : overview / activity heatmap : message " activity pick in 68-72 "
[slide] actor profile : " artist = engineer "
[slide] art : " diversity of art pratices"
[slide] techno : " blue card, main technology use"
[slide] actors : " main actors pops up ", " maintaining complexity ", " organizations are actors"
[slide] activity type : "diversity of activities", "Projects are underminded in Klüver's EAT

story”
[slide] actor project network : “link between activities and actors : who did what ?”
“link betwen actors: social network”
[slide] network detail on Klüver : “Klüver neighborhood and position on the graph”
[slide] network detail on Rauschenberg : “Rauschenberg...”

Christophe : “ datascape exploration : go deeper on project details”

[slide] activity Oracle : WHEN and WHAT Phases, sources, WHO actors + legend, actor type tags, WHERE places
[slide] zoom period 1 : 1960 - 1970 :
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[slide] mouse over a phase : who participates to this phase ?
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Conclusion

[slide] : Datascape = tools & methods, structure is common but model and viz are dedicated
[slide] : generic