W. Bradford Paley / Jefferson Y. Han ,,,,,,,,,,
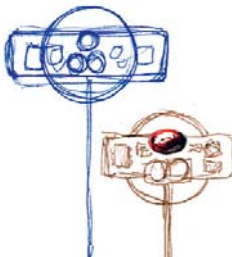
,,,,,,,,,,, **TraceEncounters**

A Social Networks Visualization at Ars Electronica 2004

Central to my understanding of good visualization *and* esthetics is the any project's purpose: I believe a project must address a subject in which people have a deep interest— beyond the viewing of the project itself—to be worth the time it takes to create it, or even the few minutes someone might spend to read it. This is the primary motivation for *TraceEncounters*. *TraceEncounters* traces and displays every social encounter people have this year at Ars Electronica.
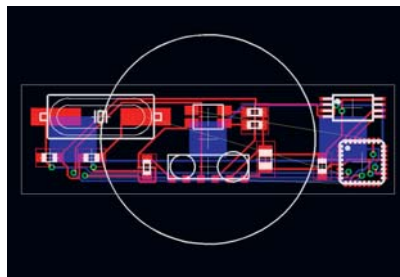
Information Collection ,,,,,,,,,,

My collaborator, Jeff Han, and I give each of the thousand core Ars Electronica people a piece of jewelry. This limited edition stick-pin, loosely patterned after Victorian silver and marcasite pins, is comfortably small (roughly 2.5 by 3 cm), and sport a real semi-precious garnet cabochon that will gently pulse, glinting with a slightly different temporal pattern depending on which one you get and whether you customize it with your name or initials. But it's more than pretty: it uses IRDA to remember every other pin it "sees" during the five-day festival, when you met the person wearing it, and exactly how long you spent with them.

The pins respect privacy in two ways: first, they start with a numerical identity that has no tie to personal identity (though a *TraceEncounters* variation provides a way for people to personalize their pins, and therefore the pin's representation in the resulting network visualization). Second, people will be able to turn it off by the simple, sure, and intuitive action of turning it to face their clothing.


First pin concept sketches
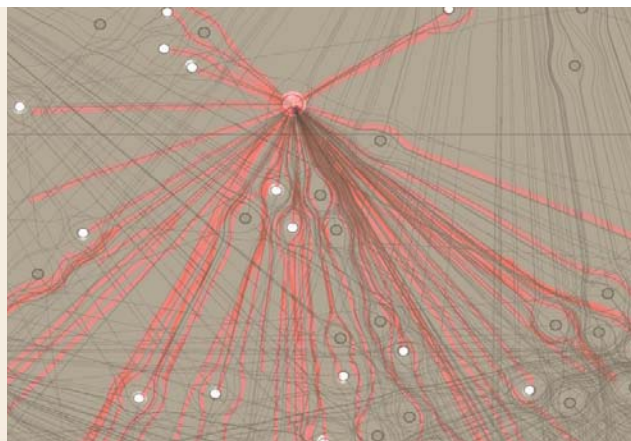

Provisional printed circuit board layout & battery

Information Visualization ,,,,,,,,,,

The pin downloads all the encounters it has collected (a simple list of other pin IDs, times, and durations) when people come to a specific spot among the artworks: the site of *TraceEncounters* network display (software, firmware, and some hardware development for the pin's information management comes from Peter Kennard). The information gathered from the pins is combined as an innovative node/link diagram designed for two synergistic purposes: to show the complexity of the relationships among the Festival attendees, while simultaneously exposing the inherent beauty in this trace of the social tapestry people weave as we meet and introduce, chat and rest.

Early tests of a new type of visual link have shown the idea to be robust, visually engag-
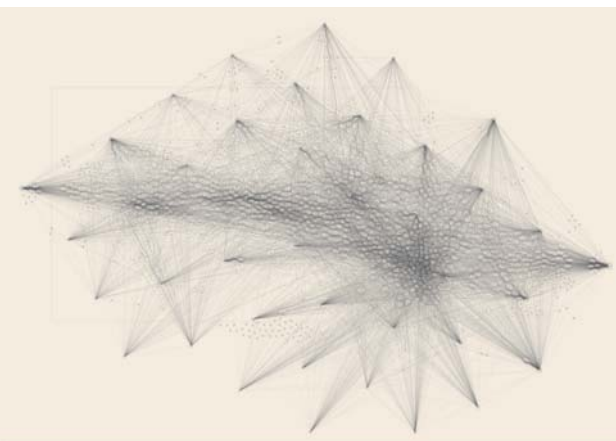
Early bulk link test: 20,000 links among 1,500 nodes   Close-up with simulated plasma panel back lighting

ing, and potentially very useful. The idea was to design a way to show the huge number of meetings as lines simultaneously revealing dense "well worn pathways" where people and groups interact often, and allowing people to trace individual lines to remember specific conversations. The links innovate in how they avoid the nodes while generally keeping from overlapping one another.

And in order to be able to show the incredible density of information while still retaining interactivity, the *TraceEncounters* network display uses Illuminated Diagrams. An Illuminated Diagram combines the incredible information density possible in a print with the interaction possible from a computer display. The nodes and links are printed on vellum at the extremely fine full resolution of the printer, and that vellum is mounted on the front of a 50" plasma panel touch screen. The touch screen plasma panel gently glows behind your own node as you approach the visualization. (The display computer has its own pin reader, so it knows who's in front of it). And it lights up the printed lines that emanate from you, and from anyone else directly in front of the display. In this way, two people may be able to find connections to mutual friends that they did not know they had in common.

Esthetic & Academic Contribution

To make sure that the intellectual and communicative basis of the project is rigorous and meaningful, we have had conversations with an acknowledged leader in the field of social network analysis, David Krackhardt: professor of Organizations at Carnegie Mellon University and editor of the journal *JoSS: The Journal of Social Structure.* Dr. Krackhardt is enthusiastic about the project, giving us keen insights as to what sorts of observations researchers in his field are seeking. This provides the basis for the iconography and visual language in the network display. He even tells us that the database we will be creating will be one of the richest available to his field for this type of sociological study. We plan to release it with him for the free use of scholars around the world.

As for esthetics, the work directly embodies my ideas of Information Esthetics: that complexity from the real world can enhance both visual pleasure and meaning more profoundly if the image is "readable." That is, if the representation allows meaningful discourse not just about the image, but the subject database itself. The project includes new vellum overlay prints for the Illuminated Diagram MetMap, made two or three times a day, allowing people to view the progressive revelation of social structure in the past diagrams, as well as interact with the current one. This will support discussion and insights not just about our technology, hardware, and images, but about the true subject of *TraceEncounters:* Ars Electronica and the rich social tapestry it helps us weave.