

**Author:** Robert Sheil of sixteen\* (makers)  
**Research Output 1:** *Blusher*

**Co-Authors:** Phil Ayres, Nick Callicott, Chris Leung

**Output Type:** Design

**Design and Production of Artefact for Solo and Group Exhibitions:** *Blusher*

**Media:** Pressed steel sheet, layered polymer sheet, sensory array, lighting array, microprocessor, dedicated software

**Dimensions:** Variable according to venue

**Exhibition:** *Making Buildings*

**Locations:** New Art Gallery, Walsall; Crafts Council Gallery, London; Centre North East, Middlesbrough; The Turnpike Gallery, Leigh; Aberystwyth Arts Centre, Aberystwyth; Brighton University, Brighton

**Curator:** Greg Votolato

**Dates:** 2001 – 2005

## 300 Word Summary

### Questions/Aims/Objectives

*Blusher* explores spatial and temporal relationships between occupants and environments, investigating:

- (1) Variability and adaptability in responsive assemblies.
- (2) Occupant behaviour in relation to alternate configurations.
- (3) How a system acts upon rather than simply responds to occupant behaviour.

### Contexts

The majority of related research (namely DeCoi's *Aegis* and Beesley's *Orpheus* series) concentrates on singular assemblies of reciprocal architecture. *Blusher* provides two significant extensions of knowledge in this field: recognizing the influence of difference between sites, and how the use of historical data in relation to real time activity allows for systems to extend from reflexive to adaptive.

### Methods/Description

A structural skin is assembled from 21 variably cut/pressed steel plates. A secondary surface of polycarbonate leaves and shape memory wire incorporates responsive properties. Both are networked to a sensory and lighting array and dedicated software. Circumstances of each venue inform site-specific configuration of the assembly in which variable modes/passages of approach are constructed. The assembly maps fine-grain visitor movement, direction, density, proximity, duration of occupancy. In response, its leaves are activated with a varying intensity of 'blush'. Over time, trends in behaviour are recognized, allowing predictions concerning activity to be made with greater certainty.

### Dissemination/ Esteem

Group Exhibitions:

*Making Buildings*, Crafts Council touring exhibition of six UK cities, 10,000 visitors, 2001; *Material Intelligence*, Entwistle, London, 2005.

Reviews:

W. Jones, 'Responsive Behaviour', *Frame*, v. 26, (2002), pp. 108–113; C. Melhuish, 'Hightech and Customisation: sixteen\* (makers)', *Making Buildings*, (London: Crafts Council, 2001); S. Gardiner, 'Complete Fabrication', *Building Design*, n. 1474, (2001).

Publications:

Robert Sheil: one refereed paper, 'Making Paraforms', *Journal of Architecture*, v. 8, n. 2 (2003), pp. 203–210; talks: Winnipeg, Toronto; one residency: Phoenix.

sixteen\* (makers): two book chapters, two refereed papers, talks in Copenhagen, Delft.

### Authorship

As part of the design/making practice sixteen\* (makers), Ayres, Callicott, Leung, Sheil all contribute equally to the research.

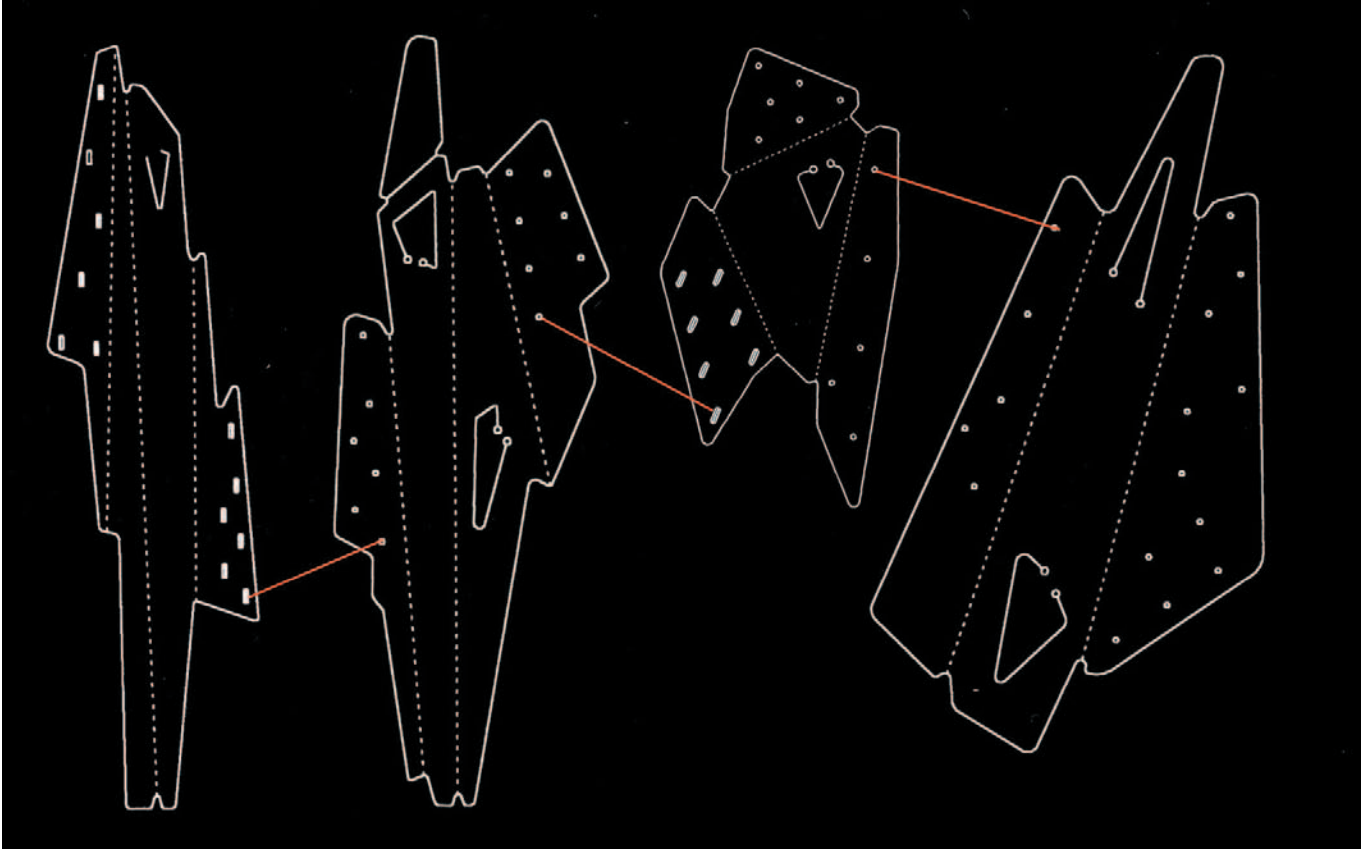


Image 1

## General Description

'Blusher' was created in response to an invitation by The Crafts Council to participate in a year-long national touring exhibition in 2001 across six venues entitled *Making Buildings*. Unlike the other works in the show, sixteen\*(makers), comprising Robert Sheil, Phil Ayres, Nick Callicott, and Chris Leung, were commissioned to design and fabricate a new work specifically for the exhibition. Hence, *Blusher* explored questions that sixteen\*(makers) believed were particular to the purpose of this exhibition, specifically a touring exhibition.

The invitation reflected sixteen\*(makers) growing reputation for researching architectural design questions through the practice of making, with respect to the impact of digital technologies and time-based architecture. With professional qualifications in architecture, members of the group also regularly practise disciplines of craft and manufacturing in a variety of skills including CAD/CAM and software script writing. Such an inter-disciplinary approach towards the research of the group is central to its aims and objectives.



Image 2

## Research Questions/Aims/Objectives

Within this context, sixteen\*(makers) became very interested in the notion of an intervention that might be reconfigured at each venue as a response to differing specific and found spatial qualities. sixteen\*(makers) were also interested in exploring how such a proposition might reflect, or act upon, the continually transforming and transient conditions of its context including the presence and activities of exhibition visitors. Subsequently, the work was designed to explore spatial and temporal relationships between occupants and their environment. The focus was threefold:

- (1) To explore variability and adaptability in the design and manufacture of architectonic components.
- (2) To explore occupant behaviour in relation to alternate configurations of the assembly from venue to venue.
- (3) To investigate how such a system might act upon the variable behaviour of its occupants.



Image 3

## Research Methods/Contexts

### Variability and Adaptability

In the first instance, *Blusher* was composed as a kit of interchangeable parts which allowed assembly at each venue and produced specific spatial relationships with the site. *Blusher* consisted of three series of components:

(1) A set of components comprising 21 variably cut and folded steel plates capable of interconnecting in a variety of ways. (images 1–3)



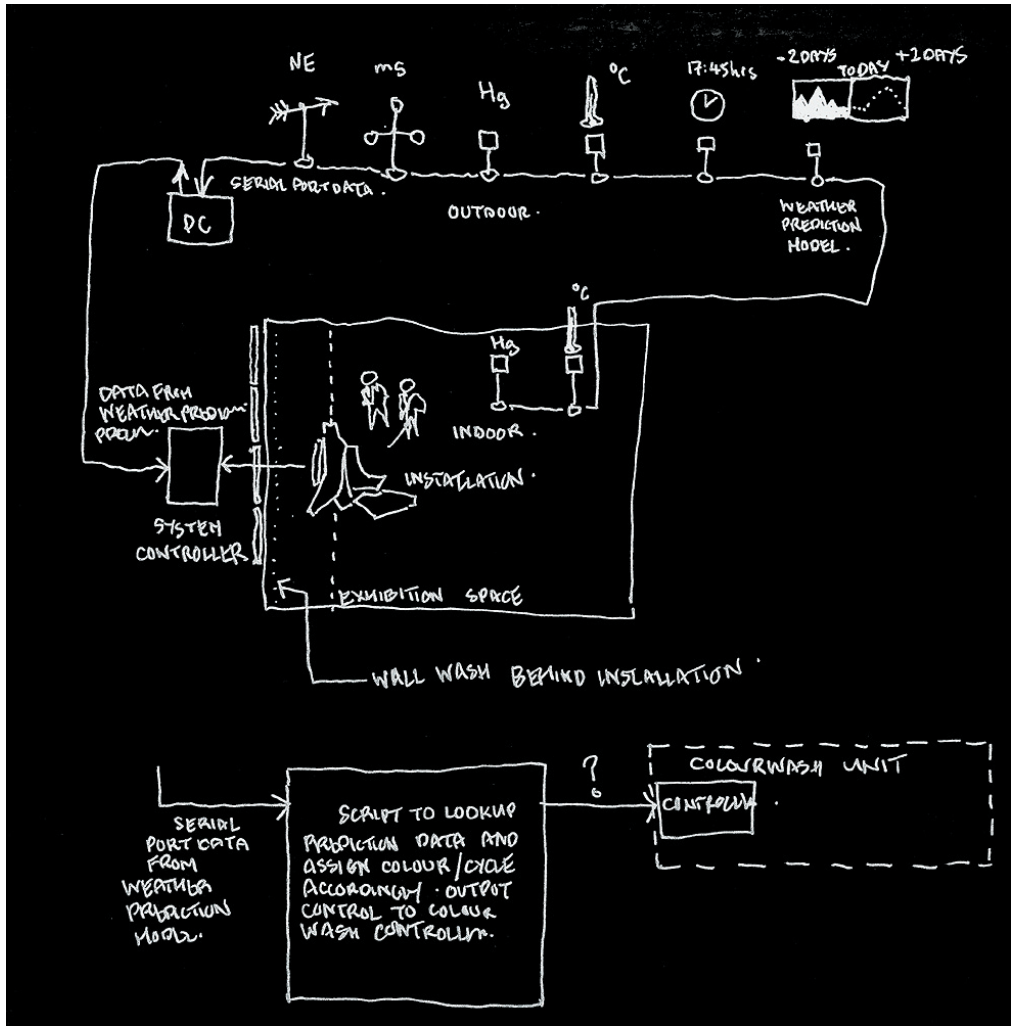


Image 4

(2) A network of embedded sensors including proximity sensors, retro-reflective beam breakers and a sonar device. (images 4–6)

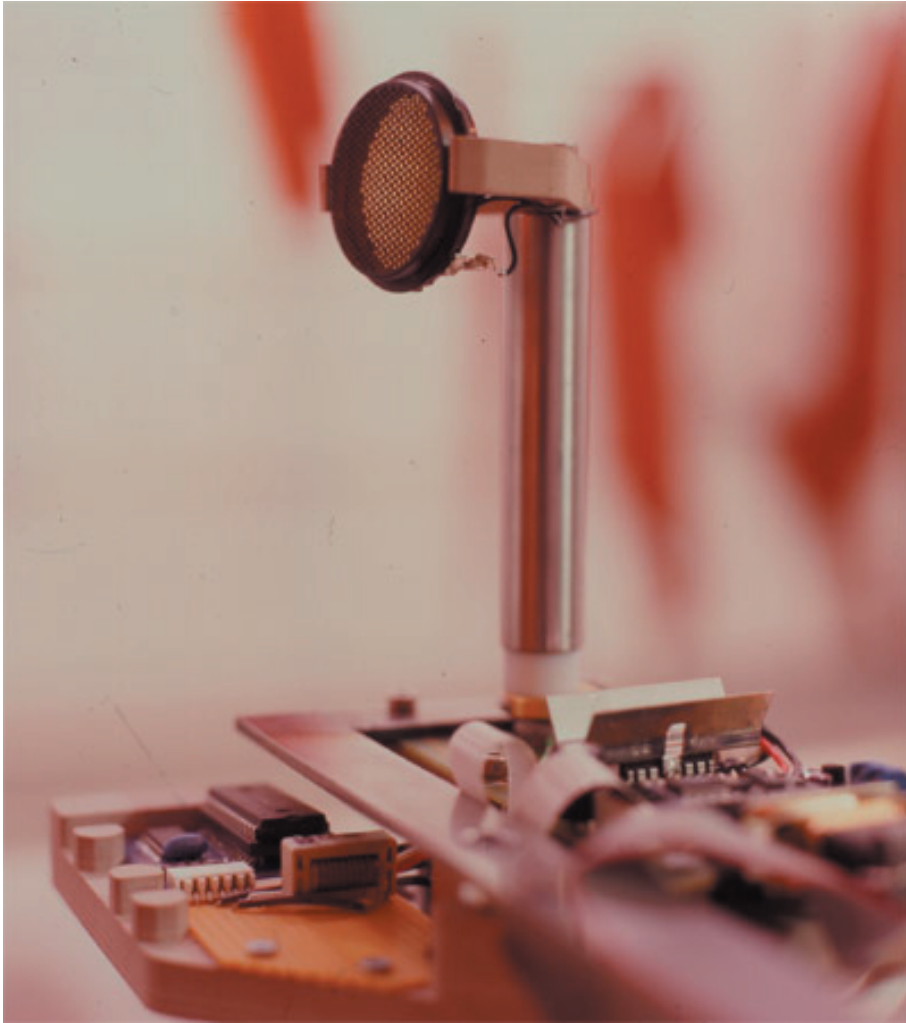


Image 5



Image 6

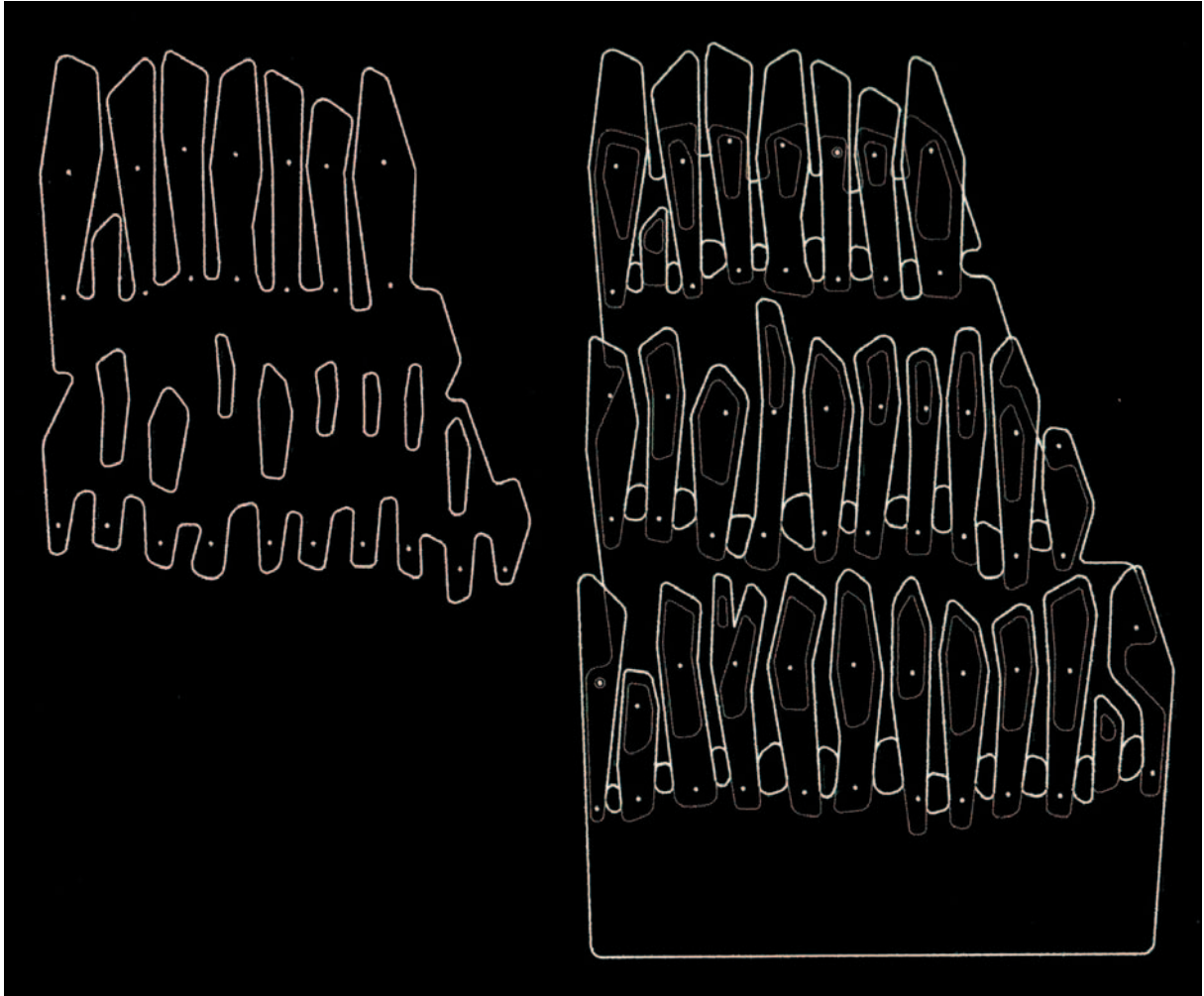


Image 7

(3) A layered surface of polycarbonate leaves with responsive properties known as 'feathers'. (images 7–9)

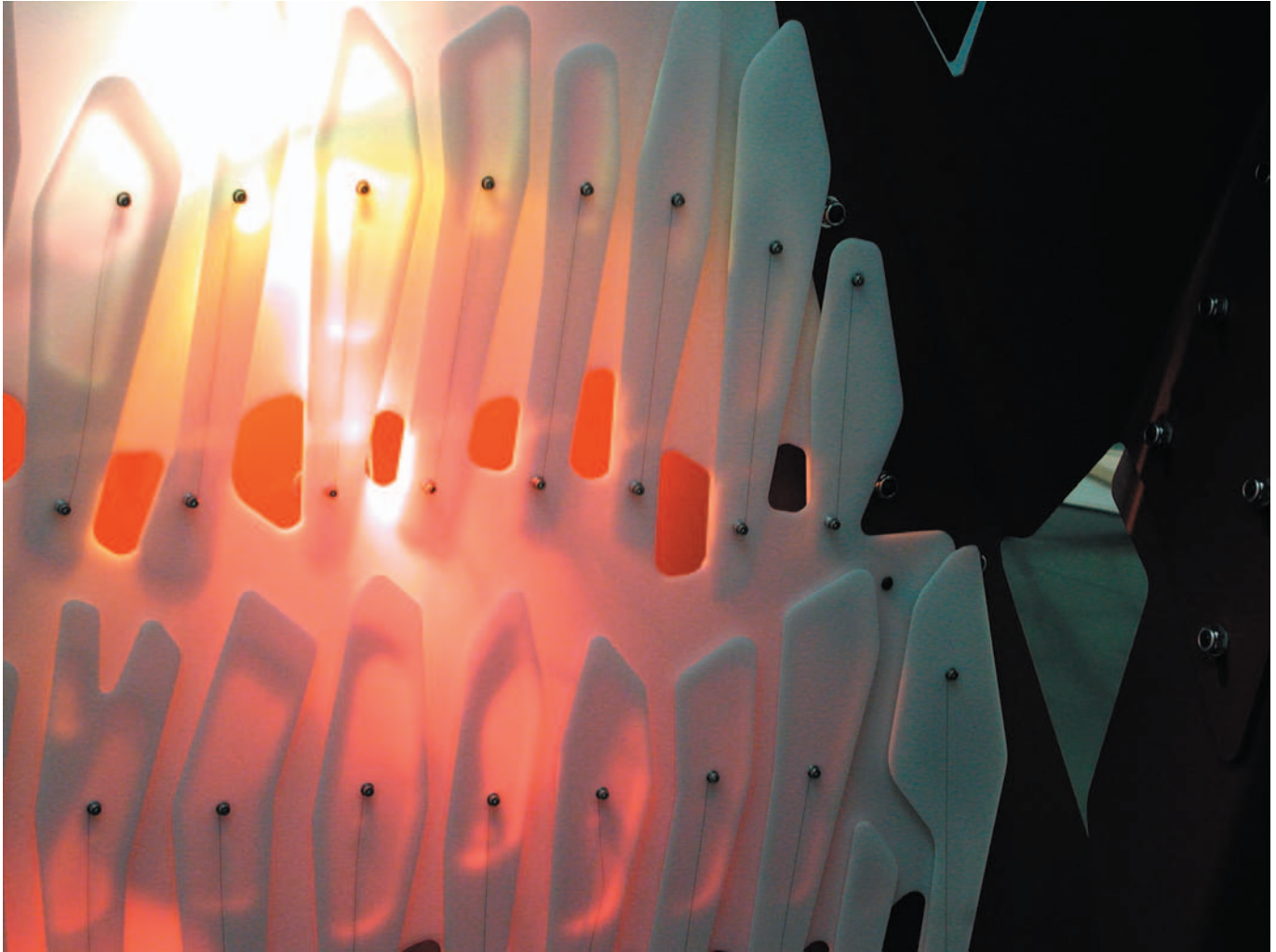


Image 8





Image 9



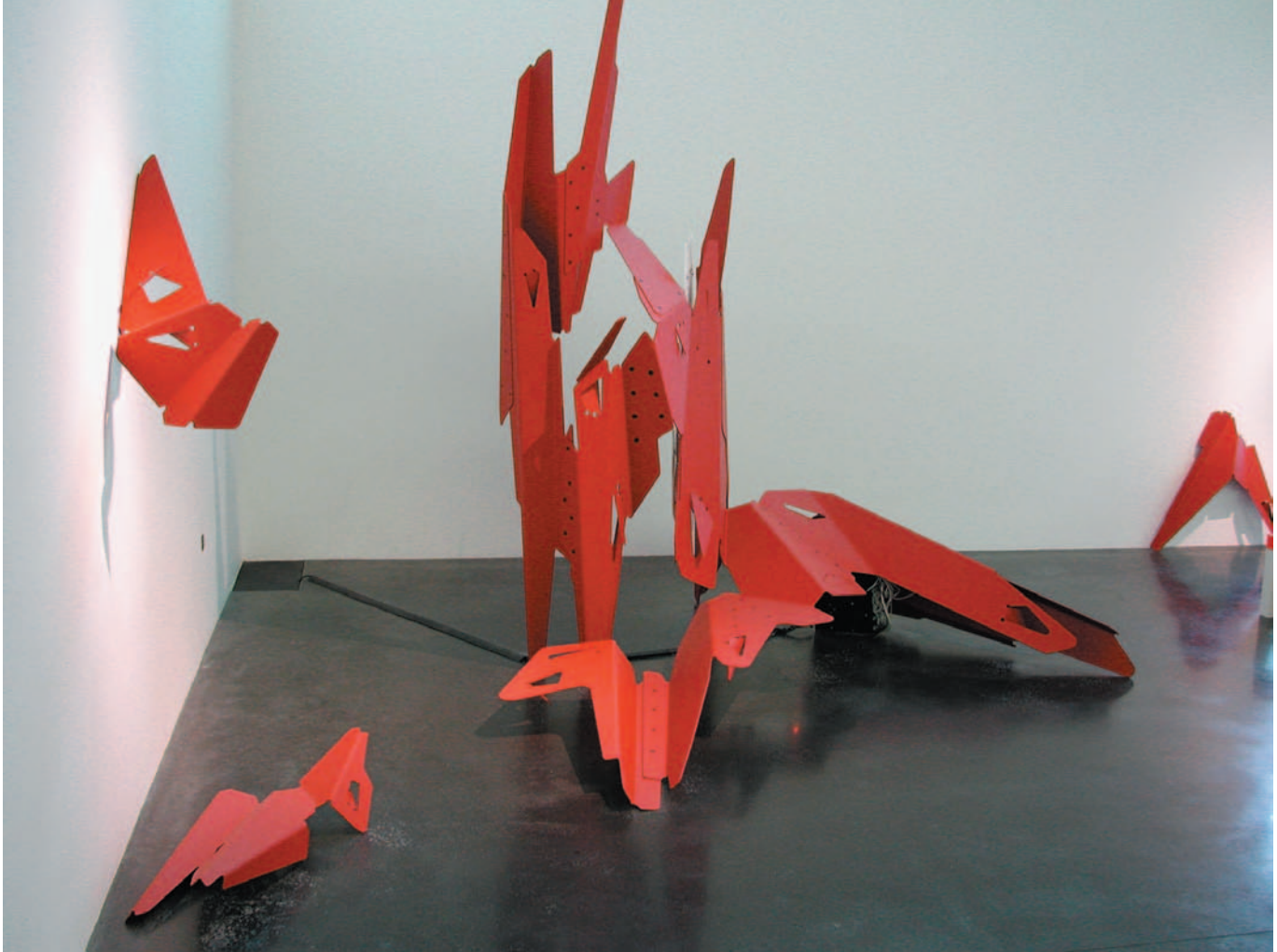


Image 10  
*Blusher, Making Buildings* (group  
exhibition), New Art Gallery,  
Walsall (2001).

The configuration of these components was uniquely assembled and arranged in each site. An array of steel plates formed structural enclosures, spatial boundaries and luring elements. Embedded within this array the sensory network monitored immediate and adjacent territories, routes and lines of approach, and logged activity in these zones as data on a microprocessor over time. (images 10–16)

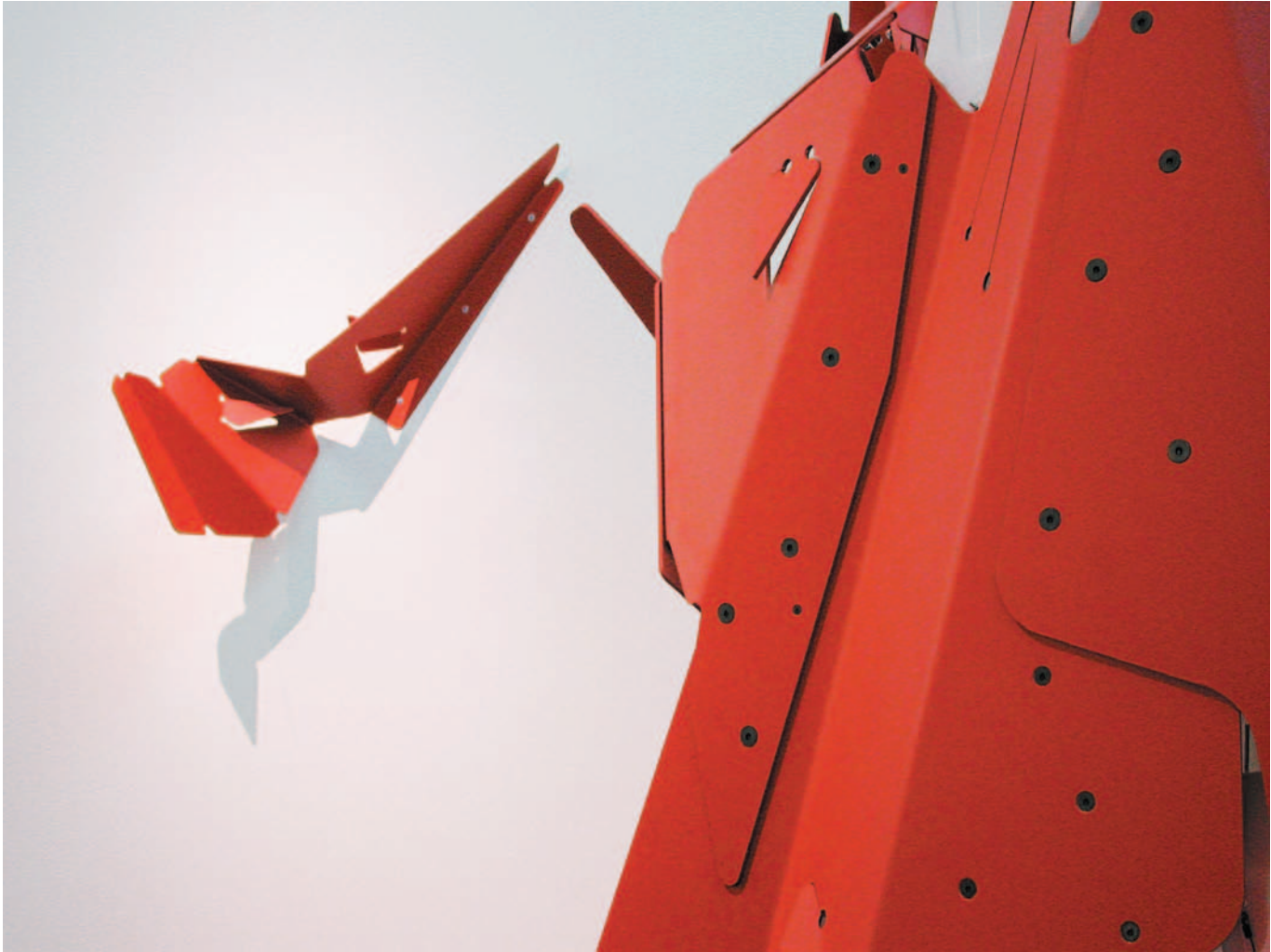


Image 11  
*Blusher, Making Buildings* (group exhibition), The Turnpike Gallery, Leigh (2001).



Image 12  
*Blusher, Material Intelligence*  
(group exhibition), Entwistle  
Gallery, London (2002).



Image 13  
*Blusher, Making Buildings* (group  
exhibition), Centre North East,  
Middlesbrough (2001).





Image 14  
*Blusher, Making Buildings* (group exhibition), Crafts Council Gallery, London (2001).



Image 15  
*Blusher, Making Buildings* (group  
exhibition), Aberystwyth Arts  
Centre, Aberystwyth (2001).



Image 16  
*A Year in the Making* (solo  
exhibition), The Bartlett School of  
Architecture, UCL (2001).



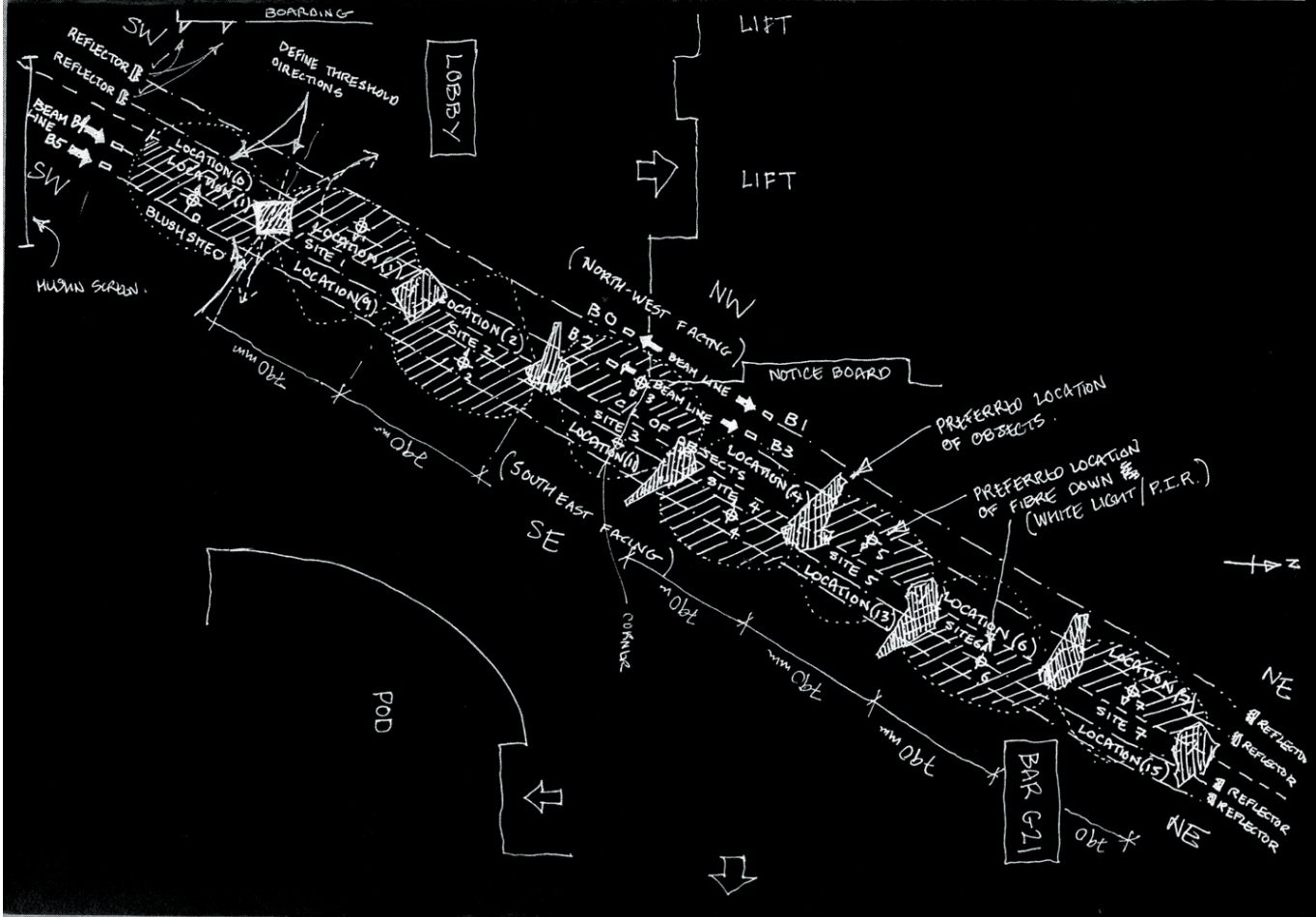


Image 17

### **Responsive Behaviour**

The work was titled as a reference to typical behaviour in relation to gallery exhibits. The intention was to make explicit the status of *Blusher* as, quite literally, a work in progress and that it stood as an invitation for curious occupants of the exhibition to become involved in its evolution. The more inquisitive an occupant became, the more *Blusher* would react. However, even if an occupant was nearby but appeared indifferent, *Blusher* might flirt a little to attract their attention. *Blusher* aimed to focus attention on physical and tactile qualities in architecture, and the relationship between such qualities, context, environment and occupants.

The spatial and temporal conditions set up at each exhibition venue generated explicit relationships between the observer and the observed. (images 17–19) The differential qualities of logged data, once correlated and assessed, allowed fine grain inferences to be made about movement, direction, density, proximity, and duration of occupancy for both single occupants and groups of occupants. Subsequently the data was used to drive the feathers, which fluttered and glowed in various ways. Various intensities of 'blush', related to both the history of sensory data and live stimuli, were witnessed. (images 20–21)

As trends began to emerge from the data set, it was possible for *Blusher* to make predictions concerning behaviour with greater certainty, and to respond accordingly with increasing confidence.

The research demonstrates how the use of historical data in relation to real time activity allows for systems to extend from reflexive to adaptive. This was seen as a unique achievement.

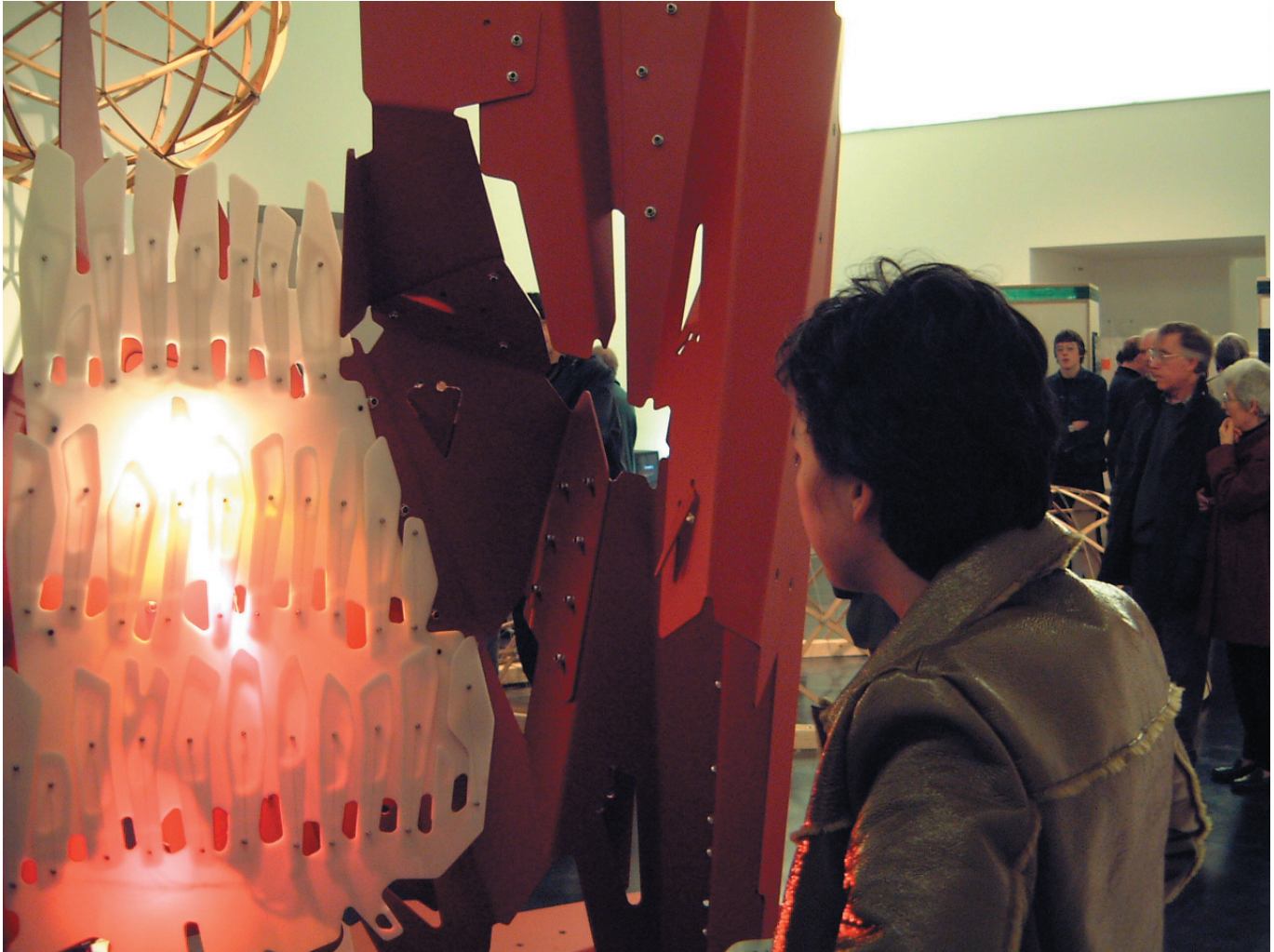


Image 18



Image 19



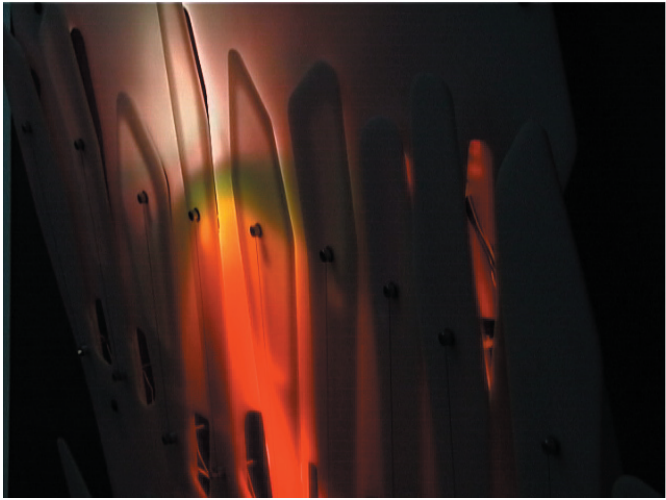
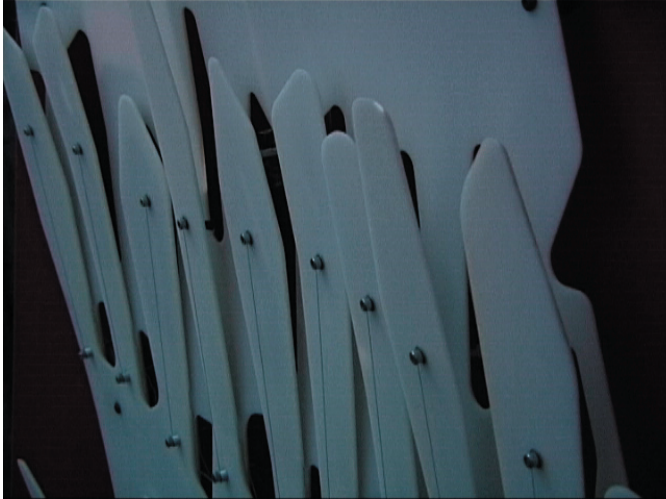


Image 20

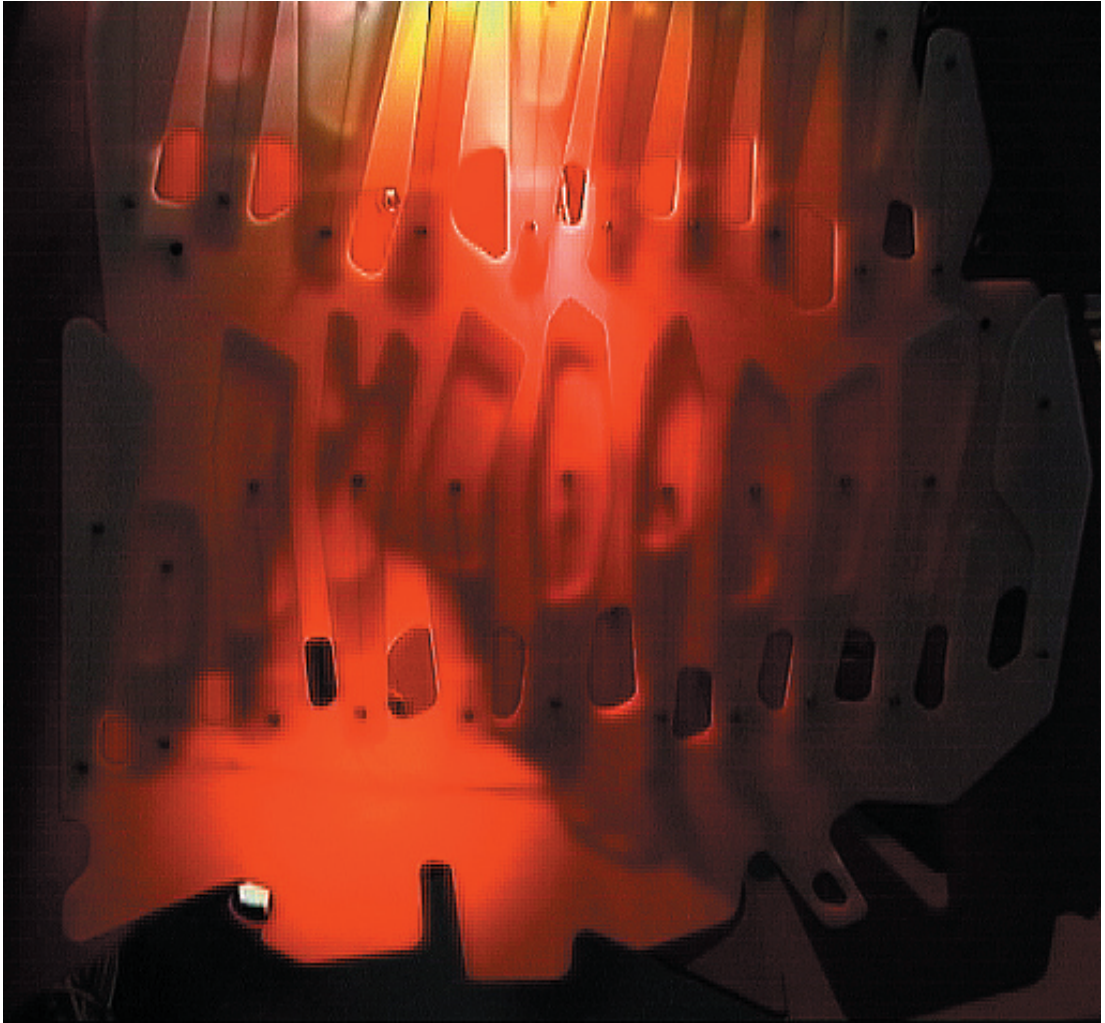


Image 21



## Dissemination/ Esteem

*Blusher* was exhibited in 2001 as part of the group exhibition *Making Buildings* at the following venues:

New Art Gallery, Walsall.

Crafts Council Gallery, London.

Centre North East, Middlesbrough.

The Turnpike Gallery, Leigh.

Aberystwyth Arts Centre, Aberystwyth.

Brighton University, Brighton.

*Blusher* was then re-exhibited as part of:

*A Year in the Making* (solo exhibition), The Bartlett School of Architecture, UCL (2001).

*Material Intelligence* (group exhibition), Entwistle Gallery, London (2002).

*Avatar* (group exhibition), The Bartlett School of Architecture, UCL (2005).

On completion of the last exhibition, the work had been seen by over 10,000 participants.

Invited Talks:

Lowie International Lecture Series, The Bartlett, UCL, 2001.

University of Brighton School of Architecture, 2001.

*Talking Shape*, RIBA/Hampshire Sculpture Trust Conference, 2002.

*Digital Fabrication*, Building Centre Trust, 2002.

*Physical and Computational Models Convergence and Divergence*, Building Centre Trust, 2002.





### Appendix 1: Related Articles by this Author and other members of sixteen\*(makers)

(1.1) Robert Sheil, Nick Callicott, Jeremy Till, 'sixteen\*(makers)', *Young Blood*, Neil Spiller (ed.), special issue of *Architectural Design*, v. 71, n. 1, profile n. 149 (London: Wiley, 2001), pp. 22–27.

(1.2) Nick Callicott, *Computer-Aided Manufacture in Architecture*, (London: Architectural Press, 2001), pp. 7–9; pp. 79–97.

(1.3) Robert Sheil, 'Making Paraforms', *Opposites Attract*, special issue of *The Journal of Architecture*, v. 8, n. 2 (2003), pp. 203–210.

(1.4) Phil Ayres, 'Constructing the Specific', *Game, Set and Match II*, K. Oosterhuis and L. Feireiss (eds) (Rotterdam: Episode Publishers, 2006), pp. 314–321.

(1.5) Phil Ayres, 'Getting Specific', *Design Through Making*, special issue of *Architectural Design*, Robert Sheil (ed.), n. 176 (July/August 2005), pp. 58–65.



## Appendix 2: Critics' Reviews

(2.1) W. Jones, 'Responsive Behaviour, a profile of sixteen\*(makers)', *Frame Magazine*, n. 26 (2002), pp. 108–113.

(2.2) C. Melhuish, 'High-tech and Customisation', *Making Buildings* (London: The Craft Council, 2001), pp. 25–29.

(2.3) S. Gardiner, 'Complete Fabrication: A Review of *Making Buildings*', *Building Design Magazine* (2001), pp. 26–27.

