

## Aires

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# Aires: a wearable for women in their menopause

## Abstract

In this demo we show an active garment to support women in matters of menopause issues, more specifically: hot flashes. This demonstrator shows the marriage of 'hard' technology and 'soft' textiles in a practical wearable product.

## Keywords

Wearables, Fashion, Hot Flashes, Support, Interaction Design

## 1 The context: menopausal hot flashes

The menopause is the period in a woman's life when she stops ovulating and menstruating. During the menopause the body goes through a hormonal change. Often physiologic and psychosocial changes are experienced. Associated symptoms are: hot flashes, bone loss, urogenital atrophy, urinary tract infections and incontinence, increased cardiovascular risk, somatic symptoms, sexual dysfunction and decreased libido, and loss of skin elasticity (Utian, 2005).

### 1.1 Hot flashes

It is estimated that 75% of women older than 50 years old will experience hot flashes. Hot flashes are seen as a response of the brain to the reduced hormones and hormonal fluctuations that happen during the menopause (Utian, 2005). Hot flashes are felt when the core body temperature crosses the upper threshold of



Fig. 1. Aires in use. (©Tamara Hoogeweegen)

the thermo neutral zone. The thermo neutral zone is when the core body temperature is between the upper threshold for sweating, and a lower threshold for shivering. Women who suffer from hot flashes tend to have a narrowed thermo neutral zone and are therefore more sensitive to fluctuations in core body temperature (Archer, D.F. et al. 2011). The frequency women experience hot flashes differs per individual; some experience it irregularly, weekly or monthly, whereas others experience the hot flashes frequently, for example hourly (North American Menopause Society, 2004).

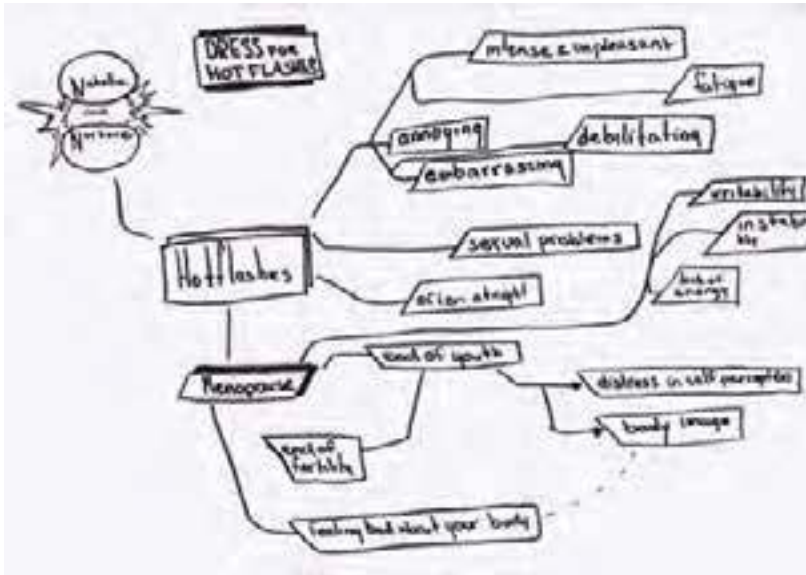


Fig. 2. Scheme on web based information on hot flashes.  
(©Tamara Hoogeweegen)

### 1.2 The impact

Hot flashes have a substantial negative impact on the overall quality of life for a large number of women. It can cause sleep and mood disturbances (Utian, 2005) and emotional distress in self-perception. Also is it often perceived as being embarrassing, annoying and causing irritations (Nelson H, Haney E, Humphrey L, et al., 2005; Nelson, H.D. 2008). Besides the physiologic and psychosocial changes it is also an economic burden. Women confronted with menopausal hot flashes make more use of the health care system and are confronted with other extra expenses (Utian, 2005).

### 1.3 Design opportunity

At the age women start experiencing hot flashes they have generally established their identity in the way they live, in what they wear and how they move. As soon as they start experiencing hot flashes they adjust the way they dress and take the chance of getting hot flashes into account in their daily lives. This can be seen as a clash between the nature and nurture. As regards the methods of treatments for hot flashes a broad range of papers approach it from a medical perspective. This largely encompasses hormonal and non-hormonal management or treatments (Nelson, H.D. 2008). When looking at non-prescribed therapies, most of them have an invasive approach and not many are non invasive.

Considering the case of menopausal hot flashes from a design perspective, design opportunities arise. As a designer it isn't realistic to design solutions for hot flashes, but there are design opportunities when it comes to easing the experience of hot flashes. By easing it will reduce the feeling of annoyance and irritation of sudden hot flashes and hopefully help towards a better quality of life.

## 2 The concept

### 2.1 The demonstrator

Aires is an underwear collection for women in their menopause. The design is a bra that cools the upper chest to neck area through ventilation. It combines soft textiles for it to be comfortable and wearable for the user and integrates a technology to cool. The technology used is a ventilator that blows air through the air channels created in the textile.

The prototype has two types of fabrics, the blue fabric is soft for the skin and stretchy, the other textile is a windproof fabric. With this wind proof fabric the air-channels were created by gluing it but leaving strips unglued for the channels. The ventilator used has the size of 50mm by 50 mm by 5mm. This fan is then connected to a 12-volt battery and a button.

### 2.2 Use-case scenario

Any woman who suffers from hot flashes can wear the Aires bra under their conventional garments. Whenever the user feels the hot flash coming up she can turn it on by a subtle touch on the side of the bra (see figure 1). This will activate the ventilator and will make the air flow through thin air channels with tiny holes in the neck and upper chest area (see figure 3). The air circulation created under the worn garments cools the skins. Cooling the skin by air movement is called convection. The moving air causes the warm air to rise up away from the body (Someren, J.W. Van, et al. 2002). Whenever the feeling of the hot flash is eased, the user can turn the ventilation off again by a subtle touch on the side. (See movie: <https://vimeo.com/99635490>)

### 2.3 Design choices

In the design process specific choices were made. Starting with the colors to fit the target group of middle-aged women. The chosen colors are dark blue, grey, beige and light blue, to fit the visual image of being elegant, simple and comfortable. Secondly the type of garment,

a bra, isn't visible and can be turned on without it being obvious for others, which might be desirable as a hot flash can be experienced as shameful by some women. Furthermore the bra gives the women a sense of femininity and sensuality, because during the menopause hormones change the body, this might entail feeling bad about their body, end of fertility and end of youth.

#### 2.4 Proposal for further development

To take this project to the next level improvements can be made on different levels: material and technology. For a bra the textile used needs to be stretchy to adjust to the body movements and curves, but at the same time it needs to be strong to give good support. For this specific target group the material needs to be airy, not retain heat and dry quickly. Proposed fabrics, common in sportswear, are: S.café by Singtex, Thermocool by Invista, c\_change by Schoeller. Also interesting would be fabrics with phase changing material (PCM). When PCM's change from solid to liquid state it absorbs energy, and when it become solid again it releases heat. The PCM's used in clothing change phase at temperatures close to the thermo neutral temperature of the skin (28–32°C) (Reinertsen, R.E. et al. 2008). Based on laboratory experiments Reinertsen et al. (2008) stated that their subjects rated lowering of skin temperatures positively, even though core body temperature didn't fall. This would also be interesting for women suffering from hot flashes.

Furthermore the current prototype has a ventilator which is too big. The bra could have a removable module on the back; by this you can to wash the bra and change its batteries easily. The current ventilator could be replaced by either a couple of micro fans which would still generate enough air movement.

#### 3 Societal impact

With the help of demonstrators like Aires the idea is to show and inspire fashion designers and technologists to work closer together. And raise awareness of what can be done when 'hard' technology and 'soft' textiles are combined in a wearable product.

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Fig. 3. Aires close-up showing the air channels (© Tamara Hoogeweegen)

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# Animism Expression: Materializing Basic Principles of Animation for Interaction Design

## Abstract

Input technologies using natural communication skills (e.g., voice and gesture recognitions) have been developed to a mature level, while daily experiences with such skills are mostly with ‘living subjects’ rather than ‘inert objects.’ On the other hand, the general mindset of interacting with (inert) objects is usually based on functional movements such as button pressing. We argue that there is a novel cognitive perspective needed to be addressed in order to create natural interaction experience, and animism can be leveraged to develop an interactive mindset of interacting with artifacts, thus creating living things that users would perceive. Drawing on animation principles of how animators make still things alive, we propose eight principles of designing animistic interactive artifacts. We further conceptualize how these principles can be implemented in terms of light changes and physical transformation with cubic prototypes. Materializing these principles with lighting examples, we present interactive artifacts as *live-things* that bring animistic metaphors in tangible interaction design, where participants could perceive perceptual crossing promoted by the phenomenology of perception as well as how Ihde frames technology as ‘quasi-other.’

## Keywords

Embodied interaction, designed animism, phenomenology of perception, alterity relations, tangible interaction, animation, poetic interaction.

## Introduction

We’ve seen new technology rising up and maturing over the past decade, but we still keep the usual practice in everyday life: we control electronic objects with switches and buttons. Although voice recognition and input technologies have been developed to a mature level, we as human, whose common communication experiences with our nature skills are with ‘living subjects’, rather than ‘inert objects’. On the other hand, the general mindset of movement on interactive objects is merely ‘on & off’ based on ‘digitalized input & output.’ We argue that there is a novel cognitive perspective needed to be addressed, and animism can be leveraged to develop an interactive mindset of designed objects, thus creating living things that users would perceive. For example, when the GPS Table [1] is indoors, and cannot communicate with the satellite, it will just shows “Lost”. The table invites users to intervene the dialogical contexts, to start to understand its needs, to recognize its subjectivity, and then to change the relation between the table and users.

Ihde had proposed three human-technology relations, namely, embodiment relations, hermeneutic relations, and alterity relations [2]. In this study, we conceptualize interactive artifacts as animated things or intentional subjects to support the perspective of “alterity relations” in Ihde’s viewpoint. Technology of object that we present is experienced as shifting from functionality into ‘quasi-other,’ [2] embodying as a perception