Chapter 1.

Mapping a contingent web of connections.

> It is impossible to really see ourselves as part of the universe, or fully comprehend just where we are in the universe. From down here or just out there, or even from several places further out there. We need multiple perspectives from all over the place, all over the universe, from myriad vantage points. Close at hand and way out there …. A focus on the spotlight rather than the starlight, the figure rather than the ground, is a hazard every time we step out of ourselves and look back. [1]
>
> Paul Levinson, 2003. *Real Space. The fate of physical presence on and off the planet*.

Out there – a speculation.

In speculating about the relationship between 'out there' and 'back here', I am interested in the idea that these spaces exist because they are part of each other, they define each other, they are folded into each other and never static. This can be considered through the simultaneity of spatial relations which the philosopher Elizabeth Grosz proposes. She suggests that we look at spatiality:

> in terms of the co-existence of multiple relations of *succession,* space as a layering of spaces within themselves, space enfolded in others, spaces that can function as the virtualities of the present, the 'here.' [2]

I have written this exegesis as an unfolding, and at times, fragmented narrative, where fluctuations and deviations within the continuing text open up one idea, one space and time and fold them into another.

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[1] Paul Levinson, *Real Space. The fate of physical presence on and off the planet,* (London and New York: Routledge, 2003), p. 72.

[2] Elizabeth Grosz, 'The Space of Architecture and Invention,' in *Olafur Eliasson - Surroundings Surrounded – Essays on Space and Science,* ed. Peter Weikel, (Karlsruhe, Germany, Centre for Art and Media, Cambridge, Massachusetts: M.I.T. Press:, 2001), p.267.

Suzanne Cottier observes that our contemporary perception of the world:

> is no longer bounded by the immediate landscape through which we move, but by a vast network of information that connects personal experience with the shifting borders of geography, history and culture.[3]

With this in mind questions have been posed in this chapter that map out the focus of the research. Here I have established a staging ground upon which to assemble the philosophical underpinnings of my work. In the context of contemporary ideas about space and time, my research is a speculation on the representation and understanding of the night sky through creative acts of mapping. My focus is on cosmic space. This space is an extension of what we understand to be the natural world 'out there', where unseen to our own eyes, in an expanding universe of gravitational waves and distortions it is thought that space and time stretch and shrink in response to matter.

The intention is to raise our awareness of this remote cosmic space through interactions between art and science in an increasingly computerized and complex milieu. It is about seeing beyond the visible, where space and time are fragmented and reconfigured through the new physics, light and flight. It is about sense experience in a disorientating and disquieting milieu. The process of mapping is discussed in terms of reconfiguring space and reconstructing experience within changing perceptions of reality. It is about locating creative acts of mapping through communications, projections and visualizations, and using these as the basis of art.

The night sky is now mapped and revealed through technologies associated with the emanation of light, a physical phenomenon with a long history in both scientific and artistic research. It is a space almost completely incomprehensible to our immediate senses, a mysterious and strangely replete void that invites speculation. Weak glints of light embedded in the dark, traveling from almost unimaginable distances are the only clues to its hidden depths. It is a space in the natural world, where 'nature' is increasingly understood through the filter of civilization. Once viewed as an

[3] Suzanne Cottier, *Real Worlds – The Dissolving Space of Experience*, exh. cat., (England: Modern Art Oxford, 2004), np.

extension of the life of the earthbound observer to which the patterns of daily life and beliefs were intricately bound, the night sky now is regarded as 'outer space', a space which is increasingly demystified through specialized fields of knowledge in engineering, astronomy and physics. This space is made accessible through telescopes and photographic processes, computerization and the electronic light of remote sensing technologies. It is understood through data and information that now increasingly stands in for the immediacy of sense experience. The scientist Margaret Wertheim, describes the space 'out there' as:

> a space that in general we know only through "virtual eyes." In this respect our experience of "outer space" parallels our experience of cyberspace, for it too is a space we do not experience physically. Both are seen through a technological filter. [4]

Paradoxically such technologies have enabled us to become more familiar with the night sky, while also revealing its elusive and infinite extent.

This extra dimension lying beyond the visual and tactile scope of the finite space we see through the constraining limitations of 'common sense', is defined mathematically by scientists. By artists it is inferred visually. We look to mathematicians to imagine reality in space-time experience, however the artists' imagining of reality is not bound by the laws of physics. As an artist who has consciously engaged with astronomy and physics Vik Muniz asserts that:

> [a]rtists are constantly changing the physical descriptions of the world in order for science to prove the possible. It was Einstein himself who said that while logic can only get us from A to B, imagination can take us everywhere. [5]

In the current social climate art seems valued predominantly for some wider social benefit, but art also has the potential to play an educational and imaginative role in demystifying science. Artists are able to challenge the alleged neutrality of science, as mapping has been challenged by changing social mores and new technologies. I am interested in processes by which

[4] Margaret Wertheim, *The Pearly Gates of Cyberspace,* (London: Doubleday: 1999), p. 144.
[5] Vik Muniz, *Reflex. A Vik Muniz Primer,* (New York: Aperture Foundation, 2005), p. 169.

ideas in a scientific context can be transferred into works of art in order to heighten our awareness of the possibility for relationships between the rationalism of science, and the exploration of the subconscious in art. The generalist tradition that emerged in the Enlightenment promoted the difference between art and science but also encouraged dialogue between them. Murdo MacDonald, Professor of Scottish Art at the University of Dundee, explains, 'artists and scientists offer us many different views of reality. Each is a different way of seeing the world and each illuminates the blind spots in the other.' [6] The scientist C.H. Waddington notes that:

> both art and science explore fundamental structures of the material world in their own different but complementary ways. Together they yield overlapping insights about reality. Our task is to find ways of understanding these insights in their variety and richness. The flow of ideas between scientists' and artists' views of the world cannot help but be affected by scientific discoveries, but these ideas can also travel in the other direction. [7]

The nature of cosmic space determines that we are only ever observers, watchers in the night, imagining the invisible. Cosmic space has unfolded for us essentially through thought experiments; the kind that Einstein conducted in his research. However, while revealing new knowledge about the structure of the universe, the new physics is also becoming increasingly complex and inaccessible to the lay person, limiting feedback into the humanities and popular culture. The physicist David Bohm suggests that the most profitable way to view the activities of art and science today is through paradigms. He describes these as:

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[6] Murdo MacDonald in Julian Kiverstein, 'Where In The World Do Art And Science Meet?' *Map Magazine – You Are Here: Journeys in Contemporary Art:* www.mapmagazine.co.uk/pages/article_view.cfm?articleid=40 p. 2 [accessed 28/03/06]. Artists working with space subjects and themes invariably become heavily involved in both the physics and technologies of space – either as a muse, a metaphor, a subject or as a tool necessary for the development of their artistic creations. 'Space: Science, Technology and the Arts' at www.arsastronautica.com/myphpblog/forum.php [accessed 31/05/05]. However as Muniz notes somewhat satirically, 'the actual role of science in the humanities has about the same weight that the weather report has on the evening news. The panic engendered by Orson Welles's infamous radio announcement of a Martian space invasion in 1938 is more than proof of the potential effects of the disconnect between scientific fact and the media. Whenever fiction crosses the path of reality, whenever art is mixed with scientific evidence, the result usually proves constructive to both sides of the bargain,' Muniz, *Reflex,* p. 179.

[7] Ibid., Conrad Waddington in *Map Magazine*, p. 2. In 1969 C. H. Waddington, professor of animal genetics at the University of Edinburgh published a seminal study of the relation between painting and science.

> in effect, simplified but typical examples, the study of which illuminates nature as a whole for us, by revealing the essential relationships that are significant for observation and experiment… once we understand the paradigm relationships we can look afresh at nature in all its complexity, and see it in a new light in a wide range of more particular and limited kinds of questions … science and art have always been deeply related in this way because both have really been concerned mainly with the creation of paradigms rather than with a mere reflection or description of subject matter. [8]

In recent times our thinking has been increasingly determined through a set of interacting processes and relational fields that are more spontaneous and less rule-bound. This requires a new paradigm to account for a variety of physical and biological phenomena that cannot be accounted for necessarily by simple universally applicable rules. It has been described as 'complexity.' Lev Manovich comments on the way in which this paradigm is reflected in computer software:

> [it is] the larger paradigm I see behind the visual diversity of contemporary software driven practice… modernist art followed modern science in reducing the mediums of art and our sensorial experience to basic elements and simple structures, contemporary software abstraction instead recognizes the essential complexity of the world.[9]

Art, science and history view the world through a complex tissue of events where the texture of the whole, is determined by various connections which are in a constant state of flux. In each case our knowledge is filtered through time and space and we reconstruct the residue to construct new realities. Historical reference has enabled artists to engage with specific interests in the history of cartography. History can be thought of as a kind of mapping, however, not unlike the outer reaches of space, the territory is mostly beyond our reach. We can only model and imagine it through memory. The historian John Gaddis observes:

> [i]f time and space provide the *field* in which history happens, then structure and process provide the *mechanism.* For it is from structures that

[8] David Bohm, *On Creativity*, ed. Lee Nichol, (London and New York: Routledge,1998), p. 33-34.
[9] Lev Manovich, 'Abstraction and Complexity' in *White Noise,* exh.cat. ed., Ernest Edmonds, Mike Stubbs, (Melbourne: Australia Centre for the Moving Image, 2005), p. 39.

> survive into the present – "certain residues"… that we reconstruct processes inaccessible to us because they took place in the past. [10]

Gaddis maintains that historians are prepared to acknowledge tendencies or patterns but he reminds us that we should not regard such laws as immutable. The historian R.G. Collingwood cautions against confusing 'the transient conditions of a certain historical age for the permanent conditions of human life.' [11]

In posing questions for the research and formulating a methodology within the framework of visual art practice, I am interested in unearthing diverse sources in an interactive or ecological way where, as Gaddis explains, there is a consideration of 'how components interact to become systems whose nature can't be defined merely by calculating the sum of their parts.' [12] The questions follow from these considerations.

1. If we acknowledge that there is a mapping impulse in human consciousness that precedes the physical artifact, then how has this impulse shaped our understandings and experiences of space and time?

2. In what ways can historical models and processes of mapping and their relationship to art and science inform us about remote cosmic space (in this case the night sky) and the way it is has been mapped and imaged through complex and mutable relationships between nature and culture?

3. In what ways can the practices and processes of observation, speculation and visualization employed in both art and science, (and filtered through data and the senses, analogue and digital technologies and models associated with the emanation of light), inform us about the nature of seeing and our constructions of reality?

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[10] John Gaddis, *The Landscape of History*, (England: Oxford University Press, 2002), p. 35.
[11] Ibid., p. 63.
[12] Ibid. p. 55.

4. How can contemporary ideas about artistic experience and mapping space in a wider field of relationships, propose further readings about historical models and their relationship to current practices ?

Art, science and mapping – reconstructing experience.

'Light can be both fact and idea, both matter and energy,' the architect and poet Alex Selenitsch observed, when writing on the work of Robert Owen.[13] Owen, uses pure colour to recreate the experience in his painting of what Selenitsch describes as, 'the vibration of light through the dispersal of wavelengths.' [14] Remote cosmic space is a space mapped with light. It is a space where art and science interact with fiction and reality to search for codes that express the metaphorical potential of space and its structural organization. Mapping is also a fiction constructed from factual observation. James Corner identifies three essential operations involved in mapping:

> [f]irst, the creation of a field, the setting of rules and the establishment of a system; second, the extraction, isolation or 'de-territorialization' of parts and data; and third, the plotting, the drawing out, the setting-up of relationships, or the 're-territorialization' of the parts. At each stage choices and judgements are made, with the construing and constructing of the map alternating between processes of accumulation, disassembly and reassembly. [15]

Mapping is a construction of objective realities, whether scientific or otherwise but always embedded in the subjective conditions of human thinking. Gerhard Roth reminds us that this is also true of physics, (to which there are numerous references in my work). He observes that physics,

> [is] like every natural science, *a description of the phenomena of reality*, which is tied to the conditions of this reality and thus constitutes a part of it. Physics might be the best, most critical or most general description of the phenomena in reality, but it does not surpass reality. [16]

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[13] Alex Selenitsch, 'Robert Owen – Jumping Dimensions' in exh.cat. *Robert Owen – Flickering Light*, (Melbourne: Arc One Gallery, 2005), np.
[14] Ibid.
[15] James Corner, 'The Agency of Mapping' in *Mappings*, ed., Denis Cosgrove, (London: Reaktion Books, 1999), p. 231.
[16] Gerhard Roth, 'Can One Meaningfully Speak of a World Independent of Consciousness?' in *Olafur Eliasson - Surroundings Surrounded,* p. 517.

Scientific images often arise from the use of metaphor and analogy. One of the things that science and art have in common is pattern recognition, as well as an understanding that something can resemble something else. John Ziman, for example, in his book *Reliable Knowledge: An Exploration of the Grounds for Belief in Science,* points out that scientific insights often arise from such realizations as, 'the behavior of an electron in an atom is 'like' the vibration of air in a spherical container.' [17] This does not mean that reality is compromised by such thinking, but as the sociobiologist Edward O. Wilson observes, 'that it is best delivered in the same way it was discovered, retaining a comparable vividness and play of the emotions.' [18] It is thought that the Italian cartographer Andrea Corsali, in 1515, was the first European to describe the Southern Cross constellation: 'crux' or 'crucero' 'this crosse….so fayre and bewtiful', [19] as Corsali saw it. In the crude woodcut illustration, the *First Printed Description of the Southern Cross*, 1516, (see fig. 4), he describes roughly drawn arcs from these stars, and in so doing he maps an analogue for the orbiting earth and the relationship that navigation has with time and space.

Science decodes nature. Nature is increasingly regarded as a testing ground for models in science. Information gained from science, often in the form of data, is transformed from one medium to another. Artistic experience is increasingly seen in contemporary terms as a viewing environment which stimulates the senses through the prism of data. Scientific vision, Paul Levinson suggests, needs to be reinvigorated through the recalling of myth and wonder, 'not as substitutes for facts, but as better vehicles of their presentation.' [20] Andrew Benjamin, critic and theorist, states that the strength of art is to leave the viewer wondering, suggesting 'that [the] very state of being left wondering is itself potentially productive.' [21]

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[17] John Ziman in Gaddis, *The Landscape of History, p.* 2.
[18] Ibid.
[19] *Letters of Andrea Corsali – The First Printed Description of The Southern Cross, 1516*, (Sydney: Hordern House, 2003). See also 'Letter of Andrea Corsali 1516' in *The Corsali Manuscript,* Digital Collections/Manuscripts, National Library of Australia: www.nla.gov.au p.8, [accessed 23/06/05].
[20] Levinson, *Real Space*, p. 13.
[21] Andrew Benjamin in *Exhibit A* with Julie Copeland, 'Walter Benjamin – Changing the Way We See', pt 3:www.abc.net.au/rn/arts/sunmorn/stories/s1331112.htmp.6[accessed 10/16/15]

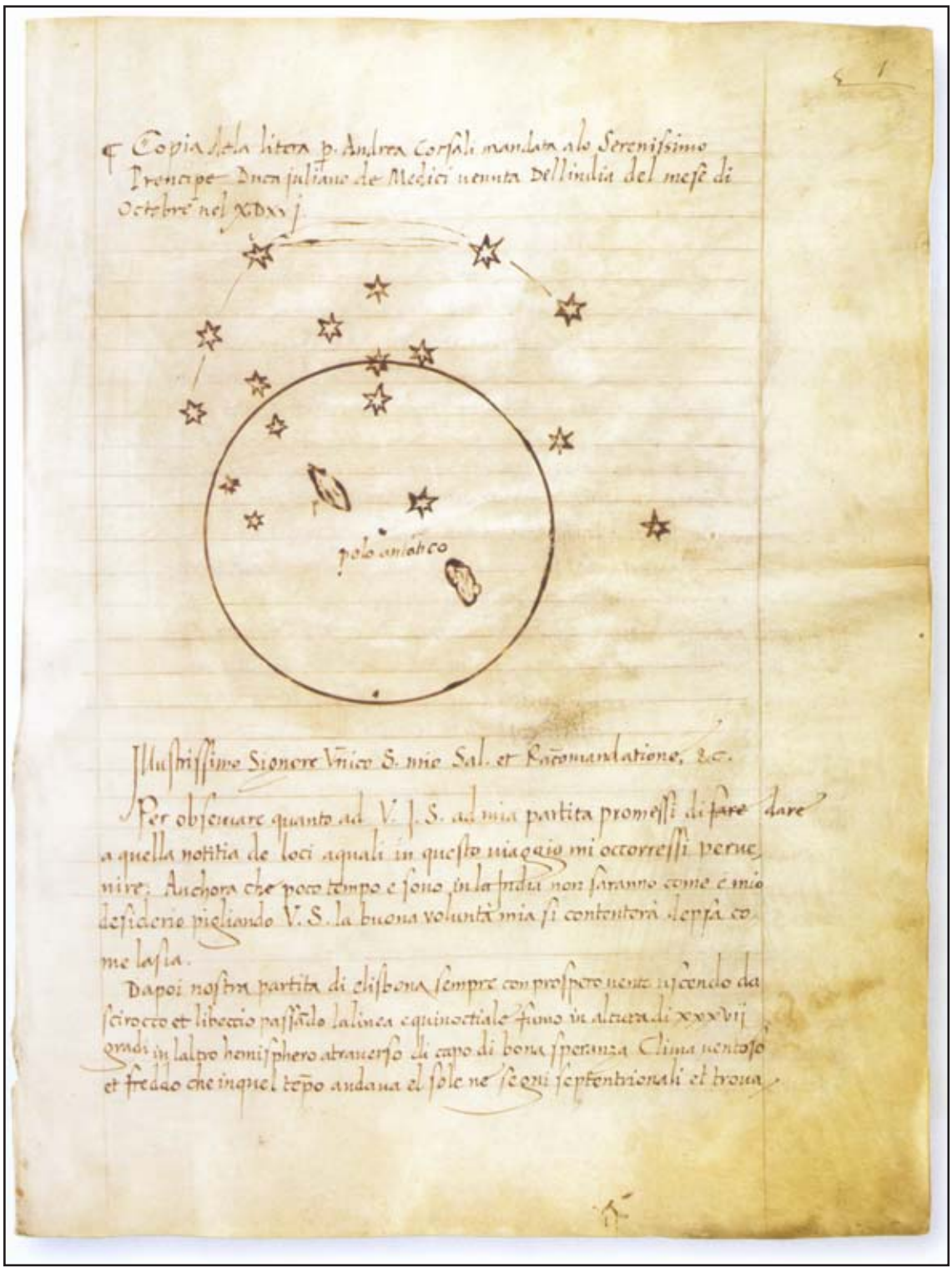

Fig. 4 Andrea Corsali, *First Printed Description of the Southern Cross*, 1516, manuscript on vellum, 29.5 by 22.5 cm, National Library of Australia.

Artists who are drawn to the representation of nature, while remaking nature on the basis of understanding, are not accountable to demonstrable proof, as an art historian interested in science Martin Kemp suggests:

> [w]hat the artist presents as a final product is an open but not unstructured field for the exercise of the spectators' faculties, blatantly exploiting the subjective impulses that are apparently wrung out of the dry exposition of science. [22]

Although art and science are not the same thing, they manifest in all their various forms as a response to our systems of perception, cognition and creation, where the visual has a central role. The acts of observation, speculation, visualization, the use of analogy and metaphor, testing the ideas and finally the remaking of the experience, are activities of both fields of research. The act of looking is also the act of analysis, but beneath all these considerations there appears to reside for both artist and scientist deep intuitive structures. Although our era seems dominated by physics, as Kemp notes:

> [a]rt should be regarded in its own right, as exploring submerged worlds of mind and matter that had only been implied under the skin of older naturalisms, now that the burden of naturalism has shifted to photographic media.[23]

The reconfiguring of space.

The wide dissemination of the aerial photograph, sophisticated cameras and our experience of jet flight have reconfigured our sense of space. The aerial view has, during the twentieth century, enabled the photographic documentation and building of Earthwork art and interpretations of ancient Earthwork sites seen in the work of the American artists such as Robert Smithson and James Turrell. Communication technologies have also altered the meaning of the term proximity, as Victoria Lynn suggests:

> being present in one place no longer means that you are absent in another, and our sensations of 'here' and 'there', present and future become increasingly blurred. We live in a society in which ideas and

[22] Martin Kemp, *Visualizations – The Nature Book of Art and Science,* (California, United Kingdom: University of California Press, Oxford University Press, 2000), p. 4.
[23] Ibid., p. 6.

> information are increasingly exchanged through the vectors of the internet, phone lines, satellites, and instant communication.[24]

Now satellite photographs and remote sensed images of outer space and the earth have taken the place of conventional maps. The NASA photographs, *Earthrise* (a view of the half-shadowed earth rising over the lunar landscape), and *Whole Earth AS 17-22727*, (the whole globe floating in dark space), taken during the Apollo Space Project, have become the iconic images of the globe, simultaneously 'true' representations and virtual spaces. [25] This re-configuring of space which human geographer Denis Cosgrove describes as 'a revolution in spatial representation,' he suggests:

> permits spatially referenced data to be generated, manipulated and illustrated with a speed, accuracy and facility quite unimaginable within the memory of even relatively youthful people…The naturalism of satellite and computer generated images of the earth and spatial distributions … has destabilized the conventional architecture, meanings and significance of mapping and maps, helping to expose the 'authored' nature of the latter. [26]

There is a number of ways in which the contemporary artist has re-configured space through the idea or process of mapping. Hal Foster notes that there has been in the latter part of the twentieth century, in post-minimalist practice, an interest in the siting of art, as well as an ethnographic and conceptual leaning in art practice. He observes that there has been:

> [a] series of shifts in the *siting* of art from the surface of the medium, to the space of the museum, from institutional frames to discursive networks … Along with this figure of siting has come the analogy of *mapping* … Robert Smithson and others pushed this cartographic operation to a geological extreme that transformed the siting of art dramatically... Otherwise mapping in recent art has tended towards the sociological and anthropological. [27]

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[24] Victoria Lynn, 'Space Odysseys: Sensation and Immersion' in *Deep Space*, exh. cat., (Sydney: Art Gallery of New South Wales, Melbourne: Australian Centre for the Moving Image, 2001), p. 11.

[25] Denis Cosgrove, *Apollo's Eye. A Cartographic Genealogy of the Earth in the Western Imagination,* (Baltimore, London: John Hopkins University Press, 2001), p. 258-9

[26] Denis Cosgrove, ed. *Mappings,* (London: Reaktion Books, 1999), p. 6.

[27] Hal Foster, *The Return of the Real*, (Cambridge-Massachusetts, London: October Book, M.I.T. Press: 1996), 184-185.

Smithson and his contemporaries, who were influenced by geometric abstraction and minimalism, made Land art and constructed Earthworks on such a scale that the territory became the map. In a remote and wild place in New Mexico Walter De Maria constructed his work, *The Lightning Field,* 1977, (see fig. 5), a one mile by five eighths of a mile grid of four hundred stainless steel poles of about two inches by twenty feet, the tops terminating on a unified level plane despite the varied terrain. From the distance at dawn and dusk they reflect the light, but remain virtually invisible in high sunlight. Jonathan Fineberg describes their impact:

> [t]he desolate beauty of the site seems to exist beyond time, with the power of nature brought home most dramatically by the play of lightning in the sky behind the grid.[28]

Muniz describes these Earthworks as 'the mysterious by-products of geography's saturation.' [29] Somewhat like Jorge Luis Borge's fictional map of the Empire, its size being that of the Empire, 'where a disjunction between the real and its copy might cease to exist.' [30] These works, (which were often situated in remote and inaccessible sites), were to be experienced rather than interpreted. Instead perhaps they demonstrate how difficult it is to find an analogous structure to understand the world. The complexity of their representation renders them often remote from reality. However, the Earthwork artists worked with symbolic interpretations of these environments. Their relationship to their representations through photographic and graphic representations and documentation created an interactive mapping between these spaces. Muniz describes this activity as 'an awkward reversal of the tradition of landscape painting in defining civilization by looking outside its borders.' [31]

The British artist Richard Long's work manifests as an interaction with, and mapping of, the landscape through walking, and with nature and natural materials, revealing a system of relationships that are joined in an invisible

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[28] J. Fineberg, *Art Since 1940*, 2nd ed., (London: Laurence King, 2000), p. 327.
[29] Muniz, *Reflex*, 157. Images of Land Art can be found in L.Virgine, *Art on the Cutting Edge* (Milan: Skira, 1996), p.136-139.
[30] Robert Storr, 'The Map Room: A Visitors Guide', in exh. cat. *Mapping,* (New York: Museum of Modern Art M.O.M.A., 1994), p. 5
[31] Muniz, *Reflex*, p. 160.

Fig. 5 Walter De Maria, *The Lightning Field*, 1977, stainless steel poles, av. height, 6.29 m overall 1,609.34 by 1,005.84 m, New Mexico.

and infinitely complex natural web. With maps, photographs and texts he then records the walks, and the sculptures which he inserts into the landscape. Through the same process of abstraction that is recognized in mapping Bernard Possidente suggests that Long, 'transforms his actions into a sort of virtual map,' [32] where the movements or landmarks encountered on the way are later documented.

Traditionally we think of maps as having a double-sided characteristic. The surfaces are analagous to actual physical territory, but conversely they are inevitably abstract through the necessity of codification. Robert Storr noted when curating the *Mapping* exhibition in 1994 at M.O.M.A. in New York that, 'The particular opportunities maps provide visual artists … result from their being the ultimate pictorial coincidence of exacting representation and total abstraction.' [33] Abstraction in this context could be described as being a vision of the absent, a structural analogy of the unseen. The unavoidable processes of mapmaking however, through simplification and the organization of space through codes, both obscure and reveal the things they represent.

The abstracted images that emanate from places beyond our vision and the mapping of light through space and satellite photography, are in fact revealing something of the real world. What can the artist make of these remote spaces, mapped through what appears to be an electronically induced hallucination? Speaking at a conference on cartography in Australia in 2003, David Woodward suggested that maps should be seen as both artistic as well as scientific, where their interest lies in their structural analogies and patterns, offering something different from 'real life.' He notes that, '[t]he sophistication of modern remote-survey techniques and the new spatial images they have generated have also stimulated artists to re-work the long historical connections between art and cartography.' [34]

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[32] Bernard Possidente 'Genetic Mapping: I Map therefore I Am' in exh. cat. *The World According to the Newest and Most Exact Observations*, (New York: The Tang Teaching Museum and Art Gallery at Skidmore College, 2001), p. 64.

[33] Storr, *The Map Room*, p. 13.

[34] David Woodward, Art and Cartography: Six Historical Essays, (Chicago and London 1987), in Cosgrove, *Mappings,* p, 6

Mapping can be considered a kind of architecture. It involves both visuality and codification. It embodies spatial knowledge, the archival, the remembered and the imagined. Remembering and experiencing space through the relations and interactions between things suggests that the act of mapping, like memory, might be embedded in our genetic code. Currently the process of mapping is metamorphosing in a world of radically unstable spaces and structures. Jacques Levy observes that:

> [i]n the opinion of many observers, it is the spatialities of connectivity, marginality and liminality, and the transgression of linear boundaries and hermetic categories –'flow' – which mark experience in the late twentieth century world. [35]

The contemporary New Zealand artist Ruth Watson's work has been informed by maps, and mapping this kind of territory. She interrogates the politics of representation and desire to draw attention to different ways of imaging the world. An aerial photograph formed the basis of her 2002 work, *From the Air – Without Parachute*. Watson used composites of the first aerial surveys of New Zealand to fabricate a Victorian era dress, the foreign and familiar, the past and the present sewn together, commenting on space and time and the manipulation of society in post-colonial debate. The artist has also worked with map projections that she suggests 'are displaced in the history of mapping, or otherwise at odds with entrenched conventions of cartography… emphasizing how thoroughly contingent common depictions of the world are.' [36]

Mapping reality – materiality and virtuality.

The advent of digital simulation now expresses form through number to create the illusion of reality, just as the mathematically rendered images of the early Renaissance strove to provide convincing simulations of a three dimensional reality on a flat surface in material space. Now, computerization

[35] Jacques Levy, 'A-t-on encore (vraiment) besoin de territoire?' Espaces et Temps, p. 51-2 (1991), p 102-42, in Cosgrove*, Mappings***,** p. 5.
[36] *From the Air: Ruth Watson, 'Without Parachute'* at the Physics Room: www.anu.edu.au/culture/abstractions/artists/rw_4.htm p.1 [accessed 14/04/2006].

offers the extended field of painting another surface and another space to refer to. In doing so the possibilities for other realities are being revealed. Cyberspace maps a new form of virtual space or reality that consists of electronic data. Digital art has reached beyond form as matter and now also organizes and occupies the space of the screen.

The function of mapping is to give a form of visible reality to an invisible reality through a process of deconstructing and reassembling selected components in space. It is also a form of thought and practice. Maps represent parallel worlds. Cosgrove suggests that mappings, '[a]lthough drawn from measured observations in the world … are neither depictions nor representations but mental constructs... [and in] describing and visualizing otherwise hidden facts, maps set the stage for future work.' [37] If these realities are constructs of the mind then what is meant by reality? If one takes into account recent findings in neurobiology, Oliver Grau suggests that reality is simply a statement about what we, as individuals, observe. He suggests that:

> [a]ny observation is dependent on our individual physical and mental constraints and our theoretical scientific premises. It is only within this framework that we are able to make observations of that which our cognitive system, dependent on these constraints, allows us to observe. [38]

Arguably all art is an attempt to create a 'virtual reality' by visual means, working with sense experience and perception to present to the observer ideas about reality. Or to immerse the observer in a space of illusion. This virtual space can be entered into through the mind's perception of matter and memory, and the responses of the body in actual space. The virtual reality of electronic space, of cyberspace, is seen by some as an 'other' reality, and by others as merely a 'tool' for engaging with different states of reality. Electronic images are able to represent worlds that the human eye will never see. It is a reality taken on trust. Much of what we receive from this electronic space is information, but how do we read it as reality? The science writer Paul Levinson suggests that:

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[37] Cosgrove, *Mappings,* p. 250.

[38] Oliver Grau, *Virtual Art – From Illusion to Immersion*, (Cambridge-Massachusetts, London: The MIT Press, 2003), p. 17

> [i]n a very real sense, information is not real: it is a representation of something else that is real. It has profound effects on real things. It is perceived and/or thought by real things – living things, human beings – either about themselves, or about other real things, or about other information which is a representation of something else that is real. Information certainly exists, and in that sense is part of the universe, and so in that sense is real. But the reality of information is very different from what it describes. [39]

Information is evidence that a process of intervention and observation has taken place. In order to make new work, in many instances, I have found myself taking the role of editor and director of operations, recycling visual references, recontextualizing information in found or existing cultural material, and organizing technical assistance. This process I liken to Cosgrove's description of the process of mapping, where he suggests that the map itself is:

> both analogue and abstraction,… the surface of the map functions like an operating table, a staging ground or a theatre of operations upon which the mapper collects, marks, masks, relates and generally explores. The surfaces are massive collection, sorting and transfer sites, great fields upon which real material conditions are isolated, indexed and placed within an assortment of relational structures.[40]

During this process, new technologies of image making and transference resulting from computerization have gradually crept into my practice, as has access to a breadth of information and communication made available through the internet. These have influenced the focus of my research both directly and indirectly. The French curator and theorist Nicolas Bourriaud likens the activity of the artist today to that of a computer programmer. He suggests that '[t]his recycling of sounds, images and forms implies incessant navigation within the meanderings of cultural history, navigation which itself becomes the subject of artistic practice.' [41]

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[39] Levinson, *Real Space*, p. 39.

[40] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention,' in *Mappings* ed. Denis Cosgrove, (London: Reaktion Books,1999), p. 215.

[41] Nicolas De Olivera, Nicola Oxley, Michael Petrey, *Installation Art in the New Millennium: the Empire of the Senses,* (United Kingdom: Thames and Hudson, 2004), p. 22.

The twentieth century philosopher Gilles Deleuze suggested that the virtual is a precondition of the real. He avoided the tendency to distinguish between the real and the virtual, proposing the virtual as potential reality.
Colebrook recounts his argument:

> [i]mages are not pale replicas or second rate versions of a real world. Images are fully real, from the images produced by a camera to the images produced by the eye that expects what lies beyond its immediate viewpoint.[42] [He suggests that], … an actual being is also a virtual dimension; a plant is not just its matter but is also a need or expectation of light and water. So, instead of dividing the world between an actual reality and its unreal virtual copy Deleuze argues for a world of simulacra. There is not an original life that is then varied or copied in different versions; each event in life is already other than itself, not original, a simulation. [43]

If reality is a collection of life's events, and our consciousness of them in a mutable time and space, then the virtual is also part of our physical, material conditions. Roth observes that, '[r]eal space is … neither "real" three-dimensional Euclidean space nor relativistic, but rather a conception of our reality.' [44] What is emerging today is a heterogeneous space in which the growing psychological lack of any fixed orientation is refocusing attention on sensation and subjectivity.

Space and time – *in situ.*

Henri Lefebvre proposed that space is not 'an abstract mathematical - geometrical continuum, independent of human subjectivity and agency.' [45] Our experience of the world and our representations of it are active constructions and mutually interdependent. He described three manifestations of social space in which the physical and psychological are mutually dependent. The 'perceived' is seen as spatial 'practice,' which is a material, communal space of social interactions and relations, such as the marketplace. The 'conceived' is seen as 'representations' of space, conceptual abstractions like Cartesian geometry, which determines the

[42] Claire Colebrook, *Gilles Deleuze* , (London, New York: Routledge:, 2002), p. 91.
[43] Ibid., p. 99.
[44] Roth, 'Can One Meaningfully Speak …' in *Olafur Eliasson - Surroundings Surrounded*, p. 516
[45] Victor Burgin, *In/Different Spaces. Place and memory in Visual Culture,* (Berkeley, Los Angeles, London: The University of California Press. 1996), p. 26-27.

structure of spatial practice. The 'lived ' is seen as 'representational' space belonging to the imagination and the symbolic, created out of physical space. Merleau-Ponty suggests that we have moved from a classical to a modern sense of space through the reawakening of the world of perception:

> [w]e are once more learning to see the world around us, the same world which we had turned away from in the conviction that our senses had nothing more to tell us, sure as we were that only strictly objective knowledge was worth holding on to. We are rediscovering an interest in the space in which we are situated. [46]

The process of perception could be seen as a filter through which to mediate our experience of the world. Deleuze however argued against mediation, where life or 'being' is ordered by ideas and a reality that is 'given' and exterior to us. He challenged the Platonic idea of an unchanging, pre-ordained reality, the foundation of knowledge grounded in experience, (phenomenology), or language, (structuralism), and ideas about 'being' and 'presence.' He proposed instead that the world is a fiction of the imagination, where 'difference' and 'becoming' more accurately and creatively express reality and the dynamism and instability of thought. It has more to do with invention than representation. Colebrook summarises here Deleuze's desire not to negate difference but to see it as a way of generating continual creativity and possibility in a state of becoming:

> [w]e cannot add up all we know from philosophy and science, and all we have felt through art, to come up with some coherent picture of the world. On the contrary, if we express the true power of each tendency in thinking we will realize the very differences of the worlds we live. [47]

Suppose the world is founded on timeless laws and ideals. How then do we account for the flux of time? Our experience of reality and the way in which we perceive the external world through the paradox of process and being, (where thinking is the process and being is the state), is discussed by the contemporary philosopher and physicist Paul Davies. He observes that:

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[46] Maurice Merleau-Ponty, *The World of Perception*, trans. Oliver Davis, (London, New York Republique Francaise: Routledge:, 2004), p. 69.
[47] Colebrook, *Gilles Deleuze*, p. 27.

> [w]hen I think my mental state changes with time. But the 'me' to which the mental state refers remains the same … Though our own selves constitute our primary experience, we also perceive an external world, and we project on to that world the same paradoxical conjunction of process and being, of the temporal and the atemporal. On the one hand the world continues to exist; on the other hand it changes … Things happen. The present fades into the past and the future comes into 'being'. [48]

He describes this as the 'phenomenon of *be*-coming', which he maintains defines our existence. In the late nineteenth century the arts were influenced by an awareness of science and changing ideas about the flow of time. Through the process of perception, imagination and memory, this awareness resulted in experimentation with the improvisatory, the impressionistic and the fragmentary. The French philosopher Henri Bergson suggested that 'becoming' is closer to reality than 'being,' because our existence is never static and therefore our lives are defined more by time than space. Our contemporary understanding of time is multi-dimensional. It is understood that clocks only measure the intervals of time. The motion of time is related to the perception of the observer.

As Paul Davies explains:

> just as rulers measure intervals or distances in space, and not speed or motion through space. Certainly we can measure intervals of time. What we can't measure is the passage of time. Not only can we not measure it, but many philosophers and scientists argue that time simply doesn't pass, that our psychological impression of the passage of time is simply an illusion. [49]

Time is thought of more as a quality rather than a measurable substance. In terms of artistic experience, William Fleming describes Bergson's view of time as anticipatory and perhaps intuitive, where he relates:

> [t]he aesthetic experience is essentially an experience in time and involves an "anticipation of movement" that permits the spectator or auditor in various ways "to grasp the future in the present " His theory of art is based on what he calls "spiritualistic materialism," by which finely perceived

[48] Paul Davies, *The Mind of God – Science and the Search for Ultimate Meaning* (England: Penguin Books, 1993), p. 34

[49] Paul Davies, In Conversation with Paul Davies and Phillip Adams, *The Big Questions - The Riddle of Time*, ABC Online: www.abc.net.au/science/bigquestions/s460740.htm [accessed19/18/03].

> material activity awakens spiritual echoes. All is based on the "uniqueness of the moment"'; and perception of the flow of time is the same as an awareness of the pulsation of life, something that is quite apart from mechanical or lifeless matter. [50]

While researching ideas about the role of the observer, electronic technologies and the speed of light, my attention has been focused on the relationship between space and time and the way that these phenomena can be experienced visually. The sky is like a time machine.

It is possible to view the mapping of remote cosmic space as a form of becoming. As we look deeper into the universe we look further back into time. Because the light from distant stellar objects in this space takes a long time to reach us, its mappings take place 'in' time and space, where glimpses into a remote past are continually being revealed, as they were but not as they are now. Starlight for example may be hundreds to thousands of years old when it reaches our eyes as illustrated in, *Looking Deeper in the Universe, Looking Further Back in Time.* (See fig. 6). It is territory not able to be inhabited and as Rees observes, '[it] covers a vast range of scales, and an immense variety of structures, stretching far larger, and far smaller, than the dimensions of everyday sensations.' [51] It is modeled and imagined through continually unfolding and fragmented theories and images analogous to the complex pieces of a puzzle that may never be completed.

Sense and perception.

Deleuze sought to privilege the corporeal world by destabilizing the idea of 'ideals,' suggesting as Colebrook relates:

> [w]e do not perceive a picture or idea of the sun, we experience sunlight itself. Indeed far from our ideas *ordering* our world; the world itself produces ideas – or images – of which we are effects…. Ideas are the effects of experience.' [52]

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[50] William Fleming, *Art and Ideas*, 8th ed., (Philadelphia, Toronto, London, Sydney Tokyo: Syracuse University - Holt, Rinehart and Winston Inc, 1990), p. 518.
[51] Martin Rees, *Just Six Numbers – The Deep Forces That Shape the Universe*, (London: Phoenix, Orion Books, 2000), p. 7.
[52] Colebrook, *Gilles Deleuze*, p. 80.

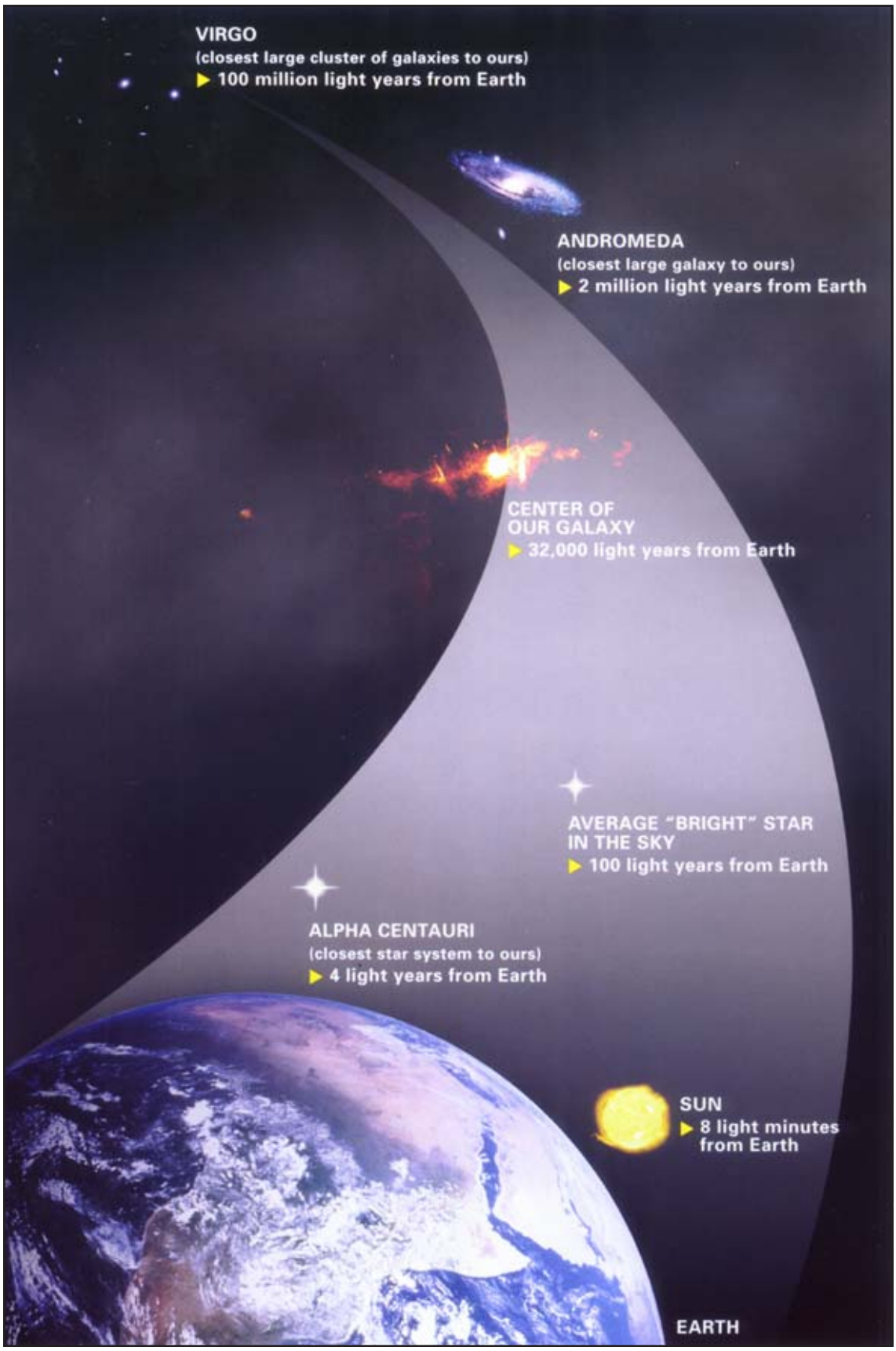

Fig. 6 Keith Soares / Bean Creative, *Looking Deeper in the Universe, Looking Further Back in Time*, National Air and Space Museum, Smithsonian Institution. 2002.

The subject here is formed by sense experience, a world prior to cognitive operations. This experience then leads to perception, and subsequently to the isolation and definition of our surroundings that then affect our responses to them. It is a characteristic of modern science that the sensory parameters of our experience are abstracted through devices and technologies. Some are able to extend our vision in the field of the non-visible sections of the electromagnetic spectrum. They expose forms and forces at unimaginable scales of the macro and micro. Nieman however, like Deleuze, notes that it is the immediacy of sense experience and how it impacts on our lives, that comes before theoretical interests. He suggests that:

> [a]lthough astrophysics tells us a great deal about the sun, it is our direct daily experience of it that is most significant to us. We make the sun meaningful for ourselves first and incorporate astronomer's perspectives second. The same is true for the moon. When at the nadir of the Cold War and the zenith of technological optimism, Neil Armstrong stood on the moon, it wasn't left to scientists to tell us how we should find this interesting…..[that is not to say that our] experience of the sun … is much richer for a little knowledge of solar physics…[however, if] at the back of your mind, there is the sense that space is the province of 'experts' then considering your place in the 'greater scheme of things' can feel like an act of trespass. This gets in the way of idly gazing up at the stars, let alone buying a telescope and getting further engaged. [53]

Through computerization and the transmission of all kinds of chaotic information, it would appear that this age has become absorbed by process. It could be said that a computer aesthetic dominates our visual lives in various graphic ways, including the space of the screen itself. This has engendered for artists an interest in process and machine visibility. Brandon Taylor commenting on the change in thinking required to negotiate computerization suggests that:

> [t]he screen is matter too, obviously, but the characteristics of the screen experience are so different from painting, sculpture, installation, or video film … and its operations so unfamiliar, as to bend the language needed to describe it and certainly the criteria needed to appraise it. [54]

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[53] Adam Nieman, Welcome to the Neighbourhood: Belonging to the Universe (Even if Most of it is Hard to Get to). *Projets Singuliers – Space and the Arts – Workshop 2004:* www.olats.org/space/13avril/2004/te_aNieman.html p.5, [accessed 13/04/2006].

[54] Brandon Taylor, *Art Today*, (London: Laurence King, 2005), p. 242.

Grosz queries what it is that drives the impulse to art in human beings … what conceptual necessities does one have to have in order to think and produce art? She proposes that art is about sensation and feeling, something we experience with an animal intensity which through the exploration of the medium itself, and if intense enough, may then generate thought and a kind of understanding. She suggests that:

> [t]here's something about art that's an abundance of excess. Art is the revelry of the excess of nature, but also revelry in the excess of the energy of our bodies … an intensification of the body…The point is, nature is full of these teeming impulses that we don't really control, and at best what we do is carve out a location, a territory, and in the process of carving out a territory, which is the primordial impulse of architecture, we also carve out something like a body for ourselves. So this dual operation of territory and body is produced simultaneously. .. I think everything living has this artistic impulse to excess and to the revelry and pleasure of that excess. It's only some of us who have the rigour and the discipline to impose form on that sensation to give it life. [55]

For me art is a revelation of the sensorial. It is a tool for expanding conscious awareness of the sensation of seeing and feeling, perceiving and understanding. We make a space for ourselves framed through the senses. I am interested in the idea that sense experience is a catalyst for consciousness, stimulating awareness, recollection and invention. Through the senses we are immersed in a world of memories, meditations and interpretations that draw on the self to look beyond the self. By becoming conscious of consciousness we question and construct reality.

Disorientation and the senses.

Through heightened sense experience remote space can present as disquieting and mysterious and interactions between art and science often confound the senses. Sidney Nolan, in the 1960's, made a series of paintings about Antarctica after visiting various scientific posts there. This visit was not in fact to engage with science although his motivations, his experiences and his observations (including those of strange weather phenomena that played

[55] Elizabeth Grosz, 'Chaos, Territory and Art' in conversation with Julie Copeland, *'The Creative Urge*': www.abc.net.au/rn/arts/sunmorn/stories/s1381964.htm, p.1,3,4, [accessed 10/06/05]

with visual perception), and his research, (recording his impressions with photographs and sketches), have analogies with scientific observation. He was there to discover the landscape. He was motivated, in his own words, 'to convey the vastness of nature's flux', [56] and in a radio interview in 1964 he describes a sense of disquietude:

> One felt this instantaneous fear at the sight of it, that it would annihilate one, but this was overcome straight away by a sense of wonder in it. You knew it was so remote, so big and in a way so beautiful that this swept away any fear you had, and there was this feeling in the back of my mind that if one had to die there, in a way it wouldn't be so bad. It represented a reality stronger than oneself…[57]

I believe that Christopher Chapman's observations about the disquieting representations by artists of the Australian landscape in the mid- twentieth century, and its elusive surreality, can also be said of the night sky. He suggests that:

> a sense of reality exists beyond the 'natural' .. 'realism' begins to slide into something else … If we accept that the type of landscape that may be described as surreal may range from vastness to claustrophobic spaces, is it possible to locate an element that is common to both types of spaces? What makes a landscape image convey a feeling of surreality is essentially a sense of 'disquietude'… Disquietude is like the notion of the sublime: ungraspable in its essence … something beyond the known, beyond that which is apparent. [58]

It seems now that contemporary life has situated us in a disquieting and disorienting time and space. Increasingly we find ourselves negotiating the electronic space of the internet which simultaneously draws us together and drives us apart. There is a sense in which the body is continually being dematerialized and rematerialized. So much is mediated and secondary now. Ideas of what is real and what is representation seem to be blurring as are ideas around the possibility of 'meaning.' In thinking a way through this Michel Foucault observed that:

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[56] Sidney Nolan in *A Power Drawn From Darkness*, Alison Lester, The Critics, (Melbourne: The Age, 9/12/06), p. 19.

[57] Sidney Nolan , transcript of 2FC radio broadcast, 22March 1964, in ex.cat. *Sidney Nolan*: *Antarctic Journey*, Rodney James, (Victoria: Mornington Peninsula Regional Gallery, 2006), p. 8.

[58] Christopher Chapman, 'Surrealism in Australia,' in exh.cat. *Surrealism – Revolution By Night,* (Canberra: National Gallery of *Australia,1993),* p*. 232.*

> [t]he death of interpretation is to believe that there are signs, signs that exist primally, originally, really, as coherent, pertinent and systematic marks …. The life of interpretation, on the contrary, is to believe that there are only interpretations. [59]

Or as Colebrook says of Nietzche's observations about 'truth' '… there is no "true" world behind appearances, only further appearances.' [60]

Communications, projections and visualizations.

In searching for more creative responses to contemporary life, Gilles Deleuze and Felix Guattari constructed the map as a metaphor for a certain way of thinking and acting. Maps they suggested are 'an experimentation in contact with the real.' [61] Arguably, the idea of the network has become a form of mapping, a kind of discursive surface with the potential for multiple and complex projections and visualizations. The network, like the Cartesian grid, has played a part in the communication and dissemination of different spatial possibilities. In the still from the animation, *Warriors of the Net*, 1999, (see fig. 7), designed by Thomas Stephenson he shows in a fun, non-technical way how the internet works by following an imaginary journey of data packets. Currently electronic technologies map the power of communications through networks, which allow information to be widely and instantly disseminated across space-time. Jean Baudrillard described the network as 'an immanent surface where operations unfold – the smooth operational surface of communication.' [62]

Deleuze and Guattari questioned the idea of order in the structure of the network as a metaphor for the possibility for unity or wholeness in the human condition. Instead they looked for breaks, ruptures and disruptions, sometimes described as folds. Like the idea of assemblages, where

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[59] *Michel Foucault, This Is Not A Pipe* - with illustrations and letters by Rene Magritte, trans. ed. James Harkness, (Berkeley, Los Angeles, London: University of California Press,1982), p. 12.

[60] Colebrook, *Gilles Deleuze*, p. 18.

[61] Gilles Deleuxe and Felix Guattari, *A Thousand Plateaus ; Capitalism and Schizophrenia,* (London: Athlone Press, 1988), p. 12.

[62] Jean Baudrillard , 'The Ecstasy of Communication,' in *Post Modern Culture*, ed. Hal Foster, (San Francisco: Bay Press,1983), p. 66.

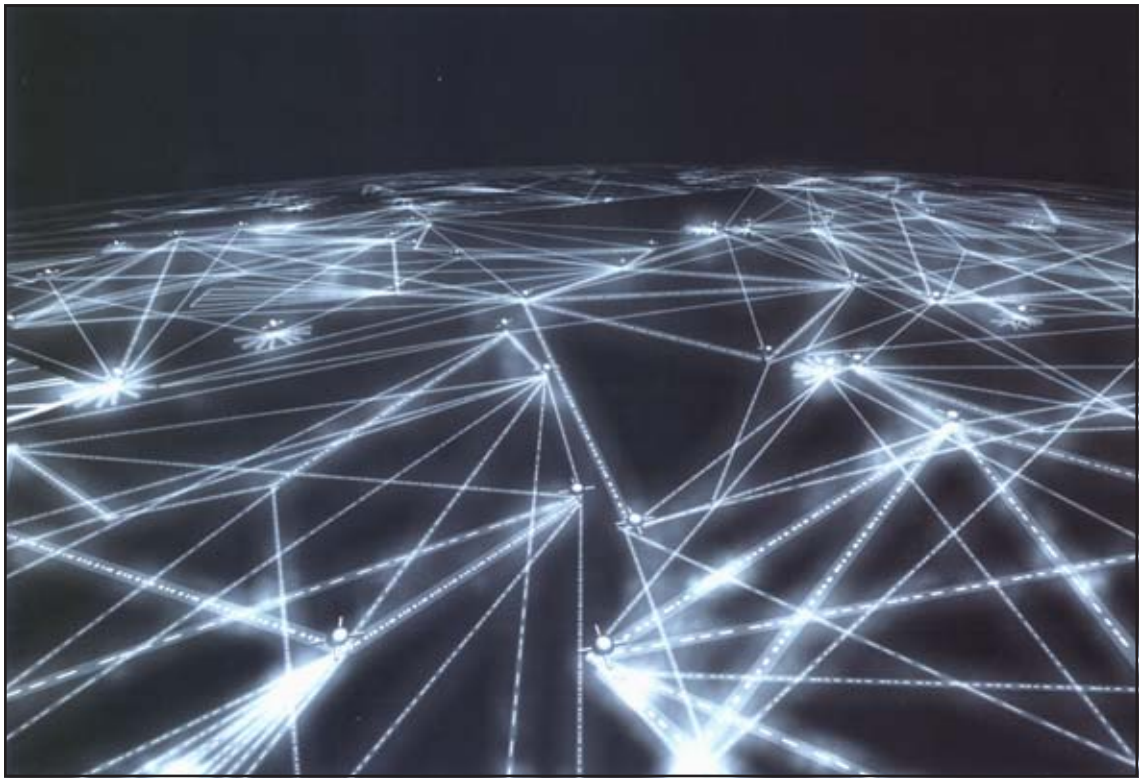

Fig. 7 Thomas Stephanson, *Warriors of the Net*, 1999, still from animation, Erikson Medialab, Sweden.

disparate, found or unrelated parts are brought together, they seem closer to the way things actually operate in the world. They open up other possibilities and experiences. Deleuze's concept of the 'fold', inspired by a Baroque sensibility, was as John Lechte explains, 'the relationship of difference with itself.' [63]

Henri Focillon describes the Baroque state as one not limited to a particular time or place, suggesting that what it reveals are:

> identical traits existing as constants within the most diverse environments and periods of time. Baroque was not reserved exclusively for the Europe of the last three centuries any more than classicism was the unique privilege of Mediterranean culture. [64]

This state allows for fragmentation and discontinuity, where systems change through interaction, flow and connection. Corner suggests that mapping has the potential to behave in this way. He notes that, 'the unfolding agency of mapping is most effective when its capacity for description also sets the conditions for new eidetic and physical worlds to emerge.' [65]

To generate more open and flexible ways of thinking Deleuze and Guattari suggested that the map should model itself on the form of a rhizome. In rejecting the hegemony of traditional binary logic they described the rhizome as a form 'not answerable to any structural or generative model.' [66] The works of the artist Gordon Bennett, (of Aboriginal origin), in the exhibition *Virtual Reality,* in 1995, including *Panorama with floating point of identification, 1993,* (see fig. 8), are constructed with abstract fields of dots, circles and strokes. Appearing as an 'other' vision, reminiscent of Deleuze's idea of the rhizome, they critique the principles of perspective on which Western art was so reliant to interpret the landscape. They re-map a notion of space not fixed by 'perspectivalism.' Gail Newton observes that:

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[63] John Lechte, *Fifty Key Contemporary Thinkers – From Structuralism to Post-Structuralism,* (London, New York: Routledge, 1994), p. 104.
[64] Henri Focillon, *The Life of Forms in Art,* (New York: Zone Books,1992), p. 58.
[65] James Corner, 'The Agency of Mapping,' in Cosgrove, *Mappings*, p. 214.
[66] Gilles Deleuze and Felix Guattari, *On The Line,* trans. John Johnstone, (New York: Semiotext{e}, Columbia University,1983), p. 24.

Fig. 8 Gordon Bennett, *Panorama with floating point of identification,* 1993, synthetic polymer paint on canvas, 137.0 by 167.0 cm, National Gallery of Australia.

> Bennett collapses the window box and the unities of time and space … [and is] let loose on the free range of the mental ethernet. [She notes that] Ian McLean (in 'Psycho(d)rama Mirror Line, Reading Gordon Bennett's Installation Mirrorama'), has seen this process as generic to Post Modernism, using as his model that of the rhizome, a circuit which by ever - dividing and proliferating 'explodes the prison house of difference and representation.' Everything from the macro to the microcosm can be articulated in the digitalized codes of its single gesture: the ever-dividing cell. [67]

The creative act of mapping.

Mapping space in the Western mind has suffered from an excess of factual representation, classification and structure. Cosgrove suggests that mapping, like space, is in the process of being reconceptualized and reimagined in contemporary life. He says:

> [m]apping in a flexible era has become a creative and critical intervention within broader discourses of space and the ways that it may be inhabited. Mapping is freed from the problems of factual legitimacy and authority with which a centric and rationalist model of absolute space has until recently burdened it. [68]

Spatiality implies both structure and relative location, connectivity, and the inter-relationships between things, as well as the effects and affects they produce. Mapping requires a cognitive schema in order to navigate, to find one's way, to open up new territory. In this way the perception of space is an experience that is culturally determined. I am interested not only in the meanings mapping might have, but also what mapping does. Corner suggests that:

> [a]s a creative practice, mapping precipitates its most productive effects through a finding that is also a founding; its agency lies neither in reproduction nor imposition but rather in uncovering realities previously unseen or unimagined, even across seemingly exhausted grounds. Thus mapping *unfolds* potential; it remakes territory over and over again, each time with new and diverse consequences. [69]

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[67] Gail Newton, 'Gordon Bennett' in *Virtual Reality*, exh. cat. ed. Mary Eagle. (Canberra: National Gallery of Australia, 1995), p.15.
[68] Cosgrove, *Mappings,* p.19.
[69] James Corner, 'The Agency of Mapping,' in Cosgrove, *Mappings*, p. 213.

Given a more expansive turn of mind, and in association with computerisation, new generative possibilities are being found for the idea of mapping. These have the potential to focus attention on the interplay of theoretical and perceptual oppositions, the relationship between the material and the immaterial, surfaces and structures, spatial consciousness, and the nature and embodiment of sense experience. For my research this involves looking at observational practices in both art and astronomy, and finding relationships between space, light and time. It also involves the poeticizing of science, or to express it another way, the subjectifying of the ostensibly 'objective' which requires an engagement with the 'real.' Cosgrove observes that art, science and cartography are re-engaging through changing technologies. He suggests that:

> [d]uring the twentieth century, when the divorce of art and science seemed most complete, we discover a continuous but complex conversation between art, science and cartography taking place. It is best understood in terms of actual artistic practices and the changing technologies of space and movement generated by science and technology, rather than through universal definitions of 'art' and 'science.' [70]

In the developed Western world we now operate in a heterogeneous zone. Our lives are split by a dislocation in subjective reality between the ephemeral space of the electronic world of computerization, and the physical territory in which our bodies are situated. The philosopher Maurice Merleau-Ponty maintains that:

> [i]n psychology as in geometry, the notion of a single unified space entirely open to a disembodied intellect has been replaced by the idea of a space which consists of different regions and has privileged directions; these are closely related to our distinctive bodily features and our situation as beings thrown into the world…. Man is a mind *with* a body, a being who can only get to the truth of things because its body is as it were, embedded in those things. [71]

Although the ineluctable fact remains that our bodies are our referents, Corner notes that '[t]here are some phenomena that can *only* achieve

[70] Denis Cosgrove, 'Maps. Mapping Modernity: Art and Cartography in the Twentieth Century' in *Imago Mundi,* Vol. 57, Part 1, (London, New York: Routledge, 2005), p. 51.
[71] Merleau-Ponty, *The World of Perception*, p. 56.

visibility through representation rather than through direct experience.' [72] Certain phenomena remain hidden until they are mapped. He observes that '[l]ike a nomadic grazer, the exploratory mapper detours around the obvious so as to engage what remains hidden.' [73]

Installation practice has opened up an arena for a composite of contemporary experience and experimentation. It has triggered interactions with space, and opened it up to thinking about the process of art, its reception, consumption and production. Experimentations with diverse or hybrid media have enabled artists to model different ways that we might understand, re-configure or transform experience. The practice of installation has generated the formation of reciprocal relationships with our surroundings. In this way the boundaries between our physical bodies and our psychological responses are continually being negotiated. Meaning is now being determined in a field of relations, and space and time are increasingly filtered through the imaginative dimensions of electronic media. Maurice Merleau-Ponty suggests that our interactions with space are no longer experienced in an objective divide between subject and object suggesting that:

> [t]he way we relate to the things of the world is no longer as a pure intellect trying to master an object or space that stands before it. Rather this relationship is an ambiguous one, between beings that are both embodied and limited and an enigmatic world of which we catch a glimpse, (indeed which we haunt incessantly), but only ever from points of view that hide as much as they reveal, a world in which every object displays the human face it acquires in a human gaze.[74]

Imaging is not the same as seeing.

Remote space is mapped through systems and data, virtual models and imaging technologies associated with time, light and sound. However imaging is not the same as seeing. The invisibility of phenomena is revealed through the filter of a machine-produced visibility, through the eye of analysis, where mechanical imaging processes reveal the elusive materiality of light.

[72] James Corner, 'The Agency of Mapping,' in Cosgrove, *Mappings*, p. 229.
[73] Ibid., p. 225.
[74] Merleau-Ponty, *The World Of Perception*, p. 69.

Through computer simulations, physical space seems to be dematerializing, mapping a new form of reality generated by electronic data. We are having to learn to re-negotiate the physical and phenomena in an increasingly abstract and desensitized milieu. It is in this context of absence, in the process of discovering the little or not known, that abstract models become effective as projections across space and time. Having in mind that both science and art are modes of discovery, the artist and writer Vik Muniz says of the model:

> [i]t marks the turning point between mind and matter. While artists create models that expand our picture of the world beyond its physical reality, scientists make models that expand our understanding of the physical world beyond the limits of perception. In both cases a mental image is tested against material – but while the artist adapts matter to his imagination, the scientist adapts his imagination to what he discovers about matter. [75]

In this chapter I have outlined the philosophical underpinnings of my research work. These have emerged from speculations about the process of mapping the remote space of the night sky. Questions have been posed that focus on the way in which over time, creative acts of mapping can reconstruct experience and reconfigure space. This in turn has influenced the roles played by art, science and technology, in changing perceptions of reality and sense experience, and it has provided a context for the development of my visual work.

[75] Muniz, *Reflex A Vik Muniz Primer*, p. 177.