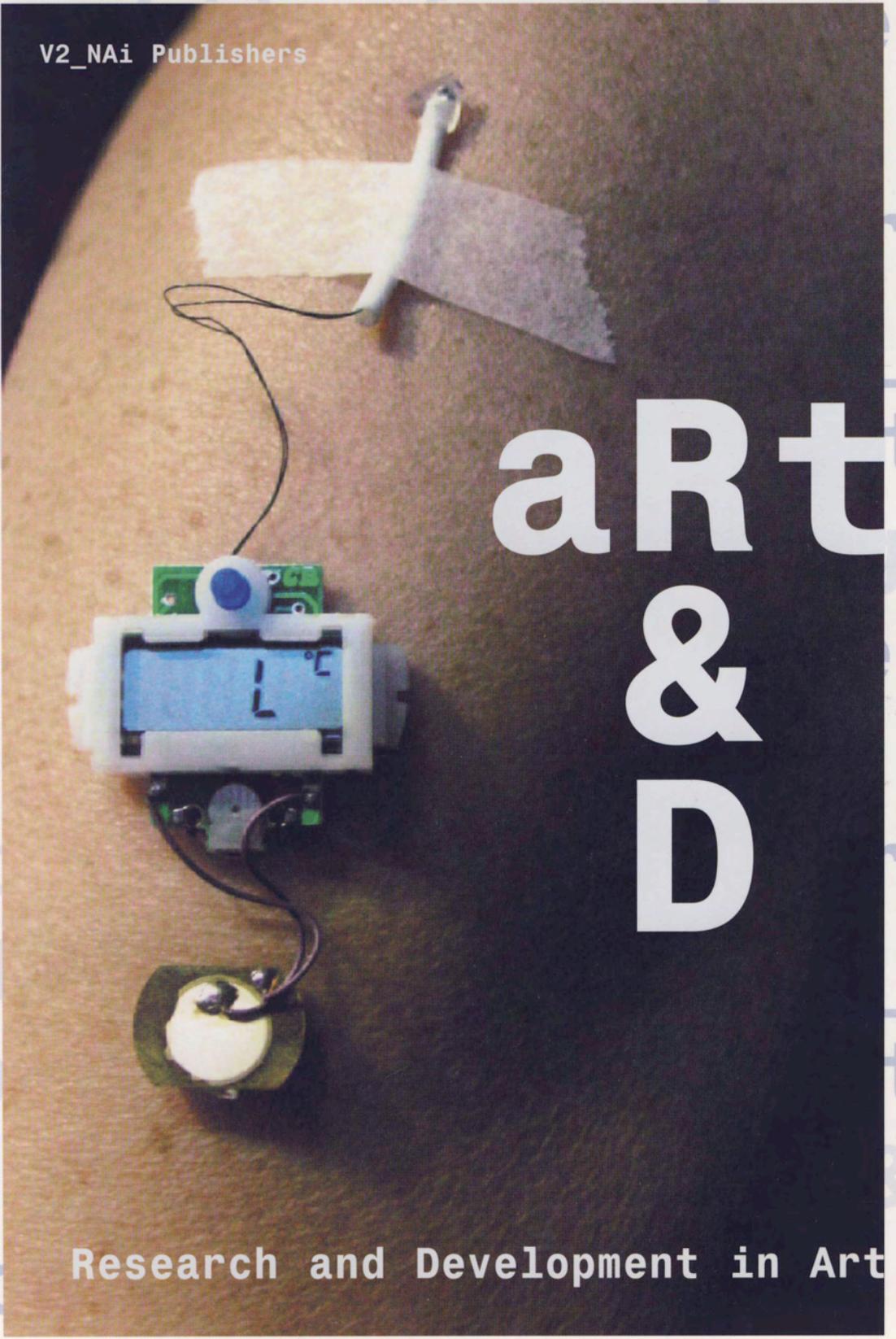


V2\_NAi Publishers

# aRt & D

Research and Development in Art





$$\mathbf{A}_{\alpha\beta} + \mathbf{A}_{\alpha} + \mathbf{R}_{\beta\alpha} + \mathbf{D}_{\beta} + \mathbf{AD}_{\alpha\gamma} + \mathbf{A}_{\beta} \times [\mathbf{RD}_{\beta}$$

**soft, softer and softly:  
[whispering] between the lines**

Thecla Schiphorst



**] × RD<sub>β</sub> + D<sub>β</sub> + D<sub>β</sub>**

## Conceptual Framing

This article describes some trajectories of the artistic research and development for the *whisper* project, an art research project that was developed in collaboration with the V2\_Lab from 2002 to 2003. The concept of softly developing art research through embodiment strategies and techniques is borrowed from first-person methodologies as defined within somatics. In this essay we will look at the role of R&D, the research and devising process within our art research.

Our project name, *whisper*, is an acronym for wearable/handheld/intimate/sensory/personal/expectant/response/system. The research of *whisper* is based on wearable body architectures, extrapolated as small wearable devices, embedded within garments, worn close to skin: proximity creating resonance, contact and communication, body as carrier to device, device as devising the body.

The whispers research group is a collective made up of dancers, choreographers, software engineers, hardware engineers, interaction designers, fashion designers, media artists, sound designers, and computer scientists. With a research team of over a dozen individuals, one size does not fit all. *whispers* builds art research through techniques of body. But what does this mean? Does this "work"? As we work ... softly, softer, whispering, shouting, weeping, dissolving, and re-emerging our strategies, technologies and techniques.

Our art research reappropriates usefulness, user and usability, reinventing usefulness in terms of relationship to the self. One can perhaps even refer to this as a form of hypersubjectivity, "a process of de-hypnotizing ... this depends upon avoiding external suggestion and becoming independent of anything which is not internal."<sup>1</sup>

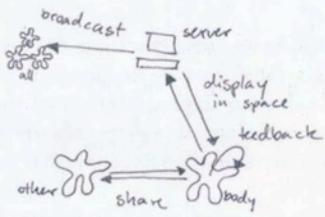
In our own art research this creates outcomes that include delicate hardware, biodegradable software, softer firmware, tough love, biokinesiology for textiles, energy work for circuits, and "circuit training" for dancers. Our art research for *whisper* deals very much with interface, and it does so as techniques of body interface, creating a synthesis of art research that weaves body, interface and technique as a threaded research question.

The title of this article – "soft, softer and softly: [whispering] between the lines" – refers to methods of embodiment that extend through the body, softening the edges between our selves and each other, our methodology, and our materials: hardware, software, textiles, objectiles, and the sensual smudging, messing and pleasure, exotic and abject, that exists between the lines. "Soft, softer and softly" also refers to drawing attention, and paying attention, to ourselves within our processes, observing ourselves observing, in hyperreflexivity.

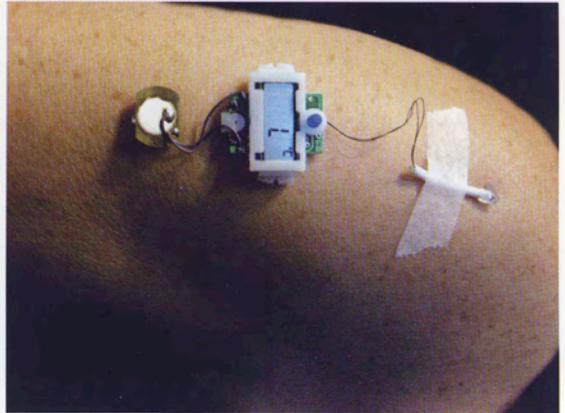
We also explicitly reference building somatic practices between the "lines" of software code, as well as between the lines of our own rhetoric. We call these somatic practices first-person methodologies. Somatics is a term applied to a physically based research discipline, named and developed during the twentieth century in Europe and America by Thomas Hanna.<sup>2</sup> Somatics studies the living body as perceived from within first-person perception, from within its experience of itself. And the soma as internally perceived incorporates a viewpoint that includes immediate proprioception.

First-person methodologies as defined and used within performance practice and somatics share a common set of features. They exist as a set of rigorous, definable physical processes or techniques that can be learned, and produce repeatable results. They are based on the direction of attention in order to affect, alter or produce body states. It is possible to retrain perception, utilizing directed attention that is produced through the application of directed movement, gesture or action, through intention in the body. First-person methodologies access and construct knowledge through the body. They are simultaneously epistemological and ontological, creating knowing through being.

Our research methods attempt to subvert and destabilize traditional software and hardware engineering, as well as traditional physical engineering: the bodies of technology. This destabi-



Sketch of the *whisper* system: the physiological data “shared” between players create a sonic, graphic or haptic output.



Detail of temperature measurement sensor

Detail of sensed garment



lization loosens and softens, releases previous boundary conditions, problematizing technical processes (body, code, method). In order to design our circuits, living as they do alongside the electromagnetic energy of the body, traditional electrical engineering employs techniques that "retrofit" our selves. Are we retrofitting our bodies into our technologies, or reverse-engineering the self to map the "shortening circuit"? Is there a radical reinvention of engineering that can create a longer exhale in the design life cycle?

In order to bridge this perspective within our research, we have created a curiosity cabinet of methodologies for the creation of physical, technological, kinesthetic and affective vocabularies.

## **Methodological Framing**

Our methodological framing is something we call "experience modeling." We were interested in creating gestural protocols for the interaction model used in our wearable body architectures. Since we were interested in using data "of the body" to model or map the space of body state, we used physiological data of the body as a data source.

170 One of our methodological approaches was to create experience workshops as a way to imagine communication protocols between bodies. In other words, we designed our hardware and software networks by exploring experience itself, utilizing the workshop as a model for the hardware, software and network architectures.

A series of user-experience workshops was designed with the goal of developing an interaction model for the network. These workshops modeled levels of intimacy, social navigation and play, using performance methods to create gestural protocols, or movement responses between participants.

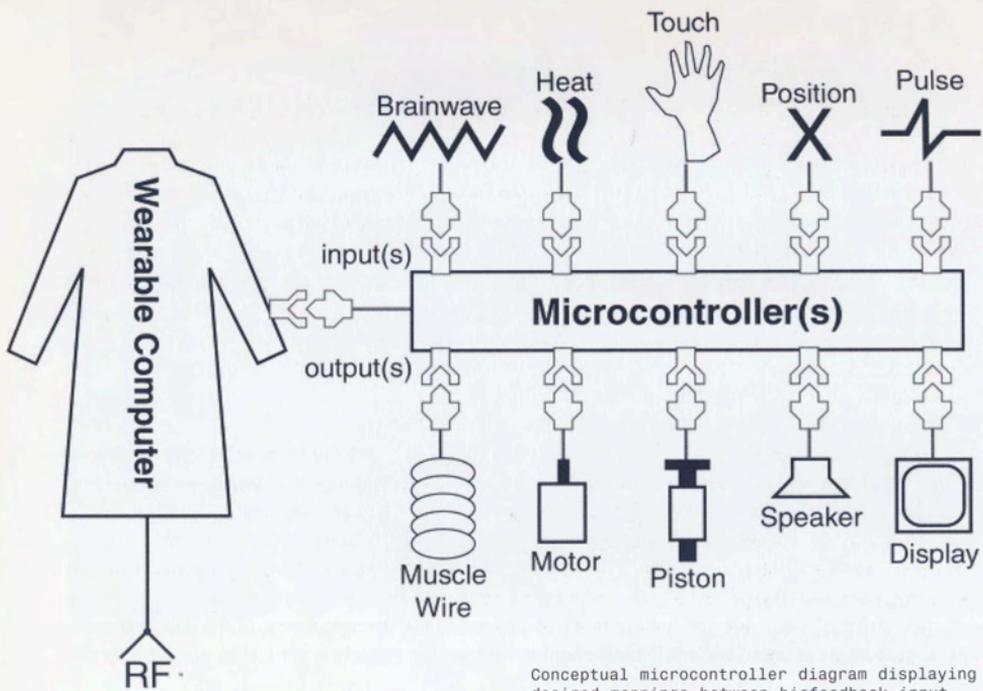
Participants generated movement vocabularies by negotiating permission and control of their own physiological data, their own "body states." Gesture was utilized as an expressive indicator of intentionality, extension of body image, permission, control, exchange and play.

We gathered data from the workshops through video, gestural analysis, and experimental feedback in the form of small hand-drawn cards which participants could draw or "journal" on. These feedback mechanisms let us imagine how we could create an interaction model, wearable garment design, and body-to-body network protocol that would eventually be used in the public art installation, and also how performance methodologies could contribute to the research and devising of interaction.

## **Technological Framing**

Keywords: gestural protocols, performance methods, choreography, wearable computing, intentionality, improvisation, first-person methodologies, physiological computing, play, experience prototyping, public art, informance design, bodystorming, somatics, experience design, social navigation.

Our work in designing and testing experience models borrows methodologies from the performance practices of theater<sup>3</sup>, dance<sup>4,5</sup>, and the field of somatics<sup>6</sup>, expanding work in the area of computationally centered design techniques as well as the rhetoric of user-centered design, experience design, and participatory design. Our premise is that performance, as a practice-based research domain, contains a longstanding history of constructing experience models. Computational interface strategies omit the bodily experiences of participants. We explore embodied cognition as a reflective process that is simultaneously inter-body and intra-body.



Conceptual microcontroller diagram displaying desired mappings between biofeedback input and actuator outputs.



Participants playing in the interactive *whisper* installation during Future Physical's RESPOND Interchange festival in Cambridge, 2003. The sensed garments record biofeedback, which is visualized as floor projections and made audible.



## Technical Interaction: Gestural Movement Vocabulary

Our interaction model required that participants exchange their body-state, or physiological data between themselves, and their garments. In order to design circuit connectivity for networked participation we needed to explore how gesture could enact bodily connectivity.

What are the properties of a gestural movement vocabulary? In *Activity Theory*, Nardi<sup>7</sup> illustrates the notion of a "function organ" – a transforming bond with an artifact. A photograph depicts a child listening intently to the radio; the expression of intense concentration suggests the creation of a relation between body and object. In dance and theatre the gesture itself can also become a "function organ," an artifact that creates or enacts a transforming bond between the participant and his or her own movement. In this way, we think of the gesture itself as a function organ: an artifact that creates affordances for interaction.

The design of specific gestures that can become enactors is a notion common to theatre and dance practice. We follow with examples from performance practice that support this notion. Richard Schechner<sup>8</sup> uses the term "Restoration of Behavior" to describe gesture as "material." Restored Behavior is organized as sequences of events, scripted actions, or scored movements. Schechner refers to these as "strips of behavior," and states that a restored behavior, although "originating from a process, used in the process of rehearsal to make a new process, or performance, the strips of behavior are not themselves processes but things, items, material." This concept of gesture as source "material" for designing interaction models is central to our work explicated in this paper.

Augusto Boal<sup>9</sup>, in *Games for Actors and Non-Actors*, states that "bodily movement is a thought, and a thought expresses itself in corporeal form." Boal's arsenal of theatre can be used to reenact or rematerialize the body state that accesses or indexes that thought, or "thought-unity." Grotowski refers to an acting score as a script for designing point of contact or connection<sup>10</sup>. In Interaction Design this is the equivalent of interaction schemas, which are navigated in order to construct the instantiation of the interactive experience. Grotowski speaks to the necessity of scripting gestural sequences in order to construct connection schema: "What is an acting score? The acting score is the elements of contact. To take and give the reactions and impulses of contact. If you fix these, then you will have fixed all the context of your associations. Without a fixed score a work of mature art cannot exist."<sup>11</sup>

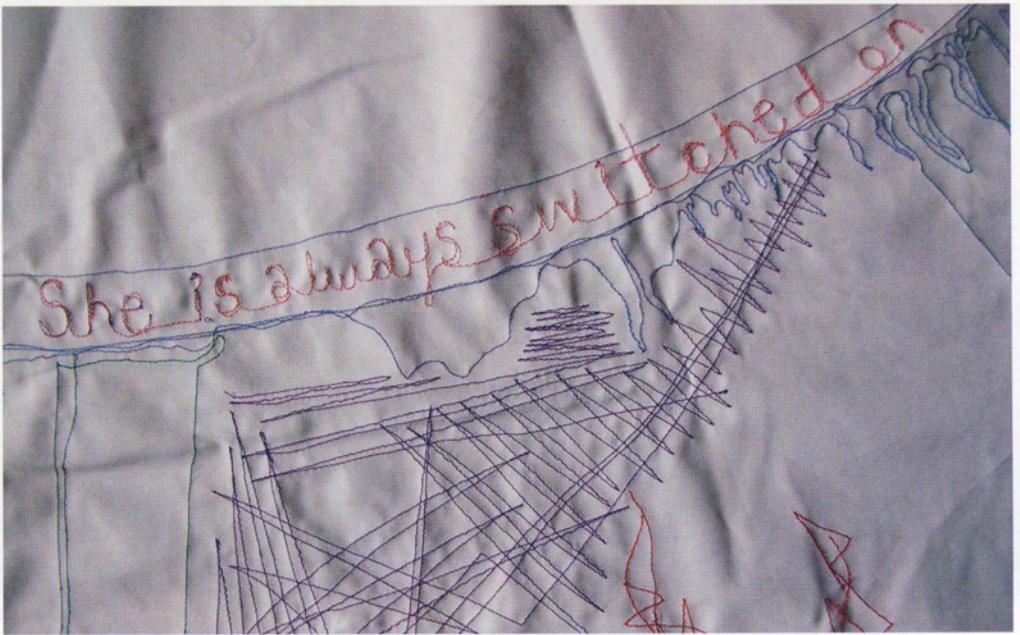
We suggest using gesture as a "function organ," as a mechanism that can assist in defining properties for a scripted interaction score. These gestural function organs have the goal of paralleling processes to construct Grotowski's concept of mature art: works of "mature interaction."

## Circuit Training for Dancers: Addendum

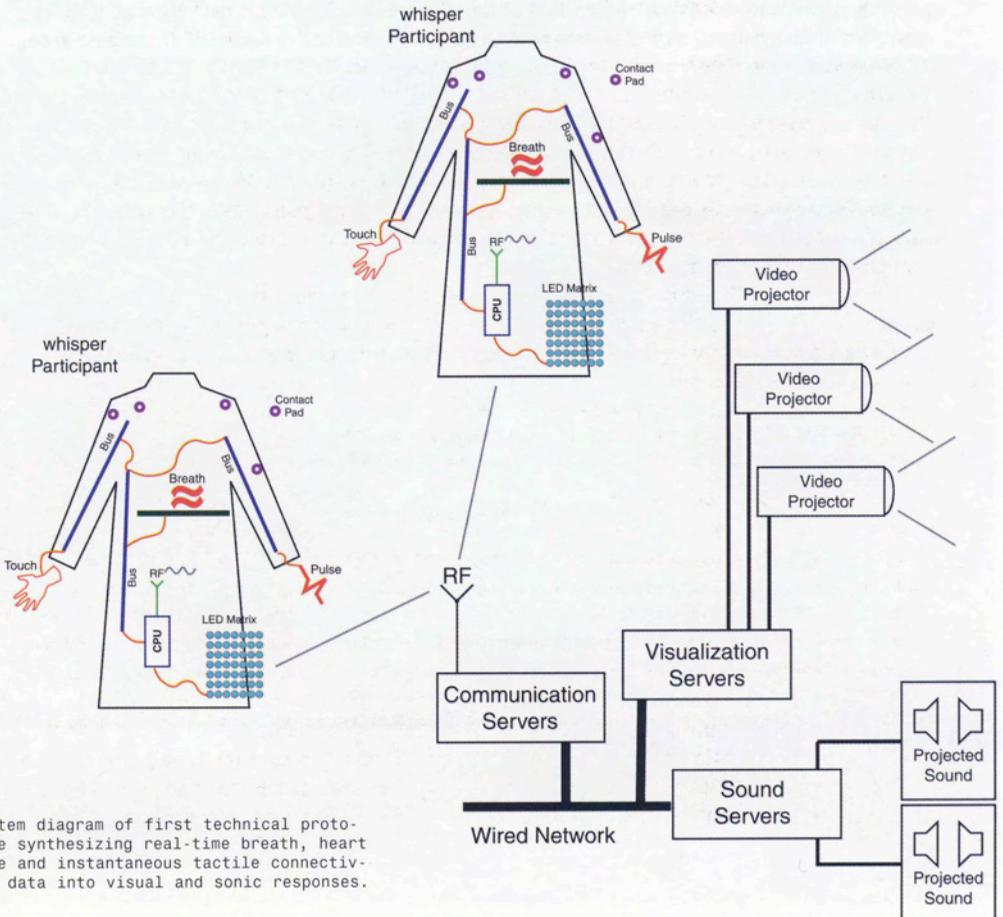
In the spirit of our embodied research we have created artifacts of these processes which have been exhibited at DEAF 2003, Future Physical RESPOND in Cambridge in 2003, the e-culture fair in Amsterdam in October 2003, Ciber@rts Bilbao in April 2004, Siggraph in Los Angeles in 2004, and the New Forms Festival in Vancouver in 2004.

Our first technical prototype – developed in very close collaboration with the V2\_Lab – involved compact networked microcontroller systems that were linked via Bluetooth communication to a network of servers. The wearable systems integrated real-time breath and heart rate data as well as instantaneous tactile connectivity information to synthesize visual and sonic responses that were derived from the dynamic aggregate data streams.

The second generation platform, <between bodies>, incorporates commercial, off-the-shelf PDA (Personal Digital Assistant) technology with integrated WiFi communication as well as custom electronics that interface with Thought Technology's biofeedback/psychophysiology moni-



Detail of garment prototype



System diagram of first technical prototype synthesizing real-time breath, heart rate and instantaneous tactile connectivity data into visual and sonic responses.

toring devices, which provide EMG (electromyograph – which is muscular biofeedback), breath rate, heart rate and GSR (Galvanic Skin Response) physiological signals from directly attached sensors. The PDA is also connected to multiple transducers to generate localized feedback to the wearer in the form of air motion (with miniature fans) as well as tactile and sonic feedback.

We continue to explore a set of embodied practices within our research. These continue to develop our research questions, our (aRt&D), forward, soft, softer, and softly through ...

#### Emanating Relationship

Whisper device states are learned and emerge from living on a specific body, and begin to represent that body; whisper devices remember past lives and these past lives influence their behavior.

#### Body as System

Whisper devices are held close to the body. Our bodies have secrets, contain multiple intelligences, conceal information in unlikely places, surrender things to one another, learn, habituate and unlearn by applying directed attention. So do the devices of whisper. Any one of our bodies is a "we." When our bodies are together they can operate as an "I." So can the devices in whisper.

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#### Future Memory

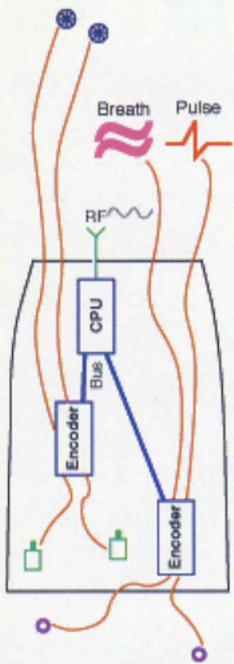
Whisper builds and represents and builds "future memory." The past is incomplete and the whis- pers can revisit and reconstruct past views as time progresses. The past is not replaced; it is aug- mented and restructured as the system perception grows. And the rediscovery of the past prop- agates into the future and the system's anticipated behaviors.

#### Cultural Study of Telepathy and Mapping

Whisper is an incursion into the cultural study of telepathy: impressions are transferred invisibly, mediated both through body and technology. Telepathy is the ultimate wireless network, we cre- ate wearables for the telepathically impaired. Whisper excavates the invisible, is a search for lost things.

#### Notes

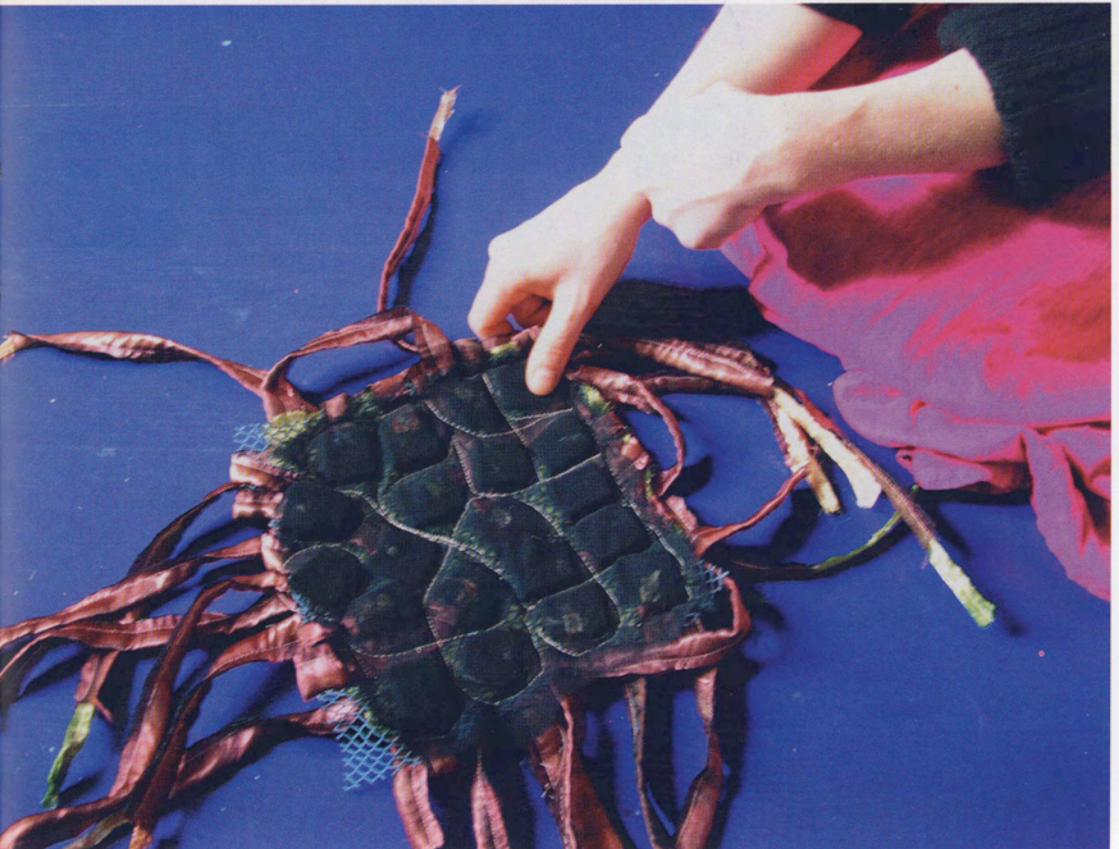
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Details of sensed garment prototypes



Diagram of a sensed garment for the second-generation platform of *whisper* <between bodies>. In addition to pulse and breath, EMG (muscular biofeedback) is also measured. Localized feedback is generated by multiple transducers in the form of air motion (through miniature fans) as well as sonic and visual output.



Sensed garment prototypes

In the creation of electronic and digital art, a research and development phase is almost always necessary. Research sometimes concentrates on the use of existing technologies in the content of the work, and at other times on the development of new technologies (hard-, soft- and netware) needed to realize the intended project. This research is notably interdisciplinary, linking visual and sound artists with engineers, programmers and designers as well as with scientists from diverse fields. The projects are often carried out in "art labs" which have been set up in the past fifteen years around the world especially for this purpose.

*aRt&D: Artistic Research and Development* lays open this new, investigative field of art by looking at a number of characteristic and thought-provoking projects. At the same time, it develops a theoretical framework for situating and evaluating this important new artistic practice.

ISBN 90-5662-389-3



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