From Television to Drone Vision: Telepresence and Touch in Contemporary Art
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Chapter 4: Inhabiting the Interface: The 'Mixed Reality' of Satellite Telecommunication

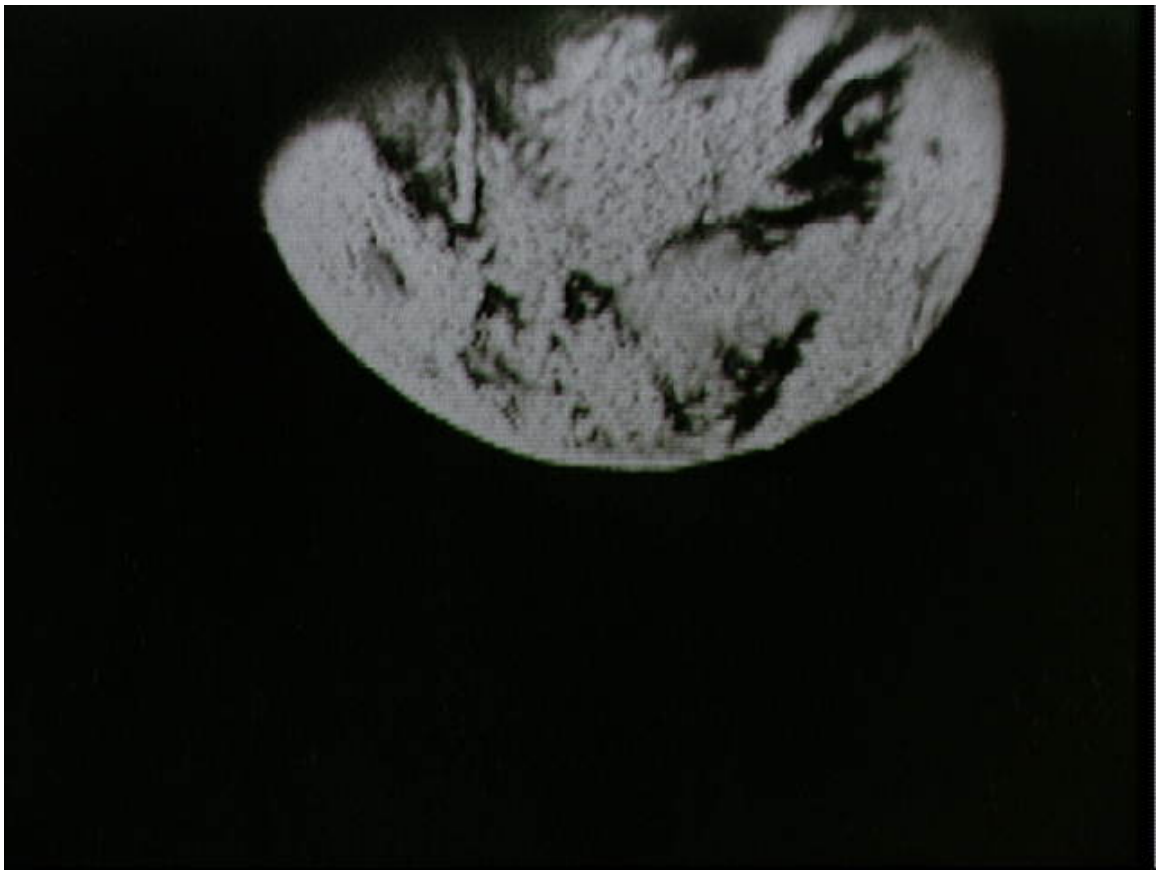

Figure 1: Apollo 8 live television broadcast of the Earth, December 23, 1968. Copyright NASA. Public Domain.

On December 23, 1968, millions of television viewers saw a startling sight—a live image of Earth spinning in the quiet blackness of space (fig. 1).[1] The three men aboard Apollo 8, Frank Borman, James Lovell, and William Anders, were the first humans to leave Earth's orbit, and they brought a video camera along for the ride. In their second television transmission from the lunar module, the astronauts pointed the video camera out of the window, away from the moon, back toward the

earth. As opposed to the more famous photograph from the trip that was widely published after their return, Anders's "Earthrise" (fig. 2), the television image revealed Earth as neither tranquil nor weightless In the photograph, Earth, beautiful, blue, and buoyant, slips out of an envelope of darkness and looks almost heavenly against the craggy and harsh pocked surface of the Moon. On the television, it loomed at the top of the frame, the camera peeking in for an unsettling and unflattering close-up.

Figure 2: NASA/William Anders, *Earthrise*, 1968. Copyright NASA. Public domain.

1968 was not a tranquil year, and perhaps the video image suits it better than the photograph, which was reported to have "saved 1968."[2] It was, across the globe, a tumultuous time, remembered for its protests, demonstrations, wars,

assassinations, revolutions, and rebellions. It was also, as I have discussed earlier in this book, the year video emerged as a consumer and artistic form. For the first time, individuals were able to see live images of themselves in television's electronic mirror. In Chapter 2, "Uncanny Video: Early Video and the Fantasy of Presence," I discuss Rosalind Krauss's early diagnosis of video as a narcissistic medium that, because its live feedback acts as a mirror, traps users and viewers in a closed circuit of narcissistic self-regard and "self-encapsulation."[3] The image of Earth beamed live to home TV sets from more than 176,000 miles away unsettled, at least for a moment, this narcissistic principle and the basic assumptions that structured our political and social interactions.[4] Because of its medium the televised image had a different effect and meaning than the photograph. Photographs are always images of the past, sealed off and "mummified." The Apollo 8 television broadcast delivered a real-time view of the whole planet and, by extension, everyone on it at once. It was suddenly possible to see ourselves not as separate peoples and nations, divided by oceans, languages, and cultures, but as all one people in one place at one time—now. One could imagine a dramatic zoom-in from outer space, through the atmosphere, down to the ground to picture each of us from behind staring at the backs of our own heads on the TV screen. At the time of the transmission, Anders said to the television audience, "You are looking at yourself from 180,000 miles out in space."[5] If we turned around to face the camera, to narcissistically engage in the image, the view of it would suddenly be foreclosed. To be in the picture, and to see ourselves as part of it, we have to face the screen; we had to be in the picture as objects rather than subjects.

It is easy to understand NASA's goals, and the Apollo missions' in particular, as narcissistic, hubristic, nationalistic endeavors—the planting of flags and the photographing of footprints are all clearly motivated by the desire to evidence and index the advancement of humankind, or more accurately, the rapid mastery of space, time, and physics by certain nations. Leaving the atmosphere to look down upon the earth seemed to sustain two simultaneous and opposing world-views. Viewing the world from on high was to inhabit, as Borman put it, the vantage point of God.[6] It allowed one to imagine holding an otherworldly, omnipotent, disembodied power over the globe, and so to regard it, or parts of it, as a potential target for spy satellites, for example, or weapons systems. At the same time, the view of Earth from above sutured each and every living subject into a totalizing picture, not by a series of shot-reverse-shots, but by an establishing shot that showed us as a collective "we," rather than an alternating series of "I"s and "you"s."[7]

In this chapter, I examine how the space-age technology of satellite television structured these two opposing yet linked views of the world. First, I look to "satellite spectaculars" on network television, such as *Our World* (1967), that showcased the power of military technologies to open up "windows" or "keyholes" onto far away places for mastering views that served to separate east from west, good from bad, self from other, and then to artistic uses of satellite technology that worked to undo these structuring binaries. In particular, I devote special attention to Kit Galloway and Sherrie Rabinowitz's *Satellite Arts 1977* (1977), an early artistic collaboration with NASA, to show how the televisual image might go beyond mediating distant locations and become a "place" itself. The live, bi-costal, bi-directional video

performance linked dancers 3000 miles apart through a composite video image that merged the two sites into a continuous space. Galloway and Rabinowitz, I argue, transformed the television screen into a synesthetic surface by exploiting the inherent latency of the "real time" satellite image, which required that the dancers negotiate all of their embodied senses through their collective image on the screen. They used their physical bodies to steer their images toward each other to "immaterially touch." I propose that through a series of "crossed wires" that combined two video feeds into one and that synesthetically collapsed vision and touch, *Satellite Arts 1977* modeled a version of Maurice Merleau-Ponty's "chiasm," diagraming what phenomenological experience might be like in the space age. In doing so, Galloway and Rabinowitz hypothesized an ethics of engagement with others in mediated environments. They imagined what it might be like to be simultaneously real and virtual, self and other, subject and object, seer and seen, here and there, now and then. *Satellite Arts 1977* proposed that telepresence happens *on* the interface rather than *through* the screen.

Our World/Their World

By 1968, the year television audiences saw Apollo 8's live images of Earth, 768 rockets had traveled to Earth's orbit or beyond, and 2011 satellites were already circling the planet.[8] Since Sputnik's launch in 1957, the United States and the Soviet Union had been eagerly catapulting remote sensing devices into Earth's orbit. The Russians began the Space Race with Sputnik 1. For three weeks, the small, polished sphere broadcast radio pulses from the ionosphere to anxious listeners

below.[9] The United States quickly followed, launching Explorer 1 in early 1958. In 1962 and 1963, The United States placed its first two telecommunications satellites, Telstar 1 and Telstar 2, into orbit. Video could now be bounced from the ground into space and onto television sets across the globe. If Sputnik's launch indicated that man had conquered space by creating an object that could briefly colonize a small swath of the cosmos, Telstar, and the other telecommunication satellites that quickly followed, demonstrated man's conquering of time: the new technology enabled instantaneous, real-time audio and visual contact between distant sites, joining them in a simultaneous "now."[10]

Humankind's sudden mastery of both space and time was put on display in the mid-1960s in a series of what media theorist Lisa Parks calls "satellite spectaculars," live television events that illustrated the power of satellite telecommunications to connect far-flung people and places.[11] Most notable of these programs was 1967's *Our World*, which aimed at "global" coverage, rather than merely linking the North America with Western Europe. The Telstar and Intelsat satellites linked the US with Europe; Syncom connected East Asia, and ATS-1 brought Australia into the "global" network of satellite telecommunication. *Our World* demonstrated this technologically (and militaristically) enabled "global unity" on display during the 2-hour program. However, as Parks describes in her close analysis of the show in *Cultures in Orbit: Satellites and the Televisual*, *Our World*, in fact, did just the opposite: it highlighted how the fantasy of a "global present" as enabled by satellite technology was steeped in "Western discourses of modernization, global unity, and planetary control."[12] While claiming to create a

utopian, McLuhanesque "global village" by using satellites to link geographically and culturally separated places and peoples, *Our World* actually "divided the world once again" by emphasizing the difference between life in the various hemispheres, and making it clear that the "industrialized" and "free" North and West stood against the "hungry" and "developing" South and East.[13] That is, while ostensibly aiming to bring together approximately 500 million viewers from 30 nations, *Our World* dramatized distance, difference, and otherness by means of the technology that only a few countries had.[14]

Our World began with grand utopian gestures – the Vienna Boys' Choir sang the theme song in scores of languages, and the first segment featured a series of infants, born within minutes of one another, in places as far-flung as Japan, Denmark, Mexico, and Canada. Although all the babies were born nearly simultaneously, they inhabited different earthly times. The Danish child was born the day before her Japanese counterpart, for the time zones that demarked the physical space between them had little to do with the mediated, televisual experience of the "global now." "The dawn," the show's host reminded the viewer, "creeps around the equator at a mere 1000 miles an hour… our [television] pictures flash around at 186,000 miles a second." Television was there to witness the miracle of life, by overcoming the physical limits of the natural world. Satellite television, the message was, is god-like: it is everywhere at once.

While the structure of the show appeared to present the children as equal citizens of the "global now," the narrative worked contrariwise. Two of the children were positioned as being outside of the modern moment, despite being pictured

instantaneously. While no mention is made of demographic information or the living conditions of the other children, the Canadian baby, a Cree "Indian," the viewer was told, would have a hard first year of life struggling to survive with her 8 brothers and sisters in the "rugged north bush country, but she should live to be 60 years of age." The Mexican child's birth was the only one shown live on television, yet the producers doubted Mexico's ability to be live for the whole the program, and therefore taped its other segments and, then falsely presented them as "live."[15] Even months before his birth, producers planned to represent the Mexican baby, Mundo, as premature, and therefore, like the Mexican satellite uplink, poorly timed, and, consequently, not fully developed or modern. The introductory segment with the newborn children was used as a foil to discuss the show's main themes—population explosion, and the "hungry world." Throughout the program the modern, satellite owning countries of the North and West were set off against the still developing, struggling, and starving nations in the South and East. While the technology on display during the program was ostensibly intended to unify the globe, the narrative established a series of binary distinctions that undid any hope of equality and relationality. The show equated otherness with a lack of access to technology, as well as to food and other basic needs. The hungry, crowded, developing world was figured as a problem that could be solved, or at least pictured, by the modern, technologically advanced nations that looked down upon it from a celestial perch.

While the struggling South and East were represented as economically, technologically, culturally, and racially other, another other was made present in the program by its very absence. *Our World* was originally slated to include satellite

connections to Russia and other Eastern bloc countries, but they withdrew from the program just days before the broadcast in protest of Western support of Israel in the Six Days War. The host casually explained the failure to deliver on the "globe circling" program that the advertisements had promised: "It's a pity, but there it is. Now we can cover two-thirds instead of all of the world." What his comments and Eurasia's absence from "our world" pointed out, however, was that it was the perception of terrifying otherness that initially fueled the satellite program and the space race to begin with, and also that the entire southern hemisphere—save Australia—and nearly all of the developing world were absent from the program because they were outside of the "global now" of satellite telecommunication. One must imagine that because they did not have access to satellites or uplink technology, most of the developing nations were not even aware of their exclusion.[16] *Our World*, Parks claims, established liveness as the defining feature of both television, particularly in its satellite forms, and modernity.[17] The program, she writes, was structured around a set of contradictory impulses that claimed to unify the world while at each moment establishing it as a place that was always divided and incompatible.

Parks's argument establishes how large swaths of the globe were left out of the televisual now, and I would like to suggest that even the millions of viewers of *Our World*, who were located primarily in the privileged, satellite-owning North and West, were not truly involved either; they were neither put into contact nor joined together by the satellite transmissions. They were mere witnesses to the coordinated functioning of the space-age technology.[18] Viewers watched the hosts of

the show connect the 'here' of the television studio, to the various 'theres' of the satellite uplink sites. The viewers were neither here nor there; they were on the outside looking onto a "global now" that did not include them in any of its vectors. What the audience watched, rather, was a feel-good demonstration of western dominance and the desire for planetary control through technologcal superiority. The liveness on display in *Our World* established both the conditions of modernity and the threatening, authoritarian potential of satellite surveillance and remote sensing military technologies. Live satellite television may have provided a picturesque "window on to the world," but it was enabled by a series of cosmic "keyholes" through which those who had access to the satellites could surreptitiously look down on the small people below. At around the same time as the Apollo missions were being planned, the United States was also beginning its secret Corona reconnaissance satellite program, codenamed "Keyhole" to cleverly and clearly indicate the how the structures of power in the modern world relied on the ability to remain invisible while making others unknowingly visible.[19]

Satellites in '77

Fifty years after Sputnik, and ten years after *Our World*, artists began experimenting with satellite technology, producing a series of events that imagined satellite technology and the relationships it sustained with networked others in a radically different light. They sought to upset the power structures that satellite technology implied by both using, and thereby exposing, the government-controlled satellites, and also by making visible the viewer at the "keyhole." Between July and

November of 1977, three satellite-based artworks "launched": Nam June Paik, Joseph Beuys, and Douglas Davis participated in Documenta 6's live satellite telecast on June 24; tests for Galloway and Rabinowitz's *Satellite Arts 1977* began in July, and concluded in another series of transmissions in late November; and Liza Bear and Keith Sonnier produced *The Send/Receive Satellite Network* on September 10 and 11.[20] By the time artists created the first satellite video artworks, the technology had become commonplace in the mainstream media. News programs often showed reports from remote locations, and split-screen conversations were staged between talking heads in separate studios. Unlike the networks, artists working with satellites did not attempt to disguise the inequalities inherent in the structure of satellite technology (as well as in the access to and ownership of the equipment); they brought these qualities to the fore. I will briefly discuss the *Documenta 6 Satellite Telecast* and *The Send/Receive Satellite Network* before focusing my attention on the details of Galloway and Rabinowitz's project. In particular, *Satellite Arts 1977,* I claim, sought out the aesthetic qualities specific to satellite transmission—primarily its unavoidable latency and the inherent failure to achieve the "liveness" of closed-circuit video— and discovered how the structure of the screen determines the viewer's relationship to distant others. If *Our World* used satellite technology to unintentionally "divide the world," and emphasized the otherness of distant people and places, *Satellite Arts* hypothesized how one might design an interface that intimately and ethically connected bodies on and through the screen.

Figure 3: *Documenta 6 Satellite Telecast*, June 24, 1977. Video stills. Courtesy EAI.

The sixth iteration of Documenta (1977) had a "world-wide opening."[21] The art world traveled to the West German industrial city of Kassel for the exhibition of international contemporary art, which had taken place every five years since 1955. For the first time, however, the exhibition "traveled" as well: the opening ceremonies went out live on television via satellite transmission. Three artists, Nam June Paik (with Charlotte Moorman), Joseph Beuys, and Douglas Davis – each produced an artwork for the show that was broadcast to TV stations across Europe, Japan, and the United States. It was, according to the producers, "the first global satellite use by artists."[22] The multi-national origins of the artists, hailing from Korea, Germany, and the United States, mirrored the global reach of the broadcast. The globalization of the art world was not the only change on display at the opening. The transmission also highlighted a shift in artistic media. Unlike past Documentas, a large portion of the exhibition program – nearly a third – was dedicated to moving image media, including video and television. At the time of Documenta 4 (1968), video had just emerged as an art form in the wake of the first portable consumer model video camera, the Sony Porta Pak. Video was a popular artistic medium by

1972, when Documenta 5 opened, but it was not extensively represented in the exhibition. The title of the 1977 exhibition, "Art in the Media World – Media in Art," reflected these recent changes in the technological landscape of the art world. Video and television had become important artistic "media" in their own right. Documenta 6 director, Manfred Schneckenburger, based the concept of the exhibition on the idea that the 1970s were "media-critical" as opposed to the "media-fascinated" 1960s.[23] The difference between the "satellite spectaculars" of the 1960s and the *Documenta 6 Satellite Telecast* calls attention to this generational shift. The three artists made dramatically different works for the event, but each emphasized the power structures inherent in television broadcasts and dramatized ways in which the live satellite programs of the 1960s failed to actually connect the viewers to the far off places and people that were on display.

Figure 4: Nam June Paik and Charlotte Moorman, *Documenta 6 Satellite Telecast*, June 24, 1977. Copyright Paik Studios. Permission EAI.

Paik and his collaborator, cellist Charlotte Moorman, performed a sampling of their well-known video-performance works, including *TV Cello* (1971), *TV Buddha* (1974), and *TV Bra for Living Sculpture* (1969) (fig. 4). As they performed, Paik chatted with Moorman about the other times they performed these same

works. This time, however, was different. This time their friends were watching from all around the globe. They say hello to Jacqueline Kennedy Onassis in New York and the President of MIT, Dr. Jerome Weisner in Boston, among other luminaries and celebrities. Regardless of addressing an audience beyond the insulated elite of the art world, Paik and Moorman re-inscribed the boundaries of that milieu within the broadcast. The home viewers may have been watching the same broadcast as Jackie Onassis, but Paik and Moorman purposefully excluded them from their address. The general audience of the satellite telecast looked in on a performance aimed at a privileged few. The direct address commonly used in live television programs, like the evening news, created an intimate, if false, connection to the individual home viewer. Paik and Moorman's conversation and their anarchic, esoteric performance were delivered into the homes of thousands of distant viewers, but at each moment the artists signaled that it was not necessarily for them. In the background of the television image, the at-home viewer could see Kassel's public pressed against a glass window, peering in on the ostensibly public performance (fig. 3). They mirrored the television audience, who, too, looked on to a closed off "now." The satellite telecast made it clear that the "there" of the studio would never actually connect with the "here" of their average homes and lives. The exceptional technology reached out to the exceptional few.

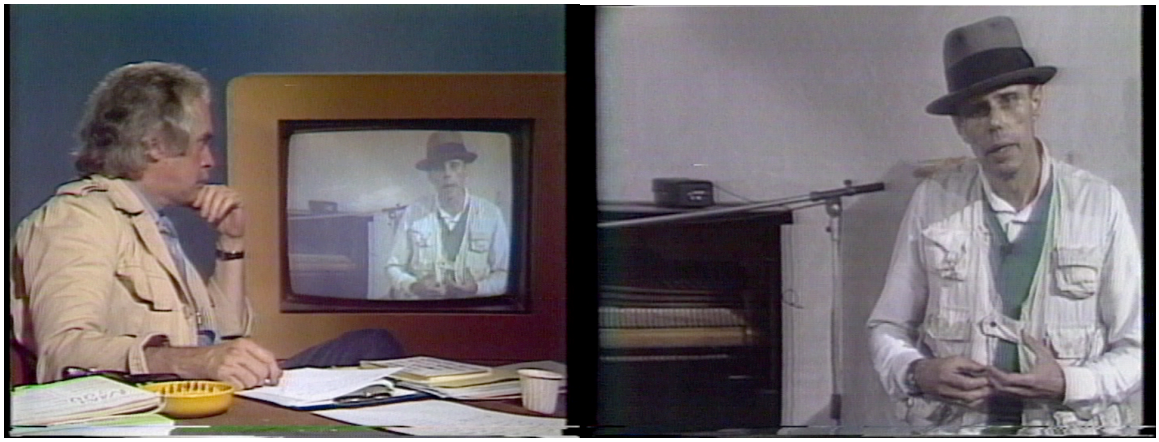

Figure 5: Joseph Beuys, *Documenta 6 Satellite Telecast*, June 24, 1977. Copyright Joseph Beuys. Courtesy EAI.

Joseph Beuys's performance, too, exposed the conventions of traditional live satellite broadcasts. Beuys used his four minutes of airtime to speak directly to the at-home audience, as if he were a politician or a newscaster. For the past decade, Beuys had been working in the field of what he called "social sculpture," a multimedia form of performance art in which the artist strives to change society and its structures by actively involving the audience in the artwork. Through this process, according to Beuys, art becomes an "evolutionary-revolutionary power… capable of dismantling the repressive effects of a senile social system" by transforming the society itself into a work of art.[24] Beuys's social sculptures of the time tended to take the form of freewheeling public dialogues in universities and museums, such as *Fat Transformation* (1972) at the Tate Gallery, and his 1974 lecture/performance tour through the United States, *Energy Plan for the Western Man*. While Beuys typically dominated the lengthy discussions, there was ample room for audience participation and interaction.[25]

Beuys's performance for the *Documenta 6 Satellite Telecast*, like his social sculptures, took the form of a public lecture (fig. 5). In the brief speech, the artist

summarized his concept of social sculpture and its power to change political and cultural conditions. Art, he proclaimed, must be released from the structures that currently confine it to a specialized world of artists and institutions. The work of art, Beuys told the audience, should speak to all of humankind and involve everyone in its production. The direct, distributed address made possible by live broadcast television appears to be a perfect means for escaping the rarified spaces of the art world, and Beuys, unlike Paik, used it to speak to the average viewer. It is clear, however, that this performance, unlike his other lectures, was not itself a social sculpture; it was a description of a situation that was not possible through broadcast television. The "evolutionary-revolutionary power" of social sculpture required participation and response from the audience. The artist was using a satellite, but the structure of the program remained within the standard unidirectional format of conventional television. There was a call, but no possibility for a response. Beuys's address, then, served to draw attention to the impossibilities of contact and communication through satellites as the networks used them.

Figure 6: Douglas Davis, *Documenta 6 Satellite Telecast*, June 24, 1977. Courtesy EAI.

Douglas Davis further illustrated the failure to connect through live satellite television in his performance, *The Last Nine Minutes* (fig. 6). Transmitted in part from Caracas, Venezuela, Davis's contribution to the broadcast enacted the frustrations an at-home viewer might have felt listening to Beuys's call for interaction and participation. Like the audience pressed to the window of the Documenta studio, Davis appeared behind a sheet of glass and peered into the adjoining space. But he did not look into studio where a live performance was occurring; he appeared to be looking into to the living rooms of television viewers around the world. At the beginning of the performance he responds to a knock on the boundary glass by a pair of hands that seem to be on the viewer's side of the screen. Wearing a stopwatch around his neck, Davis approaches the "screen" and pounds upon it for the last nine minutes of the Documenta broadcast. His frustrated, awkward gestures go unanswered, and the broadcast ends with Davis exhausted and still alone.

Commenting on *The Last Nine Minutes* in a 2004 interview, Davis explains that 1977 signaled the moment at which an artist could "finally use the satellite to reach out and … destroy your TV screen… in order to touch you."[26] While it is true that satellites held the potential to connect distant parties in new, bi-directional, interactive ways, Davis's performance served as an illustration, rather than an enactment, of this potential—and of its continual failure. Bi-directional, live telecommunication may have been *technologically* possible, but it was a *structural* impossibility: satellites, uplink stations, and the other high-tech equipment were in the hands of the government and private corporations, not the people. Televisions

were designed exclusively as receivers, not transmitters. Davis dramatized the desire to use the technology to "reach out and touch" the viewer, but the hands that seemed to appear on the viewer's side of the screen only served as an uncanny reminder of the media's limitations, and the viewer's distance on the couch from her home receiver.

Figure 7: Liza Bear & Keith Sonnier, *Send/Receive II,* September 10 & 11, 1977. Copyright Bear & Sonnier. Permission Video Data Bank.

Liza Bear and Keith Sonnier's 1977 satellite project, *The Send/Receive Satellite Network,* also explored the frustrations of contemporary satellite technology and its structures. Bear and Sonnier did not critique the false notions of contact and presence propagated by mainstream uses of the technology, as the Documenta artists did. Instead they illustrated the difficulties of small-scale satellite use and the frequent impediments to smooth functioning. The first part of the project, *Send/Receive I* (1977), a 23-minute television program distributed on Manhattan Cable, did not actually use satellite technology. The video presented research on satellites and an argument for public access to the technology. In the video, the camera pans over images of satellites, antennae, maps, charts, and close-ups of newspaper and journal articles detailing the early days of broadcast television in the 1930s and contemporary reporting on satellite television of the 1970s. The camera lingers long enough for the viewer to parse the photographs and even to read the articles, but the information is not easily taken in. Scrolling character-generated text partially hides the documents below, feeding the viewer information about PISA, the Public Interest Satellite Association, an organization "insuring that satellite technology serves the public, not the profiteers."[27] Two separate audio tracks play on top of the images and scrolling text, adding to the audio-visual dissonance: one voice reads aloud from texts on satellites, while two other voices debate the economic and political effects of satellite use. The dense layering of image, text, and spoken word make it impossible for the viewer to follow along. Even if she chose to concentrate on just one of the four streams of information, her efforts would be thwarted. The audio tracks interrupt and interfere

with each other; the trembling electronic text is hard to read and obscures the images below. The discordant effect is intentional. "The overlapping of the dialogues," Bear and Sonnier write, "tends to evoke the functioning of the satellite parallel channels and the attendant overloading of information which it makes possible. What are the implications of simultaneity? Of instant exposure and instant response?"[28] The effects of simultaneity, the artists imply, are confusion and cacophony.

This prophecy played out in the second part of their project, a live bi-directional satellite telecast between San Francisco and New York (fig. 7). Phase II connected artists gathered at NASA's Ames Research Lab in Mountain View, California, to counterparts in New York City, who broadcast via a mobile satellite truck stationed at Battery Park. Rather than the worldwide reach of the unidirectional *Documenta Telecast*, *The Send/Receive Satellite Network* set up a bi-directional link between local cable stations in two cities. If the *Documenta Telecast* highlighted the power structures of the conventional commercial uses of satellites for television broadcast, *The Send/Receive Satellite Network* called attention to the realities of small-scale satellite narrowcasts. Bear and Sonnier's signal was full of noise and the participants could not hear each other clearly. When they could, a half-second delay caused confusion and misunderstanding. They attempted a collaborative dance, but they could not get the split screen effect to work properly. The scheduled collaborative performances were sidelined while participants explained how the technology worked, where interested parties could obtain infrared transmitters, and the need for public satellite access by independent, public

groups. Throughout the program, live-generated text overlaid the image explaining the problems: "The sync generator cannot lock the noisy signal," "a half-second delay between what you say and when you are heard," "We are asking the truck whether we can use the mics yet." Their attempts at connecting and collaborating were frustrating for the participants as well as for the viewers. The realities of the technology seemed to get in the way of the artists' desires. The two groups attempted to make contact and send the result to an at-home audience, but what they delivered was a document of just how difficult that is to do.

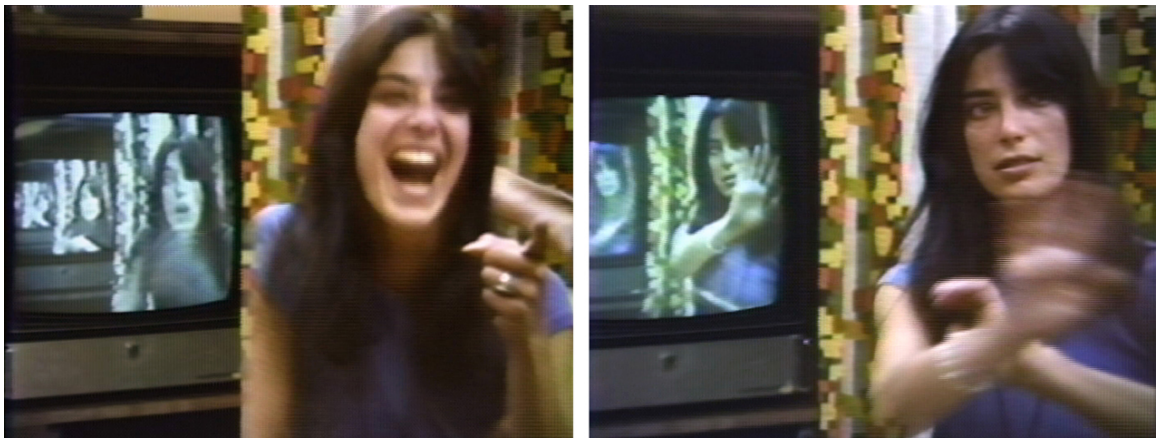

Figure 8: Kit Galloway and Sherrie Rabinowitz (Mobile Image), *Satellite Arts 1977,* 1977. Video stills. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

Satellite Arts 1977

In 1975, Kit Galloway and Sherrie Rabinowitz answered a call for proposals from NASA for non-profit groups that wished to experiment with the American–Canadian CTS satellite. Within a few months, they had secured NASA's cooperation for *Satellite Arts 1977*.[29] Working under the name Mobile Image, Galloway and Rabinowitz used NASA's satellites, staff, and equipment at the Ames Research Center in Mountain View, California and the Goddard Space Flight Center in Greenbelt, Maryland to link sets of dancers in the two cities. *Satellite Arts 1977*, like

the other two satellite works from 1977, is a document of a series of live experiments with high technology to see how it might change when out of corporate and military hands.[30] Unlike the *Documenta 6 Satellite Telecast* and *The Send/Receive Satellite Network*, Galloway and Rabinowitz's project embraced the difficulties of satellite telecommunication and signal latency to do more than simply connect various "heres" to other "theres." They used the limitations of the technology and the disorienting effects of live telecommunication to focus attention onto the screen and its virtual properties, rather than on the real spaces it had the potential to connect. The screen in *Satellite Arts 1977* is not a window or a keyhole; it is a place.

Satellite Arts 1977 exists today as an archival video recording of a series of live satellite test transmissions, closed-circuit video rehearsals, and a collaborative dance in a composite video space performed over a live satellite transmission. The documentation presents the three parts as components of a single work.[31] According to Galloway, "the performances were tests and the tests were performances."[32] Following Galloway's lead and the structure of the archival documentation, my discussion of *Satellite Arts 1977* will give equal weight to all of the component performances. Together, I will argue, the various parts articulate a new understanding of how space, time, and the body might intersect on the surface of the screen to create chiasmic phenomenological experience with the other, or rather, to eliminate the dualities that maintain such distinctions.

In July of 1977, Galloway and Rabinowitz began the preliminary tests for *Satellite Arts* by transmitting signals between NASA Headquarters in Washington,

DC and The Goddard Space Flight Center in Greenbelt, MD. The artists knew that staging a collaborative, improvisational performance over satellite transmission would not be an easy feat. The purpose of the July tests was to experiment with live satellite transmission to understand the specific problems and phenomena bi-directional video telecommunication would produce. Though only preliminary tests, the July performances constitute some of the most interesting segments of the project. They capture the disorienting first encounter with satellite latency, and expose the fiction of the "simultaneous now" of satellite telecommunication.

The documentation of the July tests shows Rabinowitz on camera in front of a curtained backdrop (fig. 8). She appears sitting next to a monitor showing her own image repeated in the deep space of video feedback. The monitor looks to be just inches from her right shoulder. On closer examination, however, one can see the dividing line of a split screen running along the edge of the monitor and curtain. She is, in fact, facing the television set displayed on the left side of the screen. Rabinowitz is looking at a feedback monitor that shows her the same image the viewer sees. The split screen that divides Rabinowitz from the monitor cleverly disguises this disjuncture in space, but makes apparent an even more dramatic gap in time: the daisy-chained images on the monitor are dizzyingly out of sync. There is a significant lag between Rabinowitz's actions on the right side of the screen and their appearance on the feedback monitor pictured on the left (and then, again, on the left side of that monitor, *ad infinitum*). This is because the instantaneous video signal is being bounced off a satellite circling high above the earth. A "live" video signal transmitted by satellite travels at the speed of light, but it must cover a great

distance, and this distance is manifested as visible temporal lag. Traveling from Earth, into orbit, and back again resulted in a latency period of about ¼ second. This delay, which is present in all satellite video transmissions, is usually disguised in conventional uses of the technology. In *Our World*, the lag resulted in just a slight delay before a remote commentator responded to her cue. In typical split screen news reports, it manifests as a polite pause between question and answer, or occasionally, interruptions, followed by overlapping apologies. During *Satellite Arts 1977's* trial transmission, Rabinowitz playfully experimented with the delay, making small gestures with her hands and head. A quick motion with her arm on the live right side of the screen hops to the left a brief moment later, and then successively tumbles down the corridor of feedback images.[33] Rabinowitz's immediate past is displayed in space rather than disappearing with passing time. She and her "live" satellite image exist in different times. The lag makes visible the technological fact supporting the performance: Rabinowitz may look as if she is sitting next to her image, but it has traveled through the cosmos to meet her back on the screen.

While the satellite latency produced a charming and comical effect when Rabinowitz engaged with her own image, it would cause problems for performers wishing to respond to one another in real time, as Bear and Sonnier had also discovered. To test the effects of the delay on collaboration and improvisation, Galloway took Rabinowitz's place in front of the camera. The documentation shows him sharing a split screen with a NASA technician at the space agency's headquarters in Washington, DC. On the tape, the two men attempt an exercise: Galloway makes a motion, and his partner imitates it as quickly as possible (fig. 9).

Playing this simple game was, in fact, quite hard. The temporal gap between the two movements was even greater than in Rabinowitz's experiment with the playback monitor, because now there are two delays: the satellite latency and the synaptic lag of imitation. Galloway begins the test by opening and closing his hand at a regular interval, and his partner follows suit. They attempt to sync their images by counting beats and, eventually, they fall into phase. The men have to concentrate to correctly control their images. They need to look at their side-by-side representations and use the feedback to control their slow avatars on the monitor; the only time-space that matters for this exercise is that of the screen, which does not exactly correspond to either of the physical sites.

Figure 9: Kit Galloway and Sherrie Rabinowitz (Mobile Image), *Satellite Arts Project 1977*, 1977. Video stills. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

The July test performances exposed the problems that latency would cause for real-time interaction and the difficulty of engaging with other bodies in the specific space-time of the screen. The monitor, here, does not act as a window or keyhole. It does not give the viewer a disembodied, god-like vantage onto another space. The screen does not simply frame or transmit a camera's view; it brings two feeds together to form a space parallel to those it represents, and which does not

mirror any single reality. Moreover, it is governed by its own laws of time and space, which do not correspond to either of the source environments. It becomes a meeting ground, or as the artists termed it, an "image as place."[34]

The specific conditions the "image as place" are determined by how the sets of source imagery come together to form an "immaterial architecture" for the bodies to inhabit. Galloway and Rabinowitz spent the months between the July tests and the final performances in November rehearsing with an experimental dance troupe, Mobilus, in Optic Nerve's San Francisco studio. They used closed circuit video to explore the various ways an "image as place" might be constructed, and the specific aesthetic effects each arrangement would produce. An *ex post-facto* storyboard for *Satellite Arts 1977*, "Image as Place" (1978), collages video stills from the project with drawings to map out all the potential ways the two sites might come together (fig. 10). The split screen, even in the novel form used during the tests, was only one potential arrangement. The artists show monitors appearing within other frames, images keyed together, or invisibly mixed into a single, image-environment, among other options. Rabinowitz described the importance of this choice in a 1987 interview with *High Performance*:

> The video image becomes real architecture for the performance because the image is a place. … If you have a split screen, that defines the kind of relationship that can take place. If you have an image mix or a key, other relationships are possible. So it incorporates all the video effects that are used in traditional video art, but it's a live place. It becomes visual architecture.[35]

Each arrangement creates a specific organization of space and enables particular visual phenomena to occur. The artists experimented with a large variety of spatial arrangements, however the split screen and the mixed image are of particular importance for the work. The former represents the conventional mode of simultaneously presenting two satellite feeds. The latter emerged through their tests as an alternative mode of bringing people together into a single screen with drastically different aesthetic and phenomenal effects.

Figure 10: Kit Galloway and Sherrie Rabinowitz, Image as Place, c. 1978. Drawing. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

A split screen constrains the dancers to their separate halves of the screen. If a person on one side attempts to cross the boundary line, she disappears into the fold between the images. In the rehearsals, the Mobilus dancers tested the limits of the split screen, emphasizing how it both bridges and maintains physical distance.

The dancers leaned on the dividing line, as if the immaterial and physically non-existent boundary were a wall. Alternately, they bowed their heads into the center of the screen, and decapitated their figures in the fold.

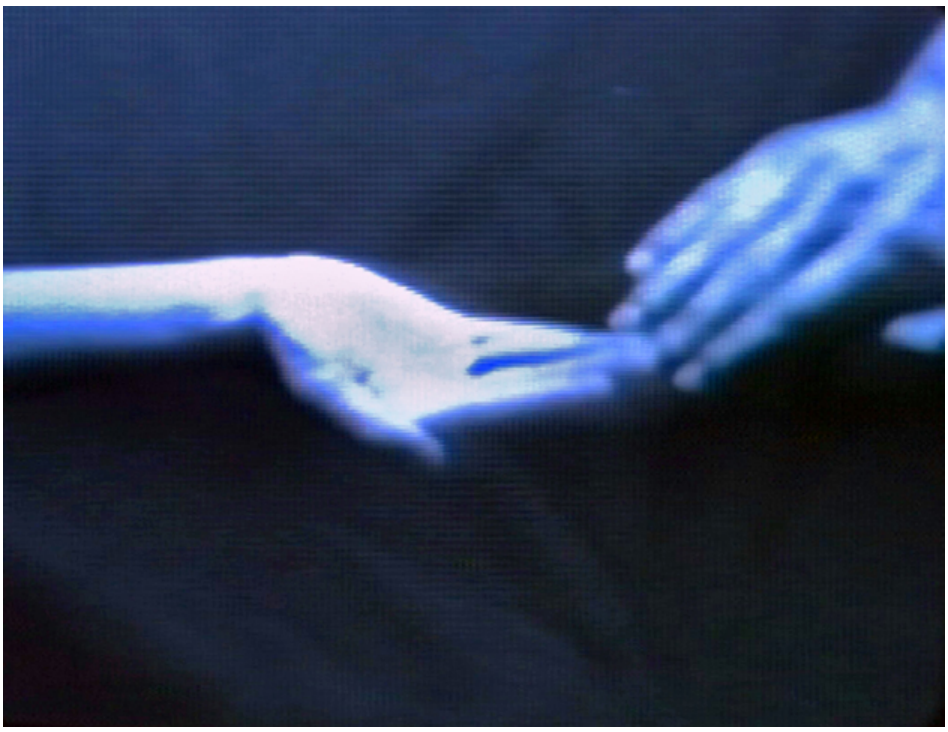

Figure 11: Kit Galloway and Sherrie Rabinowitz (Mobile Image), *Satellite Arts Project 1977*, 1977. Video still. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

The artists found the split screen structure to be limiting, for the dividing line prevented the participants from interacting with each other's images. They could be side by side, but they could not "touch." A mixed image, on the other hand, which blends the two feeds into a single picture, allows the dancers to occupy any part of the screen. It thereby highlights when the bodies are out of sync. Dissolving the split screen has a profound effect on how bodies can interact in the space.[36] In the rehearsals, the dancers explored the mixed space with only their hands. Over a black background, the dancers reach from outside of the frame toward the center of the screen, and toward each other. They apparently touch fingertip-to-fingertip, gently

caressing and holding each other's hands (fig. 11). It takes a moment for the viewer to realize that it is the images that touch, not the hands. Despite the fact that the dancers' material bodies do not come into contact, the images act as if they do. They hover in the weightless televisual ether, yet they do not overlap, overcome, or occlude each other. To do this, the performers used the feedback monitor to carefully and precisely control the images. All of their physical movements were at the service of the screen image, not what was in their immediate surroundings. The dancers transformed their material, tactile bodies into exclusively visible bodies in order to exist on the surface of the screen. They let go of their corporality to be together, not in space or time, but in the "image as place."

Figure 12: Kit Galloway and Sherrie Rabinowitz (Mobile Image), Satellite Arts 1977, 1977. Video still. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

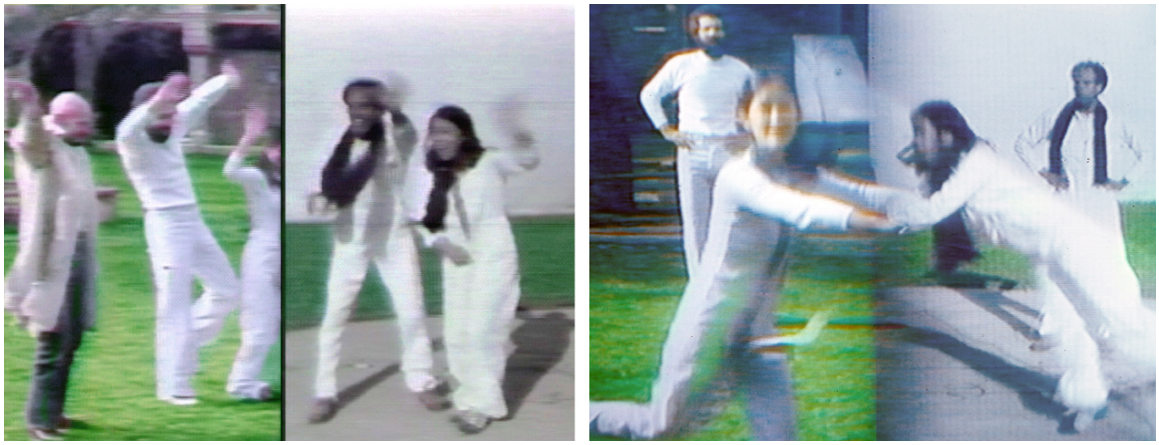

Figure 13: Kit Galloway and Sherrie Rabinowitz, *Satellite Arts 1977*, 1977. Video still. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

The final series of performances for *Satellite Arts 1977,* which began on November 20, dramatized the process of breaking down the conventional split screen structure in favor of "an immersive global real-time environment."[37] The dancers were now located on opposite coasts and were connected by a "live" satellite uplink with a quarter-second delay. For the satellite performance, the dancers took their places in fields lined with feedback monitors, which would allow them to always remain in visual contact with the "image as place" (fig. 12). The performance began within a split screen video architecture. The far-flung dancers wave at their partners across the dark dividing line of the split screen (fig. 13). Their gestures – waving, jumping, and shouting – all imply physical distance. The graphic bisection of the image maintains the feelings of detachment, distance and insurmountable boundaries despite the fact that the dancers appear on the same screen. They run their hands along the seam as if looking for a break in its structure where they might push through to the other side (fig. 12). When the dancers reach out toward each other, they disappear into the gulf between the images (fig. 13). The line divides the image and constrains the dancers, and in doing so it accurately

diagrams the technological situation: two video feeds from opposite ends of the country occupying opposite ends of a television monitor.

Figure 14: Kit Galloway and Sherrie Rabinowitz (Mobile Image), *Satellite Arts Project 1977*, 1977. The Mobilus dancers attempt to sync their movements through a "scored improvisation." Video stills. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

Then the architecture of the image shifts. The four performers are no longer just in the "here" of California or the "there" of Maryland; they are together in a contiguous composite image on the television screen (fig. 14). All the dancers now stand in an open field lined with trees and shrubs. It is only when they try to respond to one another that their separate locations become evident. The "image as place" is temporally disjointed despite looking spatially coherent. Just as Galloway did in the July trials, the dancers begin moving in a regularized manner in attempt to sync up with their counterparts in a "scored improvisation."[38] The dancers hold their arms out from their bodies and begin to count off beats. They switch positions on each count, moving their arms as if they were the hands of a clock (fig. 14). Through these careful motions the dancers make a slow entry into the time and space of the composite image. They can coincide once they have cut their ties to the physical world and given themselves over to the physics of the screen. Afterwards, they are able to accurately navigate their "ambassadors," as Rabinowitz calls the screen avatars, through the weightless space.[39] The sets of dancers cross paths and

weave between one another; they lightly, immaterially touch as they turn circles around each other's images and create organized patterns of movement across time and space (fig. 15)[40]

Figure 15: Kit Galloway and Sherrie Rabinowitz (Mobile Image), *Satellite Arts 1977*, 1977. Video stills. Copyright Kit Galloway & Sherrie Rabinowitz. Used with permission of the artists.

The Chiasmic Screen

Sherrie Rabinowitz described the experience of performing *Satellite Arts* as an electronic version of a traditional dance studio mirror:

> It was a model, like the mirror in a dance rehearsal studio. You know, everyone's dancing, looking at themselves in the mirror, seeing a reflection, and from that they're able to develop a choreography, to get in sync... So this was the electronic version of that: the creation of a virtual space, in which full-bodied individuals could convene, an electronic image space — so the 'image' becomes 'place.'[41]

Since the 1976 publication of Rosalind Krauss's "Video: The Aesthetics of Narcissism" it has become commonplace to describe the video monitor as a mirror, and to understand the performing video artist as a new Narcissus, fascinated with

her own image. “Mirror reflection,” Krauss writes, “implies the vanquishing of separateness. Its inherent movement is toward fusion. The self and its reflected image are of course literally separate. But the agency of reflection is a mode of appropriation, of illusionistically erasing the difference between subject and object.”[42] Rabinowitz’s description of *Satellite Arts 1977* as a studio mirror opens up to a different set of understandings about the power of video’s mirroring functions that differs from Krauss’s account. *Satellite Arts 1977* does complicate the categories of self and other. The effect, however, is not self-fascination or a “bracketing out of the object.” Rather, *Satellite Arts1977* diagrams a phenomenological relationship between self and other that can only take place on the television screen.

In Rabinowitz’s studio mirror metaphor, each dancer sees herself as part of a larger image via a mirrored wall. She takes in her image as part of a total visual field that includes her body, as well as those of the other dancers. This is not a situation in which one fixates on one’s own reflection. The dancer, instead, uses the mirror to see herself in relationship to others, as part of a community of bodies occupying a space. This is only possible through the mediating and reflective function of the mirror, for one’s own body is always excluded from the picture in direct vision. The same thing occurs with the mixed screen in *Satellite Arts 1977*. The screen is, indeed, like the studio mirror in that it presents to the dancer an image of her own body situated in space among the other dancers. She uses reflection to understand herself as part of a total image. Rabinowitz’s apt description of the screen as a studio mirror models a kind of looking akin to the “intertwining” of subject and object that

phenomenological philosopher Maurice Merleau-Ponty explains in his essay "The Intertwining – The Chiasm."

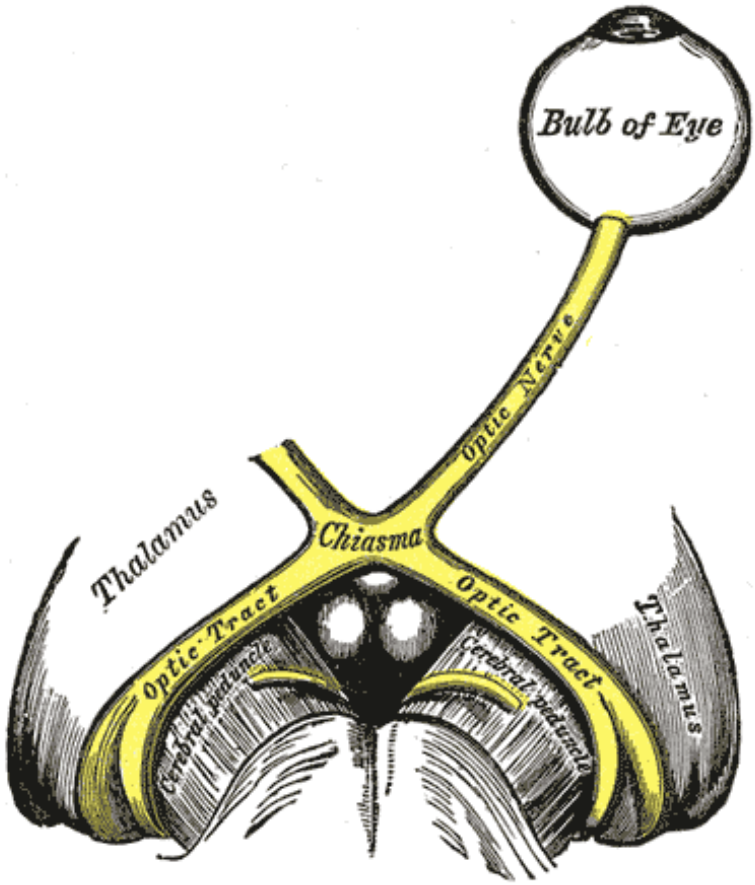

Figure 16: Henry Vandyke Carter, "Plate 773: Ocular Chiasm" from *Gray's Anatomy*, Henry Gray, author. Public domain.

A chiasm is an anatomical term that describes the crossing of physical structures in the form of an "X," such as nerves or ligaments. Perhaps the most well known chiasmic structure is the crossing of the optic nerves at the base of the brain, which enables images from each eye to combine into a single image for binocular vision. The definition from optics strongly resonates with the structure of *Satellite Arts 1977*: the two video feeds come together into a single continuous, coherent, composite image despite coming from separate sources. There are, however, still

deeper connections between the chiasm and the structure and effects of *Satellite Arts*. In his essay, Merleau-Ponty describes what he calls "a second and more profound" kind of narcissism, which is "not to see the outside, as others see it, the contour of a body one inhabits, but especially to be seen by the outside, to exist within it… so that the seer and the visible reciprocate one another and we no longer know which sees and which is seen."[43] The viewer sees herself as part of an image of the larger world. She is not separate from it (a subject looking upon a scene), nor is she fixated on her own singular image. She is "caught up in what [s]he sees."[44] She can see, but, more importantly, she recognizes herself as seen by others. To be a subject, according to Merleau-Ponty, one must necessarily be part of the world one looks at and touches; therefore one must also be an object in that world. "He who looks," the philosopher writes, "must not himself be foreign to the world that he looks at. As soon as I see, it is necessary that the vision (as is so well indicated by the double meaning of the word) be doubled with a complementary vision or with another vision: myself seen from without, such as another would see me, installed in the midst of the visible, occupied in considering it from a certain spot."[45] One has vision, and one is a vision. The movement from subject to object, seer to seen, toucher to touched, sentient body and body sensed are "the obverse and reverse of one sole circular course."[46] Krauss's conception of narcissism, the viewer vanquishes the other in order to be with her own image. Here, in Merleau-Ponty's account of this more profound kind of narcissism, the individual gives herself over to vision in so that she might be seen by the other and become part of the visible world.

Even though the viewer is also a visible thing in Merleau-Ponty's conception of phenomenological experience, she cannot experience these two poles of being simultaneously. The roles are reversible, not simultaneous. The concurrent experience of both poles of existence is "always imminent and never realized in fact."[47] This might be the case for the physical body, but Galloway and Rabinowitz's *Satellite Arts 1977* suggests how this phenomenological experience of being simultaneously both subject and object, seer and seen, toucher and touched can happen through and on the television screen. A dance studio mirror performs the function of showing the dancer how she appears to others, "installed in the midst of the visible." The image in the mirror, however, is still organized from her vantage point, displaying and adjusting the scene based on the shifting subjective position of her body. This is where the differences between the camera/screen set up in *Satellite Arts 1977* and the dance studio mirror become significant. Each dancer in *Satellite Arts 1977,* too, sees herself from the outside as part of a total visual field. Her vision, however, is routed through the camera and the screen. Therefore she sees herself from the camera's distinct vantage point, not from a subjective position relative to her body in real space. Displacing the subjective viewpoint from the body to the camera enables the dancer to see herself as others see her. She can experience her body as a visible object.

There are further differences between the studio mirror and the satellite-transmitted screen images that result in a significant phenomenological shift. Unlike the dancer in the studio, the participant in *Satellite Arts 1977* does not share her physical space with all of the other bodies represented on the screen. If she turned

away from the monitor, she would not find all of the other dancers, only those who were at the same geographic location. The screen portrays an alternative space parallel to, yet separate from, the physical world. It does not simply mediate; it is a visible but not "material" place. Consequently, to engage with the others, the dancer must navigate her body via the screen, that is, to operate as a subject, she must view herself as an object.

The temporal difference between a mirror reflection and the screen image *Satellite Arts 1977* further intensifies this effect. A mirror's image is always live. It reflects what is in front of it in exacting real-time, whereas a satellite image always registers the time that it has traveled in its latency period. Latency may seem to be a failure of the system to live up to its claim of real-time telecommunication. *Satellite Arts 1977* turns the delay into an advantage, for the "unworkability" of the satellite video interface forces the dancer to synesthetically commute her understanding of her body and its movements to her sense of sight.[48] She cannot simply act in real space and assume that her actions will coherently transfer to the screen, as they would in a mirror. The delay insures that the dancer abides by the rules of the screen and fully inhabits her avatar. This process causes the distinction between "sight" and "site" to collapse, as vision becomes the tactile means by which one touches other bodies and inhabits space. Galloway and Rabinowitz aimed to "destroy" the split screen and its oppositional logic in *Satellite Arts 1977*.[49] By crafting a mixed image space from multiple camera feeds, the artists used screen space to model an impossible and idealized phenomenological situation in which the binary differences that govern our typical experience of the world dissolve.

The Immaterial World

I have suggested that *Satellite Arts 1977* stages a phenomenological encounter in the space of the screen by collapsing the clear distinctions between subject and object, here and there, and now and then, thereby forcing the performer to see and control her body as an object "installed in the midst of the visible," surrounded by other subjects-as-objects. *Satellite Arts 1977,* consequently, confuses the difference between the real and the virtual as well. The term "telepresence" is typically used to designate experiences enabled by live telecommunications technologies that allow users to execute actions in a real place via a screen interface. Ken Goldberg provides a helpful definition of the difference between virtual reality and "telepresence" in his article, "Virtual Reality in the Age of Telepresence." "Virtual Reality," he explains, " presents a simulacrum, a synthetic construction: in contrast, telepresence provides access to a remote physical environment. With telepresence what is being experienced is distal rather than simulacral."[50] The salient difference between virtual reality and telepresence, then, is that in telepresent experiences real places and real bodies are at stake. One's actions have effects, and, therefore, "matter." Virtual worlds present fictions; telepresence presents mediated realities.

Most telepresence systems are, like conventional television, uni-directional – a remote user can look at and listen to a far off place, and, with the help of telerobots, physically manipulate people and things at the represented site. While there are physical effects to one's actions, there are few consequences for the user.[51]

She can touch the site, but no one can reach back toward her. Virtual spaces, on the other hand, present non-existent worlds, but typically allow for interactivity between users. Their actions may not register physical effects, but they can communicate and come together within the fiction. The virtual might, at first, be taken for an area of freedom: the world presented is a fiction, and all actions within it are immaterial and, therefore, seemingly inconsequential. Galloway and Rabinowitz make it clear that this is not the case:

> Our artwork is about social spaces that accommodate the physical reality and the virtual. A major theme is the mixing of the real and the virtual – those two things. You are more involved and invested in the presence of that image which is an extension of you…. [In Satellite Arts 1977] that meant that people had to take responsibility for the event, for their image and who they were as they were presented by the lens and camera captured imagery.[52]

By using indexical avatars in a simulacral space, the artists attach specific identities to the images on the screen. The avatars are not generic stand-ins for anonymous users; they are "ambassadors" for the individuals who control them. The performers are simultaneously real and virtual bodies; they are telepresent in a space that has "no geographical boundaries," and, therefore, they are responsible for their actions on both sides of the screen.[53]

I began this chapter with an image of Earth seen "live" from Apollo 8. Astronauts Frank Borman and William Anders described the event of seeing the earth from the Moon in two different ways. Borman imagined his vantage point from the man-made satellite to be like God's. Anders, pointing the television camera

at the globe, diagramed the scene differently. When vision was routed through the screen, the view from the Moon became an image of everyone on the ground looking at themselves." These two points of view—a mastering, Gods-eye-view through a keyhole, and seeing oneself as part of a total, encompassing picture—are both equally possible through satellite video. The satellite spectaculars of the 1960s used the keyhole effect to create the fiction of a shared global "now" and to reinforce the divisive differences between the people and places represented. They separated here from there, and stressed the differences between west and east, have and have not, us and them by giving the viewer an omnipotent, subjective view onto a world that did not include her as an object available for engagement or scrutiny. In the networks' hands, satellite transmissions re-inscribed the dominant power relations of the cold war era. When, in the late 1970s, NASA offered artists the opportunity to engage with this same technology, they challenged not only the conventional uses and structures of satellite-transmitted imagery, but also the politics and ethics of such uses. *Satellite Arts 1977* undid these binaries without succumbing to narcissistic structures typical of video, which vanquish representations of others in favor of an overwhelming fascination with the self. Galloway and Rabinowitz reimagined the relationships a viewer could have to herself and to others by using a mediated image, and, consequently, they provoked the viewer to rethink how she might be responsible for and relates to the images she sees on the television screen. They demonstrated how combining the here and now with the there and then might stage a chiasmic experience in video space. One cannot simultaneously experience being both subject and object in the physical, material world, but the "image as

place" diagrams what this phenomenological experience might be like in the immaterial world.

A condensed, early version of this chapter appeared in *Leonardo Electronic Almanac*.

[1] For a complete account of the Apollo 8 television transmissions, see Bill Wood, "Apollo Television," *Apollo Lunar Surface Journal* (2005). http://www.hq.nasa.gov/alsj/ApolloTV-Acrobat5.pdf. While the images of Earth are the most memorable and iconic images of the Apollo 8 mission, photographing and videotaping Earth was not a major part of the plan. The recording equipment on board was intended for imaging the moon. The mission transcripts record Commander Frank Borman jokingly telling photographer Bill Anders not to take the "Earthrise" image because it is "not scheduled." See NASA's transcripts of day 4 of the Apollo 8 mission. http://history.nasa.gov/ap08fj/14day4_orbits456.htm. Even an article on the development of the Apollo video camera by NASA engineers Stanley Lebar and Charles Hoffman begins: "More 'vast wasteland' is in store for television viewers—the surface of the moon." The idea that the astronauts would look back toward the earth rather than at the moon was not fully thought out by either the engineers or the astronauts prior to the trip. Stanley Lebar and Charles Hoffman, "TV Show of the Century: A Travelogue with No Atmosphere," originally printed in *Electronics* (March 6, 1967) reprinted at http://www.hq.nasa.gov/alsj/Electronics-670306.pdf.

[2] Andrew Chaiken narrates the popular reception of the photograph and the much publicized telegram the astronauts received: "In the last days of 1968, there was a single image—pure, awesome, even holy—to counter a year's worth of violence. It was a photograph of the earth, rising beyond the battered and lifeless face of the moon. Apollo 8 was more than a successful space mission; it was a bright moment for a nation experiencing its first pangs of self-doubt. Even as Vietnam threatened to become a war America could not win, here was an American triumph. Not long after Borman, Lovell, and Anders were back in Houston, Borman got a telegram from someone he had never met. It said, 'You saved 1968.'" Andrew Chaiken, *Man on the Moon* (New York: Penguin, 1995), 134.

[3] Rosalind Krauss, "Video: The Aesthetics of Narcissism," *October* 1 (Spring 1976): 53. For a full discussion of Krauss's argument, see Chapter 2 of this book, "Uncanny Video: Early Video and the Fantasy of Presence."

[4] NASA places Apollo 8 at 176,533 miles from Earth at the time of the television transmission. See: http://images.jsc.nasa.gov/luceneweb/caption.jsp?&photoId=S68-55809. (Accessed May 1, 2014).

[5] NASA, Apollo 8 Flight Journal Transcript, Day 3. http://history.nasa.gov/ap08fj/09day3_green.htm.

[6] Borman, describing the experience of seeing Earth later wrote, "This must be what God sees." Borman quoted in Robert Poole, *Earthrise: How Man First Saw the Earth* (New Haven: Yale University Press, 2008. Appropriately, the Apollo 8 astronauts read from the book of Genesis during their Christmas Eve television transmission. While the reading was chosen as a unifying gesture, since the story is shared by

many of the world's major religions. It also makes it clear that the astronauts are inhabiting the would be position of a creator or god.

[7] It is interesting to note that Stewart Brand, whose involvement in "The Mother of All Demos" I discuss in the introduction to this book, campaigned in 1966 for NASA to release its then-rumored photographs of Earth from the satellites that were already circling the globe. If we could see a picture of the whole earth, he argued, we would realize that it was a finite thing and that we were all on it together. It is not a coincidence to Brand that the first Earth Day occurred and the environmental movement began after the publication of Anders's photograph. Stewart Brand, "Photography Changes Our Relationship to the Planet," *Click! The Smithsonian Photography Initiative*, http://click.si.edu/Story.aspx?story=31 (accessed May 1, 2014).

[8] David S. F. Portree and Joseph P. Loftus, Jr., *Orbital Debris: A Chronology* (Houston: NASA, 1999), 9. http://ston.jsc.nasa.gov/collections/TRS/_techrep/TP-1999-208856.pdf. (Accessed May 1, 2014).

[9] Sputnik 1 was launched on October 4, 1957. Its batteries lasted for three weeks, but the object stayed in orbit for 92 days before falling back to Earth. NASA, "Sputnik 1," National Space Science Data Center. http://nssdc.gsfc.nasa.gov/nmc/spacecraft Display.do?id=1957-001B (accessed May 3, 2014).

[10] Lisa Parks, *Cultures in Orbit: Satellites and the Televisual* (Durham and London: Duke University Press, 2005), 21.

[11] Parks, *Cultures in Orbit*, 21

[12] Parks, *Cultures in Orbit*, 23.

[13] Parks, *Cultures in Orbit*, 43.

[14] Our World was originally designed to integrate feeds from 30 countries. However, after the pull out of the Eastern bloc nations and the addition of Denmark, the final program only included 24. Parks, *Cultures in Orbit*, 43.

[15] Parks, *Cultures in Orbit, 38.*

[16] Lisa Parks writes, "Since Our World's cameras did not venture into the third world, the population problem was visualized as a series of statistics, graphics, and images of hungry people. … While producers may have had good intentions, the absence of both the Eastern bloc and developing countries within the show revealed its self-promotion as a "globe-encircling now" to be somewhat of a farce. The "global" scope of Our World was particularly problematic given that Nigeria, Pakistan, and India had expressed desire to participate in such "world community projects" during the UNESCO meeting of 1965." Parks, *Cultures in Orbit,* 28.

[17] Parks, *Cultures in Orbit,* 23.

[18] I borrow the idea of coordination from Brooke Belisle's discussion of satellite technology. See: Brooke Belisle, "I See the Moon and the Moon Sees Me: Trevor Paglen's Satellite Images," *Media-N* (Spring 2014): np. http://median.newmediacaucus.org/art-infrastructures-hardware/i-see-the-moon-the-moon-sees-me-trevor-paglens-satellite-images/

[19] Belisle writes, "At the same time the United States stoked public desire to go to the moon, and began the space program, it also created the National Reconnaissance Office and began a military spy satellite program. Since the 1960's, The United States

has launched optical spy satellites under the codename Keyhole, a moniker well suited to the idea of peeking through an aperture that conceals the intimate distance of the voyeur. The United States government did not admit the National Reconnaissance Office existed until 1992. The Keyhole satellite program was kept secret until 1995, when President Clinton released some details of its early years and declassified over 800,000 frames of early satellite images. By that time, satellites were becoming essential to the structure of contemporary life. Brooke Belisle, http://median.newmediacaucus.org/art-infrastructures-hardware/i-see-the-moon-the-moon-sees-me-trevor-paglens-satellite-images/

[20] The very first satellite art project was Douglas Davis's *Seven Thoughts*, which took place on December 29, 1976. Other satellite artworks of around the same time were Nam June Paik's *Picture Phone Performance* (1979), *Good Morning Mr. Orwell* (1984), and *Wrap Around the World* (1988), Galloway and Rabinowitz's *Hole in Space* (1980), Davis's *Double Entendre* (1981), and Jaime Davidovich's *Artist & Television* (1982).

[21] Michael Glasmeier & Karin Stengel*, 50 Years documenta 1955-2005*, vol. 2, Michael Glasmeier & Karin Stengel, eds. (Kassel: Kunsthalle Fridericianuum, 2005), 273.

[22] *Documenta 6 Satellite Telecast* script, 1977.

[23] Manfred Schneckenburger, "Exposé for documenta 6," in *50 Years documenta 1955-2005*, vol. 2, Michael Glasmeier & Karin Stengel, eds. (Kassel: Kunsthalle Fridericianuum, 2005), 273.

[24] Joseph Beuys, "I am Searching for a Field Character," in *Participation*, ed. Claire Bishop (London & Cambridge: Whitechapel and The MIT Press, 2006) 125.

[25] For a discussion of the social and political dynamics of Beuys's performances see, Barbara Lange, "Questions? You Have Questions" in *Joseph Beuys: The Reader*, eds. Claudia Mesch and Viola Michely. (Cambridge, MA: The MIT Press, 2007), 183-184

[26] Douglas Davis quoted in Jeremy Turner, "Outer Space: The Past, Present and Future of Telematic Art – 07: Interview with Douglas Davis about Early Telematic Art" (2004). http://www.openspace.ca/web/outerspace/DouglasDavisInterview 2004.html.

[27] Liza Bear and Keith Sonnier, *The Send/Receive Satellite Network* I (1977)

[28] Liza Bear and Keith Sonnier, *Send/Receive Satellite Documents – Phase I*, 1977. http://sendreceivesatellitenetwork.blogspot.com/2009/02/sendreceive-phase-i-and-ii-documents.html

[29] Steven Durland, "Defining the Image as Place: A Conversation with Kit Galloway, Sherrie Rabinowitz & Gene Youngblood," in *High Performance* 37 (1987): 54.

[30] Galloway and Rabinowitz staged another bi-directional satellite performance, *Hole in Space*, in 1980, and planned other yet to be realized satellite works.

[31] Technical difficulties on the final two days of the performance prevented the artists from completing the work as planned. See note 40 for further details.

[32] Annmarie Chandler, "Animating the Social: Mobile Image/Kit Galloway and Sherrie Rabinowitz," in *At a Distance: Precursors to Art and Activism on the Internet* (Cambridge: The MIT Press, 2005): 161.

[33] The right side of the image was totally live for Rabinowitz since it was in a closed-circuit connection to the camera.

[34] Chandler, 158.
[35] Durland, 56.
[36] Galloway and Rabinowitz pursued a large-scale study of interaction in mixed image space in their closed-circuit video project, *Art-Com* '82.
[37] Chandler, 159.
[38] Kit Galloway, e-mail message to the author, February 19, 2013.
[39] Durland, 56.
[40] The dance described above was only intended as rehearsal so that the dancers might get their "sea legs" for the following two days of satellite time. Kit Galloway writes, "It was fortunate that we turned on the video recorders because in actuality we were just doing walk through." The next two days did not go as planned: a fire knocked out the uplink from Goddard the second day; and a severed power cable prevented transmissions on the third. On both days the artists were able to conduct experiments from one site. They inserted the dancers into broadcast television programming, showing the Mobilus members weaving among football players and dancing across commercial advertisements. On the final day, they bounced video and audio signals off the CTS satellite to create a feedback dance with the delayed images. Storyboard illustrations for *Satellite Arts* provide a glimpse of the intended scale and scope of the work if completed. Kit Galloway, e-mail message to the author, February 16, 2013.
[41] Waag Society, "Kit Galloway & Sherrie Rabinowitz: Teleconference Lecture," November 12, 2003, http://connectmedia.waag.org/media/sentientcreatures /gallaway.mov. (Accessed February 10, 2013).
[42] Rosalind Krauss, "Video: The Aesthetics of Narcissism," *October* 1 (Spring 1976): 56-57.
[43] Maurice Merleau-Ponty, "The Intertwining- The Chiasm," in *The Visible and Invisible*, trans. Alphonso Lingis (Evanston: Northwestern University Press, 1968), 139.
[44] Merleau-Ponty, 139. This kind of looking undoes the structures of power established both by Cartesian models of subjectivity and satellite surveillance. It is interesting to point out the metaphorical use of the "keyhole" by another phenomenological philosopher, Jean-Paul Sartre. In the "Existence of Others" of *Being and Nothingness*, Sartre describes how "the look" structures our position as either subject or object. He uses the example of a person peering through a keyhole to describe the state of being "a pure consciousness of things." When the person hears footsteps behind him, he is pushed into vision. He writes, "I am in the world which the Other has made alien to me, for the Other's look embraces my being and correlative the walls, the door, the keyhole. All these instrumental-things, in the midst of which I am, now turn toward the other a face which on principle escapes me. Thus I am my ego for the Other in the midst of a world that flows toward the Other." Jean-Paul Sartre*, Being and Nothingness*, trans. Hazel E. Barnes (New York: Washington Square Press, 1992), 347-348.
[45] Merleau-Ponty, 134.
[46] Merleau-Ponty, 137. It may be helpful here to think of Merleau-Ponty's oscillating subject as the image on a Thaumatrope, spinning rapidly so that two images, located

on opposite sides of a disk appear in such quick succession that they seem simultaneous.

[47] Merleau-Ponty, 147. We might also think of the television image, which is in a constant process of forming an reforming, never actually showing a complete image on the screen at any one time, as also "always imminent, but never realized in fact." Lisa Parks says something to this effect in her article "Orbital Performers and Satellite Translators: Media Art in the Age of Ionospheric Exchange." Discussing the limiting concept of "electronic presence" in regards to "phenomenological nuances of electronic exchange." She writes: "The term 'presence' ultimately privileges discourses of representation because we tend to discuss and evaluate it by what appears in the frame, and often this negates the idea that the electronic signal may indeed be a way of being in the world as opposed to a way of being present or re-presented. … If the video image can be described as 'always coming into being' by virtue of its own scanning process, then the satellite image adds to this a pronouncement about its own distribution, embodying in its quickly scanned surface an indication of the ways the material has been transported from here to there." Lisa Parks, "Orbital Performers and Satellite Translators: Media Art in the Age of Ionospheric Exchange," Quarterly Review of Film and Video, vol. 24 (2007): 210.

[48] See: Alexander R. Galloway, "The Unworkable Interface" in *The Interface Effect* (New York: Polity, 2012), 25-53. The inherent latency of the satellite video image makes the interface, at base, productively "unworkable," to use Alexander R. Galloway's phrase. For an extended discussion of Galloway's concept of the unworkable interface, see Chapter 2 of this book.

[49] Kit Galloway, e-mail to the author, February 16, 2013.

[50] Ken Goldberg, "Virtual Reality in the Age of Telepresence." *Convergence* 4 (March 1998): 33.

[51] For extended discussions of the ontological, epistemological, and ethical implications of telepresence see: Hubert L. Dreyfus, "Telepistemology: Descartes's Last Stand", in *Robot in the Garden: Telerobotics and Telepistemology in the Age of the Internet*, ed. Ken Goldberg (Cambridge: The MIT Press, 2000), 48-63, and the first chapter of this book, "The Index and the Interface."

[52] Chandler, 162.

[53] Durland, 55.