Woody Vasulka's "Didactic Video" — page 9
Introduction:

Woody Vasulka's current work in video synthesis, here recorded in photographs, leads into a conceptual space of waveform encoding and processing operations. His previous work in videotapes, made cooperatively with Steina Vasulka, have included a parody and homage to surrealism (Golden Voyage), and retinal-activating imagery (as in Key Snow). The interest here, however, is not in mental or perceptual space as such, but in time-energy principles that lie behind video's reconstruction of space-time.

The aspect of video important to the development of these images is the light/code interface: between the segment of the electronic image (as if projected on the opposite wall of a darkened room). Video synthesizers, however, make possible the development of non-camera imagery, so that the electronic/light interface occurs only at the monitor, when the wave form is displayed as a visible image.

The basic character of these Images is imprinted in the tool from which they are derived — the Rutt/Etra scan processor, one of several current designs for video synthesizers (others include Pal/Abbe, Dan Sandine’s and Stephen Beck’s). The Rutt/Etra reorganizes imagery by electromagnetic deflection of the electron beam; deflection coils form a yoke surrounding a monitor built into the synthesizer. The resulting images can only be recorded by means of an external camera, since the waveform display, or raster image, alone is altered, not the waveform code directly. Yet despite the specific nature of the machine, inevitably personal aesthetic preferences develop with its use. The aesthetic here is specifically didactic; to visually display, as clearly as possible, the step-by-step development of very primitive, basic modes of information available with this synthesizer. Accordingly, sine, triangle, or square waves are used as the bases for most images. The didactic purpose involved is to enable the principles of time-energy construction to become common knowledge, as a primary conceptual and technological tool of our evolving electronic society.

This mode of imagery is rarely seen, and verbal language does not yet adequately exist for it. Engineers, mathematicians, psychologists, and artists — among others — all have information which applies to the conceptualization of the electronic image, and a synthesis is not yet formed. These words, then, are an initial tentative attempt to rationalize images that are themselves still just beginning to be generated.

— Scott Nygren

Statement:

These time segments (tableaux I-IV) belong to a larger work titled Time/ Energy Structure of the Electronic Image, dating from 1974 through 1975. The images are produced on a scan processor (Rutt/Etra Model-4, Rutt Electrooptics Inc.), a tool providing various means of reprogramming electromagnetic conditions around its work (cathode ray tube or CRT).

Contemporary to previous work on videotape, the work with the scan processor indicates a whole different trend in my understanding of the electronic image. The rigidly and totally confinement of time sequences have imprinted a didactic style on the product. Improvisational modes have become less important than an exact mental or perceptual space as such, but in time-energy components, and the process of their synthesis and programmability. To me this indicates a point of departure from light-space image models closely linked to and dependent upon visual-perceptual references and maintained through media based on the camera obscura principle. It now becomes possible to move precisely and directly between a conceptual model and a constructed image. This opens a new self-generating cycle of design within consciousness and the eventual construction of new realities without the necessity of external referents as a means of control.

— Woody Vasulka

The images:

The photographs reproduced here are records of raster displays from the modified monitor built into the scan processor hardware. These illustrations are organized into four tableaux (I-IV), within which each vertical series (A-C) indicates a time sequence (1-5, or 1-4). The first image (I-A-1) is a sine wave derived from a waveform generator, and displayed as if on an oscilloscope. This sine wave is manipulated by means of the scan processor to generate the following images in the first series. To analyze more precisely how this is done it is helpful to posit an x-y-z three-dimensional grid, in which the x-axis represents horizontal, the y-axis represents vertical, and the z-axis intensity or brightness. The video raster or screen consists of 525 horizontal lines, half of which are scanned in vertical sequence — the electron beam tracing alternate lines — to form a single field. Two fields make a whole image, since the electron beam in its next sweep traces the lines omitted in the first field. A whole image is traced each 1/30 second, a field each 1/60, and a line each 1/15750 second.

Hence, the x-axis may also be described as the line axis and the y-axis as the field axis; x and y describe different units of timing (with y slower than x), and z indicates energy or intensity within a time-energy grid.

What is happening, then, in I-A-1, is that a single line display of a sine wave is modified to show the wave's energy form (z as height, y), making the oscilloscope-like image. In I-A-2, the sine wave is repeated in a diagonal series four additional times within the field, and in I-A-3, this repetition or extension becomes continuous, completing an illusion of three-dimensional space. In I-A-4, the sine wave is simultaneously used to trigger brightness, modulating gray levels in proportion to the rise or fall of the wave form; this creates an illusion of shading, as if cast by an external light source. Finally, (CONTINUED ON PAGE 12)
The images
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In I-A-5, the borders of the illusionary warped plane are repositioned to coincide with the borders of the TV frame, so that the sine wave coincides with the x-axis, modulating brightness (z-axis) to create a vertical dark band (y-axis). I-B and I-C follow the same operations, but beginning with triangle and square waves, respectively.

What is astonishing here is the ease with which a two-dimensional raster can take on the appearance of a three-dimensional object. Moving backwards from 5 to 4 in each series of tableaux I and II, we can see that the video raster can be relocated in illusionary space so that brightness is displayed as illusionary height. An energy/space relationship is herein described: light by means of a time-energy code can become a building material for architectural space.

In the second tableau, the organization of energy—sine, triangle, square waves—and the processing operations are identical with those in I. What's changed is the rate of reproduction: the apparently simple shift from horizontal to vertical display, because of the time-energy nature of the raster, actually indicates a radical shift in timing. Vertical is much slower. For example, in II-A-5, the horizontal dark band coincides with a group of lines, and is hence read out once each field, or 1/60 second. The apparent horizontal band is caused by a vertical (y-axis) sine wave; when an x-axis sine wave causes a vertically appearing band, as in I-A-5, each horizontal raster line must read out a section of the dark band, once each 1/15750 second.

The redundancy of waveform sources and processing operations throughout the first two tableaux are designed to visually clarify those operations on a step-by-step basis, and lay down a primitive vocabulary of sorts, by which more complex or varied image information may be analyzed.

In the third tableau, the first series is like I-C in that a horizontal square wave is the signal input, but differs in that this source is retimed on each line in relation to the field rate. The result, as sampled in the three images of III-A-1, is similar to I-C-2, except that the positions of the square pulse is relocated within each line display of the whole wave. This relocation is determined by the placement of the line display within the vertical field. The square pulse is positioned within the wave by controlling entry rates, or beginning times, of the wave in line display by a field-locked ramp, or triangle wave. The result, when processed as before for extension, tilt, and shading, is a diagonally shaped surface. In III-A-3 the illusionary plane is tilted forward, and in 4, the y displacement of z in illusionary space is flattened back into brightness, making a white bar. Beyond this, curved shapes could be programmed by varying the same entry rates by non-linear forms (such as a sine wave).

In III-B, more complex illusionary space is created by means of two signal inputs, if x₁, y₁, and z₁ describe the video raster as a two-dimensional surface, then x₂, y₂, and z₂ may be used to describe the three axes of illusionary space appearing within the raster, so that x₂ coincides with x₁, but y₂ is displayed as illusionary depth along an x₁-y₁ diagonal from upper right to lower left, and z₂ is displayed as height, y₁. (The basic difference is that z₁ functions as brightness, an invisible third dimension, on the raster, while z₂ appears as height. It should also be noted that x₂, y₂, z₂ describe a purely visual and illusionary space, which is derived by technical operations performed on the actual space, x₁, y₁, z₁ of the raster.) In III-B, then, a square wave is the initial horizontal (x₁ and x₂) input and a sine wave is added as a diagonal input (y₂). The square wave is processed as in I-C, and the sine wave as in II-A, so that the intersecting processes produce the irregular topographical surface of III-B-2, shaded as before. In III-B-3, the sine wave (y₂) is repositioned vertically to coincide with y₁, and in 4, the square wave is similarly altered to coincide with the horizontal. The result is a hard-edged vertical bar derived from the x-axis square wave, and soft-edged bars from the y-axis sine.

III-C follows the same construction as III-B but with sine and triangle waves replacing the square and sine waves respectively. The resulting rounded shapes of III-C-4 are an interference pattern created by the coincid-
ing periodicity of the two waves.

In the fourth tableau, operations are altered significantly, with an initial input of greater complexity than before. IV-A begins with two sine waves—one horizontal (x, or line display), one vertical (y, or field display)—each extended across the frame, and constructed so as to appear as a soft bright rectangle. IV-A-1 to IV-A-2 describes the same tilting process as from I-A-5 to I-A-4, causing the surface image to lay back in illusionary space. IV-A-3 then uses the z-axis (brightness) to modulate vertical deflection (z2, or y1), completing an image in illusionary space parallel to I-A-4. IV-A-4, brightness modulation (z1) is then totally subtracted, leaving all lines of equal intensity so that the appearance of varying brightness is due only to the overlay of some vertically-deflected lines on others (z2). In IV-A-5, the polarity or directionality of the deflection system is reversed, so that the illusion of a convex surface becomes the illusion of a concave surface.

IV-B follows an identical construction process except the initial image input comes from a camera (the hand image). This is technically simpler than IV-A, but creates a more complex, irregular image, and implies different aesthetic goals. IV-A-5's horizontal display of waveforms in the first tableau, yet the y-axis display of what was originally brightness (z2) remains deflected and appears as an irregular raised surface out of a flat plane.

WOODY VASULKA graduated in 1964 from the Film Academy of Prague. Since 1969 he has conducted systematic exploratory work in electronic image and sound; in 1970 he established "The Kitchen," a media theater in New York City. Since 1974 he has been an associate professor of the Center for Media Study at the State University of New York at Buffalo.

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