

AN INTERACTIVE SCULPTURE USING AN AIR/LIQUID GRAPHICS DISPLAY

Concieved and designed by THEO BOTSCHUYVER and JEFFREY SHAW, 1981 Pat.Pend.
Commissioned by the FRASCATI THEATRE in Amsterdam in the context of the renovation and re-opening of that theatre in 1981.
Integrated Engineering BV Amsterdam were the electronics consultants for this project.

The sculpture is basicly composed of four parts:

1. The air/liquid graphics display panel.
2. The air and liquid dosing valves, with drivers and microprocessor.
3. The air compressor and liquid pump.
4. The interactive graphics terminal with touchscreen and Apple 11.

The air/liquid display panel is attached to the theatre building in the following way - it begins on an outside wall, bends around and goes into the building above the main entrance doors, and then continues along the ceiling of the foyer.

This display is made up of 32 tubular channels running the length of whole panel. Each channel can be injected with varying doses of air or liquid. The air constitutes the 'white pixels' and the liquid (which is dyed dark blue) constitutes the 'black pixels', and together, in controlled proportions. they create a continuously flowing graphics display of text and/or images.

Because the tubing itself is quite narrow (\emptyset 5mm.), it is zig-zagged in each channel in a figure '8' pattern, so that the channel width becomes 4cm. The total length of the display panel is 12 metres, and approx. 1500 metres of transparent polyurethane tubing is wound in it, between two sheets of polycarbonate.

Air under constant pressure is supplied by a compressor. The liquid flows in a closed circuit from a pump, through the display, then into a reservoir where it is taken by the pump again.

The dosing of the quantities of air and liquid into each channel is done by means of two electro-magnetic valves - one releases air and the other the liquid. Thus a total of 64 valves are the electro-mechanical

means of generating the graphics display. Because the two media - air and liquid - have different coefficients of expansion and friction in the tubing, there is also a feedback control loop on the system which by means of optical sensors on each channel, measures the behaviour of the air/liquid flow in each channel. This information is used to modify the timing of the electro-magnetic valves so as to insure that all 32 channels flow synchronously, no matter what the ratios of air and liquid are in each channel.

Graphics data for the display is generated at the interactive terminal. The two input means are: a CRT with touch-screen, and a digitizing camera.

It is intended that this sculpture operates in the following two ways:

- a) to provide a continuous flow of text and/or image information relating to the particular performances that are going on in the theatre. For instance the title of the play and pictures of the actors. Such a particular sequence of text and image information repeats itself continuously while the whole system is switched on. In this mode there is considerable flexibility in the software tools that allow for the composing of the text and image graphics.
- b) to permit members of the public who visit this theatre to enter their own drawings or text into the display. This is done by means of the CRT and touch-screen, which gives instructions for use and allows drawings (in a 32 x 64 dot matrix) to be made by moving one's finger about on the CRT screen. Such an audience generated drawing interrupts the normal informational graphics in the display, which resumes again after that drawing has been shown in its entirety once.

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