WORLD BEYOND THE HORIZON

Reconstructing the complexity of the ‘normal’ experience.

by
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BCA (Hons) First Class

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the Degree of Doctorate of Philosophy.

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STATEMENT OF ORIGINALITY:

I certify that the exegesis entitled *The World Beyond the Horizon* submitted for the Degree of Doctor of Philosophy, University of Tasmania contains no material which has been accepted for a degree or diploma by the University or any other institution, except by the way of research and background information and duly acknowledged in the exegesis. To the best of my knowledge and belief no material previously published or written by another person except where due acknowledgement is made in the text of the exegesis.

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ABSTRACT:

> To be an artist is not a matter of making paintings or objects at all. What we are really dealing with is the state of our consciousness and the shape of our perception (Irwin in Noë 2000, p. 123).

World Beyond the Horizon explores the way people witness and experience variations of light falling on a landscape. To support the investigation I used the case study of the 1979 Mt Erebus aviation disaster in Antarctica, to explore degraded visual functioning, a condition resulting from variable perceptual experiences formed through the senses.

The landscape of Northern Tasmania was surveyed from the cockpit of an aircraft – the 'flight view', where sound recordings and video data were collected to study the extent to which light conditions may affect the process of perception.

The work of John Constable and Joseph Turner who, through their own art practices, pioneered new ways to depict light in the 1800's, have been central to my investigation. In his paintings, Constable predicts changing weather patterns, through time, by referring to the science of meteorology. By contrast, Turner's paintings are freely abstract, atmospheric and immediate with recognisable forms disappearing almost entirely, leaving only light, space and natural elements. Constable offers a pictorial forecast of the weather as a pilot would witness it from the ground, where as Turner places himself in the weather as a pilot would do while flying. The work of Constable and Turner expresses ideas of observation and participation that are integral and complementary to my study of the 'flight view'.

To experiment with the paradox of reality and illusion and to create the synthetic experience of ‘scientific landscapes’, I designed and built an optical laboratory. The outcomes of this have been presented as a video-sound installation.

Simon Bourke

11 June 2010

Reference: Robert Irwin in Nœ, Alva, 2000, ‘Experience and Experiment in Art’, Journal of Consciousness Studies, 7, No. 8-9, 2000, pp. 123-35, viewed 21 March 2007, http://socrates.berkeley.edu/~noe/art.pdf

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INTRODUCTION

How it started

My investigation commenced innocently enough: In 1995 I heard about the European 'Secret Garden Project' and their first international album, *Songs from a Secret Garden*. It included a track called *Nocturne*, the winning entry of the Eurovision Song Contest for that year. Soon after, I purchased the music-CD. The lyrics of the fourth track, *Sigma*, written by David Agnew, were a trigger for my memory, bringing back a flood of things relating to my childhood as an 11-year old boy.

Sigma

The wind is your voice
The rain is your tears
Your burning heart
And spirit is my salvation

I search for a sign
That will set my soul free
My heart must be pure
So that I can find peace

My grief cannot last forever
My love will be fulfilled
I pray a sign will help me
Be all that I can be

The wind is your voice
The rain is your tears
Your burning heart
And spirit is my salvation

David Agnew, 1995

The fact that the song was sung by 11-year old boy soprano, Rohnan Sugrue, took me back to a time full of melancholy. For me it also proved a salvation, an uplifting of spirit that came through nature, assisted by flight. It was a moment of reflection that led to the start of this creative project,

marrying aspects of a love of flight, my perception of the landscape and the space within it, together with freedom and developments in my own artistic expression. The song also confirmed what I believe; that somewhere within us all is the idea of 'a secret garden'. I know it as a garden where we can seek refuge in times of sadness and loneliness, or a place to retire in time of happiness or contemplation. In some novellas, the secret garden expounds the concepts of new thought as well as ideas about the healing powers of the mind. As a young boy I found my own secret garden, and even today, it is a place I frequently visit. It was the place where I was to be inspired by nature and its 'gift of flight' to human kind. For me, it is a very special place.

When I commenced the project in September 2004, the memories provoked by the song were prominent in my mind. I found myself returning to my secret garden. The project reflects on my life's experiences, starting at the age of 11 with an ambition of learning to fly. It was not an ambition to idolise or glorify the heroics of flight, but a desire to escape an emotional battle stemming from childhood abuse (from outside my family) at that time. I wanted to rebuild my inner self-worth and to better understand the nature of the world, in particular, the world from the air. It was achieved through knowledge of aviation and the skill of flying an aircraft.

This experience is now represented through the creative mediums of painting, photography, and later in life, the emerging digital technologies. There was also a need to survive, and to escape a sad childhood, a situation that society and religion did not cater for, particularly in the inward-looking society of the early 1960's in Northern Tasmania. At that time I felt I had no-one to turn to for help. I found some solace in nature and befriended a pair of wedge-tailed eagles that lived in bushland adjoining my parents' farm. The male eagle would circle above, then descend and land on a fence post to

feed from my hand. I began to realise that flight could be a means of escape from what I then perceived as the surly bonds of earth and society. I have never forgotten this experience with the eagles and still visualise it today. It has become a primary memory in my life, one I refer to as a 'mental set' later in Chapter 1: The Project.
Aviators, throughout the ages, have spoken about escaping from the confines of everyday life to enjoy the freedom of flight.

'One of the words that appears most frequently in the writings of aviators and their passengers in this period (1920's-1930's) when describing the charms of flight is that of escape' (Whol 2005, p. 281).

At the age of 22, I achieved my ambition of flight, my personal escape from the childhood thoughts, which had continued to bother me. At that time I wrote the following words:

> *As a child, I would look up from my father's fields with a fascination of things that flew. I watched the 'sky artist' paint with clouds and would wonder beyond the blue. I learnt to fly, and then, understood nature's gift of flight to mankind.*
>
> Simon Bourke, 1972

As an older man, I see this landscape from the 'eagle's view' as I fly over *Barega*, my childhood home, filming and collecting data for my project (2006-2007).

Richard Bach is a writer, pilot and author of books on the mystique of flight. His book, *Jonathan Livingston Seagull* is a fable in novella form about a bird, no ordinary bird, but one, which assumed an almost human persona to experiment with life, in particular, flight.

Figure 1
Simon Bourke (1949-)
Principles of Flight – Jonathan Livingston Seagull, 2000
Oil on canvas
84.5x34.5cm.

The other seagulls of the flock only knew the simple facts of the principles of flight. Richard Bach reflects on Jonathan Livingston Seagull's dilemma in his book:

> How much more there is now to living! Instead of our drab slogging forth and back to the fishing boats, there's a reason to life! We can lift ourselves out of ignorance, we can find ourselves as creatures of excellence and intelligence and skill. We can be free! *We can learn to fly!* (Bach 2003, p. 17).

I can relate to Richard Bach as a fellow aviator, his love for flight and his homily about self-perfection. Also, Jonathan Livingston Seagull was like the eagle I once knew and befriended, the one who would take my mind to a 'higher plane of existence'. This idea is reminiscent of an enlightened world found through a perfection of knowledge, in turn leading to a better relationship and understanding of nature: in short, a spiritual experience.

The secret, Jonathan Livingston Seagull says, 'is to begin by knowing that you have already arrived...'

Case Study – The Mt Erebus Disaster, Antarctica

The research is informed by a case study (Appendix B), one based on the findings of the 1981 Royal Commission enquiring into the crash on Mount Erebus, Antarctica, of a DC10 aircraft (Flight TE 901) operated by Air New Zealand Limited.

On the 28th day of November 1979 Flight TE 901, carrying out a tourist flight from New Zealand to Antarctica and back, flew in broad daylight into the lower slopes of Mount Erebus in Antarctica. There were no survivors of the crash and 257 people lost their lives.

Figure 2
Air New Zealand Flight TE 901 Crash Site.
The wreckage made a 600-metre trail across the lower slopes of Mount Erebus.

The Royal Commissioner was The Honourable Peter T. Mahon, Judge of the High Court in Auckland, New Zealand. The findings placed the dominant cause of the disaster as a systemic failure within the aviation company, Air New Zealand. In his report, Mr Justice Mahon stated:

> In my opinion [therefore], the single dominant and effective cause of the disaster was the mistake made by those airline officials who

> programmed the aircraft to fly directly at Mt Erebus and omitted to tell the aircrew. That mistake is directly attributable, not so much to the persons who made it, but to the incompetent administrative airline procedures, which made this mistake possible (Mahon 1981, p. 157).

The report also took into account the existence of ten factors or circumstances that preceded the disaster.

The tenth factor or circumstance stated that:

> (10) The nature of the cloud base in Lewis Bay and the unrelieved whiteness of the snow-covered terrain beneath the overcast combined to produce the whiteout visual illusion (Mahon 1981, p. 158).

In the 1979 event, incorrect co-ordinates (not known to the crew) were programmed into a flight computer, which in turn led the airliner into an environment known as clear air whiteout.

Figure 3
Royal Commissioner Peter T. Mahon at the public hearings of the Royal Commission of Inquiry into the Erebus disaster.

Experiencing this phenomenon, the crew's mental and psychological sets – what could be considered the breadth of their experience – were pushed beyond their defined perception. For pilots:

> ...loss of perception is among the main effects of whiteout conditions. It should also be noted that the cause of this loss is the absence of contrast and texture in a landscape occasioned by the high, diffuse illumination and by high reflection from white surfaces (Vette 1984, p. 259).

The concept of clear air whiteout is discussed in more detail in Chapter 3:1 Art – Interpretation of Light in the Landscape.

For Air New Zealand, 'It was billed as the flight of a lifetime – a sightseeing tour over the pristine, icy wilderness of Antarctica on an Air New Zealand DC10' (Lilly 2004).

When the accident happened in 1979 I was living in Hobart, the southern-most capital city of Tasmania. My own aviation profession had just ended due to a medical condition carried over from a flying career in the Royal Australian Air Force. Hobart has always had strong historic and scientific links with Antarctica and I had known about tourist flights conducted by Air New Zealand and Qantas over the previous two years.

This disaster and the events leading up to it have had a significant impact on my current arts practice. In 2005 I created a series of works relating to the final 16 minutes and the crash of Flight TE 901. The image in [Figure 4] *Anatomy of an Air Disaster* depicts (in a creative way) the aftermath following the impact and the fire that broke out in the remaining wreckage. The artificial horizon flight instrument, frozen in time and undamaged, indicates that the aircraft was operating in normal straight and level flight at the time of the crash.

Figure 4
Simon Bourke (1949-)
Anatomy of an Air Disaster, 2005
Optically generated image, size variable.

A blue sky and the Antarctic landscape is seen though the window openings of the tangled fuselage. It was this landscape which only moments before, aided by a malevolent trick of the Polar light, trapped the crew into believing they were in a different place. The enquiry would establish that the airliner and the crew had different destinations. At the time of the accident it was suggested by investigators that the aircraft must have been flying in cloud at the moment of impact.

Almost every passenger on the Flight TE 901 had been carrying a camera. Film from these cameras was retrieved from the crash site. Even though some of the film was water and fire damaged it provided vital evidence to the Royal Commission revealing that the aircraft was in fact flying in clear air seconds prior to impact.

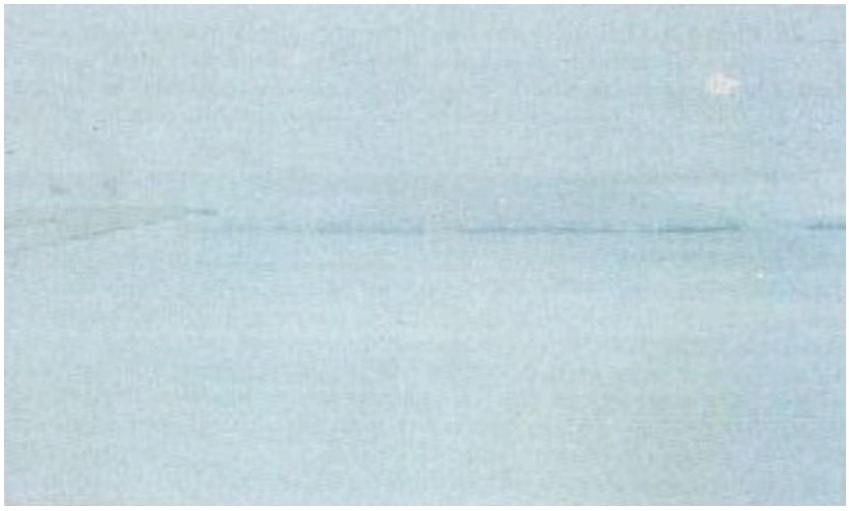

Figure 5
Photograph taken from right side of the aircraft showing textured cliffs 92 seconds prior to impact: Unknown Passenger Photograph Flight TE 901.

The image [Figure 5] was taken at 2000 feet from the right hand side of the aircraft, 92 seconds and 8.0 nautical miles prior to impact. Sunlight can be seen shining on Cape Bird peninsular. Some cloud shadows are also visible on the Lewis Bay sea ice. The cloud base consists of low-level stratus. It also shows that the pass between Mt Erebus and Mt Bird is free of cloud, indicating that the main cloud base is above 2500 feet, and possibly just below 2700 feet. It is obvious that a clear outline exists of the textured cliffs of Cape Bird with stratus cutting and forming an artificial horizon across the slopes of Bird. The Cape Bird cliffs were obviously mistaken by the crew for the Cape Bernacchi cliffs on the other side of McMurdo Sound. No doubt this line of demarcation between the base of the cloud and the snow slopes continued around in front of the aircraft toward the other textured cliffs of Cape Tennyson, on their left side shown in [Figure 6].

The image in [Figure 6] was taken from the left-hand side of the aircraft looking at almost a right angle to the line of flight at 51 seconds and 3.75 nautical miles prior to impact.

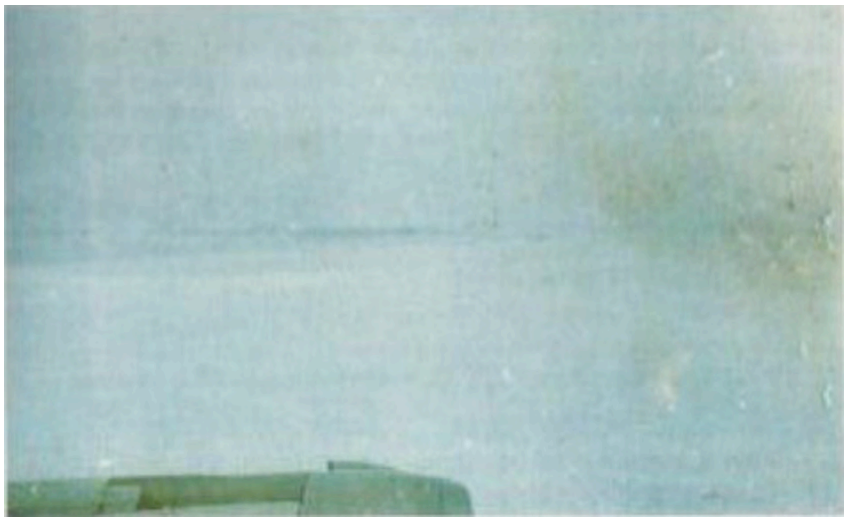

Figure 6
Photograph taken from left hand side of the aircraft (engine nacelle indicated bottom left) wing showing textured cliffs of Cape Tennyson, 51 seconds prior to impact: Unknown Passenger photograph Flight TE 901.

In general terms this photo shows the textured cliffs of Cape Tennyson, which the crew probably believed was Cape Royds. At this time the aircraft was cruising at 1500 feet and horizontal visibility did not appear to be reduced, indicating that the aircraft was still below the cloud base. Shadows on the sea ice show the cloud above was of variable density. There are fewer bright patches on the surface of the right of the photo indicating that there was a denser cloud in this area, towards the impact area.

This line of demarcation of the cloud meeting the slopes of Cape Bird shown in passenger photo [Figure 5] supported Captain Vette's hypothesis of the same effect on the slopes of Erebus ahead, giving the impression of a far distant horizon as illustrated by New Zealand artist Sam Mahon's visual models shown in [Figures 7 and 8] which were presented to the Royal Commission.

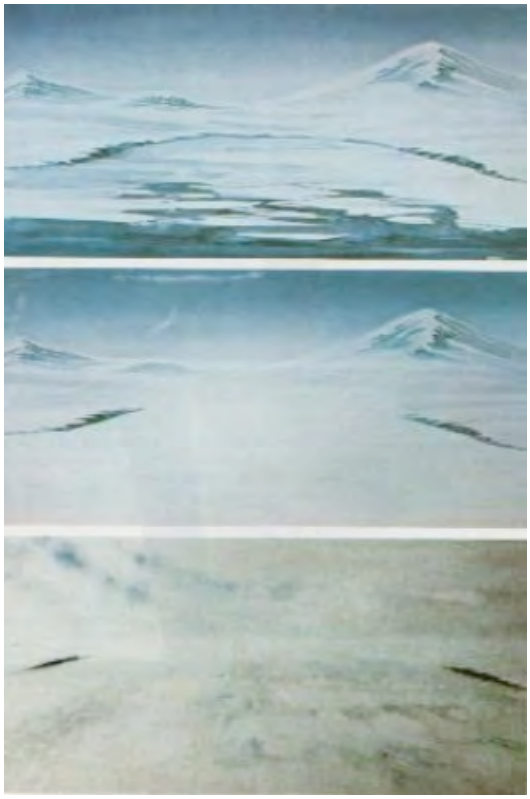

Figure 7
Sam Mahon (1954-)
Visual model presented to Royal Commission
Entrance to Lewis Bay.

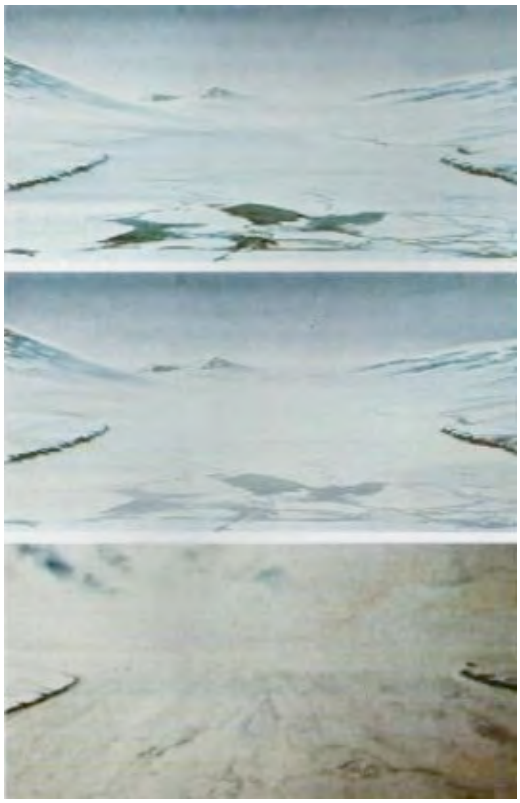

Figure 8
Sam Mahon (1954-)
Visual model presented to Royal Commission
Entrance to McMurdo Sound.

Back then I asked myself how could this happen; that trained airline pilots and the three other members of the crew had flown an airliner into a mountain in clear daylight. I was aware of the difficulties of flying in whiteout conditions in Antarctica and other areas where minimal texture and lack of contrast in the landscape creates illusionary experiences. In the early seventies I had experienced some similar situations in flight simulators when I trained in the Royal Australian Air Force.

In my opinion, pilots and crew experiencing clear air whiteout, as in the case of Flight TE 901, would have entered a state, passing beyond normal perception into an erroneous perceptual experience where human systems

fail. This then extends into a situation where illusion became reality as described in the case study philosophy (Appendix C).

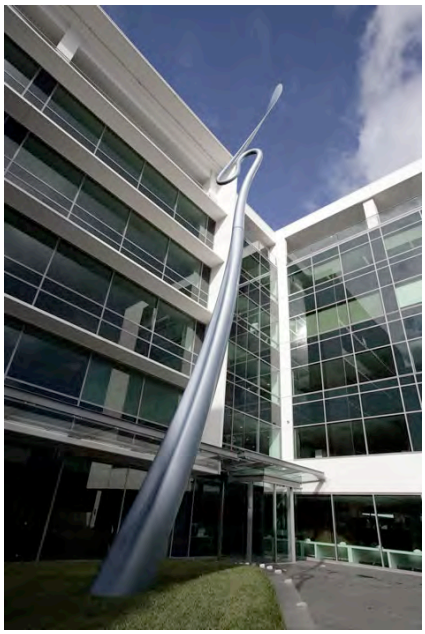

Figure 9
Phil Price (1965-)
Momentum, 2009
Air New Zealand Headquarters, Auckland, New Zealand.

On the 23rd October 2009 the sculpture *Momentum* by Christchurch artist Phil Price was unveiled at Air New Zealand headquarters in Auckland, New Zealand. The sculpture is a memorial and a focal point for reflection on all the significant events in the national airline's history.

> At the heart of the sculpture is the theme of *Momentum*, capturing the allure of flight. The sculpture, [the] movement [of which] will be powered by the wind, is an interaction between physical and environmental elements and a reminder of the fragile nature of flight and the dynamics of the forces at play (Ministry for Culture and Heritage, 2009).

The unfolding story of this accident is one that relates to my own sensory perception as a pilot, in particular that of the concept of what I choose to call the 'flight view'. For me, this view is an opportunity to see the world from

another perspective, one I had imagined and wished for as a child. The aircraft is the vehicle that allows this to happen. Using the aircraft as an extension to my body, I am able to explore and experience the world, as a bird would see it. The result is a re-manufactured world represented by synthetic vision, discussed further in Chapter 2:3 Synthetic Vision – Believing what we See.

The exegesis is intended to support my project, which is located in the field of practice of video and sound installation practice. My undertaking includes new and subtle differences to perceiving the landscape. There are many artists that have been influenced by viewing the landscape from the air invoking similar states of mind, but none that I know of use my methodology and approach to flying and the 'flight view' to achieve this end.

The Introduction describes how the project was initiated and how the influence of the Mt Erebus disaster, effected the research. Chapter 1 summarises the project and its structure, leading into the visual and sound methodologies and the use of an aircraft to revisit the landscape of Northern Tasmania to collect data for this project. Chapter 2 investigates background information into human physiology and psychology relating to flight in an attempt to inform the project. Chapter 3 discusses how changing light effects the way a landscape may be perceived from the 'flight view'. The discussion extends to various artists' perceptions of landscapes and how they deal with changing horizons. Chapter 4 refers to a basic understanding of art and cognition, one used to support the argument used in this project as it relates to reality and illusion. Chapter 5 locates me into the childhood perceptions of light in the landscape, place and space that have influenced my approach to this reseach. This chapter also introduces the importance of machines in assisting the human body in gaining a greater knowledge of the world

around us. Chapter 6 initiates the development of the project as it places the pilot as artist in the cockpit of the aircraft in an attempt to gain a creative vision of the ‘flight view’ as apart from the normal process of flying a machine. At the same time this chapter is intended to locate practice within other creative practices, which I consider relevant to my research. Chapter 7 consolidates the development of the project as it discusses the technical and creative processes used to create an immersive, engaging and transportive video sound installation. These processes took the work out of the realm of pure documentary resulting in a final project that I consider speaks for itself regarding its effectiveness as an artwork constituting legitimate research.

CHAPTER 1: THE PROJECT

1:1 The Project Outline

World Beyond the Horizon explores ideas of phenomenology relating to light and its effect on shaping perceptions of the contrasting landscapes in Northern Tasmania and Antarctica. The process of investigation is described in the project research plan schematic diagram (Appendix A).

The landscape of Northern Tasmania was surveyed from the cockpit of an aircraft – the 'flight view', where sound recordings and video data were collected as raw material for the project. The intention was to explore ways that I can create an innovative immersive video installation that conveys the sense of personal escape and connection with the landscape while flying. To manipulate and help me explore and with the visual material gathered for my project, I designed and built an Optical Laboratory. From this exercise I have developed a body of work that I consider allows me to bring a moment from my imagination into the real world thus forming the context of the installation – the artwork confirming the research.

The investigation draws on my experience as a pilot, an understanding of meteorology, and the landscape vision as seen from the 'flight view'. In 2006-2007, I revisited the skies of Northern Tasmania from the perspective of my own 'flight view', this time as a painter, photographer, and new media artist. The purpose of this exercise was to consider the illusions one may encounter in a textured landscape with notable colour variations compared with a landscape with minimal colour variation and texture, such as would be experienced in Antarctica. I have endeavoured to show how these illusions would affect my perception of the landscape in art. This included new research in perceptual psychology of aircrew and scientific progress in aviation as a result of the tragedy in Antarctica, in particular the application of synthetic vision. The

project investigates how the viewer interprets variation of contrast and texture caused by atmospheric conditions that change the way light falls on a landscape. I have investigated the science of phenomena in the context of that which impresses itself upon the observer as being extraordinary – a remarkable event, thing or a particular happening. At the same time, I have considered the term 'mental set' as applicable to human perceptual experience – by gaining knowledge through the senses. Wayne Weiten, psychologist and author of the book *Psychology, Themes and Variations,* summarised the term: 'a mental set exists when humans persist in problem-solving strategies that have worked in the past' (Weiten 2004, p. 316). This is a familiar theme in psychology.
The project proceeded on the basis that the action of perception through all the senses, in particular visual and aural, is a highly synthetic process and is sometimes erroneous as described in the project philosophy diagram (Appendix D). The result of perception can sometimes be far removed from an exact image of the physical world.

The project sought to examine the inter-play of the senses, in varying degrees, especially how perception responds to visual and aural conditions. I have been interested in what I see as the moment of apprehension – the exact time at which the subject recognizes that something out of the ordinary is happening and how the mechanics of perception give rise to an integrated visual and aural experience.

Figure 10
Richard Wilson (1953-)
20:50, 1987
Used sump oil and steel
Dimensions variable

British artist, Richard Wilson, demonstrates this in his installation work *20:50*, 1987, [Figure 10] at the Saatchi Gallery, London, where he attempts to disorientate the viewer's senses. A layer of 2500 gallons of used black sump oil gives an illusion of great depth, and also of emptiness falling away beneath one's feet. Edging gingerly along the walkway leading into the work there is a feeling as if you are stepping into a void. The strong odour of the oil tends to bring one back to reality and reconstructs the complexity of a 'normal' experience. In this instance the participant is generally relying on the senses where perception, spatialisation, illusion and reality are all addressed by human sensorial experience. This complex body of knowledge passes as 'normal' in the everyday experience of an individual.

Figure 11
Rescue team approaching the Mt Erebus Crash Site.
'This is the first photo I took of the crash site as we were approaching the scene for the first time'. Photograph: Stuart Leighton, 1979.

Yet, there was nothing 'normal' about the Erebus disaster, and nothing could have prepared young New Zealand police officer, Stuart Leighton, for the tragic scene he experienced on the slopes of Mt Erebus when he arrived as part of a team of eleven Kiwi police personnel involved in the recovery of bodies from the wreckage of Flight TE 901.

> My senses were overloaded. There was the sight of bodies and the wreckage of an Air New Zealand plane. This was accompanied by an overpowering smell of kerosene. I just need to get a whiff of it now and I'm instantly back on the mountain side (Leighton 2009).

In this instance, Stuart Leighton's senses were pushed beyond 'normal' sensorial experience – any faint smell of kerosene (aviation turbine fuel) continues to unlock that memory from 30 years previously.

I have investigated the science of phenomena in the context of something that impresses itself upon the observer as being 'extraordinary' – a remarkable thing or a particular happening. Also considered are the terms 'psychological and mental sets' and their application to individual human perceptual experience as a means to gaining knowledge through the senses. These ideas have been applied to the way I perceive the landscape of Northern Tasmania and they find

expression through the creative processes of painting, photography and new media. The place where I spent my childhood and my adolescence is where my body formed an understanding for these things, even before I gave them a second thought – they became part of my mental and psychological sets – my past shaping the present.

I have examined links between cognitive science, psychology, human physiology, phenomenology, climatology and art in exploring the idea of the 'flight view'. It is a particular place with its own physical constraints and perceptual opportunities, which together condition the observer; it is this construct which has been a driving force within this project. Deliberation has been given as to how phenomenology plays a part when investigating earth-sky relationships associated with the 'flight view' and applying it to my creative process. I have questioned 'what is the creative process' and considered the philosophy relating to aesthetics in art. 'There are two fundamental issues in aesthetics – the essential nature of art, and its social importance (or lack of it)' (Graham 2005, p. 3). The 18th century German philosopher, Immanuel Kant initiated dramatic changes in the field of aesthetics. 'In the Kantian aesthetic all the emphasis on the mental state of the observer whose imagination may as freely play on nature as on art' (Graham 2005, p. 29).

I have considered Maurice Merleau-Ponty's perception of the French artist and Post-Impressionist painter Paul Cezanne (1839-1906). Merleau-Ponty discussed Cezanne's struggle to deal with the complexity of human visual perception. 'self-questioning and his struggle to exist as an artist' (Merleau-Ponty in Johnson 1993, p. 5). His desire was to realise sensation reflected in art by releasing meaning from objects rather than creating stylisations of imposed effect.

> The meaning Cezanne gave to objects and faces in his paintings presented itself to him in the world as it appeared to him. Cezanne released that meaning; it was the objects and the faces themselves as

> he saw them that demanded to be painted, and Cezanne simply expressed what they wanted to say (Merleau-Ponty 1993, p. 71).

For me, Merleau-Ponty's view is confirmed as I look beyond images and sounds of the realistic landscapes I have captured on film and video. These experiences have served as an entry point to the process of exploring the limits of my perception. I have created imagery relating to environmental systems that are in concert with my own sensory experience and mental sets, in particular, those of a pilot and the 'flight view'. Sometimes, the inspiration comes directly from that landscape as my mind explores this particular world, extending the experience. It is my belief that no position or aesthetic, or indeed how one works as an artist, should affect this creative process – it is just a matter of trying to move closer, through a process I have developed of physical representation, to what is in my head.

Holmes Rolston III (1932-) is Professor of Philosophy at Colorado State University. He is best known for his contributions to environmental ethics, science and religion. Rolston's philosophy questions whether the aesthetic appreciations of landscapes need to be science-based?
He goes on to say:

> Aesthetics – this argument continues – is nothing that science can discover on landscapes objectively, independently of persons. Aesthetic experience of landscapes is not some pre-existing characteristic of the landscape that is found, but one that emerges when persons react to landscapes. Landscape is land-scope, land taken into human scope (Rolston 1995, p. 375).

The process has been instrumental in bringing my own thoughts and ideas from the imagination and placing them in the physical world. This is realised in the form of a video-sound installation; a journey through a synthetic landscape of memories from past experience, one that challenges reality and illusion.

As an artist I strive towards a greater synthesis as I search for the integration and creative unity of things in the world around me. In the early 1900's, Walter Gropius had a synthetic vision for utopian architecture. He was a lateral thinker who could operate with ease in both the academic and the practical worlds. For Gropius, '...synthetic vision was a rare gift in an analytical age of specialization' (Herbert 1955, p. 1).

Since the early nineties, it has been the aspiration of NASA researchers to give pilots a perfect vision of their surroundings – regardless of weather conditions. In aviation '...synthetic vision is a virtual reality display that uses vast topographical, navigational and meteorological databanks to generate an accurate picture of your surroundings in any condition' (Flight Safety Australia 2006, p. 54).

With a background in painting and photography, my project has been built upon the creative platform of new media to explore the idea of synthetic processes. This is represented with other synthetic process, one called synthetic vision, which asks what philosophers of art and perception see as reality and illusion. The project is an analysis of the world around me supported by my sensorial perception, in turn controlled by 'mental sets'. The analysis resulted in a re-manufactured world represented by synthetic vision.

Throughout this exegesis I have taken into account experiences involving horizons in earth-sky relationships and the space seen between the object and the viewer. These relationships have included the loss of visual reference to the horizon, as experienced by pilots (in particular the crew of Flight TE 901) and the subsequent effect on human physiology and aviation flight safety. When reference to the horizon line is lost in a landscape, one begins to imagine that landscape in the mind as an image or sound of expectation. This is set up by

the brain's reference to life experiences or instruction – what I refer to in this exegesis as a 'mental set'.

I explore the landscape looking for creative inspiration and moments in time where my mind is encapsulated in the world around me. Sometimes the creative inspiration is there in front of me, as I view it through the lens of a camera or hear it through headphones. This is generally a raw and pure creative experience and I endeavour to work with it. Sometimes this process is not so fluid. In this case, I have manufactured the experience with the use of models, constructs, optics and manipulated light to convey the feeling and meaning of the idea. I have also designed and constructed a machine named the 'Optical Laboratory' partly for this purpose. The Optical Laboratory simulates images from nature. The images created are ephemeral in nature and are transmitted by means of projected light, diffused by glass media, conveying a sense of illusion. The idea is based on nature and the orientation of phenomenology as it applies to clear air whiteout as experienced by the crew of Flight TE 901 in the Mt Erebus disaster.

Throughout the project I have developed a greater understanding of theories relating to my research. It is not about overturning existing relative theories, but rather to subsume them into a more comprehensive way of working applicable to my experience. When Albert Einstein reflected on his time at the Swiss Polytechnic in Zurich, where he studied from 1896 to 1900, he found it "hard to resist the feeling that the soaring, solitary splendour of the Alpine peaks must have influenced his scientific theorizing" (Robinson 2005, p. 38). Later, while living in America, he wrote:

> ...creating a new theory is not like destroying an old barn and erecting a skyscraper in its place. It is rather like climbing a mountain, gaining new and wider views, discovering unexpected connections between the starting-point and its rich environment. But the point from which we started out still exists and can be seen, although it appears smaller and

> forms a tiny part of our broad view gained by the mastery of the obstacles on our adventurous way up (Robinson 2005, p. 38).

Part of my research has been to investigate and analyse the psychology and philosophy behind this experience. I have approached the project using an analytical philosophy in which a process has evolved, going through a cyclical progression between reality and illusion as shown in the project philosophy diagram (Appendix D). Throughout the installation I have endeavoured to retrieve reality in the presence of an illusory experience and vice versa. This process retrieves 'mental sets', elements of past experiences that assist in reconstructing the complexity of the 'normal' experience that of a person experiencing an illusion or reality.

1:2 The Project Aims

The aims of the project are to:

- use the Mt Erebus Disaster in Antarctica 1979, involving Air New Zealand Flight TE 901 as a case study in tourist landscape photography from the air and the process of perception (Appendix B);

- study the phenomenon of clear air whiteout experienced in non-familiar landscapes through the eyes of the aircrew (pilots, engineers, observers and cabin crew) and the multi-national contingent of passengers on Flight TE 901, as found in evidence produced by the Royal Commission into the Erebus Disaster;

- investigate the landscape of my home environment in Northern Tasmania from the location of the 'flight view', based on experience as a pilot and arts practitioner;

- develop an understanding of virtual reality practices involving creative synthetic vision projects with human interface technology; and

- present the findings through new media techniques by using synthetic vision and sound processing artwork supported by a written exegesis at a vision-space facility located at the Academy of the Arts, University of Tasmania.

1:3 The Research Questions

The research investigates the following questions:

- in what way can I create an immersive video installation that conveys the sense of personal escape and connection with the landscape that is experienced when flying?

- in what way can I present this so that it is an immersive, experiential work?

As part of the background to the research questions the following enquiry has been carried out:

- is there a difference between reality and illusion in terms of phenomenology (refer Appendix D)?

- can one person's reality be another person's illusion?

- if there is a difference between reality and illusion, how may it be interpreted by using creative media?

- could these creative media be used in collaboration with individuals from other disciplines to produce a body of research into synthetic perception? and

- do illusions (e.g., clear air whiteout) experienced in the landscape and those sometimes attributed to cultural mythology (the mythology of Erebus) form a basis for scientific reality relating to landscapes and demonstrated by synthetic perception?

1:4 The Project Locations

Firstly, I have selected the landscape of Northern Tasmania, Australia, for my investigation. For me, this is a very personal landscape, in particular the Mersey Valley and North West coastal areas and farmland. It was the place where I spent my early years (1949-1968). I also have explored the Northern Midlands where I now live (1985-2010).

Lucy Lippard, an internationally known writer in the USA, discusses 'being in place'. She claims:

> The sense of place, as the phrase suggests, does indeed emerge from the senses. The land, and even the spirit of the place, can be kinetically, or kinesthetically, as well as visually experienced. If one has been raised in a place, its textures and sensations, its smells and sounds, are recalled as they felt to a child's, adolescent's, adult body. Even if one's history there is short, a place can still be felt as an extension of the body, especially the walking body, passing through and becoming part of the landscape (Lippard 1997, p. 34).

Where one spends one's formative years is a place where the body develops a special 'resonance' with the land itself; it exists before you even give it a conscious thought. 'Place is the module of landscape – indeed, its very element' (Casey 2002, p. 271). Therefore the landscape becomes part of your 'mental set': the climate, the seasons and the intensity of light.

Professor Edward Casey (1939-) specialises in phenomenology, philosophical psychology, aesthetics, and the theory of psychoanalysis. Recent research includes investigations into place and space; landscape painting and maps as modes of representation; ethics and the other; feeling and emotion; philosophy of perception (with special attention to the role of the glance); the nature of edges. In his book, *Sense of Place*, 'John Constable said, "we see nothing until we truly understand it." Constable's words apply above all to the landscape as experienced and sensed' (Casey 2002, p. 274). I remember the weather and the light at our farm, *Barega*, the place where I grew up, and the place where I now live in the Northern Midlands of Tasmania. 'Landscapes are, in the final analysis, placescapes; they are congeries of places in the fullest experimental and represented sense' (Casey 2002, p. 271). This sense of place, developed over time, has become an intrinsic part of my research.

The crew of Air New Zealand Flight TE 901 experienced a landscape in another place. Flight crews based in Antarctica (in particular residents of the United States), always undergo an intensive familiarisation program on their first visit and also for subsequent visits. German philosopher and deemed founder of phenomenology Edmund Husserl (1859-1938) believed that experience is the source of all knowledge. Casey refers to Husserl's belief as follows, '...because of its deep-seated ambiguity, we need to scrutinize landscape continually – again and again, as Husserl would put it, until the "thing itself" is finally grasped' (Casey 2002, p. 274). Therefore the phenomenon of clear air whiteout becomes part of the landscape culture, a 'normal' event in nature for flight crew working in this region.

1:5 The Rationale

I have explored the various ways humans perceive an environment, in particular through the senses of sight and sound, and through the use of mental sets. The project proceeded on the basis that I believe that visual and aural perception is

sometimes erroneous, and together present a far from exact image of the physical world, as happened in the Mt Erebus Disaster. Consideration has been given to phenomenology involving the earth-sky relationship and the space seen between an object and the viewer. These relationships have included loss of visual reference to the horizon and its subsequent effects on human physiology, for example, as one begins to imagine the landscape in the mind as an anticipated image or sound set, a pre-conceived and perhaps false notion of place develops. The incorporation of sound into the project has allowed the construction of an aurally immersive space through which perception, spatialisation, and abstraction experienced by the viewer.

1:6 Methodology and Processes

My ideas and creative process are informed by the theory and practice of other artists, scientists and philosophers. The use of an aircraft to source material for the project, together with recently acquired expertise in film, video and sound (since 2007) have added to the creative skill base. In 2004, I created the Optical Laboratory, a machine that uses basic principles of the physics of light moving through different media to simulate illusory images similar to those which may reveal themselves in a familiar environment seen under unfamiliar light.

I have reasearched the work of artists and contemporaries such as J M W Turner, John Constable, Chris Langlois, Bill Henson and Philip Wolfhagen, all of whom have studied the field of the atmospheric sublime. John Constable's investigation into cloud forms and atmospheric progression, combining a process of meteorology and art, has been a particular interest in my investigation. I have considered the works of Torban Giehler and his representation of the schematic and digital landscape as it applies to flight instruments. Alexandra Rochenko's fascination of the flying experience has also been of interest, as he includes the shadow of the aircraft moving over the landscape while filming. British painter, Peter Lanyon took up glider flying so he

could gain a better understanding of the landscape. The work of American artist, James Turrell is primarily concerned with light and space. At the age of 16 he obtained a pilot's licence. He received a BA degree in perceptual psychology in 1965, including the study of Ganzfeld effect (from German for "complete field") a phenomenon of visual perception caused by staring at an undifferentiated and uniform field of colour (as experienced when flying in white out conditions). The effect is described as the loss of vision as the brain cuts off the unchanging signal from the eyes. Photographer Richard Woldenorf uses the aircraft to gain a view from above, and a flight of discovery unfolds as landscapes tell us something about their natural history and reveal their evolution. The idea of reflection, as conveyed in the paintings of American artist, Richard Estes, becomes evident in the night scenes of my work as light from instruments and outside sources are bounced off Plexiglass surfaces of the aircraft. Landscape and culture referenced by artists Patrick Grieve and Ben Nicholson have been an important part of this investigation. And finally, I reviewed some of my earlier works that I consider important in establishing the 'mental sets' applicable to this research.

Three artists in particular have influenced the technical and creative processes used in this project. They are Bill Viola, Chris Welsby and Issac Julien. In some cases their work uses multiple channel large screen projections similar to that used in my project, *World Beyond the Horizon*. Viola is a American contemporary video and sound artist. He is considered a leading figure in the generation of artists whose artistic expression depends upon electronic, sound, and image technology, the area in which I wish to locate my own work.

For Viola, the alliance of video and sound, and thus the passage of time, makes the experience highly essential, real, and hence likely to connect with emotive aspects of the human condition. Chris Welsby is a British experimental filmmaker who has been exploring the complex interplay between the moving

image, landscape and the natural world. He has developed special camera systems, which rely on wind speed or tidal action to create sometimes jarring or mysterious film and video installations. These projects often explore the inherent framing and distancing that occurs as we contemplate the world around us. His work was an important adjunct in the development of the Optical Laboratory. Isaac Julien is also a British installation artist and filmmaker. One of the objectives of Julien's work, of interest to me, is his capacity to break down barriers that exist between different artistic disciplines, drawing from and commenting on film, dance, photography, music, theatre, painting and sculpture, and uniting these to construct a powerfully visual narrative on a multi screen format. These artists work is discussed in more detail in Chapter 7:2 Experimental Film and Video.

In relation to the sound component of my project, I investigated the works of musicians and composers such as Arnold Schoenberg, Iannis Xenakis, John Cage, George Crumb and Karlheinz Stockhausen. The aural experience consists of the drone of the aircraft (two engines, the sound pulsating due to beat frequencies) together with other audio inputs as a sensory background to the visual experience.

1) I studied passenger photographs, flight data and flight deck voice recordings retrieved from the Mt Erebus crash site to demonstrate how global tourists and amateur photographers respond to the illusions they experience in the landscape.

2) I analysed photography, video and sound data collected throughout the project using documentary filmmaking techniques and disciplines, sampling sites of the Northern Midlands of Tasmania (2004-2009). This information has been overlayed with video, photography and sound data collected on day and night flights in various weather conditions.

3) I created a visual and sound platform of still and projected moving imagery, resulting in an optical and aural illusion simulating these experiences in the landscape.

1.7 The Visual Experience – Photography and three planes of movement

As I analysed photography (both still and video) collected within the project site, I considered visual experiences in a time/space (moving image) environment. These experiences relate to certain stages and procedures of flight and are related to the attitude of the aircraft based on three axes – lateral, vertical and horizontal, the three planes of movement represented by pitch, yaw and roll. These experiences are located within and around the aircraft while moving through space and time. They also influence the perception of the landscape from within the aircraft.

Consideration has been given to the last 16 minutes of Flight TE 901, including its flight track and descent from 20,000 to 1,500 feet at the point of impact with Mt Erebus. This is outlined in the case study (Appendix B).

Figure 12
The Last 16 minutes.
Flight Path of Flight TE 901

The flight pattern shows the aircraft going through various attitudinal changes. Throughout this period, passengers and crew experienced individual perceptions of the landscape from different locations within the aircraft. Individuals from their own vantage points would have formed different perceptions. Illusions would have been experienced subconsciously. At the same time, sound also supported the senses relating to various configurations of the flight.

The correlation between sound and vision was later revealed when flight data was evaluated from the two black box recorders and from passenger photography retrieved from the crash site. The three planes of flight (pitch, yaw and roll) [Figure 25] have been used, in the context of Flight TE 901, to illustrate, through art, the processes of flight once normal parameters are exceeded, and where a loss of perception may ensue.

1.8 The Sound Experience – the Drone as a Sensory Background

Throughout the process five aspects of sound have been considered. I have simulated pitch, yaw and roll within the context of flight, and structured memory relationships in relation to one another as they relate to sound. The drone of the aircraft is an anchor to the installation, as it continuously reminds the viewer of the presence of a functioning machine moving through time and space. Richard Whol has made a similar comment in his book, *The Spectacle of Flight*. 'We should not forget the importance of the sound of the aircraft as a sensory background for the story I tell' (Whol 2005, p. 6).

Sounds produced in the landscape:

- wind
- heating and cooling of objects
- mechanical sounds
- animals and humans
- rain
- sounds produced while sitting in a static aircraft on the ground.

Mechanical sounds produced in flight:

- engine sounds – synchronous and variable engine speeds
- aural beating (caused by the sound of two propellers moving in and out of synch)
- propeller sounds
- hydraulic, pneumatic and electromechanical systems – undercarriage servo-mechanisms – controlling surfaces, flaps, slots, slats,– elevators and ailerons.

Other sounds produced in flight:

- the sound of air passing over the aircraft's external surfaces while in flight, changes in sound due to variable density of the atmosphere in

clear air, in moisture, under conditions of cool and warm air, and in turbulent air.

Sounds transmitted from other locations:

- radio transmissions, voice to voice, recorded voice, Morse code signals, Nav/Com signals, and audible alarms.

1:9 The Aircraft (Cessna 337 VH-VMO)

Part of an individual's 'mental set' is established through a process of association. In this case, it is a relationship primarily related to vision and sound, and secondarily to feel and smell. Taste is a small part of it.

In the summer of 2005, while holidaying at St Helens on the East Coast of Tasmania, I heard a familiar sound, one I had remembered from a previous career as a pilot thirty years earlier. The sound I was hearing was part of my mental set. As it become louder, a Cessna 337 aircraft [Figure 13] appeared overhead on its approach to the local airfield. In the seventies, I flew this type of machine.

The 337, is unique in the way that its two engines are unconventionally located in line, one in the front and the other in the rear as shown in (Appendix F). Due to this configuration the engines create a unique thrashing sound as a result of turbulent air flowing from the front propeller into the path of the one at the rear. Memories from the past came flooding back into my mind.

Figure 13
Cessna 337 VH-VMO at Devonport Airfield.
This aircraft was used for the project.
Digital Photograph: Simon Bourke, 2006.

I hurriedly drove to the airfield where the aircraft had just landed. There I made myself known to the pilot who soon became interested in my past history in aviation, and in this project. He offered to show me over the aircraft. The wind had swung around to an afternoon sea breeze from the east at about five to seven knots, causing a gentle rocking of the wings as we walked out to the machine. I heard sounds of the breeze over the aircraft surfaces and the familiar creaking of the Plexiglass windows. Gyros driving the flight instruments were still winding down. Sounds of expanding and contracting metals were heard from under the cowlings as the engines cooled. The 337 had just returned from a flight out into the Tasman Sea for the purpose of photographing boats in the Sydney to Hobart yacht race. The aircraft was fully equipped IFR (Instrument Flight Rules), making it capable of being flown in all weather conditions – day and night. White indicators and numerals, red and green, and yellow operational bands of the instruments were prominent, set in a black instrument panel. The smell of the machine, its leather seats, fuel and oil took me back to my flying career. Not long after, the pilot and passengers re-embarked for their final leg of the trip. I stayed and watched the aircraft take off into the sea breeze, then into a climbing turn. I waited until it disappeared

into the Western sky. Shortly after, the familiar thrashing sound of the 337 could not be heard any more.

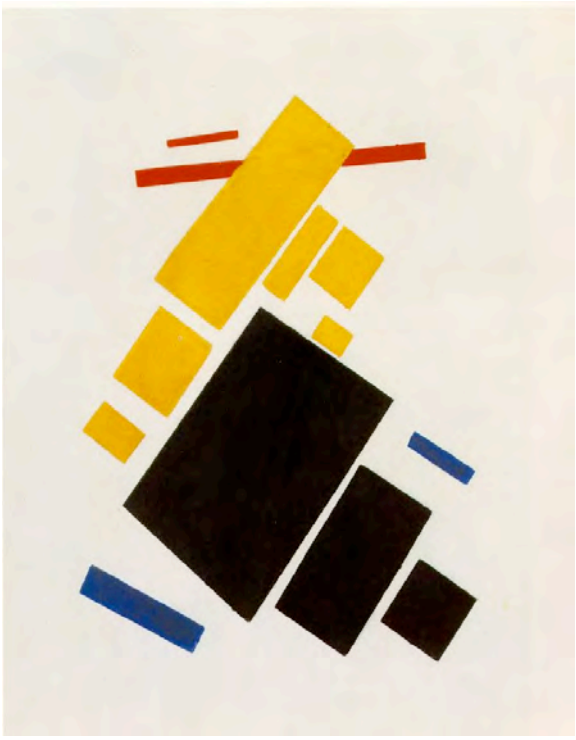

Figure 14
Kazimir Malevich (1878-1935)
(Suprematist Painting), Aeroplane Flying, 1912
Oil on Canvas.
Collection of the Museum of Modern Art, New York.

The sight of the aircraft rising up and turning as it climbed through the horizon line took me back to my undergraduate years (2001-2003) at art school. It was there I learnt about the Russian Suprematists and their association with flight.

Kazimir Malevich's painting *Aeroplane Flying,* 1912 [Figure 14] demonstrates how the Suprematist is stimulated by reality. 'The exquisite *Aeroplane Flying* is one of the Suprematist canvases first shown at the famous "0,10 (Zero-Ten). The Last Futurist Exhibition," [at Petrograd in December 1915] where Malevich introduced this new, severely abstract style of painting to the public' (Douglas 1994, p. 84). In his painting, the aeroplane [aircraft], represented by

rectangles, rises up from earth, its black elements increase in size as it approaches the viewer. ‘In these new works Malevich often positions the viewer in the air; here we see the moving plane from above, and as if in stop-time motion’ (Douglas 1994, p. 84). Malevich’s painting had all the elements of the ‘flight view” as I know it. ‘The red horizontal element establishes a reference point, a tipped horizon line, that the plane crosses as it climbs. Malevich succeeds in creating a sensation of lift and flight without any mimetic illustration of the airplane – a method he called “objectless”’ (Douglas 1994, p. 84). Many of my past experiences in flight stand behind these first Suprematist paintings.

Two days later I left St Helens to return to my home at Devon Hills in the Northern Midlands. The experience of the 337 still haunted me as I revisited memories of the time when I was a pilot. There was a feeling that I had been re-united with an old friend, and one that would partner me on this project. The aircraft I saw at St Helens was, to me, full of ghosts, and memories of flight from the past. Here was an opportunity for my project.

I had already decided that I was going to include my past experience of the ‘flight view’ in the project and I would be using an aircraft to collect visual and aural data. It would not be just any aircraft, but one of a type in which I had done much earlier flying in Tasmania: in short, I would be ‘at home’.

CHAPTER 2: FLIGHT INTO THE WHITE ABYSS

In this chapter I will deal with associations between what is seen and what is believed and their relationship to the flight view experience. I will consider how belief systems and mechanisms may effect how one interprets the landscape by artificial means when all visual reference is lost.

2:1 Human Belief Systems and Mechanisms

I vividly recall the experiences of flight when I first went solo in 1971. Take-off always has it critical moments. The instruments on the flight deck confirm operational status of the aircraft, while I focus on achieving the critical speed for lift. In the process of mechanically aided flight, the airborne machine goes through a series of performance sequences until the ultimate sequence is achieved, that of flight. These sequences require a creative objective unity known as interfacing. The process of interfacing machine systems, those of the body, the aircraft and the environment, results in an objective understanding and relationship to human input. Systems can also be considered as an ordered and comprehensive assemblage of facts, principles and doctrines relating to a particular field of knowledge or thought that can be referred to as a system of philosophy. As a child growing up at *Barega,* I became aware of machine interfacing and associated systems.

Henry George 'Harry' Ferguson (1884-1960) was an Irish engineer and inventor noted for his role in the development of the modern agricultural tractor.
In the late 1920's he experimented with lightweight tractors and mounted ploughs. In 1929 he designed the Ferguson System.

Figure 15
The Ferguson System Logo.

This arrangement allowed the weight of the implement (the plough) to be transferred to the rear wheels, increasing traction and allowing the implement (the plough) and the tractor to act in unity. The Ferguson System was not covered by a single patent, but by many that date from 1917 to 1939. The main patent (12.09.17 Patent No.119883) related to Ferguson's initial idea of the 'arrangement for direct hitching and controlling the plough, including the first top link' (The Friends of Ferguson Heritage Ltd 1994). As a result of this device, the load transfer allowed a lightweight tractor to do the work of heavier tractors. Further developments to the Ferguson System, such as draft control, improved weight transfer and power increased the amount of work the little tractor could do.

Later in life I saw how aircraft systems would also act in unity as a complex machine, one that went through a series of performance sequences until the ultimate sequence, that of flight, was achieved. This unity was later experienced in my creative life – in the role of pilot as artist. Apart from systems in machines, all systems including those used in art can be considered as an ordered assemblage of facts, principles and doctrines relating to a particular field of knowledge or thought.

Such belief systems also played a significant part in the tragic story of Flight TE 901. The passengers had faith in the management of the flight, and in effect placed their own lives on the line. The crew believed in the procedure of the flight as it had been charted, tried and tested before. They believed that the systems put in place would maintain an ordered normal eleven-hour flight. The subsequent investigation and Royal Commission into the Erebus Disaster revealed that all machine systems within the aircraft performed within their required parameters. It was the boundaries of these systems that were penetrated (in this case, by a systemic failure within the organisation, Air New Zealand) causing unity and order to revert to chaos.

> ...[as the result of] a navigational error for which the aircrew was not responsible, and about which they were uninformed, an aircraft had flown not into McMurdo Sound but into Lewis Bay, and there the elements of nature had so combined, at a total coincidence of time and place, to translate an administrative blunder in Auckland into an awesome disaster in Antarctica (Mahon 1984, p. 295).

Air New Zealand's logo 'Nobody does it better' had become a sin of hubris, an ancient Greek idea. It was a sin of pride and arrogance that had resulted in fatal retribution and nemesis, one that had involved the failure of a belief system within a company, which in turn had caused a failure between the interface of human, machine and environment.

Even though the final blame was placed with the company, the aviation world was now obliged to examine the interface between flight crews, their machines and the environments they experienced. Perceptual psychology would now play an important part of aviation future.

The interface between the crew, the aircraft and the minimalist Antarctic landscape had failed. Today, aircraft technology has evolved to an extent where this accident would now have been prevented with the use of a new interface involving the integration of sophisticated satellite navigation systems with the

aircraft flight computers. Mathematician and computer scientist, Roderic Beaulieu, refers to these computers as 'thinking machines' (Beaulieu in Deitz 1991, p. 157). The human errors causing this disaster would have been over-ridden and corrected by the machine. At the same time, pilots frequently express concern that some new technology is taking away the feel of the machine. Beaulieu has also examined the aviation industry's reliance upon computers and the effect on pilots of new glass cockpit systems and fly by wire technology. He goes on to say: '*Control systems should preserve the feel of the plane.* This has to do with the design of the "human interface" – the systems pilots will use to control the individual aircraft' (Beaulieu in Deitz 1991, p. 164).

Most of us are secure and protected by what we believe; yet to believe does not necessarily require understanding. That is why most of us fly as part of everyday life with the knowledge that others have done it successfully before. This idea can extend to the use of machines and their systems interfacing with each other to perform certain functions; simple systems working alongside more complicated ones. As the aircraft gains altitude after take-off, the pilot normally has a visual reference to reality. He sees the landscape below, the natural and the built environments all set out on a geometric grid: the mind is building a reference system. The pilot assimilates what is seen in the visual landscape to what is indicated on the flight instruments. Considering this linkage between the pilot, his instruments and machine and the landscape, I have applied a hypothesis similar to the utilitarian philosophies of Jeremy Bentham (1748 – 1832). 'Bentham's philosophies related primarily to model prison systems. He developed a system of isolation and total surveillance' (Bozovic 1995, p. 29). Over time other institutions such as schools, hospitals and even modern-day call centres came to utilise this concept.

Edward Casey discusses the supremacy of space and refers to Bentham's panopticon as signifying 'a place of sight for everything' (Casey 1998, p. 185). It

was Bentham's idea to '... convert the concrete specificity of a particular place into the "generalized function" of being a site' (Casey 1998, p. 186). Bentham also refers '...to the [fact that] "central-inspection principle" and the panopticon's "imagery intensity" would be hard to resist in the Eurocentric culture during the seventeenth and eighteenth centuries' (Casey 1998, p. 186). I have applied Bentham's idea to the cockpit of an aircraft; a space within a machine – a control centre. The instruments become the eyes of the aircraft, an airborne panoptic carrying out surveillance of machine systems that are located within its structure away from the pilot's view. At the same time the instruments are monitoring the landscape as we fly over it, in particular in bad weather and in darkness.

The aircraft has its own referencing system, an airborne panoptic comprising of instrumentation that relays the current state of systems within the machine to a central point. The instrumentation also relays information about the aircraft's relationship to the landscape at any particular time. The information received is intermingled with the pilot's own sensory referencing. It is a process in which there is a melding of objective reality with non-objective reality. Reference to the objective landscape may be partly lost as the aircraft climbs through partial cloud cover. As visual reference is lost, there is a greater reliance on the aircraft instrumentation system as the pilot's mind and body become encapsulated within the machine. This reliance becomes a belief system. The pilot has to rely on machine systems, visual and audio references to instruments and signals so that stable flight criteria can be maintained. Due to an understanding and knowledge of these technological systems the pilot believes the required parameters of flight will be achieved in an ordered manner and the final destination will be reached.

By using a structured three-dimensional medium of 25mm square wood blocks varying in height increments of 3mm, I have attempted to convey the transition

from the objective to the non-objective (subjective) landscape. This is represented in [figure 16].

Figure 16
Simon Bourke (1949-)
On Climb – Passing through 5000 feet, 2002
Wood blocks and acrylic paint.

This work relates to the body, the machine and the environment and the interplay between all three, alluding to flight above broken cloud with momentary reference to the objective landscape below. The angled 45-degree blocks allude to climbing and descending flight together with emphasising the volumetric shape of clouds compared to the flatness of the landscape as viewed from the 'flight view'.

I have carried out an analysis of this painting [Figure 17] to demonstrate, through artistic means, the sensation and meaning associated with the transition between the objective (colour and texture) and the non-objective

(minimal colour and texture) landscape as viewed from an aircraft in flight, particularly as altitude is gained.

Figure 17
Photographic Analysis
On Climb – Passing through 5000 feet, 2002.
Photograph: Simon Bourke 2005.

This idea has been created by the use of another machine, a camera, to abstract to a greater degree what I believe is already an abstract form of art. An analysis has been made demonstrating a loss of texture in a landscape, similar to that experienced by a pilot flying in cloud or over a minimalist landscape. The loss of form and texture in my art can also be compared with that experienced in Polar regions, in particular the case of Flight TE 901. Sharpness of the geometric form in the artwork is meant to stimulate one's thoughts and to aid in the perception of the landscape as one generated by the subjective mind rather than one of reality.

2:2 Human Psychological and Mental Sets

The crew and passengers of Flight TE 901 believed their eleven-hour journey via Antarctica would be like any other normal flight previously carried out by the

airline. In Australia, Qantas had been carrying out similar charter flights for two years, without incident. There was, in effect, a mental set confirming that the flight would be no different from any other previously conducted by Air New Zealand.

At a personal level, reflecting on the time when I was eleven years old, my first memory relating to flight goes back to the experience with the family of eagles on our farm. That experience was to be my first mental set relating to flight.

A mental set is the brain's method of establishing a code or shorthand for performance and behaviour under predictable circumstances. Ross Day, then Professor of Psychology at Monash University, Australia, and an expert witness at the Royal Commission into the Mount Erebus disaster, reinforced the following concept. The brain can be described as a library, a memory storage for earlier life experiences that in turn shape our perception. Mental sets are established all through life and are used to form automatic responses to diverse stimuli. The strength of a set and its resistance to be unlocked is determined by the authority behind the set, and the frequency of repetition and, at times, the number of people sharing the set. Day goes on to say:

> It is characteristic of human perception that expectations that have been formed from past experience are continually confirmed by available stimulus information. Thus, following a route, a pilot who was 'set' for a particular direction would be searching out geographical features to confirm the validity of his expectations. It is to be emphasized that the business of human perception involves not only states of expectation but frequent and repeated checking that those expectations are valid or invalid (Day in Vette 1984, p. 261).

A typical primary mental set for a pilot operating a commercial airliner would possibly include:

- childhood experiences
- pre-tertiary and tertiary education
- air force or general aviation training
- aviation science
- navigation, engineering, meteorological and commercial aviation training, and
- crew-loop and simulator training

Specific mental sets attributed to Flight TE 901 were subject to:

- passenger route maps
- Air New Zealand flight magazines
- previous crew discussions
- radio talk-back shows about experiences on past Antarctic flights
- the Antarctic flight plan lodged in the aircraft computer
- visual flight rules applied to the flight
- crew-loop
- map preparation
- the absence of an ‘operations flash’ notification confirming initial flight plan parameters
- all three navigation computers agreeing with input data
- way points for the flight checked, and an
- ‘all OK’ notification and the transponder coding, ‘confirmed’

There is a point to examining these two groups of mental sets. In the case of the first one, a primary mental set would apply to the individuals involved and the second would apply to them as a team. The inference is that as a team, the

principle of crew loop would apply i.e. on facing a given situation a crew member would react according to prior experience. The crew-member would at the same time refer any action taken to his colleagues, who similarly would rely on a common and pooled knowledge base. If it is to be flown safely, the modern jetliner relies not only on the competence of its captain, but a linkage of the minds of other crew present. Airlines sometimes apply the mechanical term 'fail safe' to the fully coordinated crew. I believe that British narrative – realist painter Laura Knight (1877-1970) captured that moment where crew loop is critical at the time of take-off in her painting *Take Off,* 1944 [Figure 18]. At the same time, Night's painting reveals the cramped quarters endured by the eight-man crew of a British Stirling bomber.

Figure 18
Laura Knight (1877-1970)
Take Off, 1944
Oil on canvas

Captain Gordon Vette, who sat on the Royal Commission, explains the term ‘fail safe’ as a manifestation of the psychological bonding that exists on the flight deck. ‘But aircrew have a more succinct name – they call it ‘the loop’’ (Vette 1984, p. 90).

2:3 Synthetic Vision – Believing what we See

It has been mentioned earlier that perception is a highly synthetic process, and what one may see is far from an exact image of the physical world. Seeing is a process that is sometimes highly erroneous. This is why the term ‘fail safe’ applies to the crew of an aircraft.

It is an accepted medical thesis that the human body’s actions are approximately 80% controlled by sight, always functioning through a combination of the eyes and the brain. ‘It is to be noted that in man about 80% of responses are visually determined and guided’ (Day in Vette 1984, p. 238). With the human eye ‘believing is seeing’. With the camera ‘seeing is believing’. We are constantly receiving visual input, as we experience an ever-changing picture of the world. The brain processes this information according to an individual’s mental set.

> Light falls on [the] eye, but you see with your brain. Although the retina does an unusual amount of information processing for a sensory organ, visual input is meaningless until it is processed by the brain (Weiten 2004, p. 134).

As an artist I use photography as part of my creative process. A cross-section of the eye is similar to that of the camera, with the lens in front and the film at the back. In the process of passing through and penetrating deeply into the eye’s tissue, the light rays have to pass through its neural wiring. The neural wiring partially blocks the phoetic cells, distorting the image like a picket fence lying in front of the retina. The image is broken, distorted and inverted in the passage of light rays reaching the phoetic receptors.

> ...light must pass through the network of the nerve fibers and cells in the retina before striking the receptors; thus, in a sense, the retina is backwards with respect to light entering the eye (Schlesinger and Groves 1976, p. 158).

How do we repair this image and restore it to its original values? This involves a process in the higher levels of the brain that takes into account an expectation of what an object really is. 'People make educated guesses about what form could be responsible for a pattern of sensory stimulation' (Weiten 2004, p. 145). These educated guesses are based on past experience and 'mental sets'.

From the 'flight view', a square field is perceived as a changing trapezoid as the aircraft gains or loses altitude and alters its attitude in relation to the centre of the earth. 'In visual perception the proximal stimuli are distorted, two-dimensional versions of their actual, three-dimensional counterparts' (Weiten 2004, p. 145). This is demonstrated in [Figure 19].

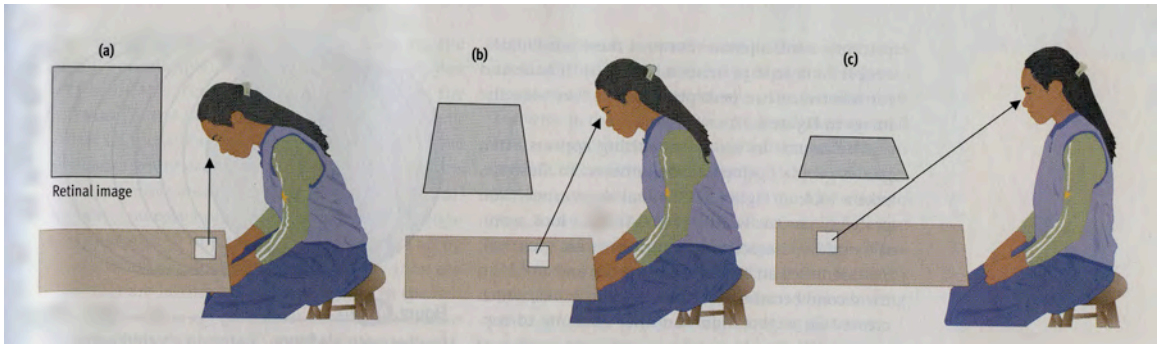

Figure 19
Distal and proximal stimuli are often distorted, shifting representations of distal stimuli in the real world.

It is critically important to understand that the final perceptual experience initiated by the stimulus is determined by a complex interplay of processes at various levels of the peripheral and central nervous system. 'There are great differences between the objects you perceive and the stimulus energies that represent them' (Weiten 2004, pp. 144-145).

Cubist painter Juan Gris (1887-1927) demonstrated a similar idea when he rotated the planar field through ninety degrees to achieve a sense of three dimensionality, interrupting the revolution at certain angles to arrest points as seen in *The Wash Basin* 1912 [Figure 20] and *The Bottle of Banyuls* 1914 [Figure 21].

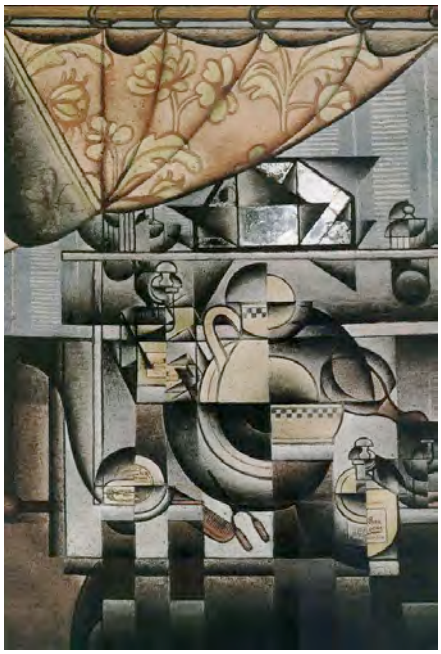

Figure 20
Juan Gris (1887-1927)
The Wash Basin, 1912
Oil on canvas

Figure 21
Juan Gris (1887-1927)
The Bottle of Banyuls, 1914
Pasted papers, oil, charcoal, and gouache, and pencil on canvas

By the early 1900's man had achieved a new sense of speed and dynamism bestowed by machine transportation - in particular, aviation. Transition was a process used by the Cubists at a time when they began to experience flight, seeing the landscape from another perspective. Robert Delaunay (1885-1941) demonstrates this in *Red Eiffel Tower,* 1911 [Figure 22] representing objects in space by multiple perspectives and the shifting complexities.

Figure 22
Robert Delaunay (1885-1941)
Red Eiffel Tower, 1911
Oil on canvas

'This new approach is evident not only in Delaunay's *Windows, Disks* and *Circular Forms* but even in his compositions with figures, such as *The Cardiff Team* and *Homage to Bleriot'* (Habasque 1959, p. 144). Contained within all of these works are elements of the new age of aviation introducing a different perception of the world.

The images [Figures 23 and 24] show the cockpit instrument coaming (raised area surrounding the instrument panel) located in the same position of the picture plane in both images. At the same time, the landscape of *Northdown* Homestead in Northern Tasmania and surrounding paddocks is vastly different, indicating shifting representations of distal stimuli as the aircraft changes its attitude, altitude and position.

Figure 23
Northdown Homestead and paddocks at 800 feet 040 degrees and level, climbing.
Digital still: Simon Bourke, 2006.

Figure 24
Northdown Homestead and paddocks at 2000 feet, 110 degrees and 30 degree bank to the the right and climbing.
Digital still: Simon Bourke, 2006.

At a different level of the brain, incoming information is decoded and interpreted as a meaningful representation of external events. Interpretation involves those higher mental processes collectively called cognition, and in particular involves memory and mental sets.

British psychologist and physiologist Susan Blackmore refers to this as our 'stream of vision'. Blackmore says that we may go on to develop a theory about what is going on:

> One might say as we look around the world, unconscious processes in the brain build up a more and more detailed representation of what is out there. Each glance provides a bit more information to add to the picture. This rich mental representation is what we see at any time. As long as we are looking around there is a continuous stream of such pictures. This is our visual experience (Blackmore in Noe 2002, pp. 19-20).

This was the case of those who work in Antarctica. For them clear air whiteout is a common event and they know how to live with it. The New Zealand crew and passengers of Flight TE 901 had little or no idea of the local environment prior to the impact.

2.4 Losing the Horizon – True and Artificial

I have mentioned previously that in flight the aircraft has three main types of movement: pitch, yaw and roll [Figure 25]. Think of the three axes fixed relative to the aircraft. The longitudinal axis runs fore and aft through the centre of gravity. The lateral axis runs parallel with a line from wing tip to wing tip and passes through the centre of gravity. The vertical axis runs through the centre of gravity at right angles to the other two axes.

Part of the investigation has been to replicate pitch, yaw and roll, visually and aurally, in the context of artistic expression. I considered the last 16 minutes of Flight TE 901, including its track and descent from 26,000 feet to the impact point on Mt Erebus at 1,500 feet. The flight pattern shows the aircraft going through various attitudes of flight and the three planes of movement.

The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references to the surface of the Earth. If the natural horizon or other surface references do not exist, the attitude of the aircraft must be determined by artificial means from the flight instruments. Sight supported by other senses allows the pilot to maintain orientation. However, during periods of low visibility the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of disorientation may vary considerably with individual pilots. The Federal Aviation Administration Branch of the US Department of Transportation has reported '...that during a five-year period, almost five hundred spatial disorientation accidents occurred in the United States. Tragically, such accidents resulted in fatalities in over ninety percent of the time' (Federal Aviation Administration 1983, p. 3).

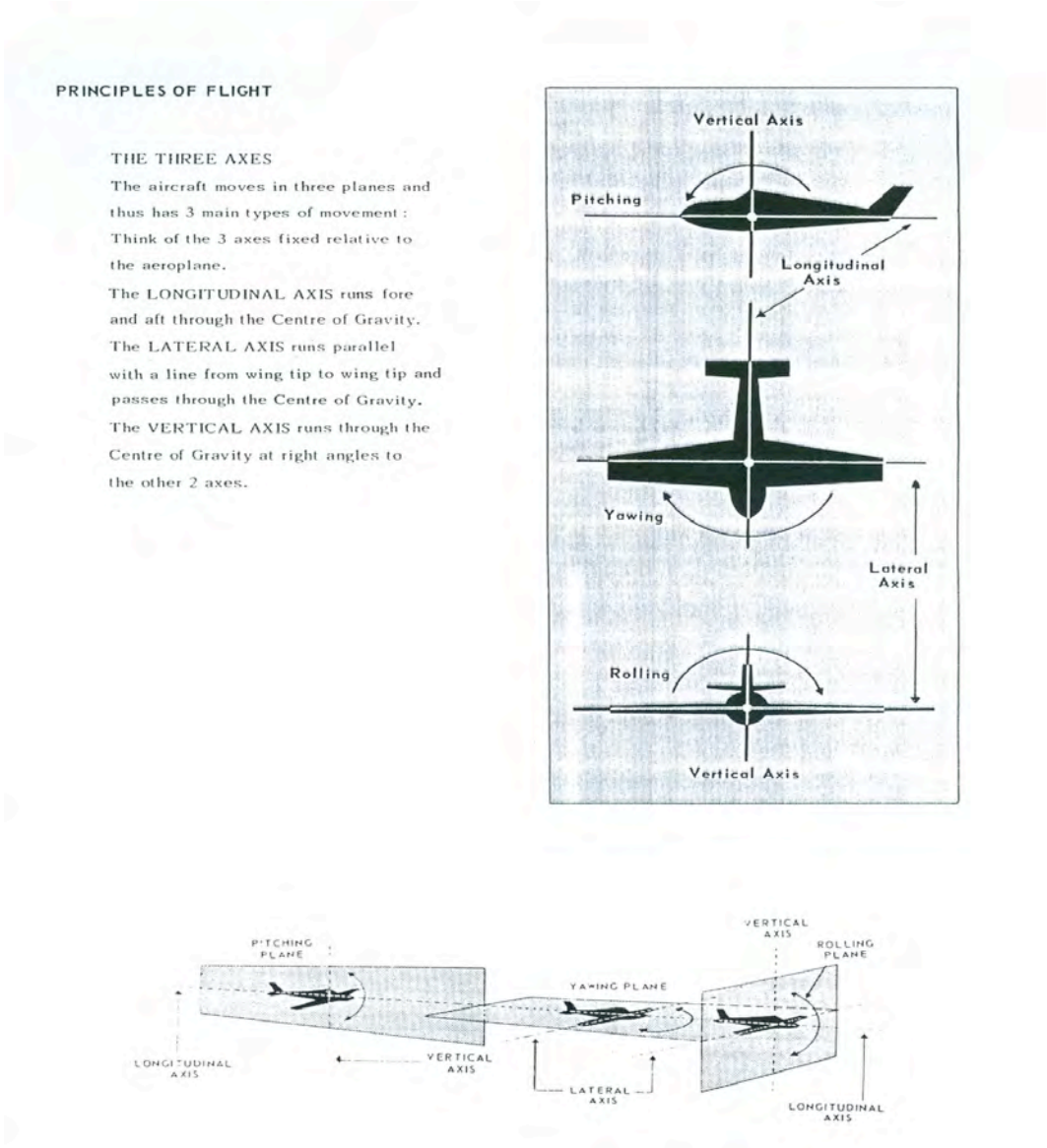

Figure 25
Principles of Flight – The Three Axes

Spatial disorientation to a pilot means the inability to tell which way is ‘up’, sometimes even the ability to tell what is straight ahead. On the ground, a similar phenomenon is experienced driving in heavy fog: there is a tendency to steer to one side simply to maintain a straight course. In flight, surface references and the natural horizon may at times become obscured, although visibility may be above visual flight rule (VFR) minimums. Lack of natural

horizon or surface reference is common on over water flights, at night, and especially at night in extremely sparsely populated areas, or in low visibility conditions. A sloping cloud formation, an obstructed horizon, a dark scene spread with ground lights and stars, and certain geometric patterns of ground lights can provide inaccurate visual information for aligning the aircraft correctly with the actual horizon.

Figure 26
Cloud forms as seen from flight assuming a false horizon, 1/3 from the picture base. Digital Still: Simon Bourke 2007.

Figure 27
Cloud forms as seen from flight indicating a true landscape horizon, 1/4 from the picture base. Digital Still: Simon Bourke 2007.

In these conditions the disoriented pilot may place the aircraft in a dangerous attitude. Other factors that contribute to disorientation are reflections from outside lights, sunlight shining through clouds, and reflections from navigation lights and the anti-collision rotating beacon.

On October 21st, 1978, 20-year-old Frederick Valentich disappeared while piloting a small Cessna 182 aircraft from Melbourne over Bass Strait to King Island in Australia. He reported that a strange airborne object was flying close to him with four bright white lights and other green lights. Soon after he disappeared without trace. From the two-way radio communications between the pilot and Melbourne Flight Service Unit (FSU) it would appear '...that Valentich...was possibly overcome by disorientation' (Journal of Scientific Exploration 2000, pp. 19-33).

In darker conditions, internal lighting e.g. the instrument panel may reflect onto the Plexiglass surface of the windows and create an illusion of external lights in the sky.

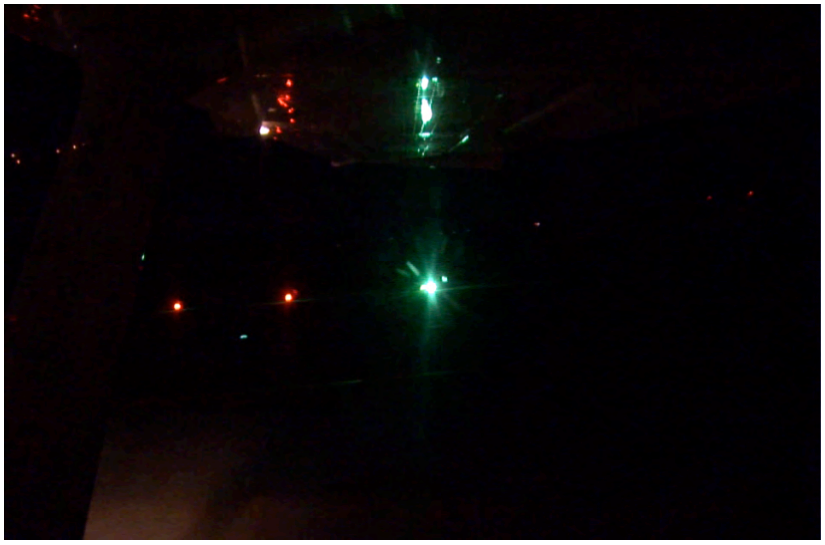

Figure 28
Lights from a night landscape reflecting onto the under-side of the wing of the survey aircraft VH-VMO.
Digital Still: Simon Bourke 2007.

As I collected visual and aural data from seven flights (2006-2007) within Northern Tasmania, I began to realize that all the elements of spatial disorientation were present. One example is seen in [Figure 28]. I have used this material to demonstrate through artistic means, the sensation and experiences of deprived visual references. The method used allowed me to recreate a simulated flight replicating pitch yaw and roll, including the optical illusions that can be experienced. In effect, I have created through art a synthetic vision of the normal experience. I refer to it as re-manufacturing the landscape. The idea is experienced in flight simulators where the landscape viewed from within the simulator is re-manufactured from an existing landscape representing a flight path.

CHAPTER 3: EARTH/SKY RELATIONSHIPS

Chapter 3 considers how light shining on a landscape may change our perception of what we see causing the viewer 'degraded visual function'. I explore the idea of a true horizon that forms the boundary between earth and sky and how changing atmospheric conditions create various phenomena such as clear air white out. This chapter also discusses how artists over time have dealt with horizons in landscapes and how the pilot's perceptions of these landscapes are confirmed by instrument flight. As a pilot and artist, I discuss how the 'flight view' assists my interpretation of atmospheric perspective.

3.1 Art - Interpretation of Light in the Landscape

One aspect of the investigation examines how light falls on the landscape and reflects off surfaces, in particular, clouds and atmospheric conditions such as fog, dust and smoke. At the same time, it has been important to deal with the lack of light, both natural and artificial light, as experienced in the transition from daylight to darkness. Richard Morris is a physicist who discusses man's thinking about light (over the past three thousand years) in regard to the development of modern physics together with the link between light and concepts in contemporary science.

> Light is a basic aspect of the human environment and cannot be defined in terms of anything simpler or more directly appreciated by the senses than itself. It wasn't until the twentieth century that scientists succeeded in gaining a fairly adequate understanding of light, and they had to create a revolution in physics to do so. The fundamental theories on which all modern physics is based – relativity and quantum mechanics – grew directly out of attempts to understand the nature of light (Morris 1979, p. 2).

In his book, *Light*, Morris refers to man's relationship to light as nature's greatest force. At the same time, he refers to painters and photographers and their understanding and use of light. Morris' reference to light underpinned my investigation on how light falls on objects in a landscape and how the viewer

perceives those objects. This understanding of light relates directly to my investigation from the 'flight view' into the effects of light shining on landscapes of minimal color and texture. Apart from the physicist's interpretation of light it has also been important for this study to understand how artists have dealt with light over the centuries. The word *chiaroscuro* refers to 'light' and 'dark', and denotes form by the use of light and shadow. Morris says '...if an artist is to create the illusion of reality, he [/she] must know how to use *chiaroscuro*. Only after he [/she] has mastered that should he begin worrying about perspective' (Morris 1979, p. 51).

Integral to the investigation has been the work of John Constable and Joseph Turner who, through their own art practices, pioneered new ways to depict light in the 1800's. 'Clouds had become for Constable subjects of pictorial, even scientific, study and application solidarity and recession in his works' (Morris 2000, p. 9). Constable was obsessed by the way clouds controlled light falling on the landscape. 'In any painting the *chiaroscuro* depends primarily on the nature and the position of light' (Morris 2000, p. 10).

Figure 29
John Constable (1776-1837)
A Windmill and Gleaners at Brighton, 1824
Oil on canvas

Constable's, *A Windmill and Gleaners at Brighton* (August 20, 1824), was painted at a time when the family first went to the Brighton seaside. The windmill operator's son [John Constable] may have made the gleaners a reassuring sight (part of his 'mental set'), in a somewhat different landscape, especially bathed in glowing light. Constable references a linkage between the machine and the elements of nature, depicting a lowering sky with white windmills seeming to hold back storm clouds and perhaps lifting their arms in warning of changing weather conditions. Martin Kemp, Emeritus Research Professor in the History of Art at Oxford University, writes extensively on issues of visualization and lateral claims that:

> For almost five hundred years the central goal of European painting was the imitation of nature. Many artists and theorists, believing that imitation must be based on scientific principles, found inspiration or guidance in two branches of optics – the geometrical science of perspective and the physical science of colour (Kemp in Thornes 1999, p. 21).

Constable offers a pictorial forecast of the weather as a pilot would witness it from the ground.

In the process of landscape painting, the sky is considered most difficult to implement due to its ephemeral character – an element that is ever changing.

> For the first half of the nineteenth century, principally illustrated through the paintings of Turner and Constable, saw the sky dominating landscape art. Yet of all the aspects of nature that artists have tried to imitate through the ages the sky has been the most neglected and poorly executed from a scientific point of view (Thornes 1999, p. 21).

Figure 30
John Constable (1776-1837)
Cloud study, Hampstead, trees at right 11 September 1821
oil on paper laid on board
24.1 (h) x 29.9 (w) cm.
inscribed 'Hampstead, Sepr 11, 1821. 10 to 11. Morning under the sun - Clouds silvery grey on warm ground Sultry. Light wind to the S.W. fine all day – but rain in the night following' on verso.

Of all the pre-Impressionist painters, it was Turner whose expressive use of light in landscape painting was an attempt to study the nature of light itself.

Figure 31
J M W Turner (1775-1851)
Val d'Aosta, c. 1836-37
Oil on canvas.

As he matured, his style became increasingly free and abstract. In his later work, recognizable forms disappear almost entirely; there is nothing left but light and space and the natural elements.

> Turner was not interested in the effects of light and shadow and he was not interested in analyzing the appearance of light in nature. In his paintings, light becomes a romantic symbol and appears to represent some cosmic force. For Turner, light is always an effect but at some point 'light' ceases to be light at all. Instead, it is a symbol for the often slumbering, sometimes vengeful forces of the universe (Morris 1979, p. 58).

Turner's work reminds me of atmospheric phenomena experienced in flight, in particular the progression into the phenomenon known as clear air whiteout. For me, Turner places himself (like a pilot does) in the weather as a direct experience.

Whiteout is an atmospheric effect that results in a loss of depth perception, not visual perception. Whiteout is especially common in polar conditions such as in Antarctica where there is snow cover and minimal texture in the landscape. This was the case in the Mt Erebus Disaster where the two conditions necessary to produce whiteout, a diffuse shadow-less illumination and a mono-colored white surface, were both present. A probable reason for the diffuse lighting that is responsible for whiteout is a situation where a large percentage of the light that penetrates cloud cover is reflected back by snow. This in return is reflected back by the white cloud undersurface. The transmission and reflection paths that this system develops are most complex as they pass from one water droplet or ice crystal to another through the cloud. These paths are then reflected by the myriad of ice mirrors tilted in all directions on the snow surface. The consequence is that the light is diffused and results in a white shadow-less lighting effect called Ganzfeld. The Ganzfeld Effect (from German for "complete field") is a phenomenon of visual perception caused by staring at an undifferentiated and uniform field of colour. This effect can be induced in pilots

flying in white out conditions as in the case of the crew on Flight TE 901.

The effect is described as the loss of vision as the brain cuts off the unchanging signal from the eyes.

> To snow skiers, it is a term used to express the total loss of visual perception in a blizzard or blown snow conditions and generally leads to the Gansfeld Effect where the eyes failing to find a focal reference point or texture, take up their natural focal length of 4-10 feet (Vette 1984, p. 232).

James Turrell based some of his creative works on the Ganzfeld Effect. For one of these works, *End Around*, Turrell transformed the main gallery of the William Griffin Gallery in California into a Ganzfeld environment of undifferentiated and evenly illuminated space.

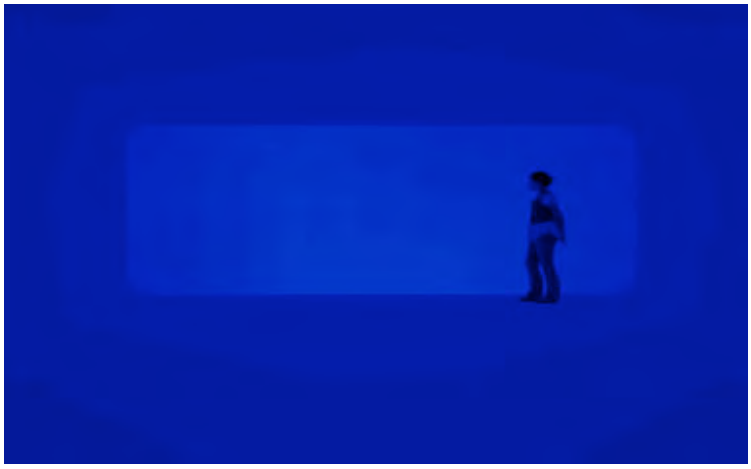

Figure 32
James Turrell (1943)
End Around, 2006
Neon light, fluorescent light and space.

> Upon entering the chamber housing the artwork, viewers instinctively approach what appears to be a faint wall of light in the distance. But upon reaching the light source, one's entire visual field is consumed by an apparently limitless field of blue light. Turrell engineers the Ganzfeld works to eliminate all visual cues that the human brain uses to process depth. As a result, one is unable to tell whether the ethereal blue field he sees from the platform extends for inches, feet, or into infinity. The loaded act of "moving toward the light" and the subsequent experience of limitlessness reopen the spiritual dialectic that has perpetually surrounded Turrell's light works (Griffin Exhibition 2006).

My investigation into the behavior of directional light, or the lack of it, eventually led to the process (the Optical Laboratory) I developed to generate imagery (moving and still) representative of my imagination and the use of my Optical Laboratory. The whiteout phenomenon is not necessarily associated with fog or haze. This condition can occur in a crystal clear atmosphere or under a cloud ceiling with ample comfortable light, even within a visual field filled with trees, huts, oil drums and the other structures commonly found around areas such as Scott Base and McMurdo Sound in Antarctica.

Figure 33
Whiteout conditions showing no ground plane

When whiteout occurs, large unbroken expanses of snow are illuminated by a sky overcast with dense, low stratus clouds that blot out all trace of surface texture or shadow and merge hollows and snow-covered objects into a flattened white background. In addition, cloud and sky may have the same apparent colour [Figure 33], so horizon discrimination is lost and the ground plane or true horizon line disappears. The U.S.Navy Weather Research Facilty defines whiteout:

> ...in a whiteout condition a dark object is visible for many miles while a snow-covered object, even a mountain, next to the observer is invisible (U.S.Navy in Vette 1984, p. 168).

In the case of Flight TE 901 the crew suffered ‘degraded visual function’; a loss of depth of field and a lowered threshold for contrast over the final period of the flight. Perception at this time was divided into two primary spaces - the interior and the exterior of the aircraft. Perception in the near space was not duly affected. This would lead to no appreciation of the extent to which vision was impaired when looking outside the cockpit. In this instant the effects of clear air whiteout are insidious in the extreme as in [Figure 34].

The true horizon, the ground plane and the world associated with it, is lost as the viewer moves into a mental state of a ‘degraded visual functioning’ and then beyond, to an ‘erroneous perceptual experience’ where systems failure occur.

Figure 34
A DC10 airliner showing high contrast in the cockpit compared to, little or no contrast outside.

The Mt Erebus Disaster raises the question of whether we can totally lose perception? It is my opinion that we always perceive through our senses. The visual perception system can be considered as a piece of biological machinery. If this human system is forced to function in extreme conditions, it will fail to operate in a fashion appropriate to the circumstances. ‘This is not human error, but systems failure’, (Day in Vette 1984 p. 263). Vette goes on to say ‘...it is analogous of placing a metal structure under stress it was not designed for’.

For the pilot of a fixed wing aircraft there are several hazardous losses of perception. There is the effect of losing the true horizon and the ground plane, where it becomes impossible, or at least very difficult, to separate sky from earth. Both may be the same colour and therefore there is a lack of a distinct ground plane. In this instance an attempted landing may result in misjudgment of the approach or a stall well above the landing surface. In the worst case, the pilot may fly the aircraft 'into the ground', which is what occurred at Mt Erebus.

3:2 The True and Artificial Horizon

As a pilot, I refer to the true horizon as the line or circle that forms the apparent boundary between earth and sky. It is also known as the apparent or visible horizon.

In aviation, the primary instrument of flight is the artificial horizon (AH), also known as the attitude indicator or gyro horizon. This instrument is used in an aircraft to inform the pilot of the orientation of the aircraft relative to the centre of the earth. It indicates pitch (fore and aft tilt) and bank or roll (side to side tilt).

The essential components of the artificial horizon are:

- 'miniature wings', horizontal lines with a dot between them representing the actual wings and nose of the aircraft;
- the centre horizon bar separating the two halves of the display, with the top half usually blue in color to represent sky and the bottom half usually dark to represent earth; and
- degree marks representing the bank angle. They run along the rim of the dial. On a typical indicator, the first three marks on both sides of the centre mark are 10 degrees apart. The next is 60 degrees and the mark in the middle of the dial is at 90 degrees.

Figure 35
Analogue Artificial Horizon Flight Instrument.

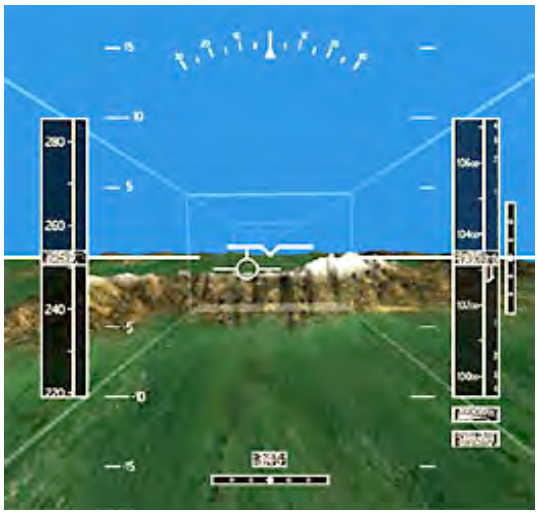

Figure 36
Digital Artificial Horizon Synthetic Vision Flight Director System.

If the symbolic aircraft dot (orange) is above the horizon line (blue background) the aircraft is nose up. If the symbolic aircraft dot is below the horizon line (brown background) the aircraft is nose down. When the dot and wings are on the horizon line, the aircraft is in level flight [Figure 35]. Because it is the horizon that moves up and down and turns, while the symbolic aircraft is fixed relative to the rest of the instrument panel, trainees get confused; a standard corrective given by flight instructors is to 'fly the little airplane in the instrument, not the horizon.' The following images show how the situation of the aircraft is depicted on the flight instruments, firstly with nose high and wings level and secondly with nose low and wings banked left [Figure 37]. The artificial horizon is indicated with an arrow in both cases.

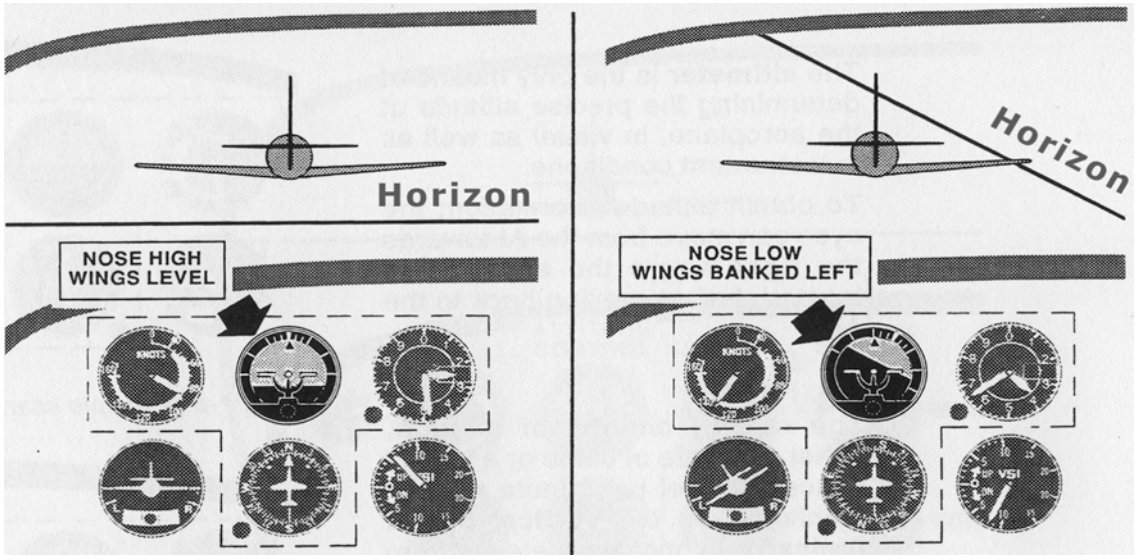

Figure 37
The Artificial Horizon Flight Instrument in relation to other flight instruments in both nose high, wings level and nose low wings banked left situations. The diagram depicts the aircraft in relation to the horizon in both situations.

3.3 The Landscape as seen through the Artificial Horizon

Being an artist my idea of a landscape (from the flight view) in a creative sense is channelled through this little instrument that forms part of the airborne panoptic. It depicts the landscape when you have no reference or visual clues to a real landscape. From a pilot's perspective it is imperative to believe in the flight instruments even if your sensorial perception is telling you otherwise.

In 2004 I created an image that depicted an approach to Lake Pedder in Tasmania's southwest. The image shows this landscape through the framing of an artificial horizon instrument in an aircraft, one depicting a descending turn to the left for a final approach to land on Lake Pedder Beach in 1972, just before its flooding as part of a hydro electricity development.

Figure 38
Simon Bourke (1949-)
On descent to Lake Pedder Beach 1972, 2004
Optically manipulated image
Size variable.

I have applied the idea of horizons in more detail to the creative element of this project. ‘A horizon is perspectival. There are no horizons without perceivers’ (Rolston 1995, p. 380). The following sketches show the depiction of a mountain range as horizon line. In the diagrams the horizon is not continuous, but broken in several parts. The spaces where no horizon line is shown tempts the mind to *fill-in* or *line-join* what one may believe the landscape should be. The first image [Figure 39] depicts the horizon, as I may perceive it from the flight view using instruments. The second image [Figure 40] arranges the images as I would photograph or paint them.

The third image [Figure 41] shows the four individual images joined as a reconstruction of a ‘normal’ experience depicting the whole horizon.

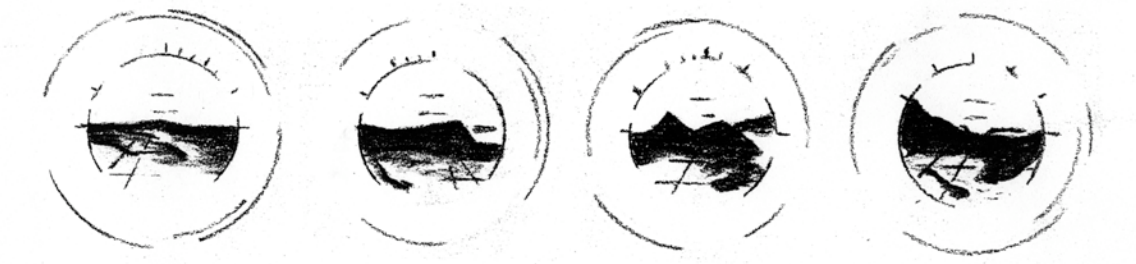

Figure 39
Four captured moments segmenting a horizon line of a mountainous landscape as could be perceived by a pilot from the air supported by flight instruments.

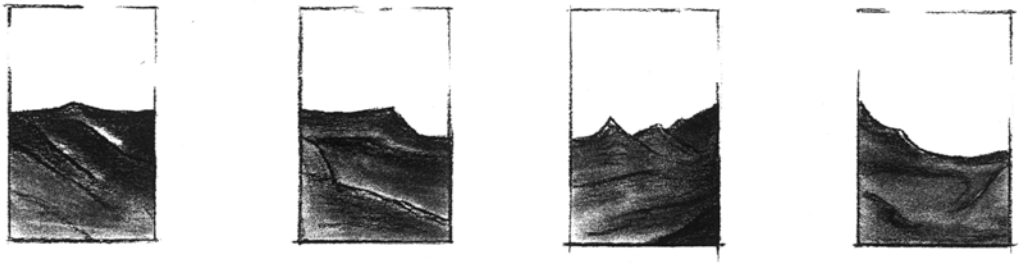

Figure 40
The same captured moments segmenting a horizon line of a mountainous landscape as could be perceived from the view of a painter or photographer.

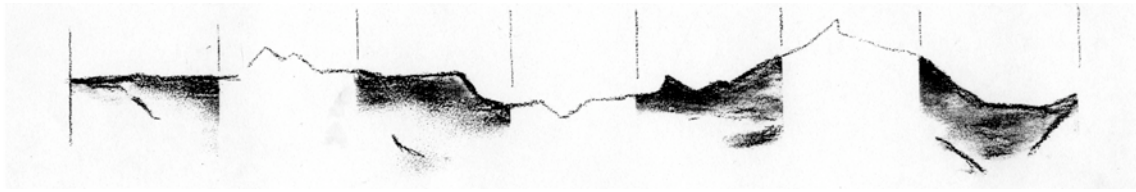

Figure 41
The same captured moments segmenting a horizon line of a mountainous landscape showing the four individual images joined as a reconstruction of a normal experience depicting the whole horizon.

Tasmanian painter Philip Wolfhagen 'flattens out' the horizon in his 2004, *The Inner Edge* exhibition. The horizon line in his work becomes questionable as the landscape merges into three colour fields with varying intensity as light changes in the Northern Midlands landscape.

Figure 42
Philip Wolfhagen (1963-)
The Inner Edge, 2004 (Part of the Exhibition)

Tasmanian academic, Dr Deborah Malor, refers to this landscape as 'Gradually the landscape mists away, the atmosphere refracted and modulated as the light retreats and dims, leaving only a trace of the Tiers' (Malor 2004).

> Reading along The Inner Edge, even the proportions of what might be read as earth/Tiers/sky are not reliant on an update of Constable's meteorological obsessions. The big sky is no longer a subject, but is complexified in a changing relationship to the earth, a band of visual experience (Malor 2004).

The image in [Figure 43] is a digital still from the video sound installation, *World Beyond the Horizon*. It references, in a creative way as suggested in [Figure 39], the pilot's relationship to the centre of the earth confirmed by the artificial horizon (flight instrument), juxtaposed against the true horizon of the landscape.

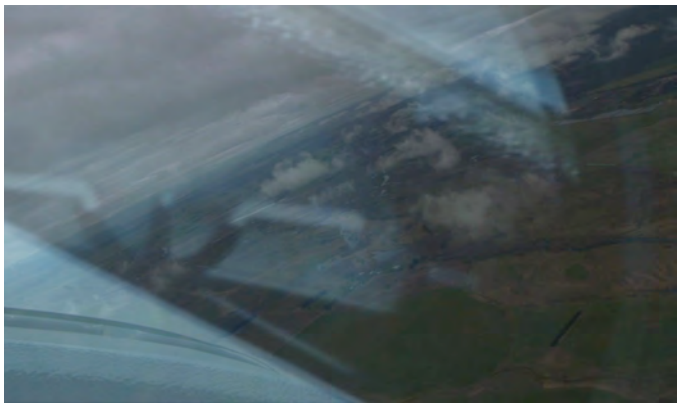

Figure 43
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still timecode 00:07:11:10 (Centre screen).

From the ‘flight view’ perspective, such a transition of atmospheric refraction causing earth-sky amalgamation becomes the precursor for ‘degraded visual functioning’ as referred to in (Appendix D). The results of these phenomena have been discussed in Chapter 2.4: Losing the Horizon – True and Artificial.

What Constable predicts as changing weather patterns, through time, giving a pilot a meteorological forecast from the ground. Turner for his part places the pilot in the weather – abstract, atmospheric and immediate with recognisable forms disappearing almost entirely, leaving only light, space and the natural elements. The pilot reconstructs the complexity of the ‘normal’ experience by using and trusting the flight instruments, in particular the Artificial Horizon (AH) or Vision Flight Director System displaying a synthetic vision of the landscape encountered.

3:4 The Viewer, the Object and the Space Between

The air between the pilot and the machine and object is the space where nature changes what we see in the landscape. As the nature of air changes, perception changes.

Climatology is synonymous with light falling on a landscape. As light changes, the landscape changes. Cloud forms constantly change, therefore causing changing light. The form or essential nature of the landscape remains the same but constantly changes in the way it can be perceived; it is constantly ephemeral. John Constable demonstrated this phenomenon in his paintings, capturing the process of changing light. He also considered the science of weather in the process as shown in his various cloud studies and meteorological research carried out on location. This was well documented in his diaries.

In 2002 an exhibition titled, *Shape of Air* was held at the Plimsoll Gallery in Hobart, Tasmania. The works in this exhibition engaged with concerns such as

the impact of an object on space. At the same time there was an association with the architectural enclosure that surrounds the space, enclosing positive and negative shapes, and a potential relationship being established between the object and the viewer.

For the purposes of my study, clouds define the spatial qualities of the sky – the dynamic void, creating forms of tension, one group to the next as the void is stretched and reduced.

> The objects, spaces and structures that surround us and how we relate to their physical attributes such as shape, scale, density and mass, profoundly impact on our sense of being and understanding of reality (Knights 2002).

At the same time the space between the object and the viewer can be taken for granted. The fact that it may seem to the viewer as clear space is not true. Turbulence, windshear, and vortices caused by other nearby aircraft or objects in the landscape are commonplace in aviation. Training and experience gives pilots a scientifically accurate understanding of these conditions, enabling them to pre-empt an emerging situation and to deal positively with it. A recent demonstration was conducted at the Sheffield School of Aeronautics in Fort Lauderdale, Florida, USA. Using a large smoke machine mounted on a tower, a stable atmosphere was produced.

Figure 44
Windshears and Vortex
Experiment conducted at the Sheffield School of Aeronautics in Fort Lauderdale, Florida, USA.

An aircraft passed through the smoke-laden atmosphere causing a visual example of windshear and vortices as seen by the pilot in the crop-duster located on the runway at the bottom of the photograph [Figure 44].

3:5 Atmospheric Phenomena

The atmosphere is the air that envelops the earth and in the context of this project, it is the space between the object and the viewer. Atmosphere has a direct relationship to Climate – Landscape – Culture that is a major component of this research. As a pilot and artist, the 'flight view' is my interpretation of atmospheric perspective. In the arts, atmospheric or aerial perspective is a method of creating the illusion of depth or recession in a painting or drawing. This is achieved by modulating colour to simulate changes caused by the atmosphere on the colours of things seen at a distance. This is known as atmospheric variation. Leonardo da Vinci used the term aerial perspective in his *Treatise on Painting*, in which he wrote: 'Colours become weaker in proportion to their distance from the person who is looking at them.' Aerial perspective was popular with artists throughout the ages such as Titian, Rubens, Claude Lorrain

and some of the Impressionists, reaching its zenith by the nineteenth century in the paintings of Turner.

3:6 The Flight View

As a young pilot, flying in remote parts of Tasmania's wilderness in the early seventies gave me the opportunity to see the doomed landscape of Lake Pedder from an advantageous aerial perspective; one I refer to as the 'flight view' concept. When flying, I feel a sense of fragility and insignificance, always at the mercy of nature. You enter its vast spaces by invitation, and tempered by your experience to survive. It is not a matter of conquering the landscape, but respecting it – knowing how it behaves – understanding it and the machine.

Figure 45
Peter Lanyon (1918-1964)
Solo Flight 1960
Oil on masonite.

In similar circumstances, British painter and glider pilot, Peter Lanyon also placed himself conceptually in the landscape allowing him an extension in his paintings and constructions. He wrote:

> that *Solo Flight* [Figure 45] his first gliding painting, enabled him to *"experience my country from outside returning to the land rather than emerging from inside…the air as the essential element of my environment."* A year or two later he amplified these remarks, saying that the fascination of gliding lay in the ability *"to get actually into the air itself and get a further sense of depth into yourself, as it were into your*

> *own body, and then carry it through painting."* These constructions function, then, exactly like those made a decade earlier, in that they enable Lanyon to depict himself within land or airscape (Lanyon in Garlake 1992, pp 57-58).

Lanyon placed himself in the air as a pilot would do while flying, allowing himself to experience the nature of air. As I stated in Chapter 3:4 The Viewer, the Object and the Space Between: *The air between the pilot and the machine and object is the space where nature changes what we see in the landscape. As the nature of air changes, perception changes.*

Australia is considered a flat continent from the air, giving the viewer a more exact overview revealing the expanse and strength of the landscape. Unlike New Zealand and Europe, the landscape in Australia is generally below the horizon when viewed from the 'flight view' due to vast open spaces and lower altitude of the mountains.

For Dutch born photographer Richard Woldendorp, now living in Western Australia, the aerial perspective is also an inspiring one. Woldendorp is not a pilot, but uses an aircraft as a platform to get to a desired altitude, to capture a particular moment in a landscape. 'It's fascinating because there is so much variety in the air, which is not always apparent from the ground' (Winton 2009).

Wolderndorp uses the mechanism and compositional elements of photography to capture the moment.

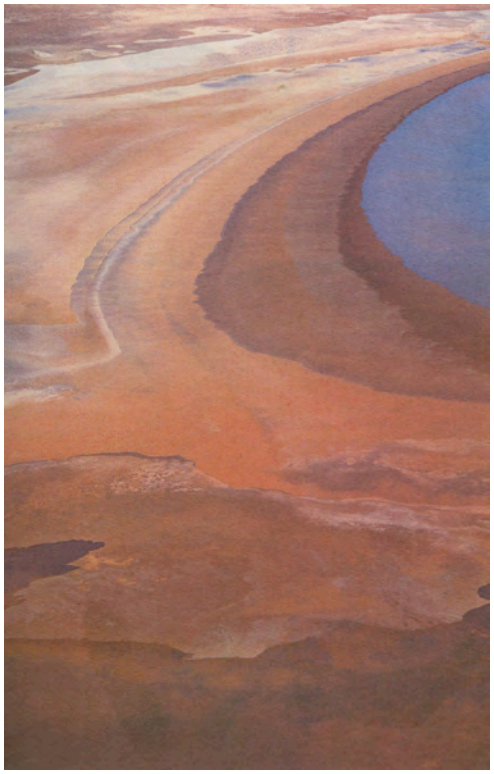

Figure 46
Richard Woldendorp (1927-)
Lake Moore, salt lake, Central Western Australia, 1995.

In His 2009 exhibition *Abstract Earth*, his knowledge and mastery of the lens to lose the horizon, results in imagery that depicts his creative understanding of the landscape.

> Abstract Earth is not just landscape; it's the landscape as seen by Woldendorp, who trained as a painter and still views the world through a painter's eye. Although each picture in the exhibition is a precise record of a landscape seen from the air, these scenes have the power and presence of large abstract paintings (Winton 2009)

Oliver Wendell Holmes, writing in defence of comments made by Charles Baudelaire about the machine quality of photography, stated 'But the honest sunshine [i.e. photographic mechanism] is nature's sternest painter, yet the best, for always true' (Holmes in Mitchell 2002, p. 181).

It has been Woldendorp's interpretation that has been influenced by the minds of abstract painters, one that is profoundly ambiguous but focused at the same time. In an article in The Weekend Australian, Susan Skelly writes:

> Henri Cartier-Bresson made much of that "decisive moment" in photography when everything comes together. Richard Woldendorp knows what he [Cartier-Bresson] means. Although, for the 77-year-old Western Australian photographer, the process is a little more complex. You need altitude (about 450 metres [1500 feet] and climbing), the right plane (preferably a high winged Cessna), a pilot with great timing and an arty eye, perfect weather and some styling from Mother Nature. "you can go around again if you miss the shot," he says, "but it's never the same twice." (Skelly 2004).

For him, each flight becomes a discovery as the landscapes he visualizes tell him something about their natural history and reveal their evolution. It is about him and a sublime aesthetic created when he [Woldendorp] reacts to a particular landscape.

My interpretation of an environment is one that was built up through sensory perceptions developed over a lifetime, in particular as a pilot and environmentalist, and now as an artist. These perceptions were also informed by the 'flight view,' in particular the lost landscape of Lake Pedder that was flooded in 1972.

In 2002, I produced *Cosmic Landscape – Seventh Heaven* [Figure 47]. This painting comprises multiple skyscapes, Rothko-like images, each painted on a square grid of 50mm x 50mm. Painter Mark Rothko was confronted with a similar experience and he identified this in his mature works, those after 1948. He said '...[they were] not representing a physical landscape but a landscape of the mind...they were simply the doorway one had left the world in which they occur' (Rothko in Chave 1989, pp. 128-129).

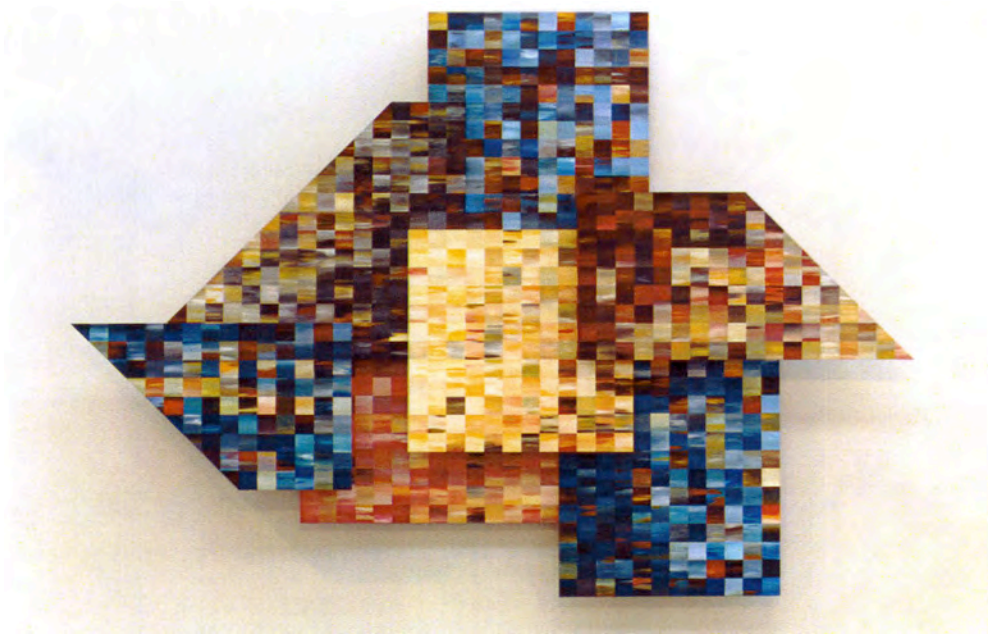

Figure 47
Simon Bourke (1949-)
Cosmic Landscape – Seventh Heaven, 2002
Acrylic paint on seven compressed fibreboard panels
Size variable.

The geometric square grid of longitude and latitude is a reference of multiple landscapes of the mind as seen from the flight deck of an aircraft. Each 50mm x 50mm picture has its own reference to an earth-sky relationship, as the horizon may be evident in some of the pictures, while in others it is an illusion.

The skyscapes in my work convey similar thought. Even though they are based on a geometric grid as would apply to navigation, the colour theory applied to each 50mm x 50mm picture allows them to merge and bleed into one another on a random basis. In turn this idea creates entry and exit points as doorways of transition between reality and illusion at any particular time.

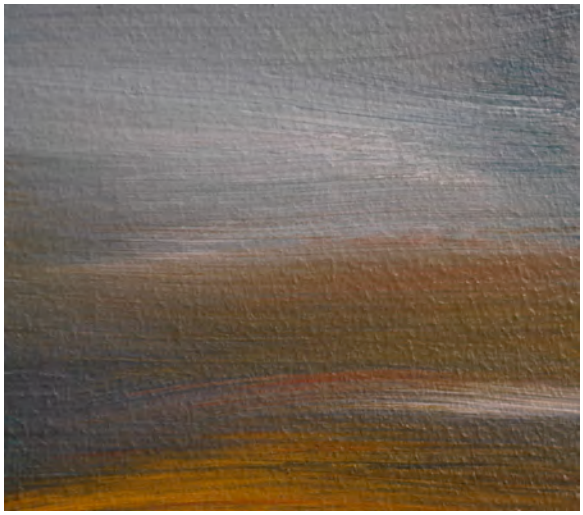

Figure 48
Analysis of one 50mm x 50mm square picture comprised in:
Cosmic Landscape – Seventh Heaven, 2002
Photograph: Simon Bourke, 2010

The picture [Figure 48] analysed in *Cosmic Landscape – Seventh Heaven,* 2002 alludes to a skyscape that could be seen from the 'flight view'. Its composition suggests an earth-sky relationship with a questionable horizon. Light and shade is also present in the left hand side of the painted image, swallowing up the idea of landform into an atmospheric void, and leaving the viewer uncertain. I have carried forward a similar methodology into the optical processes used in this project.

CHAPTER 4: ART AND COGNITION

Artists, over time, have experimented in studies of perceptual consciousness in an attempt to catch the viewer of their work in the act of phenomenological investigation. In this project I aim to create a journey of a remembered landscape and re-manufacture it as an art-form. In this chapter, I have attempted to consolidate my research and practice into text that supports the project. This has resulted in a model that explores the boundaries of one's visual perception system in relation to cognition, reality and illusion (Appendix C and Appendix D).

4:1 Linking Art and Philosophy

Throughout this project I have pushed the technical boundaries within the process of making art. Exercising my artist's hand, I have developed a machine that allows me to freely express ideas beyond the limitations of traditional creative procedures, such as painting and photography. I have been able to express moments in time that may not have been possible by using traditional creative techniques. This is discussed in Chapter 7:3 The Evolution of the Optical Laboratory.

†his section considers the research and findings of contemporary philosopher and cognitive scientist, Alva Noë, Professor of Philosophy at the University of California, Berkeley. Noë works principally on the philosophy of mind and cognitive science, with special interest in the theories of perception and art, together with the science of phenomenology. Noë argues:

> ...that dependence on simple ideas about what experience is like is a major impediment to the study of perceptual consciousness. This point has also been made by Wittgenstein, and other philosophers working with the phenomenological tradition, such as Husserl and Merleau-Ponty (Noë 2000, p. 123).

I have endeavoured to define in my mind the activity that I refer to as an experiment in art: where it fits with creativity and its relationship to philosophy. Some philosophers and scientists argue that phenomenological reflection exists in the mode of activity that arises when we consider how the world becomes available to us through active exploration. Noë states:

> ...it is a mistake to think of vision as a process taking place in the brain. Although the brain is necessary for vision, neural processes are not, in themselves, sufficient to produce seeing. Instead, seeing is an exploratory activity mediated by the animal's mastery of sensorimotor contingencies. That is, seeing is a skill-based activity of environmental exploration. Visual experience is not something that happens in an individual. It is something he or she does (Noë and Thompson 2002, p. 6).

The brain builds and constructs its own 'mental set' from all sensory stimuli received by the body, in particular light and sound. At the same time, we must consider the theory of sensory motor contingency.

In Noë's paper, *Experience and Experiment in Art,* 2000, he refers to experimental art and links it to philosophy. For him, this is a problem for the three interconnected disciplines of philosophy, art, and cognitive science. He discusses the work of artists Richard Serra and Tony Smith against the background of his construct.

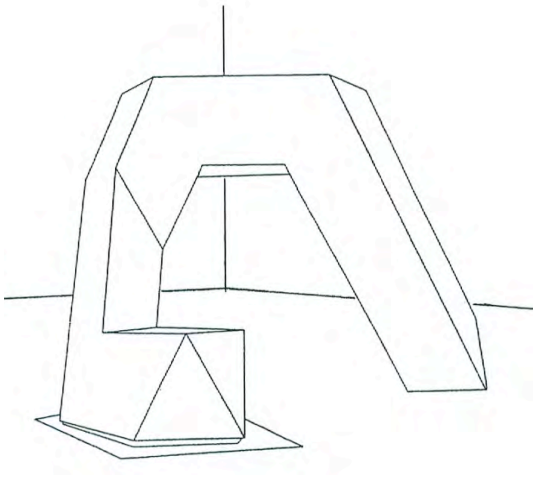

Figure 49
Tony Smith (1912-1980)
Cigarette, 1961
Illustrated by Miriam Dym

Figure 50
Tony Smith (1912-1980)
Cigarette, 1961

As I consider my own position, I have revisited landscapes of my childhood and again as a young man in the 1970's, from the active 'flight view' when I flew as a pilot in a Cessna 337 similar to the one mentioned in Chapter 1.9 The Aircraft – Cessna 337 (VH-VMO). Now, thirty years later, I see things in the landscape that were not experienced earlier; they appeared to be quite different. I found myself relocated in that landscape by remembering moments from the past in order to build or reconstruct the complexity of the 'normal' experience – referencing elements from past experiences. There was a sense of filling in the gaps so I could re-establish myself in that space. I think back to Flight TE 901 where the crew failed to reconstruct the 'normal' experience, thereby pushing them into an extreme of perception where the gaps were too large to fill in and their landscape became a visual illusion. The fact that the crew was subject to degraded visual function (gaps in conscious experience) in turn led to an erroneous perceptual experience. Noë discusses this idea:

> The brain builds and constructs from all sensory stimuli received by the body. These sensory stimuli allude to the building blocks assisting

> construction of thought, building an individual enterprise through active exploration by the human body interfaced with its particular environment. As the brain builds one's enterprise of experience it elaborates on experience in a fairly discontinuous input: a sense of filling in. These gaps in our conscious experience lead us into the debate on whether the visual world is a grand illusion (Noë 2002, p. 12).

I have demonstrated the results of *fill-in, line-joining* and *false visual ranging* in CHAPTER 3: EARTH – SKY RELATIONSHIPS. I maintain that my interpretation of the environment, as it relates to this project, constitutes an experiment. It is a creative process and an experiment in psychology, where the human mind is pushed past a perceived experience ('normal' experience) into the extremes of perception. Perceptual experience is an objective reflection and it is considered by Noë that humans tend to see, by preference, by drawing on personal experience. Noë writes:

> We encounter what is seen, not the qualities of seeing itself, a familiar theme in philosophy. Visual artists such as Tony Smith, Richard Serra, Chuck Close, James Turrell, Robert Smithson and Robert Irwin are just a few that have investigated perceptual experience, creating works that are projects in experimental phenomenology (Noë 2000, p. 28).

Noë claims that to perceive something requires conscious attention: in effect, an activity may be happening directly in front of the observer, but may not necessarily be noticed. The brain may not always be building up a detailed internal representation of the phenomena being presented.

If the apprehension of phenomena is possible, there can be pictures of the visual field itself as long as one adopts a new conception of experience. Noë also argues 'that art can make a contribution to the study of perceptual consciousness' (Noë 2000, pp. 123-35). What Noë calls 'Experimental Art' can provide those who perceive it with occasions to catch themselves in the

act of perceptual exploration and can therefore play a role in phenomenological investigation. Phenomenological reflection proceeds as an element of this activity when individuals think about the way the world becomes available to them through active exploration. Noë uses art as a tool for observing phenomenological exploration as he investigates the sculptures of Richard Serra, *Running Arcs (For John Cage)*, 1992 and *Spin Out: For Bob Smithson* 1972-1973, presenting a surprising environmental occasion for phenomenological self-reflection.

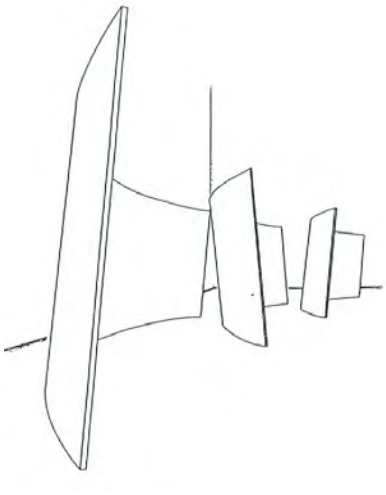

Figure 51]
Richard Serra
Running Arcs (For John Cage) 1992
Illustrated by Miriam Dym
(Noë 2000, p.130)

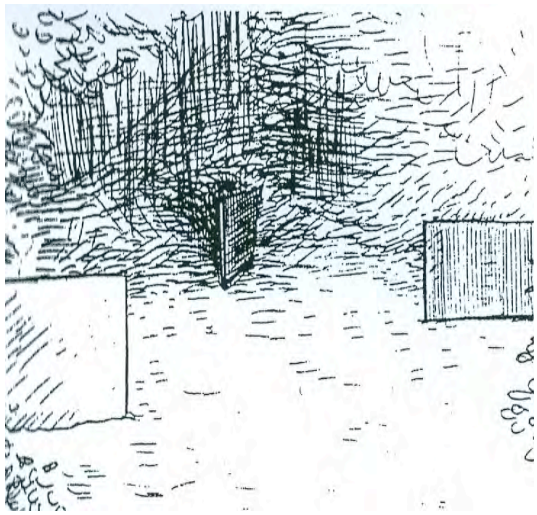

Figure 52
Richard Serra
Spin Out (For Bob Smithson) 1972-73
Illustrated by Miriam Dym
(Noë 2000, p.132)

As Noë sees it:

> …the pieces overpower and overwhelm, introduce giddy disorientation, and generally make one aware of what it is like to be a perceiver, what he calls an enactor of perceptual content. The loss of balance, for example, introduces us to what are strictly non-visual (e.g. vestibular, kinesthetic) components of our 'visual' experience (Noë 2000, p. 131).

Consider for a moment the act of walking on the edge of a dock, against which is moored a large passenger ship. For much of one's walk, there is nothing above but the sheer verticality of the ship's hull. But as one nears the bow, the sharp raking produces a sensation of that part of the ship overhanging the dock. 'Normal' experience references the fields of vertical and horizontal which in this instance become skewed; normal perception is lost.

When looking at a Serra sculpture Noë believes that one may explore an environment and the sculpture which provides another object that enables the viewer to capture himself in the act of exploring the world.

Figure 53
Chuck Close (1940-)
Robert, 1997.

Noë analyses a Chuck Close painting, *Robert,* 1997, a large format portrait in which the content dissolves into an abstraction of pixels as one moves closer, then regains sharpness and form as the viewer moves away. Noë compares Serra's work with that of sculptor Tony Smith, in particular the work *Cigarette,* 1961.

Noë explores similarities of scale and material in the work of Smith and Serra.

> Each makes metal sculptures suitable for outdoor installation at least twice the height of a normal person. Smith's work, however, in contrast with Serra's, is utterly non-psychological. Where Serra's works are experimental, Smith's works are geometrical and mathematical. Smith's constructions realize certain ways of combining shapes (e.g. tetrahedrons) in order to expand space and therefore may be compared with what mathematicians call constructive existence proofs (Noë 2000, p. 133).

In Noë's opinion, space artists such as Serra and Smith, 'make experience their subject matter, not by attempting to depict experience itself, but by providing perceivers with an opportunity for self aware enactment' (Noë 2000, pp. 9-10).

My intention is to create a journey of a remembered landscape and re-manufacture it in a synthetic art form. It has to be a different place for every person who looks at my visual and aural journey. It is your life experience that you bring to my art form, and it is therefore the individual experience that captures the viewer exploring my world.

4:2 A Theory of Perception

For the purposes of this exegesis perception is the selection, organisation and interpretation of sensory input.

> When we try to understand the nature of sensory perception, we tend to think in terms of vision, and when we think of vision, we tend to suppose that the eye is like a camera and that vision is a quasi-photographic process. To see, we suppose, is to undergo snapshot-like experiences that represent the scene – picture-like – in sharp focus and uniform detail from the centre out to the periphery (Noë 2005, p. 35).

Noë explains how *Mach's famous drawing of the visual field* [Figure 54] neatly captures snapshot conception of an ocular experience. It is not meant to be a picture of a room as seen from a particular point of view (reclining on a divan, with right eye shut, fixating a point straight ahead).

Figure 54
Mach's picture of the visual field
from Mach [1886] 1959.

Figure 55
Simon Bourke (1949-)
Mach's Dilemma – My Illusion, 2006
Optically manipulated image
Pigment ink on canvas.

Rather, this image is meant to be a depiction of what 'the seeing of the room' is like: a treatment of the visual experience itself. Mach's drawing represents visual experience as sharply focused, uniformly detailed, and in high-resolution.

I have considered Noë's theory from my own perspective as a person who has been clinically blind in the left eye since August 2000 (due to a retinal vein thrombosis). I have created an image *(Mach's Dilemma – My Illusion)* that depicts Mach's idea from my perspective, in abstract form, from my right eye [Figure 55]. From this idea came the possibility of extending my ability to make traditional forms and expand my skills of the art making process.

Figure 56
The creative processes taking place on the Optical Laboratory, monitored through the artist's right eye. Digital photograph: Simon Bourke, 2005.

My machine is called the Optical Laboratory. It permits me to draw from sensory input, forming a world of the imagination within my mind's eye, and then to place it back into the real world as a synthetic vision.

The world becomes available to the perceiver through physical movement and interaction. Ross Day, Professor of Psychology at Monash University Australia (since 1965) was chosen to give evidence at the Royal Commission into the Erebus Disaster. He related visual perception and the efficiency of visual functioning in regard to the crew of Flight TE 901. He, too, was particularly interested in the effects of perception in landscapes with minimal texture and colour variation, in particular, under whiteout conditions. Day noted 'that the cause of this loss of perception [resulted from] the absence of contrast occasioned by the high, diffuse illumination and by high reflection from white surfaces' (Day in Vette 1984, p. 259). I have made extensive investigations into literature on the whiteout phenomena and how the loss of visual proficiency could range from mild impairment to one that was totally disabling. To retrieve the complexity of the 'normal' experience, the mind is reconstructed – in Noë's world - with what is known as the intricacy [adding

back the elements of stored mental sets] of individual life experiences. I have applied this idea to the investigation.

Throughout this project, I have accepted the understanding that perception is essentially a conscious process, influenced by new knowledge from contemporary art psychology: exploring the boundaries between reality and illusion.

As Day suggests:

> Perception can also be defined as the immediate and largely effortless awareness of external objects, situations and events and the self in regards to postures, movements and actions'. He goes on to add 'Illusionary perception refers to a consistent and persistent discrepancy between the perceived and the physical properties of a stimulus (Day 2005, p. 20).

This concept offers a route into studying the idea of what constitutes original art. Therefore, I believe it is reasonable to suggest that perception is a 'window on consciousness'.

Drawing on the lessons of perceptual psychology learnt from events leading up to the Erebus disaster, I have constructed my own model that explores the boundaries of one's visual perception system in relation to reality and illusion. The following diagrams expound my idea (Appendix C and Appendix D).

CHAPTER 5: THE BODY AND MACHINE IN THE CONTEMPORARY TASMANIAN LANDSCAPE

Reflecting on *Barega,* the place of my childhood years, has played a major part in the construct of this project. It was a place where my early perceptions were formed, ones that are now part of my mental set. In this chapter I discuss how the machine formed a major part of the culture that influenced my perception. At an early age I became conscious that the machine when used as an extension to the human body could create greater efficiency, and in later in life a better understanding of the world through flight and the use of aircraft.

5:1 The Machine: 'There's a Tractor in my Garden!'

By the early 1950's a new machine culture had taken over the Tasmanian landscape. Reflecting on my childhood days, I remember how machinery played an important part in the everyday running of *Barega*, and the associated contracting business operated by my father. Before I was born in 1949, my father and indeed his ancestors generally relied on horse-drawn agricultural equipment with some larger equipment being driven by steam or stationary combustion engines.

In the post war period, technology began to play a larger part in the quiet, scenic rural landscape of Tasmania. *Barega* was a consolidation of smaller holdings owned by previous generations of my family and others, originating from settlement grants offered to them during the Colonial period. On reflection, the property reminds me of 'a little bit of England', a European pastoral landscape set in rural Australia.

During my creative project, I have often thought about my early life experiences with machines and the close unity I developed with nature on our farm through technology. This formed part of my childhood culture. Befriending a pair of

wedge-tailed eagles at the age of 11, coupled with a boyhood fascination of flight, was the catalyst for a future career in aviation. I now use aircraft to explore the world from the 'flight view'. The aircraft is a machine extension that has allowed me to draw from the world of my imagination, in particular my own mind as a young boy. Through this process I can bring the feeling and meaning of my thoughts into the art world in the form of a creative video and sound installation. I have experienced a freedom in a world through a common interface where the body, the machine and the landscape are aligned. In my opinion, this idea goes back to the root of what the Welsh academic, novelist and critic Raymond Williams saw as the meaning of culture. In its early uses culture was applied to cultivation of crops or tending of animals. Williams described the word 'culture' as:

> ...one of the two or three most complicated words in the English language. This is so partly because it has now come to be used for important concepts in several distinct and incompatible systems of thought. The fw is *cultura,* L, from rw *colere,* L, *Colere* had a range of meanings: inhabit, cultivate, protect, honour with worship (Williams 1983, p. 87).

The import of these words and their relationship to culture has played an important part in the foundation of prevailing views in cultural geography studies for this exegesis: the thought processes that align concepts about nature and place with human consciousness. In analysing this culture, its positive and negative effects, I reflect on my formative years at *Barega,* a place where my mind and body began to understand nature, the light falling on the landscape there, linking me to place and space, forming my perceptions. At the same time I have considered the research of Marcel Danesi and Paul Perron and their theories and views on childhood understanding of nature and defining culture.

> Each new infant is born with relatively few innate traits yet a vast number of potential behaviors, and therefore must be reared in a cultural setting so that it can achieve its biological potential. In a phrase,

> Culture has taken over from Nature in guaranteeing the survival of the human species and charting its future evolution (Danesi and Perron 1999, p. 2).

Barega, is part of a culture (a mental set) that has assisted in my development to better understand nature.

Part of the research has been to examine how machines have assisted humankind in exploring and gaining a greater knowledge of the landscape. It is understood that the use of the machine has been of detriment to humankind in many cases. As human beings, we are constantly searching to know more about the world we live in, (*like the passengers on Flight TE 901 as they hoped to explore a world beyond their horizon of every day living).* There is a sense of wonderment which is an essential part of my psyche as an artist, as this chapter outlines.

The world contains within it vast potentials. German philosopher Martin Heidegger calls this a 'standing reserve' (Heidegger 1977, p. 23). Nick Mansfield, cultural theorist at Macquarie University in Sydney, goes on to explain how these standing reserves can be unlocked. 'Humanity unlocks these potentials, changing them into a usable form, then storing them again as new potentials in an ever-renewing act of un-concealment and transformation' (Mansfield 2000, p. 156). Integrating technology and machines into the landscape allows this process to happen, as I have experienced with my rural and aviation backgrounds. Heidegger explains this in more detail:

> The revealing that rules throughout modern technology has the character of setting upon, in the sense of a challenging-forth. That challenging happens in that the energy concealed in nature is unlocked, what is unlocked is transformed, what is transformed is stored up is, in turn, distributed, and what is distributed is switched about ever anew. Unlocking, transforming, storing, distributing and switching about are ways of revealing. But the revealing never simply comes to an end (Heidegger 1977, p. 16).

American regionalist painter Grant Wood's (1892-1942) work, *Fall Plowing* [Figure 57] portrays a typical Tasmanian rural scene experienced in my childhood years.

Figure 57
Grant Wood (1892-1942)
Fall Plowing, 1932
Oil on canvas.

Leo Marx (1919-) is a Professor at the Massachusetts Institute of Technology and an author known for his works in the field of American studies. Marx's work in American studies examines the relationship between technology and culture in 19th and 20th century America. In his book, *The Machine in the Garden*, Marx refers to Nathanial Hawthorne (1804-1864), American novelist and short story writer. Hawthorne describes a similar setting, known in his neighborhood as 'Sleepy Hollow' which he saw as '... a shallow space scooped out among the woods, which surround it on all sides...' (Marx 2000, p. 12). Marx describes the introduction of the railroad into the American landscape, and how technology changed the culture of the pastoral ideal. He goes on to explain how Hawthorne perceived this 'little event in time':

> ...how there is no tension either within the self or between the self and its environment. Much of this harmonious effect is evoked by the

> delicate interlacing of sounds that seem to unify society, landscape, and the mind (Marx 2000, p. 13).

Marx concludes how the introduction of a new machine (the train) changes the tension within an environment. What lends most interest, however, to this sense of all-encompassing harmony and peace is a vivid contrast. 'But, hark! There is the whistle of the locomotive – the long shriek, harsh, above all other harshness, for the space of a mile cannot mollify it into harmony' (Marx 2000, p. 13).

I remember when my father purchased his first tractor. It was a grey TEA 20 Ferguson with a 28 horsepower petrol engine [Figure 58]. Actually, this tractor was one of the first things I remembered as a child and probably constituted my first 'mental set' relating to a machine. Not long after that, a multiplicity of implements followed that were integral to the Ferguson System.

Figure 58
1954 TEA 20 Ferguson Tractor.

Figure 59
Vladimir Krikhatsky (1877-1942)
The First Tractor, c.1920
Oil on cardboard.

The subject of Krikhatski's painting [Figure 59] is typically a Fordson (F model) tractor (ploughing in the background), the first agricultural tractor imported from America and then manufactured in the Soviet Union after the First World War. 'Ford [Ford Motor Company in America] signed a contract for a large consignment of Fordson tractors to the Soviet Union in 1919, which soon

became the largest customer of the company. From 1921 until 1927, the Soviet Union purchased over 25,000 Fordsons' (Wikipedia 13th November 2010). Industrial and agricultural landscapes were popular subjects for artists as seen in Vladimir Krikhatski's work. 'The First Tractor is the name of several Socialist realist paintings and other works of art that portray the beginning of collectivisation in the USSR' (Wikipedia 15th January 2010).

> In 1924, the Leningrad plant "Red Putilovite" started the production of Fordson-Putilovets tractors . These inexpensive and robust tractors (both American and Soviet models) became the major enticement for Soviet peasants towards collectivisation and were often seen on Soviet posters and paintings during the era (Wickipedia 13th November 2010).

The depicted tractor (Fordson) [Figure 60] acted as a symbol of the advantages of agricultural mechanisation and later on collectivisation (1928-1940).

Figure 60
A 1923 Soviet stamp featured the Fordson.

Because tractorisation was state policy in the Soviet Union, the paintings had a propaganda function. With the evolution of mechanization came human redundancy. In the novel *A Short History of Tractors in Ukrainian,* Marina Lewycka has become very interested in the business of an engineering *Weltanschauung* (a framework through which to interpret the world) as in an ideology incorporated into the design of new machines.

> You see as Marx [Karl] said himself, the relations of production are embedded in the machinery of production. Take for example the tractor. In the nineteenth century, early tractors were made by the individual craftsman in his workshop. Now they are produced on assembly lines, and at the end of [the] assembly line stands a man with a stop watch. He measures the process. To make more efficiency the worker must work harder. Now look at a man who ploughs in the field. He sits alone in [the] cab. He moves levers and the tractor ploughs. He follows the gradients of terrain; he takes account of soil and weather. He believes he is master of the process. But at the end of the field stands another man with a stopwatch. He observes the tractor driver, makes note of his lines and turns. So certain time is allotted for ploughing the field, and man's wages fixed accordingly. Now, you see, in this era of computerized control, even the man with [the] stopwatch will be redundant, and the stopwatch itself will be incorporated into [the] dashboard equipment (Lewycka 2005, pp. 56-57).

Just as the machine changed the American and Russian pastoral and cultural ideal in the late 19th and early 20th centuries, everyday life changed so much on the farm in the 1950's, and the years to come. These new machines saved time, were more efficient, and allowed for innovation, greater mastery of process and 'creative pastoralism'. At an early age, I learnt how to operate much of the machinery and well before reaching my teens had become proficient. I soon realized that so much more could be achieved if the appropriate machine were used to complete a particular task; it was the era that marked the emergence of systems-based engineering equipment. Later, the little grey Ferguson was replaced with larger diesel powered tractors. Williams referred to 'ploughshare culture' (Williams 1983, p. 87) in his definition of culture, relating it to cultivation of the land and the tending of crops. I vividly remember the procedure of ploughing on the farm and watching ploughshares cutting the earth and raising it to the mouldboard. Part of that process included the combined smells of diesel fumes and freshly ploughed earth – those particularly combined olfactory senses have also become part of my 'mental set'.

5:2 The Machine as an Extension to the Human Body

My father used the tractor and the agricultural equipment to extend his own physical capacity and the efficiency of running our property. Much later, in my own life, I used the aircraft to accomplish outcomes for work and to gain a better understanding of the world around me, from the 'flight view'.

Where a painter uses the canvas as a medium to explore artistic thoughts, I have used the aircraft as a vehicle, or as a medium, to convey my creative concepts. An aircraft is a complex machine: it may look like a static mass in its stationary position and even in flight convey an image of being a solid object moving through air, but under its skin exists a multiplicity of systems.

When an aircraft takes off, it goes through a series of performance sequences until the ultimate sequence, flight, is achieved. These sequences require a creative objective unity known as interfacing.

Just as the world of machines has developed, integrated systems, and the human mind continue to evolve to meet changing circumstances, as technology itself evolves. Throughout the process of evolution, our human bodies have become separated from many of the tasks they are required to perform: a new way of perception is developing, one that relies not so much on direct, tactile contact, but rather one that merely guides, or steers – a step removed from the work being done. In effect, the direct interface that once existed between man and domestic draught animals, and then the machine has largely disappeared. For example, it was only a few generations ago that farmers irrigated by physically moving pipes and pumps. Now, in 2010, the farmer can sit in his living room and commands, via technology, the centre-pivot irrigator to move where he wants it.

Donna Haraway is currently [2010] a Professor and Chair of the History of Consciousness Program at the University of California, Santa Cruz, United States. Haraway [in Mansfield] suggests that the direct interface has not disappeared between man and machine and in this case her argument is:

> ...that she sees how different domains – the machinic, the biological, the conceptual and the political – interconnect with one another, where technology as a material reality and as a cultural fiction are not separable (Mansfield 2000, p. 163).

Mansfield goes on to say, 'Her [Haraway's] main aim in '*A Cyborg Manifesto'* (1985) is to challenge the traditional left-wing independence on organic and essentialist models of humanity' (Mansfield 2000, p.158). This idea is demonstrated in Vladimir Krikhatski's painting *The First Tractor* [Figure 59] supporting tractorisation as part of state policy in the Soviet Union (1928-1040).

Haraway analyses accounts, narratives, and stories of the creation of nature, living organisms, and cyborgs (cybernetic components); showing how deeply cultural assumptions penetrate into allegedly value-neutral medical research.

Science gives us the opportunity to learn and to understand. Out of science comes technology and machines. Farmers and on the other hand new media artists, like myself, tend to develop an intrinsic trust in these machines. My life experience has taught me that machines, especially aircraft, will perform the tasks I require of them. To survive with machines, humans need systems that have earlier been referred to in this research as belief systems. As I established an understanding around socio-political, economic, cultural and scientific systems, I have considered how visual and material culture has assisted these interdisciplinary processes.

I perceive the body as a physical structure, containing a system of levers mounted in ball and socket joints allowing radial movement, in turn creating

mechanical advantage, all controlled by electrical stimuli and chemical reactions. The body functions as a machine within its design parameters. Outside these, like any machine, it will falter and eventually fail. The body is subject to mechanical resistance and will generate heat when operational, requiring cooling.

5:3 The Body and the Landscape as a Machine

Marcel Duchamp (1887-1986) like other Cubist and Futurist artists, saw the body as a machine, represented in art as shown in *Nude Descending Staircase No 2* (1912).

Figure 61
Marcel Duchamp (1887-1986)
Nude Descending Staircase No 2, 1912
Oil on canvas.

Figure 62
Marcel Duchamp (1887-1986)
Passing from Virgin to Bride, 1912
Oil on canvas.

This painting depicts a system of panels and levers all acting in unison as the nude descends the staircase. The Duchampian mechanics are also played out in his painting *Passage from Virgin to Bride* (1912), showing the body as almost skeletal, a mechanical frame connected by rods, levers, ball and socket joints. When looking at these paintings, I see the human body portrayed as a machine,

a system of panels and a framework, levers and linkages, pivoting ball joints in sockets held in place with elastic tissue lubricated by fluids. The airways of our bodies are ducts carrying oxygen to enrich the fuel, the lifeblood that is piped to the body systems to enable them to operate.

Throughout Tasmanian history, the human body, ‘a machine’, has evolved to last a period of approximately seventy years in the current environment under normal conditions. As part of the investigation I visited several cemeteries in Northern Tasmania to confirm a generally held view about the life spans of early settlers in this state. It became obvious that a century ago, the human body was failing after fifty to sixty years, even if it survived the rigours of the lifestyle and childhood illnesses common at those times. Evolution and advancement in science has enabled the human body to extend its life expectancy and its performance parameters. Machines used as extensions to the human body enable a far wider performance envelope to be achieved by people. The machine extension now becomes a psycho prosthesis, which has taken us to the age of the cyborg human.

A machine can be defined as a device consisting of interrelated parts forming systems that transmit and modify force or motion. The six simple or elementary mechanisms can be classified as the lever, wheel and axle, pulley, screw, wedge, and inclined plane. Machines are all around us, machines made by humans, and machines made by nature. Like all machines, the human body is made up of matter that occupies space; our universe is also made of matter. ‘The human body in its natural form consists of fifty-nine elements from the atomic chart’ (Emsley 1998).

The perceived link between humans, machines and the environment has been active in my mind springing from my childhood experiences with machines at *Barega.* This same feeling of connection has also been experienced in a past

aviation career. Humans may not fully understand the objectivity of the universe, but evolution has given us the understanding of a creative unity that exists between the body, the machine and the environment. The planet Earth is a very complex machine, one that relies on several systems for it to operate. Rivers, mountains, forests, flora and fauna, sky and sea and wind are part of a great and immensely complex environmental machine, inter-related and inter-dependent. I perceive the Earth as a machine that is so great and strong its objectivity is not yet fully understood. Its life span and performance envelope is far greater than any other conceivable machine, and apart from the universe, our Earth can be considered – within the limits of current understanding – the ultimate machine.

Discovery of the existence of such a unity as it exists between the physical world, the personal world and the machine world is a subjective thing, to be discovered in individual ways by every person. It is the process of appreciating the complex linkages, which draw these appreciations together becomes in effect the interface. But importantly, the interface will be different for nearly every individual – it will have been coloured and shaped by life experience, and also by physical and mental viewpoints. So, what the pilots saw as they approached Erebus was quite different from what those on the ground – people accustomed to the region in which they were living – appreciated as verity, a true representation. Yet in reality the scene, the landscape, was to all intents, identical.

CHAPTER 6: EXPERIENCING THE TASMANIAN LANDSCAPE FROM THE FLIGHT VIEW

In this chapter my aim is to place the reader on the cockpit of an aircraft as I locate my art practice within a broad but relevant field of creative practices of others. I have questioned the transition from pilot to artist in relation to the 'flight view' and how my perception has changed through is new creative vision.

6:1 My Perception from the Flight Platform

Sir Patrick (known as Gordon) Taylor (1896-1966) was a pioneer Australian aviator and author.

Figure 63
Pino. G Dell'Orco (birth date unknown)
The Sandringham Flying Boat and Outrigger Canoe
Jacket illustration from the book*, Bird of the Islands.*

In his book *Bird of the Islands,* Taylor reflects on a moment (pilot as writer) when he had previously carried out a medical evacuation charter flight from Suva in the South Pacific in his Sandringham flying boat.

These words express the way I and many pilots and aircrew experience the world of aviation from the flight deck of an aircraft.

> She [the flying boat] passed the entrance island, and opened out into the great lagoon. The wind was steady from the east, offering itself [herself] for the take-off. The moon was drawing the ocean to the time of high water, and the swell was coming in over the reef. I passed the word below to close the hatches; then I let her idle quietly while I watched the swell, thinking back to the narrow channel of Blackswan Passage as another way out to the air…We ran through the pre-flight checks, and I let her come round and up to the wind. She faced the lagoon for a moment of contemplation…and then I gave her full power. The swell was there but harmless. She protested a little, and signalled her disapproval with a half-hearted attempt to go into a disastrous porpoising rhythm, but it was only to let me know her mood. A slight backward pressure on the control column restored her equilibrium and suggested the way of escape to the air. She responded with confidence, and soon was running light and true upon the surface. A touch of the tail trim, and I broke her away when she was ready (Taylor 1964, p. 142).

Taylor also experienced unity between the body, machine and the surrounding environment. It explains his perception of the South Pacific from the 'flight view' of his flying boat.

I fully relate to Taylor's experience as suggested in the following words which are a part of a narrative in a documentary video I produced in 2007, *Flight into the White Abyss - the Pilot as Artist.*

> *I have flown through spaces well above the world I know with no-one else there, just the machine, the landscape and myself. There is a unity between the body, machine and the surrounding environment. It becomes a private world and the machine becomes my partner, a strange but intimate feeling. I am not only relying on sight alone, but on other senses that naturally become more attuned – sound, smell and the feel of the machine – the machine responding to the environment – that sort of thing.*
>
> Simon Bourke 2007

I have often tried to visualise the events that happened on the flight deck in the last 16 minutes of Flight TE 901 as described in the case study (Appendix B). This incident had a major impact on how I express the results of my creative thought relating to this project. To establish this idea in my mind I have drawn mainly from the experience of great painters and photographers; those who have investigated the way humans perceive the landscape, science and technology. For me, photography, video and sound form the primary technique – the opportunity, as I source the data for my creative project. The basis of the audio-visual installation is to create a space similar to the construction of an aircraft, it is at the same time very much the same as a flight simulator.

The intention is to offer the viewer a sense of aperture, from inside the machine, looking out through the windows, as it flies through the landscape. The pilot's perspective is shown in [Figure 64] looking forward into a minimal, textured landscape. The passenger's perspective of the outside landscape is generally at approximately 90 degrees (sideways) to that of the pilot as depicted [Figure 64]. Imagery witnessed by the passenger [Figure 65] was filmed minutes before the disaster.

Figure 64
The pilot's perspective from a DC10 airliner. *The pilots and crew of Flight TE 901 would have perceived a similar view just prior to impact.*

Figure 65
A passenger's perspective from a DC10 airliner. *This passenger's film was retrieved from the wreckage of Flight TE 901.*

I have discussed the perceptions of reality and illusion and how the human mind can move from a moment of reality into a state of illusion. The crew of Flight TE 901 experienced this phenomenon as they flew further into a landscape of minimal texture with diffuse light. Effectively (for them) they moved from reality and the complexity of the 'normal' experience into a state of illusion, one that is not native to their perceptual experience as shown in the case study philosophy (Appendix C).

I have already referred to Leo Marx and his work in American studies examining the relationship between technology and culture. In his book *The Pilot and the Passenger,* Marx talks about American literary culture and the fatalistic view of technology. He refers to landscape conventions such as the riverboat culture on the Mississippi River. Marx goes on to discuss the recurrent theme occurring in nineteenth-century literature and an age that attributed a special meaning to the landscape, particularly in America. 'Popular nineteenth-century culture depicted a national destiny as glorious and beautiful as the surface of the Mississippi at sunset' (Marx 1988, p. 23). For Air New Zealand the Antarctic Flights were of National significance. The pilots and crew were well qualified to operate a modern airliner such as the DC10 on scheduled routes around the globe. The riverboat pilot must learn the language of nature. 'He has to "know the river" by day and night, heading upstream and heading downstream. He must memorize the landscape' (Marx 1988, p. 20). The riverboat pilot and the passenger refers to two ways of life experience – the river pilot who knows the Mississippi sees beyond the surface of nature where as his passengers who are strangers to the river see it as a landscape in another place. 'The passengers lack the intimate knowledge and physical character of the river the pilot must possess' (Marx 1988, p. 22). For the pilots and crew of Flight TE 901 it was also a landscape that would trick them to believe they were in another place. The airliner and crew had different destinations. The under-lying forces of nature changed the way they perceived that landscape. Just as the passengers were on

a journey of a lifetime to the 'big ice' at the bottom of the world the pilots and crew also became tourists in a strange landscape.

The video-sound installation consists of a journey that will take the viewer on a visual and aural experience through a synthetic landscape built up from elements recorded in the survey flights. These synthetic experiences are located within and around the aircraft while moving through space and time. They also influence the perception of the landscape from within and outside the aircraft. I call this the internal-external relationship and the partition effect, this side - that side.

6:2 Pilot as Artist

In 2006 arrangements were made with Skymaster Adventures Pty Ltd based at Devonport to charter the Cessna 337 and part-owner Dr Ian Emmett was to be pilot for the survey process.

For the survey I carried out eight investigative flights (2006-2007), each commencing from and returning to Devonport Airport as detailed in the survey flight schedule (Appendix E). Each flight would differ in plan and would be conducted in varying weather conditions during day and night. In aviation the linear flight plan is broken up into route segments – legs – each starting and ending with a way-point with a designated place name indicated by three letters, e.g. NIE (Nile). This allows the pilot to evaluate each section of the flight before moving to the next leg, checking aircraft performance, fuel usage, changes in weather and navigational errors. This system is also applicable to my research in the methodology of the construction of the audio-visual installation. Even though the installation has no general reference to way-points relating to journey, both video and sound has been edited in post-production by using the Fibonacci Sequence of numbers (0, 0, 1, 2, 3, 5, 8, 13, 21, 34, 35, 89, 144...) to

stimulate the idea of symmetry, proportion, and harmony throughout the installation.

When we taxi out to the runway, on a typical survey flight, the sense of being enclosed within an internal space becomes more obvious. Apart from propeller wash causing buffeting over the wings and fuselage, the movement of the aircraft on the ground is similar to any other land-based vehicle. Vision of the outside world is interrupted with the structure of the aircraft. Our human physiology allows our minds to fill in what we cannot see. Those of the machine overtake sounds of the landscape, as the engines warm-up for take-off. Even though Nora Heysen's painting, *Transport Driver (Aircraftswoman Florence Miles)* [Figure 66] reflects the changing perception of the feminine during wartime, I imagine Florence Miles viewing a familiar landscape of an Australian air force base from the internal perspective of the driver's seat of a military vehicle.

Figure 66
Nora Heysen (1911-2003) *Transport driver (Aircraftswoman Florence Miles)* 1945
Oil on canvas.

Figure 67
Taxiing – To the Blue Void of Space, 2007
Digital Still: Simon Bourke.

A 'Hans Heysen' kind of landscape is seen through the side window of the vehicle and a flag in the foreground locates me in a past, familiar environment when I served in the RAAF in the early 1970's. The aircraft commences its take-

off roll and soon overcomes its earthly restraint. Clearing that restraint, the 337 transforms from a machine on land to one in the air, its shape then free to take its place against the backdrop of blue, a space of passages and volumes of air – a contrast, a shape in air.

The landscape begins to take on a rising perspective. The narrow trapezoidal landscape experienced on the ground is now becoming a changing geometric as the 337 climbs and turns as we set course, passing over the rich volcanic rural landscape of Northdown and Sassafras.

Figure 68
Patrick Grieve
A view of Bass Strait from Sassafras, spring day, 2008
Oil on canvas.

Figure 69
Gear Up - over Northdown, 2007
Digital Still: Simon Bourke.

Writer Peter Timms refers to Tasmanian painter, Patrick Grieve, who is also inspired by this Northern Tasmanian landscape. 'It's the colour that strikes you: specifically, its intensity. Few places in Australia are so saturated in colour' (Timms 2009). This landscape is highly managed, all set out in geometric forms. Some of this land is under intensive cultivation with other down to pasture - the rich red volcanic soil, complemented with green pasture. Timms goes on to say:

> The sudden greenness of its pastures, the almost unnatural red of its newly-ploughed soils, the drama of its distant horizons and overarching skies, make this a world in which everything exists more keenly, with more clarity and vividness (Timms 2009).

As we gain altitude, with the horizon low across the nose of the aircraft, I imagine the sky as a blank canvas, a belief system.

French artist, Yves Klein, saw a similar sky in 1959 with his painting *IKB 79,* 1959, [Figure 70]. At that time he painted a series of canvases in a distinctive shade of synthetic ultramarine, referred to as International Klein Blue. 'Klein saw his paintings as a belief system in which he saw his own reflection, instead of translation, that is what the colour blue stood for – a zone of immateriality' (*This is Modern Art* 1999).

Figure 70
Yves Klein (1928-1962)
IKB 79, 1959
Acrylic and photograph on wood.

Figure 72
Reflection, the pilot as artist, 2007
Digital still: Evan Starkey.

Two years after Klein painted *IKB 79,* 1959, a radio message came from outer space on the 12th of April 1961:

> 'It is blue...', the Russian cosmonaut Yuri Gagarin reported over his crackling radio, 'a wonderful blue', as he, the first human in space,

circled the earth at an altitude of 301km in the *Vostock 1* spacecraft (*This is Modern Art* 1999).

As we climb to the high air, the blank blue canvas of the sky mirrors the reflection of a wonderful blue - a reflection of our own planet - into the atmosphere. Beyond the blue lies the void, the void of time and space.
As a result of human evolution and the desire to reach out into space, Gagarin found himself in a similar void. A wisp of cloud brushes past the wing tip and soon visual reference to the ground is lost as the aircraft climbs and passes through partial cloud cover. I have attempted to capture this experience in my painting, *On Climb – Passing through 5000 feet,* 2002 [Figure 16] in Chapter 2:1 Human Belief Systems and Mechanisms. Australian artist Chris Langlois (1969-) also captures this experience in his work [Figure 72].

Figure 72
Chris Langlois (1969-)
Aerial No1, 2008
Oil on linen.

Figure 73
On Climb to the high air, 2007
Digital still: Simon Bourke.

As visual reference to the landscape diminishes, the pilot becomes more reliant on the airborne panoptic (the flight panel) of the aircraft as mind and body become encapsulated within, and merge with, the machine.

As the aircraft enters cloud, the pilot becomes completely reliant on machine systems, instruments, and signals to maintain the criteria of flight. The pilot's reference to the landscape is now through the instrument panel, the airborne

panoptic. It recalls the abstract revival method of Torben Giehler (1973-) a German artist now living in USA. 'He unites nature, technology, and psychology in works that combine digital and conventional media and play with special reconfigurations' (MacAdam 2007).

Figure 74
Torben Giehler (1973-)
Circling over land, 1959
Acrylic and photograph on wood.

Figure 75
The airborne panoptic, 2007
Digital still: Simon Bourke.

As the pilot's visual reference to the landscape disappears into a Turneresque atmosphere – full of light, the transition as we move into cloud brings to mind another of Turner's paintings, *Rain, Steam and Speed, The Great Western Railway,* 1844, which shows a marriage between art, industry and nature. Turner admired modernity.

'The engine he selected for his painting was the most advanced type of locomotive for the day, known as the *firefly class'* (Walker 1976). Turner's placement of the machine in the landscape of his paintings, back in 1844, directly relates to the context of my current work.

Figure 76
J M W Turner (1775-1851)
Rain, Steam and Speed –
The Great Western Railway, 1844
Oil on canvas.

Figure 77
Immersed in sunlit nothingness, 2007
Digital still: Simon Bourke.

At the same time Turner diffuses the notion of a direct relationship between earth and sky, as the horizon in his work tends to disappear into an atmospheric sublime. John Constable (1776-1837) refers to Turner's work as presenting a sense of infinity in space and is quoted '...he seems to paint with tinted steam' (Hodge and Anson 1996). Richard Morris discusses light in painting and goes on to say ... 'if an artist is to create the illusion of reality, he must know how to use *chiaroscuro*, thus fixing the true quality of light and shade' (Morris 1979, p. 51). Turner found ways of depicting light itself. In his later work, recognizable forms disappear almost entirely...'there is nothing left but light and space and the natural elements' (Morris 1979, p. 57). When I began to analyse imagery collected from these flights, I realized that subtle changes were appearing.

The landscape had changed in the thirty years since I last flew regularly as a pilot. This landscape now reminded me of relief paintings by British artist Ben Nicholson (1894-1982). It was in December 1933 when Nicholson completed his first relief.

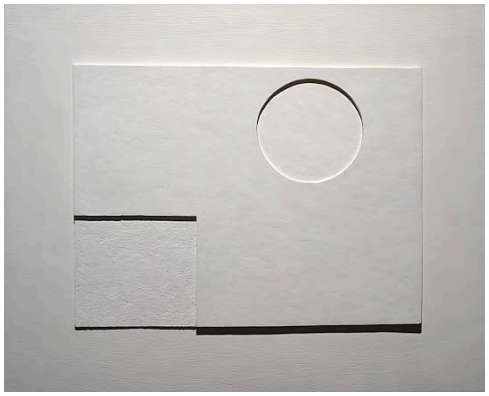

Figure 78
Ben Nicholson (1894-1982)
First Relief Painting, 1933
Oil on carved board.

Figure 79
The Valley of the Circles, 2007
Digital still: Simon Bourke.

He had been inspired when flying back to England from Paris that summer with evident excitement, not only for the sight of French fields;

> ...all laid out in small squares' and a sea of white clouds 'stretched out on one plane to the horizon', with infinite blue sky and bright sunshine above, but also the surprise of dipping down suddenly through the clouds to reach the grey winter at Croydon Airport (Nicholson in Lynton 1993, p. 108).

What we see as a managed geometric Tasmanian landscape, now has large circles reminding me of financial pie charts and reflecting human's demand on this finite resource.

Richard Estes (1932) is an American painter who is best known for his photo-realistic paintings. The paintings were based on colour photographs he would take of objects such as buildings, buses and cars, which trapped the nature of the reflections, which would change in part with the lighting and the time of day. 'All objects in realistic painting have a double life, existing simultaneously as three-dimensional volumes in space defined by perspective, and as two-dimensional patterns on a flat surface' (Canaday 1979, p. 10). While some amount of alteration was done for the sake of aesthetic composition, it was

important to Estes that the central and the main reflected objects be recognizable, but also that the ephemeral quality of the reflections be retained.

Even though Estes was mainly preoccupied by the urban landscape the evanescent elements in his work apply to my investigation. Whilst filming the landscape of Northern Tasmania many opportunities became available to capture moments in space and time such as reflection of the landscape onto the surface of the aircraft (wings and the Plexiglass windows).

Figure 80
Richard Estes (1932-)
Kentucky Fried Chicken, 2007.
Acrylic on canvas.

Figure 81
Mt Jerusalem – Snow Fall, 2007
Digital still: Simon Bourke.

'Reality and reflections of reality become all but indistinguishable from one another, until reality becomes a kind of fantasy in spite of rigidly explicit factual details' (Canaday 1978, p. 14). Despite the power of photographic illusionism, the abstract qualities are strong. One becomes sensitive to forms and shapes, as much as to the tactile quality of the surfaces and objects in this instance. 'Looking into one of Este's store windows we can hardly tell what is in front of us and what is reflected from behind us. We are at the centre of an environment where our own reality becomes questionable' (Canaday 1978, p. 14).

Patrick Grieve paints the landscape of my early life whereas Philip Wolfhagen (1963-) based at Longford in the Northern Midlands of Tasmania, paints the landscape where I now live. Wolfhagen's work is based on a relationship Wolfhagen's work is not about the recording of a place, but concerns itself with the passing of time. 'The way places change, and the ways they change us, and our comprehension of them' (Timms 2004. p. 8). between nature, abstraction and the spiritual in my home landscape.

Figure 82
Philip Wolfhagen (1963-)
Nocturne lll, 2004
Oil and beeswax on linen.

Figure 83
Last Light – Abeam Longford at 3000ft, 2007
Digital still: Simon Bourke.

His work also takes on the understanding of the pastoral ideal of the Midlands of Tasmania and its wide-open spaces. Writing in the catalogue for Wolfhagen's 2004 exhibition, critic Peter Timms said:

> It is, I think, the real daring of Philip Wolfhagen's atmospheric essays on the agricultural northern Midlands area, where he lives, that they complicate our emotional and intellectual responses to pastoralism, cutting through the rhetoric of both environmentalists and farmers, while cheerfully snubbing the snow-capped-mountain clichés of the tourist industry…(Timms 2004, p. 4).

As darkness falls, my flight instruments replace the reality of seeing the landscape as it changes from 'object' to 'subject'. The remaining Rayleigh light (Rayleigh scattering [named after the British physicist Lord Rayleigh] is the elastic scattering of light) on the horizon reminds me of Rothko's 'colour field'

paintings of his later years. It is a painting containing a message of immateriality, as the landscape referenced in reality now becomes a landscape of the mind.

Figure 84
Mark Rothko (1903-1970)
No 14, 1960
Oil on canvas.

Figure 85
The Great Western Tiers – Beyond Last Light, 2007
Video still: Simon Bourke.

Landscape, which is paramount in the literature on Rothko, suggests the impression of immense depth of thought. Mark Rothko rejected the landscape idea within his work, in particular his dark paintings of 1969.
In '*Rothko's Endgame'* by Brian O'Doherty, it was mentioned:

> Rothko, during one of our many contemplations of these works, commented that he had inverted dark and bright to avoid conventional interpretations of landscape – a perceptual habit that irreversibly claims them when turned upside down (O'Doherty 1985, p. 5).

Rothko's impression of immense depth within his work is in context with my investigation of going beyond the idea of a perceived experience within a particular landscape. Rothko's landscape was Manhattan – he was no nature man. 'He was not, certainly not, a man of nature' (Ashton in Chave 1989, p. 129). The reality of any landscape is replaced by the individual's 'mental set' (one's own knowledge of reality and experience) as the mind is reconstructed

with what is known – the complexity of the 'normal' experience referred to in the project philosophy (Appendix D). Rothko links me with 'the sublime'.

Philosopher Immanuel Kant discusses the sublime in *The Critique of Judgement* (1790). 'The sublime is found most obviously in nature' (Kant in Graham 2005, p. 19).

The structure of the encapsulating aircraft now merges into a dark void, placing me at one with the outer world, leaving only earthly lights competing with my flight instruments as we fly through the dark space of night. There is a sense of being moved from inside the machine – what might be experienced as a deepened sense of conjecture: it is the point of entry into the void.

Australian photographer Bill Henson goes beyond the perceived experience of some viewers. Henson refers to it as...'an interior landscape, a lost domain made up of our past experiences (mental sets), our fears and longings. So personal and unique are these experiences (mental sets) that they often have no meaning for others' (Henson, The Age, 2004). It is any artist's endeavour to bring these experiences from the world of the imagination into the real world.

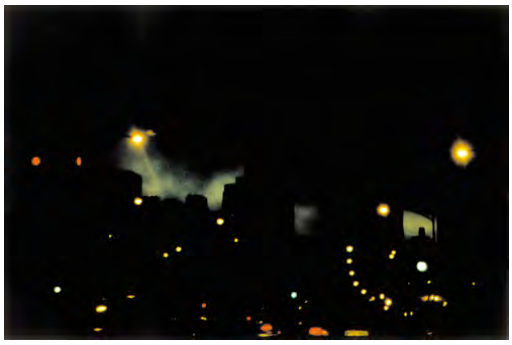

Figure 86
Bill Henson (1954-)
No 91, 1998
Type C photographic print.

Figure 87
Over Port Sorell – Machine in Dark Space, 2007
Video still: Simon Bourke.

Some of Henson's landscapes encompass an environment that combines the rural and the industrial. In these images skies play an important part of the

composition as he moves from light into dark space, a place which for him, appears to contain many messages. Whether perceived at twilight or in the depths of darkness, the images are also illuminated by both natural and artificial sources – similar to that of the 'flight view' at night. 'The ever-changing seasons, the shifting light as each day draws to a close, [are] as the strangely beautiful blending of man-made sources of light and man-made structures with those of nature' (Henson, The Age, 2004).

Looking back, I now realise that the flight survey component of the research became a revelation of something I had discovered earlier, as a young boy. There had been a strange sense of self as I re-entered my world of flight. I had always thought I knew this world of flight. The interface between machine, environment and my self was the same, but the perspective had changed. It was no longer me as a pilot in charge of a mechanical object but a new me made more perceptive through the acquisition of my new artist's vision, seeing the familiar through new eyes. The way I perceive this world now has an element of creative questioning: can it ever be the same world for me? Is this the beginning of a new way of seeing the world, a sense of personal escape and connection with the landscape, a new 'flight view'?

CHAPTER 7: THE TECHNICAL AND CREATIVE PROCESSESS OF MY ART

The flight survey allowed me to collect data relevant to the investigation and creation of the artwork. At the same time, the data mirrored the ideas and sentiments of those artists mentioned in CHAPTER 6: EXPERIENCING THE TASMANIAN LANDSCAPE FROM THE 'FLIGHT VIEW'. In this chapter I discuss the process of using this data to re-manufacture a landscape from a past experience by using the Optical Laboratory and the results demonstrated projected on three screens in a purpose-built vision space facility.

7:1 The Creative Data

This data contains elements through which I have constructed a synthetic journey of a past landscape, using the machine (the aircraft) as a vehicle for the artist's creativity. The challenge for my creative project was to find a means to re-manufacture the data related to the Northern Tasmanian landscape. I wanted the creative project to draw closer to my recollections from past experience, some that are profoundly ambiguous but at the same time, extremely well focused – it is just a matter of attempting to get closer to what I remember from the past. My art is a manipulation of the data I have collected on the flight surveys together with the ideas and sentiments expressed behind the overall concept. I devised a method (the optical machine) that assisted bringing my ideas into reality – over and above my ability to do so as a painter. This process has a wealth of possibilities to positively exploit the digital moving image, photo media, sound and other art disciplines that have been developing exponentially over the past fifteen years. It is intended that the outcomes illustrate a very distinctly different sense of place for every viewer of my work. It is my intention that the viewer-participants bring their own life experiences to the artwork, and it is the individual experience of 'readers' that locates a viewer-reader into my work.

7:2 Experimental Film and Video

For the purpose of collecting data and capturing moments in time, photography, digital video and sound were the primary techniques exploited – they provided me with the materials to tangibly express my creative idea, exploring the interaction of video and sound and memory. My installation, *World Beyond the Horizon,* comprises symbolic and emotional arenas composed of elements drawn from the everyday world of the 'flight view'

In 2007, I decided to become industry-proficient in these techniques, therefore entering the Tasmanian Polytechnic, 2007-2010. My core interest is experimental digital video and documentary film, together with the parallel cultures of aviation and cinematography in the twentieth century

I have investigated the work of American contemporary video artist, Bill Viola. 'Functioning as a surrogate for the mind's eye, Viola's video explores the interaction of image and memory, the subconscious and its dreams' (Kalil in Viola 1995, p. 15). I consider Viola as a leading figure in the generation of artists whose artistic expression depends upon electronic, sound, and image technology. Viola goes back to his childhood (as I have done) to his memory of almost drowning and the death of his mother, *The Passing* 1991, highlighting how his life and work are inextricably linked.

> His works focus on the ideas behind fundamental human experiences and aspects of consciousness. Viola seeks to reconcile the power of video with human consciousness by combining visual, aural, and temporal elements with technology as he probes the essence of being. Although based on realistic images captured by the camera, his works go beyond representation to heighten an awareness of our place in the universal order (Kalil in Viola 1995, p. 15).

I attempt to create this experience within the framework of my video installation, *World Beyond the Horizon,* where large picture projection immerses and engages the viewer.

Figure 88
Bill Viola (1951-)
The Sleep of Reason 1988
Three channel video/sound installation.

Figure 89
Bill Viola (1951-)
The Stopping Mind 1991
Four channel video/sound installation.

Bill Viola used multiple large screen projection in several of his works, namely, *The Sleep of Reason* 1988, *The Stopping Mind* 1991 and *Catherines Room* 2001. For me, the idea of three, 5 x 3 metre angled screens was to immerse the viewer into the 'flight view'. By streaming imagery conceived on a large scale in different ways (abstract and real), it aimed at the body of the viewer by using space and time and large screen projection. In shifting, destabilized visual fields, everything contends with, interrupts, and invades everything else, thereby questioning the viewer's relationship to what is being seen and heard.

Digital technologies have revolutionised the artist's cinema since 2005, pushing towards a *poly-expressiveness,* at last realising the claim by the Futurists ninety years ago in their 'Film Manifesto' of 1916:

> One must free the cinema as an expressive medium in order to make it the ideal instrument of a new art, immensely vaster and lighter than all the existing arts. We are convinced that only in this way can one reach that polyexpressiveness towards which all the most modern artistic researches are moving. (Futurist Film Manifesto 1916).

In 1919, pioneer abstract filmmaker Walter Ruttman referred to film-art. He stated:

> …that the 'acceleration of information', and the increased speed with which individual data are reeled off, both 'floods' the individual and 'defies traditional treatment.' He foresees a 'wholly new type of artist', the filmmaker, 'who stands roughly in the centre between painting and music' (Ruttman in Rees, ed. Hatfield, 1999).

In the 1960's came new philosophies and critical histories relating to avant-garde film. Gene Youngblood (1942-) is a theorist of media arts and politics, and a respected scholar in the history and theory of alternative cinemas. In *Expanded Cinema* (1970), he proposed widening the definition of cinema:

> Citing many examples, mainly from performance art and the Intermedia movement in the 1960's and 1970's, Youngblood showed that the cinema's two-dimensional screen had entered into a whole range of symbioses with other imaging elements and techniques (Grau 2003, p. 164).

His ideas relating to video and Expanded Cinema as an art form were influential in establishing the field of media arts as a recognized artistic and scholarly discipline. In the 1960's and 1970's, British filmmakers were also pushing the boundaries of alternative cinema. Their new work included both single screen and installation film (multi-screen) and video, with some older experiments going back to the Bauhaus period. These artists also sought an 'expanded cinema'. 'Some wanted just that, an art of expanded vision beyond the single image' (Rees 2005, p. 114).

Since 1969, British-born artist and experimental filmmaker, Chris Welsby, has been exploring the complex interplay between the moving image, landscape and the natural world:

> With, *Film and Installations – A systems view of Nature,* Welsby discusses structure and structuring, and considers structural film in

> relation to *structures* determined by systems within the landscape and the interconnectedness of the landscape, filming material and process (Hatfield 2006, pp. xiii-xiv).

Welsby's video installation *At Sea*, 2003 [Figure 90], is a fictional seascape constructed with a combination of digital image-making technology, multiple DVD loops, and four screen video projection. The starting point for his work is the inability of the camera and the frame, as well as the inability of the viewer, to see the enormity of the ocean. What at first appears as documentation of a dense fog rolling over a sea vista, stretched across four projection screens is, in fact, a number of very separate images of the sea.

Figure 90
Chris Welsby (1948-)
At Sea, 2003
Four channel video installation.

'These images are linked in terms of subject matter (the sea and the fog), image density, colour, scale, light, texture and line (horizon), and in the gallery, in the installation, these elements become linked in time as well as space' (Welsby 2004).

Welsby developed special cameras, which rely on wind speed and tidal action to record the sometimes jarring or mysterious film and video for his installations. 'These projects often explore the inherent framing and distancing that occurs as we contemplate the world around us to suggest a more symbiotic model in

which technology and nature are both viewed as inter-related parts of a larger gestalt' (Welsby 2010).

The Long Road to Mazatian, 1999, is a triple DVD projection, a video collaboration between British-born documentary filmmaker and installation artist, Isaac Julien (1960-) and the Venezuelan dancer and choreographer Javier de Frutos (1963-). Thematically, much of his work relates to his postcolonial black and queer identity, however my interests lie mainly in Julien's technical prowess. Julien uses three conjoined screens, fracturing cinema's controlling illusion of a single intact vision. One of the objectives of Julien's work is to deconstruct the barriers that exist between different artistic disciplines.

Figure 91
Issac Julien (1960-)
Paradise Omeros, 2002
Three channel video/sound installation.

Figure 92
Issac Julien (1960-)
The Long Road to Mazitan, 1999
Three channel video/sound installation.

He is drawing from and comments on film, dance, photography, music, theatre, painting and sculpture, and unites these to construct a powerfully visual narrative.

In a 2003 conversation with American director, director, screenwriter and executive producer David Frankel (1959-), Julien explains how he arranges these projections on screens in every possible permutation, suggesting a miniaturised version of CinemaScope. CinemaScope was an anamorphic lens series used from 1953 to 1967 for shooting wide screen movies. Frankel goes

on to suggest that this is hardly conventional film syntax, yet rhythmic editing creates a sinuous flow as follows:

> The camera work is architectonic, making use of the sculptural potential of cinematic space in three-dimensional shots. Images are slowed down, film doubled into itself, fragmented, and juxtaposed with a portion of itself, or collated as a whole on three screens. Mirror images are created simultaneously yet one image subtly lags behind the other, reiterating time. Converging and diverging images move in and out of one another, sometimes deteriorating at the edges and disappearing, into the recess of the hinge in the middle of the screen, creating a vertiginous motion (Julien in Shaw and Weibel, 2003, p. 209).

In *Paradise Omeros,* 2002 [Figure 91], Julien applies a similar methodology as he documents his tour of the spaces of two island cultures – England and St Lucia. Using the recurrent imagery of the sea, the film sweeps the viewer into a poetic meditation on the ebb and flow of self and stranger, love and hate, war and peace, xenophobe and xenophile.

This relates to my work, also exploring an island culture in Northern Tasmania, traversing the years from my childhood to adulthood, and the other, my imaginary world, which references my case study of the Mt Erebus Disaster.

7:3 Evolution of the Optical Laboratory

I was fascinated by illustrations of light refracting through prisms, Fresnel lenses, and lighthouses. My experience as a pilot enabled me to observe, intimately, the phenomena of weather – clouds, sky, wind, light and the landscape – their inter-relationships and, sometimes, their illusionary qualities, as typified by the Mt Erebus disaster.

In 2004, I created my first Optical Laboratory, a machine I constructed from salvaged and found materials [Figure 93].

Figure 93
The Beginnings of the Optical Laboratory, 2004.
Digital Photograph: Simon Bourke.

This machine enables me to superimpose layers of imagery through the transmission of moving and still images by means of projected light. I refer to this as the optical process. Imagery is projected, diffused and manipulated by refractory glass elements, lenses, prisms, shields and grates. The optical process emulates nature to a certain degree. For example, clear air whiteout occurs when light is reflected or diffused as it passes though minute prisms of frozen water, causing a loss of texture or contrast on a surface. With my process, the imagery is contained within the light source and is changed as it passes the refractory glass elements – similar to the same process of clear air whiteout. Some of the images produced on the Optical Laboratory screen present a clear depiction of the world, while other images appear attenuated and distorted, creating a sense of illusion and demanding inquiry into the unfamiliar. The process is ephemeral and is controlled by the perceptive response of the artist's hand. By placement of refractory components, such as lenses, prisms and diffused materials in the direct line of projected imagery, I can make the images transition between representational reality and abstraction.

Figure 94
The New Optical Laboratory, 2005.
Digital Photograph: Simon Bourke.

At certain times as I explore this synthetic imagery (still and moving), my mind is trapped - a moment in time, as I retrieve visual memories built up over time. If I believe, at some point in time, that the visual imagery seen on the screen expresses the feeling and meaning that I am trying to extract from the world of my imagination, I refilm it. I use a high definition progressive rate digital movie camera (Sony EX3 HD1080p) for this process. Capturing imagery this way allows me to bring that moment from my imagination into the real world. This is part of the process of re-manufacturing a landscape of the mind, one forming the context of the installation.

7:4 Re-manufacturing the Landscape

To strengthen my point of view, I have selected a part of the installation where a flight survey was carried out over the Central Highlands and the Walls of Jerusalem National Park in Northern Tasmania. This part of the installation reinforces the idea of moving from a managed landscape into wilderness and beyond, to wildness.

Figure 95
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still at timecode 00:07:21:12.

Visual reference to a geometric managed landscape over Mole Creek.

The viewer is experiencing a 'flight view' accompanied by a drone while cruising at an altitude of 5000 feet, moving south across the escarpment of the Great Western Tiers towards Mt Jerusalem. The nature of the landscape is becoming minimal, featureless, due to changing atmospheric conditions and recent snowfall.

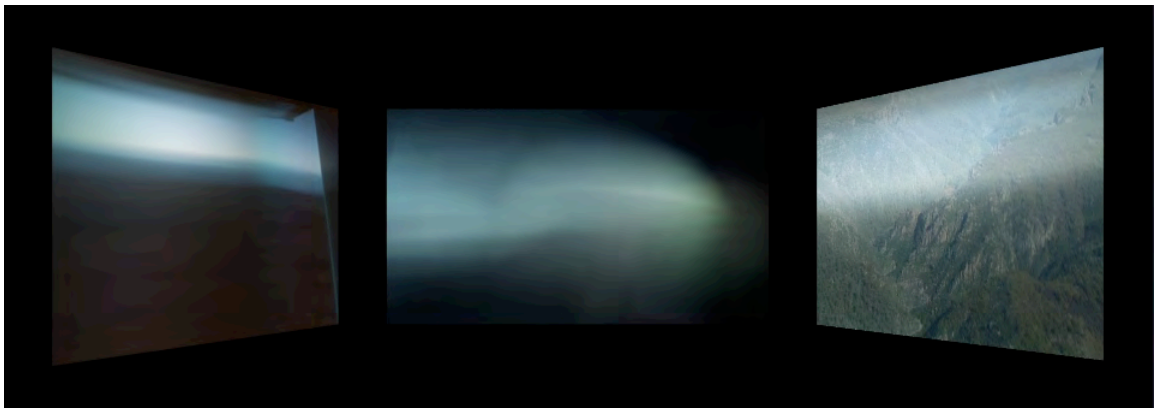

Figure 96
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still timecode 00:06:34:23.

The front screen represents looking out from inside the aircraft with only a slight reference to the horizon. Ravines are seen from the right and a distant view of Lake McKenzie from the left with flat rocky landscape in the foreground.

The intention of the installation is to play on human psychology and physiology as imagery on the three screens move closer to an illusionary landscape. Some of the imagery has been subject to creative manipulation on the optical laboratory.

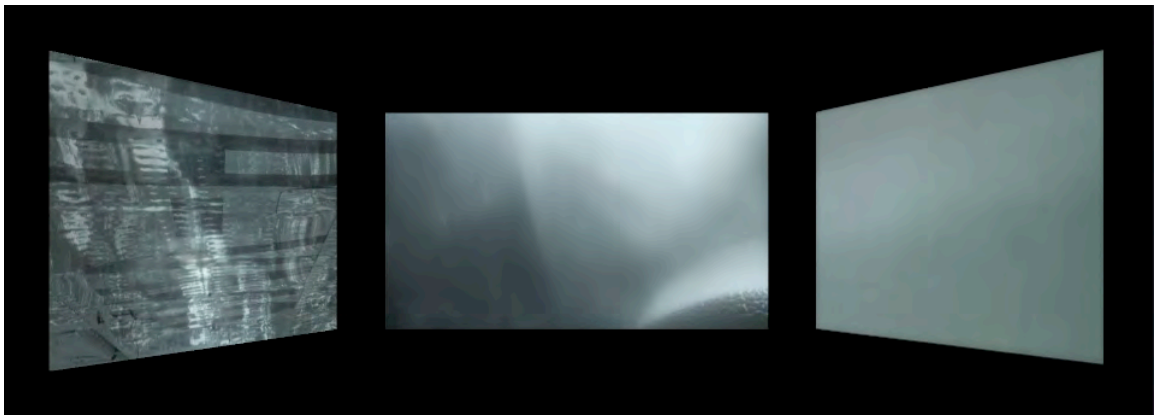

Figure 97
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still timecode 00:07:09:13.

Forward vision is now lost with only the internal outline of the flight panel coaming. The left screen shows the minimalist landscape below reflected back onto the underside of the wing. The only relevant information to the identity of the aircraft is its call-sign VH-VMO.

The result replicates the absence of contrast and texture in that landscape occasioned by the high, diffuse illumination and from the reflectivity of the white surfaces. At the same time other imagery taken direct from the camera has not been altered, but still portrays a sense of illusion due to the lack of any reference available to the human eye. As the imagery moves towards an illusionary experience, the audio component asserts itself from a background abstract as the drone of the engines heard through the communications headset. The sound moves towards the reality of the normal drone with the engines moving in and out of synchronicity, as the sound becomes more of a reality. At this time, the viewer experiences no recognisable visual reference to the landscape outside. Then, on the front screen, imagery relating to flight instruments appears from the immersive atmosphere.

Figure 98
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still timecode 00:08:20:11.

The aircraft wing strut structure appears partly visible on both right and left screens suggesting the aircraft is banking to the left. The front screen is revealing flight instruments giving reference to the landscape.

This information re-establishes the pilot in the landscape through the airborne panoptic, thus giving realistic referencing clues to the landscape below and allowing him to return to his complexity of the normal experience.

Figure 99
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still timecode 00:08:23:14.

Realistic cues of the managed landscape over Liffey Valley are visible on the left screen as the true horizon line establishes, partly through cloud on the front screen while the aircraft continues to bank to the left. There is a sense of partitioning reminding the viewer of the internal perspective on the right screen with part of the aircraft coaming in the bottom left corner. The imagery on all three screens suggests a return to the complexity of the normal experience.

7:5 Testing my Methodology at the World Year of Physics, 2005 Art Prize at the Macquarie University Sydney

Part of the critical and imaginative investigation was to explore how these creative mediums could be used in collaboration with participation from other disciplines to produce an enlarged body of research into synthetic perception. The United Nations designated 2005 as The World Year of Physics, to remind the world the pivotal role physics plays in making manifest the sciences and the creative arts. To celebrate this special year the Department of Physics at Macquarie University in Sydney held The World Year of Physics Art Prize, 2005. The aim was to communicate the activities of the physics department directly and through translation into an art medium.

Professor Deb Kane, Head of the Physics Department at Macquarie University went on to say:

> … and as such [it] is already an example of a collaboration between physics and the arts which we look forward to being further developed through the competition and the discussions that are occurring between physicists and artists,' explained Professor Deb Kane, Head of the Department of Physics. 'What we are hoping to do is to raise awareness of physics through a new medium (Kane 2005).

To generate ideas, physicists as well as approximately twelve artists, including myself, met prior to the exhibition for two workshops in June and August 2005. At that time Professor Kane questioned the familiar notion of a deep divide between science and the arts:

> What we are hoping to do is to raise awareness of physics through a new medium. The initial plan was to track down existing artworks for an exhibition to mark the World Year of Physics. Then came the idea to inspire new work (Kane 2005).

She did not wish the art prize to be seen as a gesture in the debate about the relative weakness of science and technology in universities in 2005:

> This is a celebration of physics and its interaction with the community. Professor Kane went on to say…the problem remained a real one. Compared with a country such as Germany, Australia lacked a deep tradition in hi-tech industry and a strong educational culture in science and technology. What was needed, she said, was the pioneering spirit Australia had shown more readily in other areas of nation building (Kane 2005).

Macquarie's website displayed resource sheets with images and thumbnail sketches of five key areas of work in the discipline. These disciplines were:

- Astronomy and Astrophysics
- Mathematical Physics/Quantum Information Science/Computational Physics
- Optics and Photonics
- Condensed Matter Physics/Bio Physics
- Physics Teaching and Learning

As mentioned, my project coincided with the Macquarie University World Year of Physics Art Prize, in 2005, particularly in the key area of Optics and Photonics. This was an opportunity to turn my Optical Laboratory upon itself as the object of my reflection, now to be expressed as a two-dimensional work of art.

The artwork I produced for this exhibition alludes to time and the depth of space – the movement of light into the darkness of another world. There are memories partly forgotten, passing through and beyond via mechanical devices and optics, like light into an atmospheric void of timeless space. As I see it, light and the manipulation of light has formed a vital part of our modern technological environment and is the origin of my project.

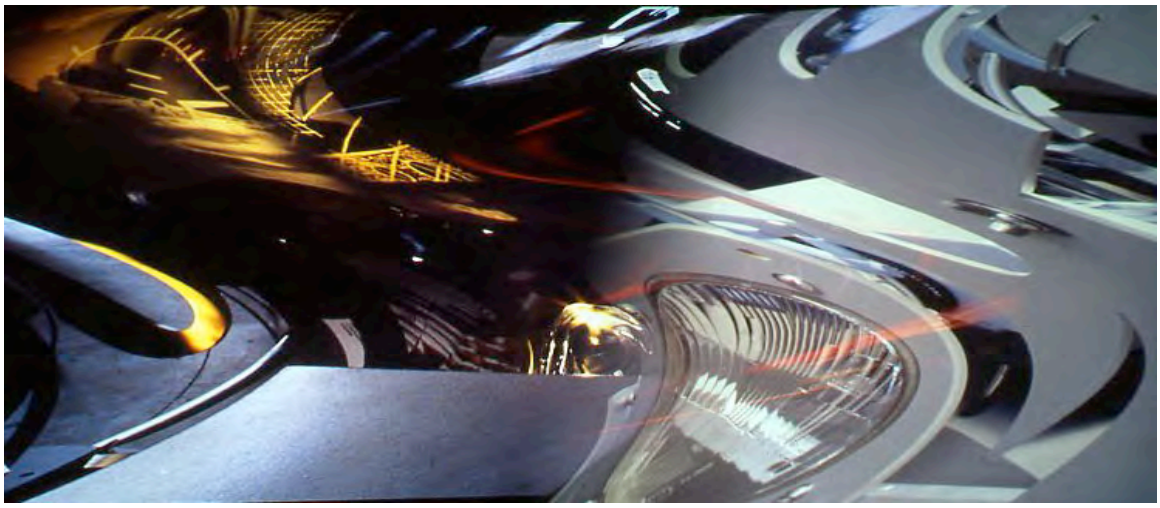

Figure 100
Simon Bourke (1949-)
The Slightly Bizarre Optical Laboratory, 2005
Optically controlled imagery, pigment ink on canvas.

7:6 Human Interface Technology

Expanded cinema has now led to an enlarged perception of reality. Austrian-born Valie Export is an artist, independent filmmaker, and theoretician who is the creator of works in a variety of media, including documentary and narrative film, video, performance, photography, installation, sculpture, and drawing. 'Today, expanded cinema is the electronic, digital cinema, the simulation of space and time, the simulation of reality' (Export 2003). Professor Thomas Furness is one of the most important pioneers in the development of virtual reality systems and interfaces between humans and complex machines. 'Furness worked on targeting devices for the U.S. Air Force and founded the Human Interface Technology Laboratory (HITLab) at the University of Washington in 1989' (Grau 2003, p. 167). For the past 24 years Furness has been an advocate for building aircraft cockpits that take into account the perceptual organisation of the human mind. Most of his work has centred on the concept of virtual interface technologies, which provide a circumambience of three-dimensional spatial information to the human using visual, auditory and tactile senses.

Figure 101
Advanced Concepts Flight Simulator Cockpit Interior. NASA.

Figure 102
Boeing 747-400 Simulator and Advanced Concepts Flight Simulator (ACFS). NASA.

I have constructed a vision space facility at the Academy of the Arts, University of Tasmania at Inveresk to demonstrate my findings. The facility consists of three screens arranged and calibrated to demonstrate the internal and external effect of the 'flight view' perspective (Appendix H). The screens forming part of the installation resemble the environment of a flight simulator as shown in [Figure 101].

The front screen gives the viewer a sense of moving through a landscape as would be seen from the pilot's seat on the flight deck. The two side screens, left and right, give the viewer a sense of passing by the landscape as seen by passengers in the cabin. The perspective of the 'flight view' is contained within the space and the shape of the window from which the viewer is looking.

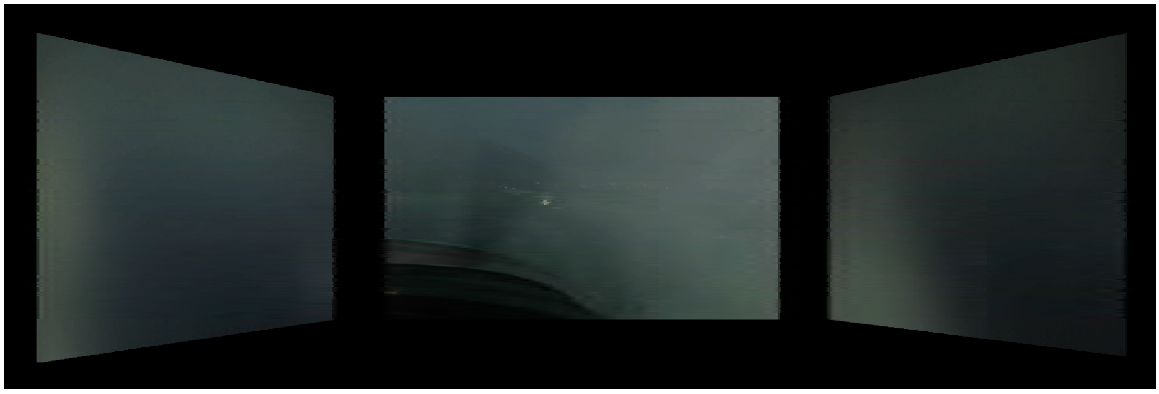

Figure 103
Simon Bourke (1949-)
World Beyond the Horizon, 2010
Video installation still timecode 00:09:40:11.

This frame was part of re-manufactured data collected on a clear day during a normal approach to Devonport Airfield. The footage was then manipulated on the Optical Laboratory by overlaying footage of a night approach to Launceston Airport at a different time from a second data projector on the Optical Laboratory. Diffusing other footage by means of refractory glass elements as part of the optical process generated the atmospherics on the left, front, and right screens. The result was re-filmed as part of the re-manufacturing process.

Synthesis and reality have been on a journey: images from a half-remembered past have gained new currency – my mind has slipped seamlessly into the machine world and the world of the computer via photography. Notwithstanding the subliminal influence of the great painters, and the artifice of computer-generated imagery has become a new truth. The whiteout experienced by the unfortunate passengers and crew of Flight TE 901 has become a part of my own mental set almost indistinguishable from a personally lived experience. For me, the lines between the real and the illusory have been blurred for ever: the whiteout experienced in Antarctica is as real and familiar as the mannered and ordered landscape of Northern Tasmania – the mind deals equally with both.

CONCLUSION:

It was the process of recalling the song *Sigma* from the Secret Garden Project that originally triggered a 'mental set' linking to an incident in my childhood. Subsequently, it was this 'mental set' that led me to develop a greater interest in the natural world. My memories as a melancholy young boy of eleven and a desire to escape from sadness and loneliness (emotions that this particular music and lyrics evoke) encouraged me to investigate more extensively the world around me. At that time the experience engendered a wonderment of what lay beyond the horizon of the landscape at *Barega*, the home farm.

In later life my research (visual and aural) explored the notion of the 'flight view' together with aspects of science and technology. Using the aircraft cockpit as an airborne platform, an extension to my body, enabled me to view the landscape from a new perspective – that of the air.

The creation of the Optical Laboratory has allowed me to remanufacture what I previously experienced as a pilot and observed intimately, namely, the phenomena of weather – clouds, sky, wind, light and the landscape – their inter-relationships and, sometimes, their illusionary qualities. As a result I have created an immersive video installation that conveys a personal escape from the memories of childhood sadness and a connection with the landscape that I experience from the 'flight view'.

I investigated the way humans respond when they witness variations of light falling on a landscape, confirming that the process of sensory perception is highly synthetic. What might be seen as one person's 'normal' experience (i.e., reality) has the potential to be another's illusion, based on experience gained through the senses. I have questioned the often-mythical aesthetic (as was the case of the Greek god Erebus) applied to a landscape, one based on climatology

and the culture located within and outside of it, using the Mt Erebus disaster as a case study. This aesthetic is one that emerges when we react to landscapes. By using scientific methodology it has been confirmed that the myth is lodged in the mind and not in the landscape: ‘Science helps us to see the landscape as free as possible from our subjective human preferences: ‘Science corrects [sharpens] the truth’ (Rolsrom 1995, p. 376). Through the human activity of flight and by using the ‘flight view’, I have looked closer at the landscape of Northern Tasmania.

My investigation has concluded that science and art can extend the human capacity for exercising sensory perception.

The project proceeded to investigate the similarities and yet at the same time contrasts between a particular clear air whiteout experience in Antarctica with an aerial survey of climatology relating to the landscape of Northern Tasmania. As humans we combine culture and nature in numerous ways, such as with the management of the landscape. Part of the investigation was to analyse the transition from the managed rural landscape of my childhood years to wilderness and ‘beyond’, extending to wildness. The results have proven that at any time, through such a transition, human perception may become inconsistent.

The survey data has been used to reconstruct the landscape of Northern Tasmania with what I know (my research) as I allude to the elements of depth of space, time, reality and illusion. The end result of the analysis is a re-manufactured view of the world represented by synthetic vision.

From the ‘flight view’ experience has come ideas informing the research and methodology that have been tested in an academic and creative arena. It has

been accepted, through my experience at Macquarie University, Sydney, that these concepts and media can be used in interdisciplinary research.

The synthetic vision I have produced by using creative mediums and methodologies offers a different experience for every person who looks at the work. The outcome is influenced by the life experiences of viewers and participants, together with what constitutes their world, and which are brought into my creative investigation. My intention is to capture the imagination of others and extend their experience of ‘being there’, in a synthesized space, representing a ‘scientific view’ of the landscape.

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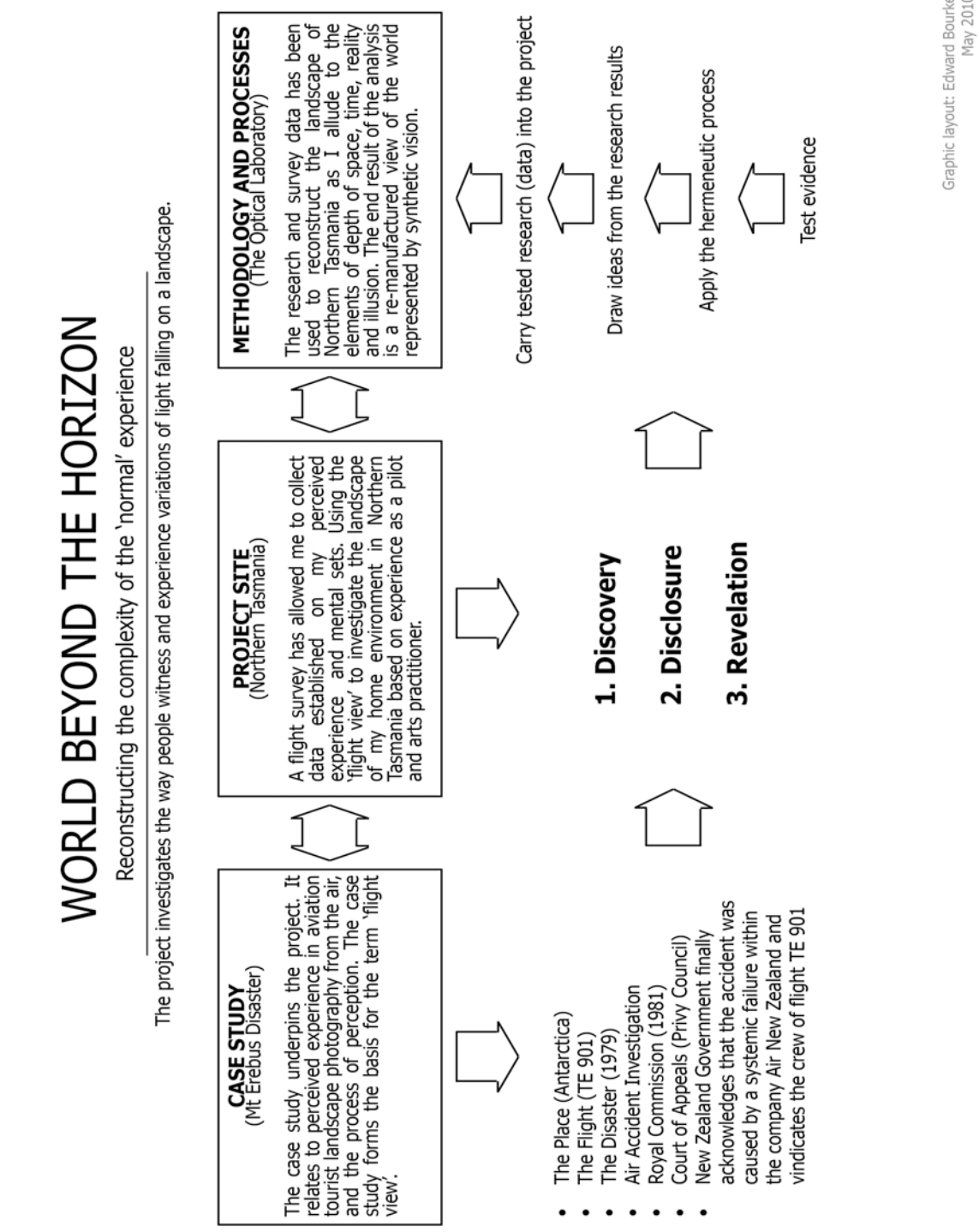
APPENDIX A: Schematic Diagram for the Project Research Plan



APPENDIX B: The Case Study

The Mount Erebus Disaster

On Wednesday the 28th of November 1979, a DC10 airliner operated by Air New Zealand, Flight TE 901, departed from Auckland International Airport and was cleared to conduct an 11 hour round trip sight-seeing journey via Antarctica, day-trippers embarking on a unique journey to the big ice at the bottom of the world. They never returned.

Figure 1
DC10 Airliner.
(Right Vision, 1984, Video still 00:11:21)

What became known as the 'Erebus Disaster' was one of the most extraordinary events in civil aviation history and, at the time, resulted in the fourth largest loss of life in a civil aviation incident. In this event 257 people died: no-one survived.

In Greek mythology Erebus was the son of Chaos and brother of *Night, Darkness Personified* and a place between Earth and Hades, the name given to the caverns on the way to Hell. Erebus was a lower subterranean world, the abode of departed spirits, a world of the dead over which Pluto ruled. This mythology had now become reality, and with a new and sinister meaning. At home in New Zealand, another ancient Greek idea, Huberus, the sin of pride, was followed by a fall as the airline's boastful billboards 'nobody does it better'

vanished. Even though a systemic failure had occurred within Air New Zealand, manifested in a sense of corporate arrogance, the ultimate key to this disaster lay in the white silence of Lewis Bay, at the foot of Mt Erebus, a 12,500 foot active volcano. It was the place to which the airliner had been unerringly guided by its inertial navigation system only to be destroyed in clear air and without warning by a malevolent trick of the polar light. But there was another factor at play. Even though the company initially placed blame on the pilots and the crew, two programming errors occurred, mis-programming of the inertial navigation computer and mis-programming of the crew, the latter as a result of a flawed company *esprit de corps*.

It meant, in effect, that the airliner and Captain Collins were flying to different destinations. From the subsequent inquiry came a responsibility for the aviation industry to establish research for the programming of flight computers and mental sets (the body of knowledge which pilots gain through flying) of airline pilots and crew as the first link in a command chain. The pilot syllabus was revised to include study in the psychology of perception and resulted in a rapid transfer of information between universities throughout the world and the aviation industry. Finally, and most importantly, a new understanding of how a pilot interfaces between the machine and the environment came into being.

Two major rules apply to pilots in the world of aviation. Visual Flight Rules (VFR), specify procedures under which visual navigation and/or traffic separation is permissible. Instrument Flight Rules (IFR) are standard rules governing flights if weather conditions preclude the use of visual navigation. However, commercial jets invariably fly IFR except on departure from or approaching airports, and also in unusual situations – such as special scenic flights, as was the case at Mt Erebus. There is a process of transition that happens as a pilot loses reference to the visual landscape and reverts to relying on the aircraft's own referencing system, the flight instruments. This referencing

system relays performance of other systems within the machine to a central point where the pilot can juxtapose this information with visual mental referencing. Such a reliance becomes a belief system, not one of possibilities, but one of probabilities and absolutes. This belief system is a faith in the assemblage of instruments and controls, a machine system that acts as a medium between the reality of the landscape below and the landscape of the pilot's mental set. The crew of Flight TE 901 believed they were flying safely down McMurdo Sound whereas in fact, they were tracking into Lewis Bay on a collision course with Mt Erebus.

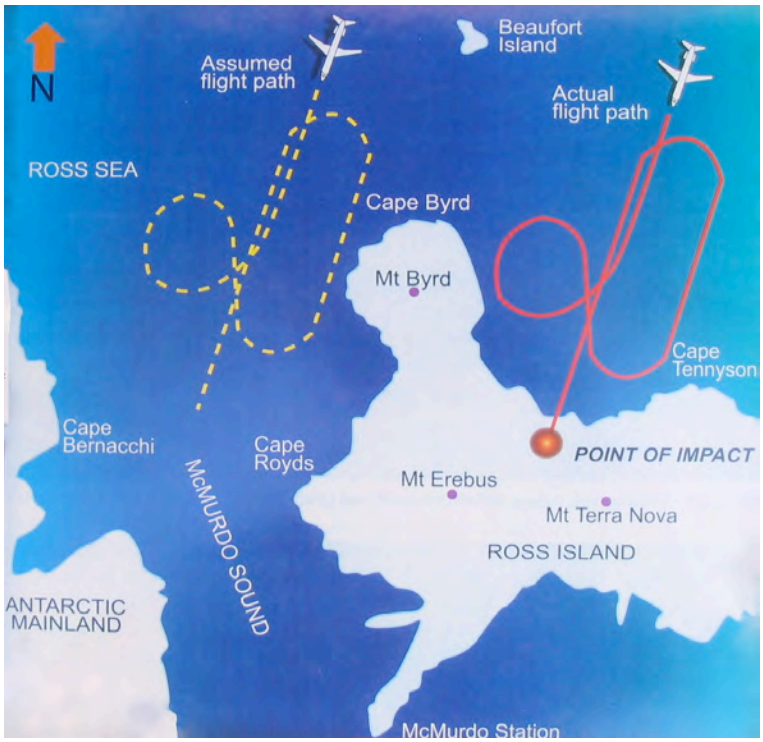


Figure 2
The Last 16 minutes.
Flight Path of Flight TE 901.

As Captain Collins commenced his let-down to the large clear area to the north of Ross Island, all the pre-requisites for a safe clear VFR approach appeared to be in place. Collins proceeded into his right-hand descending turn, at which stage the plane's position detection transponder was coding indicating that

McMurdo tower had them on radar. But their textbook avoidance of cloud during the let-down would lead them unwittingly into an area below the cloud base at this location where their eyes would fail them without even being vaguely aware what was happening. The passenger photos retrieved from the crash site showed clearly that there were at least 40 nautical miles of visibility: 40 nautical miles is the maximum visibility reported in aviation. The mystery is how the crew didn't see the 12,500 foot volcano in front of them when photographs taken just prior to impact showed that in fact a condition of maximum visibility existed.

Link between Passenger Photos, Times and Transcript from the Cockpit Voice Recorder (CVR).

In order to illustrate the view visible to passengers at the time when those on the flight deck were passing the remarks that have been recorded, the comment closest in time to where the pictures were taken is shown. Be warned that the view that the view taken by the passenger will usually be totally different from the view being scanned by those on the flight deck.

Picture of aircraft (in red) Passenger Photograph Map.

When the aircraft was located approximately where the picture marked 'A' in red on the map [Figure 3], Collins says: *'I'll have to do an orbit here, I think.'* (32.45 GMT)

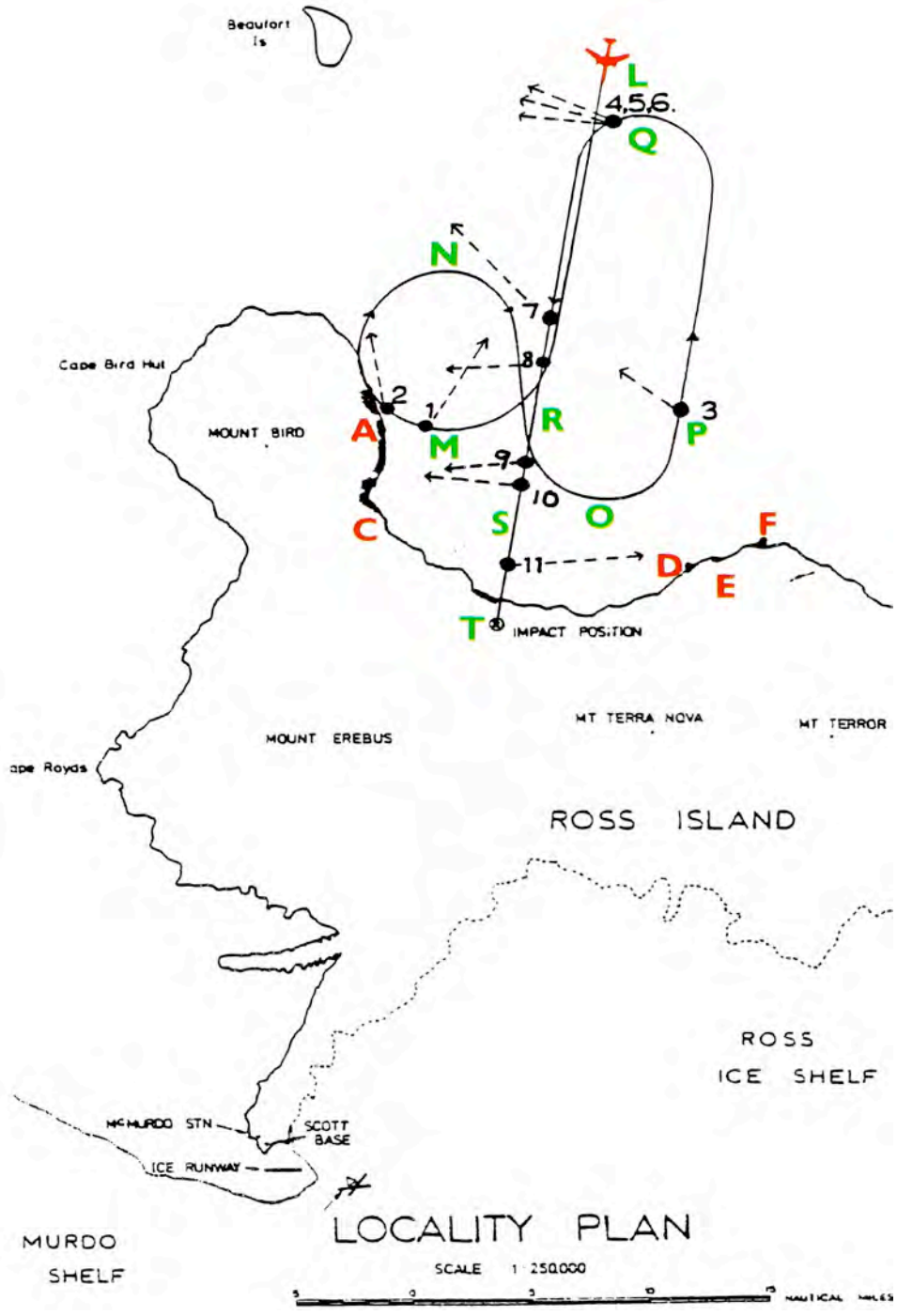


Figure 3
Passenger Photograph Map
(Vette, 1984, p. 67)

Figure 4
Fig. 20, Photo 1
(Vette, 1984, p 68)

Photo 1. The aircraft is executing a turn to the right above cloud. The photo was taken out to the right into the clear area where the aircraft was about to descend. Flimsy wisps of cloud are below and further below that again is the clearly defined sea ice.

> Time of photo: before 33.45. Collins 34:21: *'Captain again, ladies and gentlemen. We're carrying out an orbit and circling our present position, and will be descending to an altitude below cloud, so that we can proceed to McMurdo Sound – Thank you.'* Note the reference by Collins to McMurdo Sound.

Figure 5
Fig. 21, Photo 2
(Vette, 1984, p. 68)

Photo 2. This photo was taken at an altitude of approximately 16,000 feet while the aircraft was in a right-hand turn with Beaufort Island visible looking forward. This image shows the large breaks in the cloud layers and illuminated surface of the pack ice visible below together with the cloud shadows on the pack ice. Significantly, fingers of cloud extend from the end of Cape Bird towards Beaufort Island. As the aircraft progresses further to the left, the effect would be for this cloud at the intermediate altitudes to move across and mask off Beaufort Island from their view, until they progressed well to the north into the large cloud break that can be seen at the end of the finger. Another significant feature is the appearance, once you have recognized Beaufort Island, of what appears to be another land mass almost concealed below the edge of the cloud on the bottom left. While it has every appearance of being a land-mass, similar to Beaufort Island, it is in fact a break in the sea ice, could well have believed Beaufort Island to be another such break, or an extension of that one.

Figure 6
Fig. 22, Photo 3
(Vette, 1984, p 69)

Photo 3. Beaufort Island is visible but not clear. The aircraft was now at 9,500 feet, and is likely to have been near position 3 [Figure 3] on the north-bound leg. This is the view that the island would present when it was not obscured by the cockpit coaming and within the scan pattern of the crew. Peter Mulgrew (the flight commentator) was not on the flight deck at that time. The remaining crew was not expecting to see Beaufort Island in that location. If they saw anything they would either have believed it was another break in the sea ice, which was the belief of other experienced pilots such as Captain Gordon Vette on a previous Antarctic flight, or they would have identified it as Dunlop Island, located further west. At this time the aircraft was below the main cloud layer.

> Time of photo not recorded in evidence. The passenger photo reveals (to those who know what it is) an indistinct view of Beaufort Island as it appeared from 9500 feet.

This 'island' is in fact not an island at all. It is simply a break in the sea ice.

Figure 7
Fig 23. An 'Island' in the Ross Sea or a break in sea ice?
(Vette, 1984, p. 69)

It was included by Gordon Vette to demonstrate that should a member of the crew, other than Peter Mulgrew, have seen Beaufort Island, he may have perceived it as another break in the sea ice. The photographs of Beaufort Island were taken from the passenger cabin. If views were visible to the crew, they may have been visible at different times, from a number of angles and under

subtly different lighting conditions. In any case, they would be from a greater altitude with much less vertical development apparent than that shown in the passenger photos.

Figure 8
Fig. 25, Photo 4
(Vette, 1984, p. 71)

Photo 4. The aircraft is rolling out of its left-hand turn with Beaufort Island starting to pass toward the rear on the right hand side of the image. The black breaks in the sea ice and Beaufort Island itself show a marked similarity. *They were in fact 27 nautical miles to the east of their desired location.* The crew was looking almost 180 degrees away from Beaufort Island, and the island at this stage was starting to get some considerable vertical elevation because the aircraft had now descended to approximately 7000 feet. The main cloud base can be seen above the aircraft with a large hole showing up clearly at the wing tip, and extending forward. *Visibility is still excellent*. Shadows and highlights on the sea indicate a good deal of broken cloud further to the north and in the direction to which they were progressing at that stage. The aircraft's low altitude makes the island stand out from the sea ice much more prominently that it did from a high altitude, when it was within the scan pattern of the pilots. Compare photo 4 [Figure 7] showing a passenger view of the island with photo 3 [Figure 6] that shows how it appeared to the flight crew.

Time of photo 44.10, distance to impact 25.5 miles Unidentified speaker 44.06: *'Where are we?'.* Brooks (flight engineer): *'About up to here now?'* Sound of rustling paper suggesting a map being moved to indicate position on that map. Cassin (1st officer) 45:00: *'We are now at 6000 feet, descending to 2000 feet, and we're VMC.'* (Visual Meteorological Conditions).

Figure 9
Fig. 26, Photo 8
(Vette, 1984, p. 71)

Photo 8. This image was taken towards the west, in the direction of the Victoria Land coast, showing the well-defined cloud base of the high cloud and some layers of cloud at various altitudes. One layer is apparently at about the same altitude as the aircraft, which was then at approximately 2000 feet. A lower layer can be seen, apparently increasing towards Cape Bird.

Time of photo between 46.37 and 48.05, distance to impact between 8 to 15 miles. Brooks 46.39: *'Where's Erebus in relation to us at the moment?'* Reply: *'Left about (20) or (25) miles.'* Mulgrew (flight commentator/Antarctic explorer) 47.02: *'That's the edge'.* Collins 47.43: *'We might have to drop down to 1500 feet here I think'.*

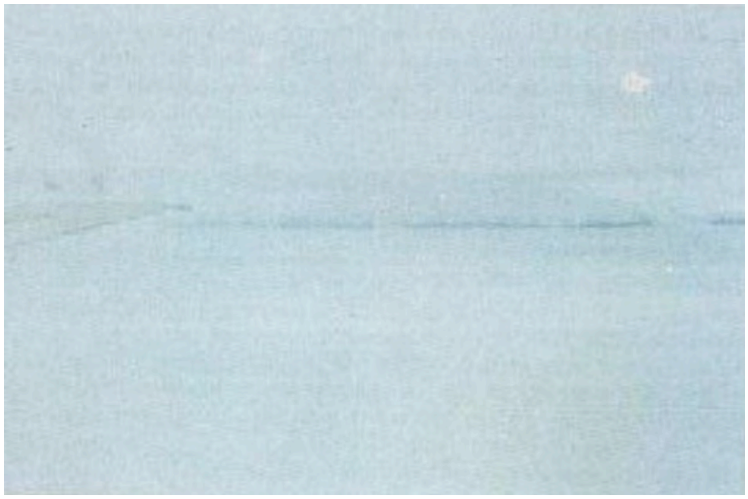


Figure 10
Fig. 27, Photo 10
(Vette 1984, p. 72)

Photo 10. This image was also taken at 2000 feet and toward the same direction as photo 9 (not shown but from approximately one mile south of photo 9. In the right of photos 9 and 10 [Figure 10] directly above 'A' [Figure 3] sunlight can be seen shining on Cape Bird peninsular. Some cloud shadows are also visible on the Lewis Bay sea ice. The cloud base above point 'A' of the low level stratus is probably above 2700 feet. It also shows that the pass between Mt Erebus and Mt Bird is free of cloud, indicating that the main cloud base is above 2500 feet, and possibly just below 2700 feet. Very significantly it shows the textured cliffs of Cape Bird on the right-hand side with stratus cutting and forming an artificial horizon across the slopes of Bird. No doubt this line of demarcation between the base of the cloud and the snow slopes continued around in front of the aircraft toward the other textured cliffs of Cape Tennyson, on their left. The Cape Bird cliffs were obviously mistaken for the Cape Bernacchi cliffs on the other side of McMurdo Sound. This line of demarcation of the cloud meeting the slopes of Cape Bird, shown in passenger photo 10 [Figure 10], supported Captain Vette's hypothesis of the same effect on the slopes of Erebus ahead, giving the impression of a far distant horizon as illustrated by artist Sam Mahon's visual models [Figures 19 and 20] which were presented to the Royal Commission.

Time of photo 48.18: distance to impact 8 miles.

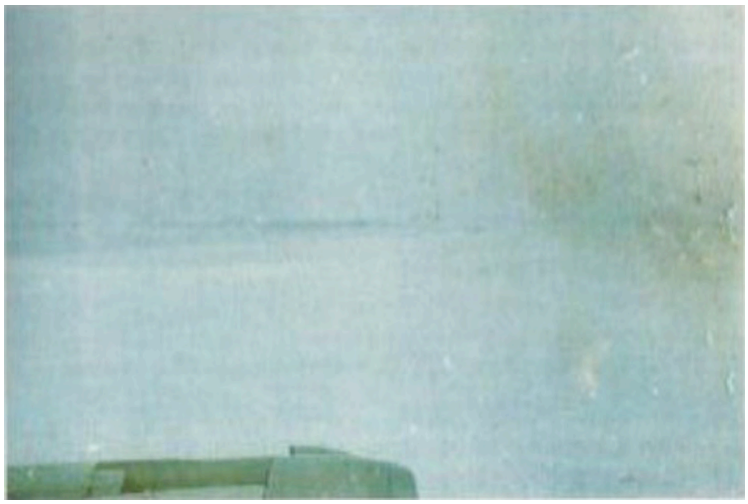


Figure 11
Fig. 28, Photo 11
(Vette, 1984, p. 73

Photo 11. Taken from the left-hand side of the aircraft looking at almost a right-angle to the line of flight. Points ‘D’, ‘E’, and ‘F’ which are marked on [Figure 3] are three dark rock outcrops visible in the photo in order from ‘D’ on the right to ‘F’ on the left. Point ‘F’ is Cape Tennyson, Point ‘E’ is barely discernible. In general terms the photo shows the textured cliffs of Cape Tennyson, which the crew probably believed was Cape Royds. Impact forces of the crash considerably damaged photographs 10 [Figure 10] and 11 [Figure 11]. The aircraft was at 1500 feet and the horizontal visibility in the direction of photo 11 [Figure 11] did not appear to be reduced, indicating that the aircraft was still below the cloud base. Shadows on the sea ice show the cloud above was of variable density. There are fewer bright patches on the surface of the right of the photo indicating that there was a denser cloud in this area, towards the impact area. This would have been the direction that Collins and Mulgrew were examining closely for the signs of buildings and structures in the McMurdo – Scott Base area as the edge of what they believed was Cape Royds moved behind them to give an unobstructed view of this part of Ross Island.

Time of photo 48.59: (51 seconds to impact), 3.75 miles to impact. Collins 48.55: *'Have you got them on them on the tower?'* Cassin: *'No – I'll try again.'* Mulgrew 49.08: *'That looks like the edge of Ross Island there.'* Brooks 49.24: *'I don't like the look of this.'* Brooks, whose vision was obscured by the cockpit coaming, has lost sight of all the textured cliffs and so has passed from sector whiteout to full whiteout.

Figure 12
Sector white out (simulated).
This is what the crew would see just prior to impact
(Vette 1984, p76)

Collins 49.30: *'We're 26 miles north. We'll have to climb out of this.'*
Unidentified 49.48: *'You can see (Ross Island).'*

Cassin 49.38: *'No high ground if you do a 180.'*
49.44: Ground proximity warning indicator sounds. *'Woop, woop……. Pull up, pull up.'*

Collins 49.48: *'Go round power please.'*
49.50: Impact photo of cabin window covered in liquid, possibly fuel.

Figure 13
Fig. 29
The final photograph of the actual impact appears to be showing fluid (possibly fuel) on the window.
Vette, 1984, p. 73)

Whiteout Phenomenon

It should be explained that the whiteout phenomenon is not necessarily associated with fog or haze. The condition can occur in a crystal clear atmosphere or under a cloud ceiling with ample light and in a visual field filled with trees and houses, or indeed the huts, oil drums and other structures commonly found around areas such as Scott Base and McMurdo Sound in Antarctica. When whiteout occurs large unbroken expanses of snow are illuminated by a sky overcast with dense, low stratus clouds that blot out all trace of surface texture or shadow and merge hollows and snow-covered objects into a flattened white background. In addition, cloud and sky may have the same apparent colour, so horizon discrimination is lost and the ground plane disappears. The true horizon is also lost and the world associated with it, as the viewer moves into a mental state of an 'extreme of perception' then beyond, to a 'loss of perception' (the question is, do we ever lose perception totally?). *For the pilot of a fixed wing aircraft there are several hazardous losses of perception. There is the effect of losing the true horizon, where it becomes impossible, or at least, very difficult to separate sky from earth, since both are*

the same colour under these circumstances and therefore it becomes very difficult to establish a ground plane. The result of an attempted landing in this case may be misjudgment of the approach or a stall well above the landing surface, or the pilot may simply fly the aircraft 'into the ground'.

Captains Vette's Models – progression into clear air sector white out.

Figure 14
A fog ramp covering the 300-foot cliffs of Lewis Bay and sector white out ahead. Pilots would be visual ranging on the cliffs either side.

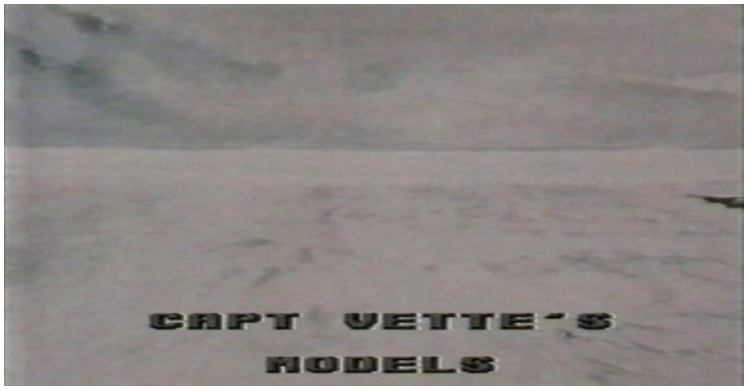


Figure 15
Pilots would be still visual ranging on the right hand cliff as they loose reference to texture in the landscape.

Figure 16
Pilots and crew would have now lost visual reference to cliffs and be experiencing clear air whiteout. The psychological phenomena known as the Ganzfeld Effect would be present.

Figure 17
This is what the approach (of Flight TE 901) would look like under normal conditions with the cliffs of Lewis Bay, without the fog ramp, and Mt Erebus in the background.

The Ganzfeld effect (from German for “complete field”) is a phenomenon of visual perception caused by staring at an undifferentiated and uniform field of color. The effect is described as the loss of vision as the brain cuts off the unchanging signal from the eyes. The result is apparent blindness.

Simulated moving in and out of a ‘clear air white-out’ condition.

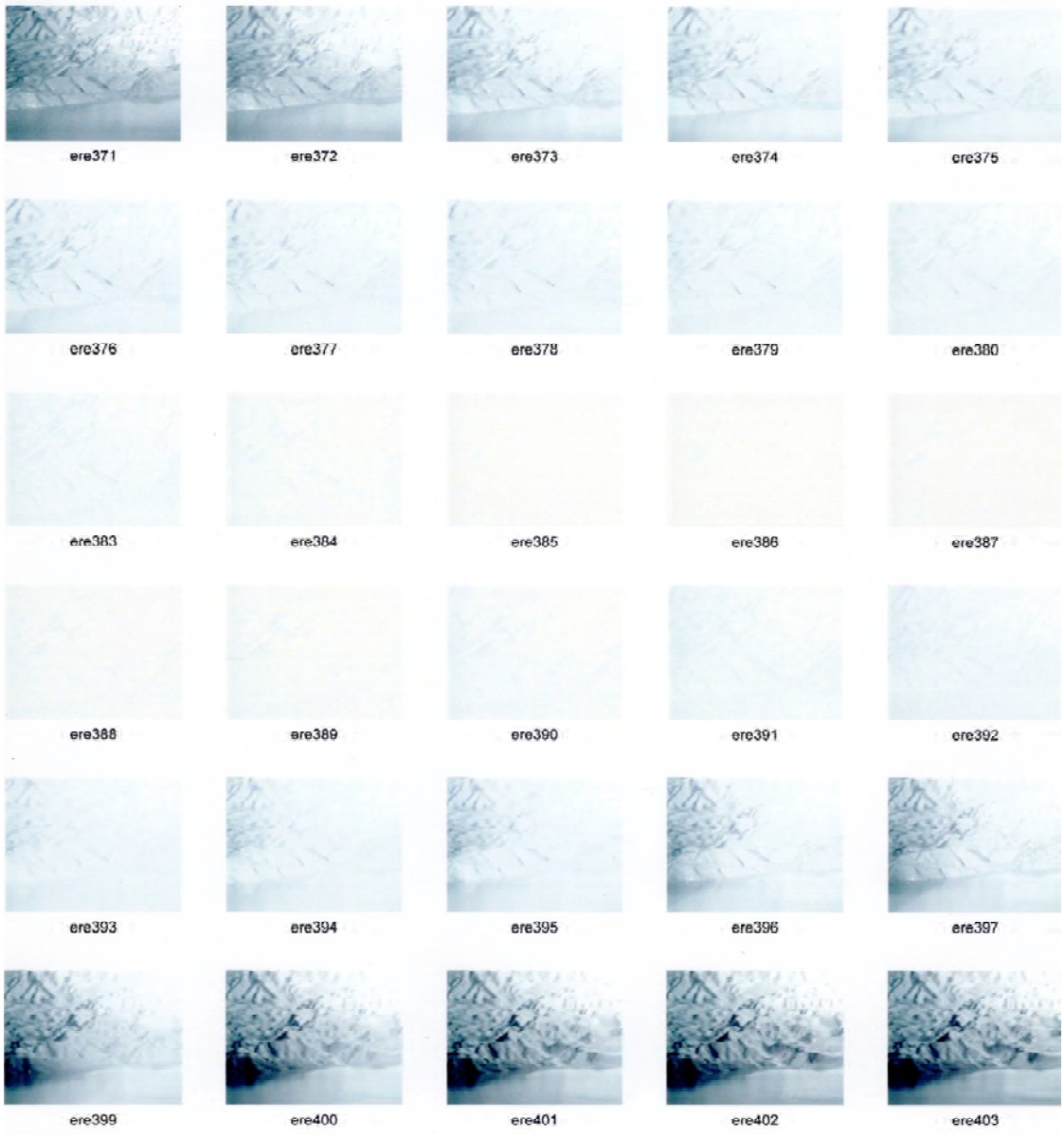


Figure 18
Experiment showing the progression and retraction of diffused light projected onto a textured surface simulating moving in and out of a ‘clear air white-out’ condition.

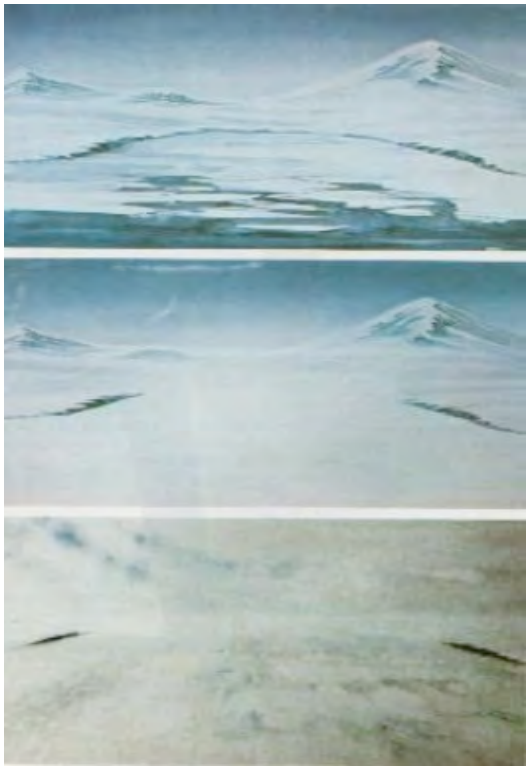


Figure 19
Sam Mahon (1954-)
Visual model presented to Royal Commission
Entrance to Lewis Bay.

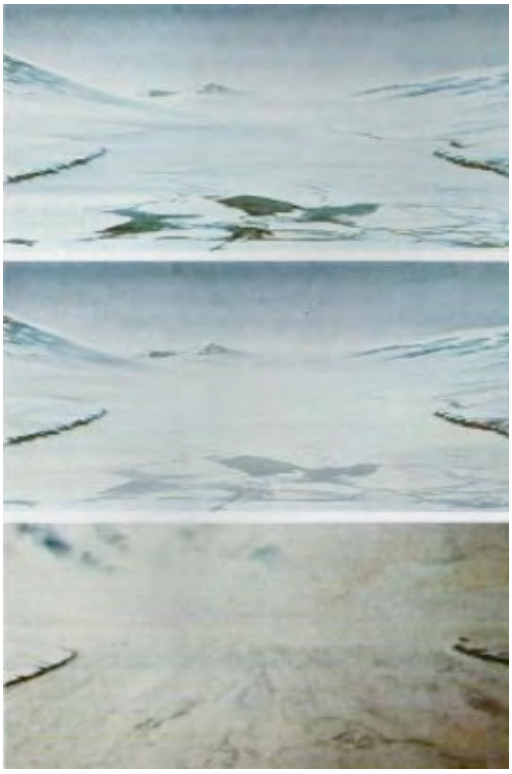


Figure 20
Sam Mahon (1954-)
Visual model presented to Royal Commission
Entrance to McMurdo Sound.

The crew at that time were experiencing sector white-out; that is the sector immediately ahead was in white-out. This was a powerful trap because they would expect nothing by way of conflict with land-mass at this stage. The crew would be reassuring themselves by visual ranging onto the textured cliffs on each side of the flight path. They would see a distant horizon ahead either by the cloud cutting the slopes or by the known psychological effects of ‘fill-in’ or ‘line joining’ or by the gradual shading difference ahead causing an horizon line by ‘marked band effect’.

Figure 21
Sam Mahon (1954-)
Visual Model – Lewis Bay
Matched expectation of crew.

Figure 22
Sam Mahon (1954-)
Visual Model – McMurdo Sound
Crew expectation.

Because of the loss of intermediate visual texture in the landscape, the crew became trapped into believing the cliffs of Lewis Bay were the cliffs of McMurdo Sound. Even though the cliffs of Cape Bernacchi are three times higher than the cliffs of Cape Bird, both out crops for all intents looked the same under these conditions. This is a classic case of an illusion being interpreted in such a way that it would serve to reinforce the crew's expectations of place and other mental sets. Right up to impact, it can be assumed through lack of cockpit voice recordings, that the crew saw primarily what they expected to see.

Seeing is a synthetic process and some times highly erroneous. It is an accepted medical fact that the human body's actions are approximately 80% controlled by sight, always functioning through a combination of the eyes and the brain. With the human eye 'believing is seeing'. With the camera 'seeing is believing'. A cross-section of the eye is similar to that of a camera with the lens at the front and the film at the back. Light rays from the object will pass through the lens crossing over and forming a distinct but an inverted image at the back. Clearly in this case 'seeing is believing'. Let us move inside this hypothetical camera and re-construct it as the human eye. At the front of the lens is the cornea that is less than perfectly transparent.

The fluid of the eye or vitreous humour through which the light rays travel is also less than transparent, and therefore the light rays impinging on the back of the eye are diffused or attenuated.

In the process of passing through and penetrating deeply into the tissue the light rays have to pass through the neural wiring for the eye which is on the side from which the light rays are traveling, another impediment before they finally impinge on the phoetic cells located on the retina of the eye. The neural wiring that partially blocks the phoetic cells distorts the image like a picket fence lying in front of the retina. This further distorts and degrades the original image. The image is broken and distorted in the passage of light rays reaching the phoetic receptors.

How do humans repair this image and restore it to its original values? To do so involves processes in the higher levels of the brain that will take into account what the expectation of that object really is. It is critically important to understand that the final perceptual experience initiated by the stimulus is determined by a complex interplay of processes at the various levels of the peripheral and central nervous system. The human eye selects a very narrow band of frequencies from within the vast electromagnetic band in picking out visual light rays. At the most fundamental level, stimulus energy at the retina is changed from light energy to electrical impulses in the neural fibres. Colour, size, and movement represent information coded in this stimulus array, and shape is preserved in the pattern of the electrical impulses transmitted to the visual areas of the cortex in the brain. At the higher level, the incoming information is decoded and interpreted as a meaningful representation of external events. Interpretation involves those higher mental processes collectively, and is called cognition, and in particular involves memory and mental sets.

It should be noted that the following account and any conclusions drawn from it by me arise through a detailed examination of accounts by Captain Vette and of the Royal Commission into the Erebus disaster. My observations are also coloured by a personal flying experience over a period of more than 40 years.

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Mahon, Peter, 1984, *Verdict on Erebus: an airline's dilemma,* Auckland: Collins.

Right Vision, 1984, *Impact Erebus - Lessons in Perceptual Psychology,* Auckland.

Vette, Gordon, 1984, *Impact Erebus,* Auckland: Hodder and Stoughton.

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Figure 9. Photo 8. Vette, Gordon, 1984, *Impact Erebus,* Auckland: Hodder and Stoughton, p. 71, fig 26.

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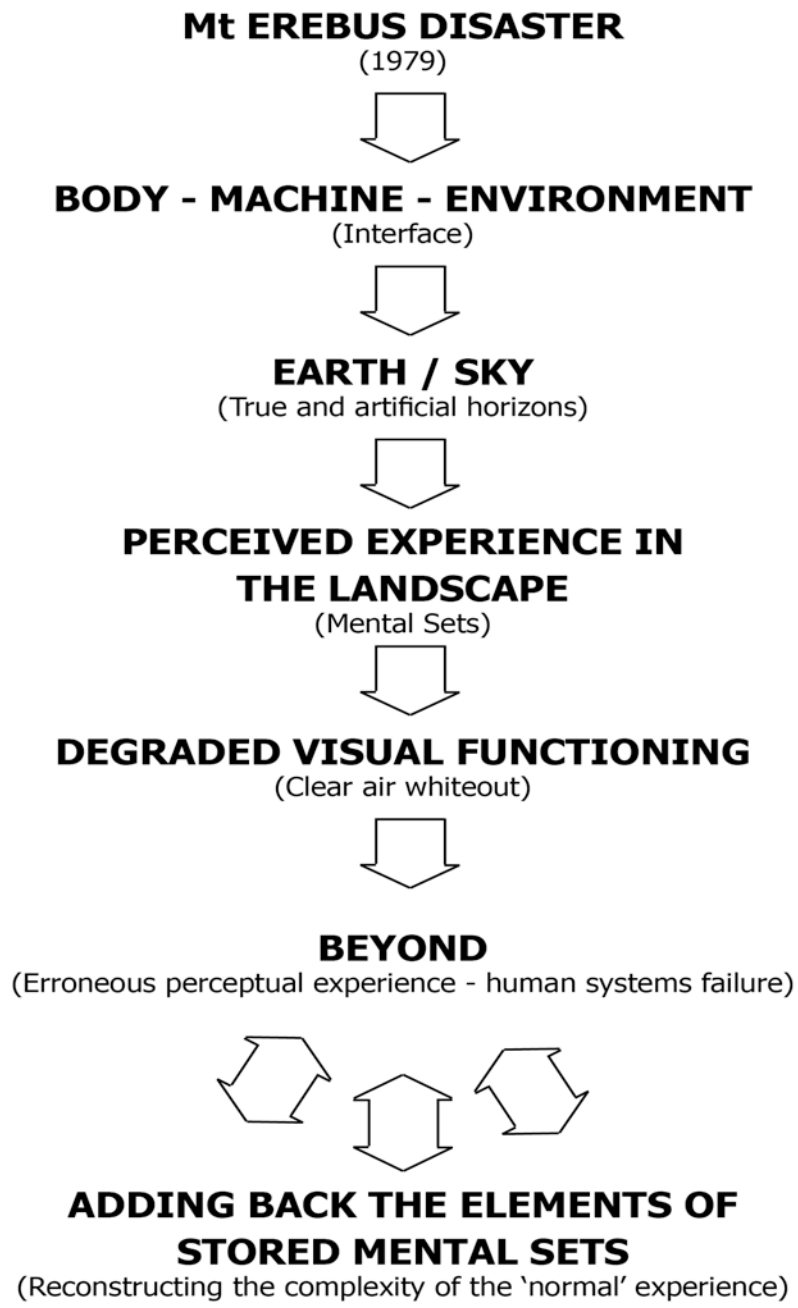
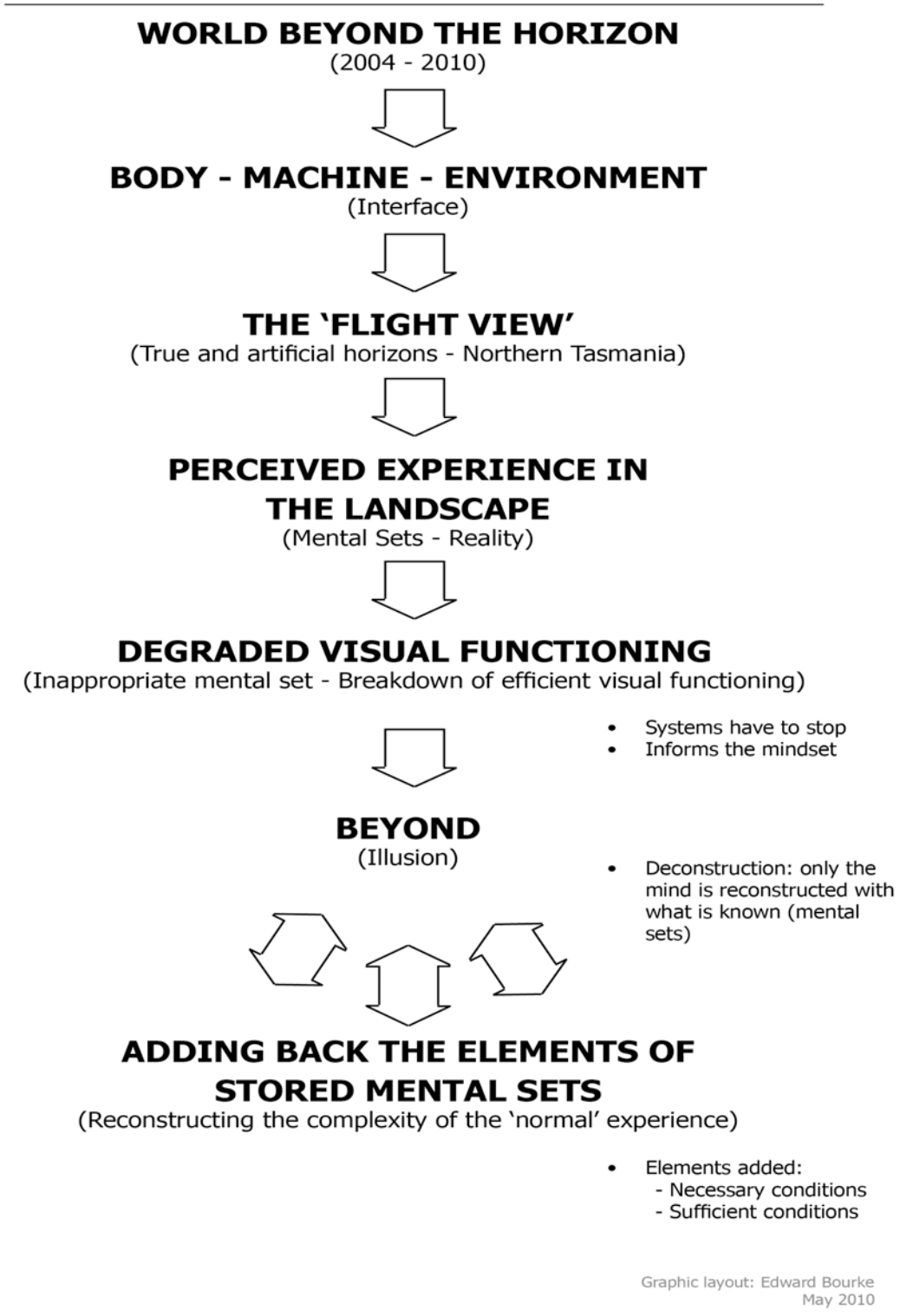
APPENDIX C: The Case Study Philosophy



Graphic layout: Edward Bourke
May 2010

APPENDIX D: The Project Philosophy



APPENDIX E: Flight Surveys and Project Site Map of Route Segments

FLIGHT SCHEDULE for data collection – Northern Tasmania				
Date	Aircraft Type	Aircraft Ident	Route Segments	Data Collecting Activity
Flight 1 27.09.06 (AM)	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV - LOCAL	Visual orientation within the survey landscape and the aircraft cockpit, checking camera angles, testing sound recording quality via camera, checking points of reference for future data collection. Recorded on Handi Cam DV. Conditions: Visual Flight Rules. (VFR)
Flight 2 27.09.06 (PM)	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV – LOCAL – CIRCUITS	Visual experimentation with earth/sky relationships. Recorded on Panasonic Handi Cam DV. Conditions: Visual Flight Rules (VFR)

Flight 3 04.10.06	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV – LTN – NIE – LTN – DEV	Visual experimentation within the Northern Tasmanian landscape juxtaposition between visual recognition of the landscape as managed and as seen through the flight instruments when flying in cloud. Reference to the landscape via sound transmitted via radio beacons and voice-to- voice radio communication. Recorded on Panasonic Handi Cam DV. Conditions: Visual (VFR) and Instrument (IFR) Flight Rules.

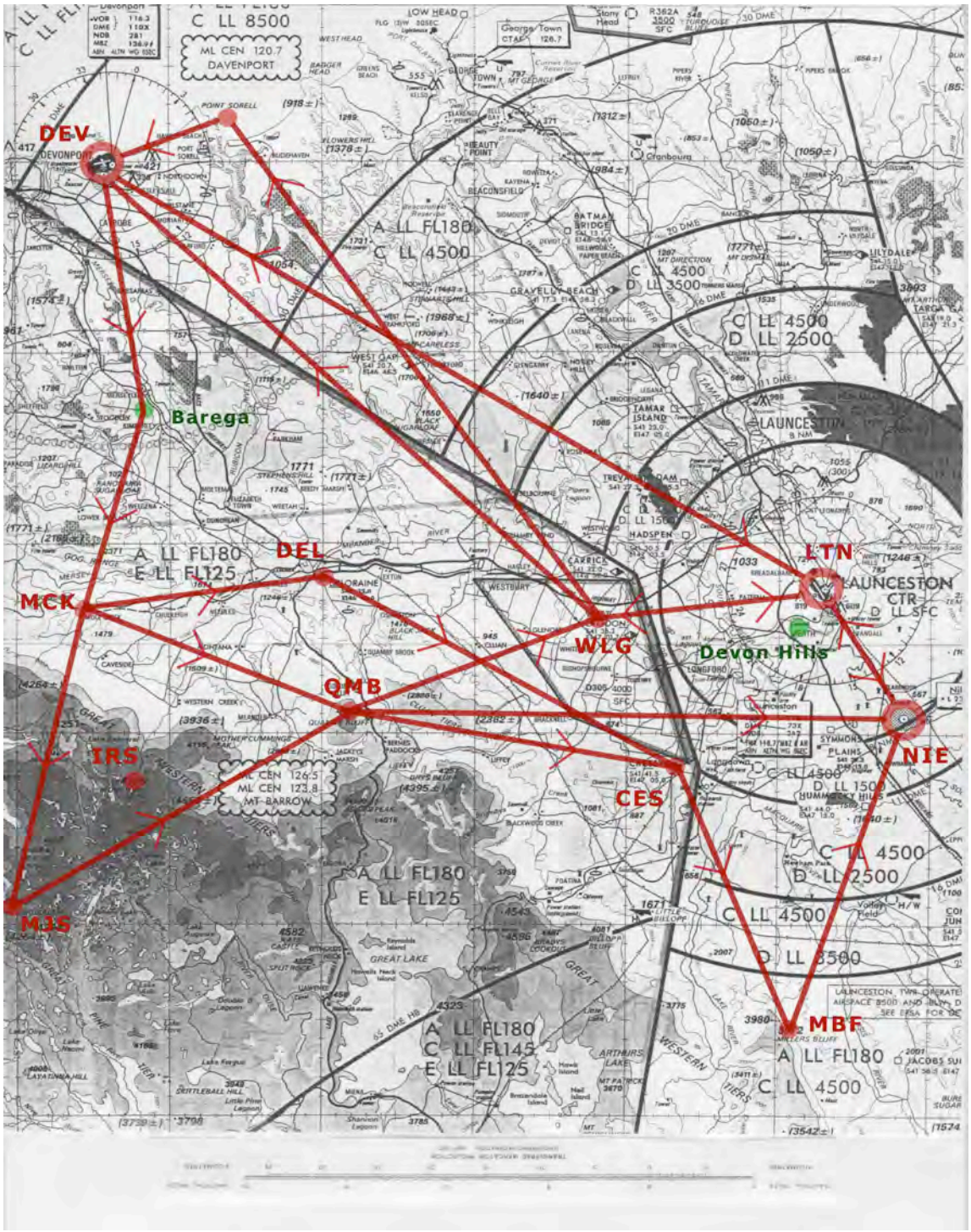
Flight 4 02.12.06	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV – MCK –DEL – CES – LTN – LTN - WLG – DEV.	Visual experimentation within the Northern Tasmanian landscape. Reference to geometric managed landscape and horizon lines. (not successful). Recording ambient sound within the aircraft with various microphone positions via digital M-Box to lap top computer running Pro Tools software. (not successful). Ambient sound recorded on Panasonic Camera was high quality and a successful experiment. Sound recorded on Sony portable Mini Disc Recorder through the aircraft Nav Com audio jack was successful and good quality. Embedded in this recording were induced sounds of the engines picked up from the avionics system. This recording is in sync with that sound recorded by the camera. This data will be suitable for the layered sound installation. Conditions: Visual Flight Rules (VFR)

Flight 5 16.12.06	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV – MCK – DEL – CES – LTN – NIE – LTN – WLG - DEV	Re–recorded ambient sound within the aircraft with various microphone positions via digital M-Box to lap top computer running Pro Tools software. Some 'peaking' on start-up (engines) but otherwise good quality signal. Recorded further sound on Sony portable Mini Disk Recorder through aircraft Nav Com audio jack. Some of the voice communications recorded 'too hot' but otherwise suitable for sound layering. Recorded landscape and instrument panel transitions juxtaposing the true horizon in the landscape with the artificial horizon on the panel. Recorded other visual instrumentation in relation with signals from the Nav Com system to form a sound /visual relationship, This recording was satisfactory. Conditions: Visual Flight Rules (VFR)

Flight 6 16.06.07	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV- LTN – NIE LTN – LTN – DEV.	Recorded high definition video on Sony HDR-FX1E Digital HD Video Camera Recorder. Focus on landscape and atmospheric conditions, transition between both. Recorded high definition imagery of flight panel in relationship to landscape and atmospheric conditions. Ambient sound was also recorded separately on Edirol hand held audio recorder. This footage will be satisfactory to edit in Final Cut Pro and cut to disc in DVD Pro 4 suitable for processing on the optical laboratory. Conditions: Visual (VFR) and Instrument (IFR) Flight Rules.
Flight 7 22.09.07	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV – MCK – MJS (Aerial work Walls of Jerusalem) – IRS - QMB - CES – MBF – NIE – LTN –LTN – WLG - DEV	Recorded high definition video on Sony HDR-FX1E Digital HD Video Camera Recorder. Focus on transition from managed landscape to wilderness to wildness and its relationship to the flight instrument panel. This footage will be satisfactory to edit in Final Cut Pro and cut to disc in DVD Pro 4 for processing on the Optical Laboratory. Other satisfactory fill-in footage was recorded. Conditions: Visual Flight Rules (VFR)

Flight 8 24.11.07	Cessna 337 Twin Engine Fully IFR	VH-VMO	DEV – LTN – NIE – LTN – LTN – DEV	Night Flight. Recorded high definition video on Sony HDR-FX1E Digital Camera Recorder. Focus on maintaining quality footage in low light conditions (low as 3 lux) while filming horizons silhouettes in relation to the airborne illuminated instrument panel of the aircraft (the artificial horizon). This exercise was carried out in full moon conditions with no cloud. Illuminated objects in he landscape were filmed together with the illuminated guidance and landing systems at both Devonport and Launceston Airports. Further sound recording of voice-to-voice communications and signals transmitted from radio beacons will be conducted. Further recording of piezo sound by using external sensors on the aircraft will also be conducted. Conditions: Instrument Flight Rules (IFR)

Project Site Map of Route Segments



Note: All flights were carried out in the same aircraft, Cessna 337 VH-VMO.

Route Segment – Place Name abbreviations.

CES - Cressy
DEL - Deloraine
DEV - Devonport Airport
IRS - Ironstone Mountain
LTN - Launceston Airport
MBF - Millar's Bluff
MCK - Mole Creek
MJS - Mount Jerusalem
NIE - Nile Locator (ILS)
QMB - Quamby Bluff
WLG - West Lagoon

APPENDIX F: Cessna 337 – Description and Specifications

The Cessna Super 'Skymaster' 337 is a United States twin-engine civil utility aircraft built in a push-pull configuration. Its engines are mounted in the nose and rear of its pod-style fuselage. Twin booms extend aft of the wings to the vertical stabilizers, with the rear engine between them. The horizontal stabilizer is aft of the pusher propeller, mounted between and connecting the two booms. The combined tractor and pusher engines produce 'centreline' thrust.

Cessna Super Skymaster 337D, VH-VMO
On the ground at Essendon Airport, Melbourne, Victoria (July 2005).
Copyright: Airliners.net. Photographer: George Canciani.
This aircraft was used for the aerial survey component of the project (2006-2007)

The 337 handles differently from a conventional twin-engine aircraft, primarily in that it will not yaw (into the dead engine) if one engine fails. Without the issue of differential thrust inherent to conventional (engine-on-wing) twins, engine failure on takeoff will not produce yaw from the runway direction. With no one-engine-out minimum controllable speed (Vmc), in-flight control at any flying speed with an engine inoperative is not as critical as it is with engines on the wing with the associated leverage. Nevertheless, the 337 requires a multi-

engine-rating, although many countries issue a special "centreline thrust rating" for 337 and other similar configured aircraft.
Ground handling requires certain attention and procedures. The rear engine tends to overheat and can quit while taxiing on very hot days. There have been accidents when pilots, unaware of the shutdown, have attempted take-off on the nose engine alone, even though the single-engine take-off roll exceeded the particular runway length. Aviation authorities require the installation of a placard with words that say "DO NOT INITIATE SINGLE ENGINE TAKEOFF".

The 337 produces a unique sound: a combination sound of its rear propeller slicing through turbulent air from the front prop and over the airframe, while its nose propeller addresses undisturbed air.

General characteristics

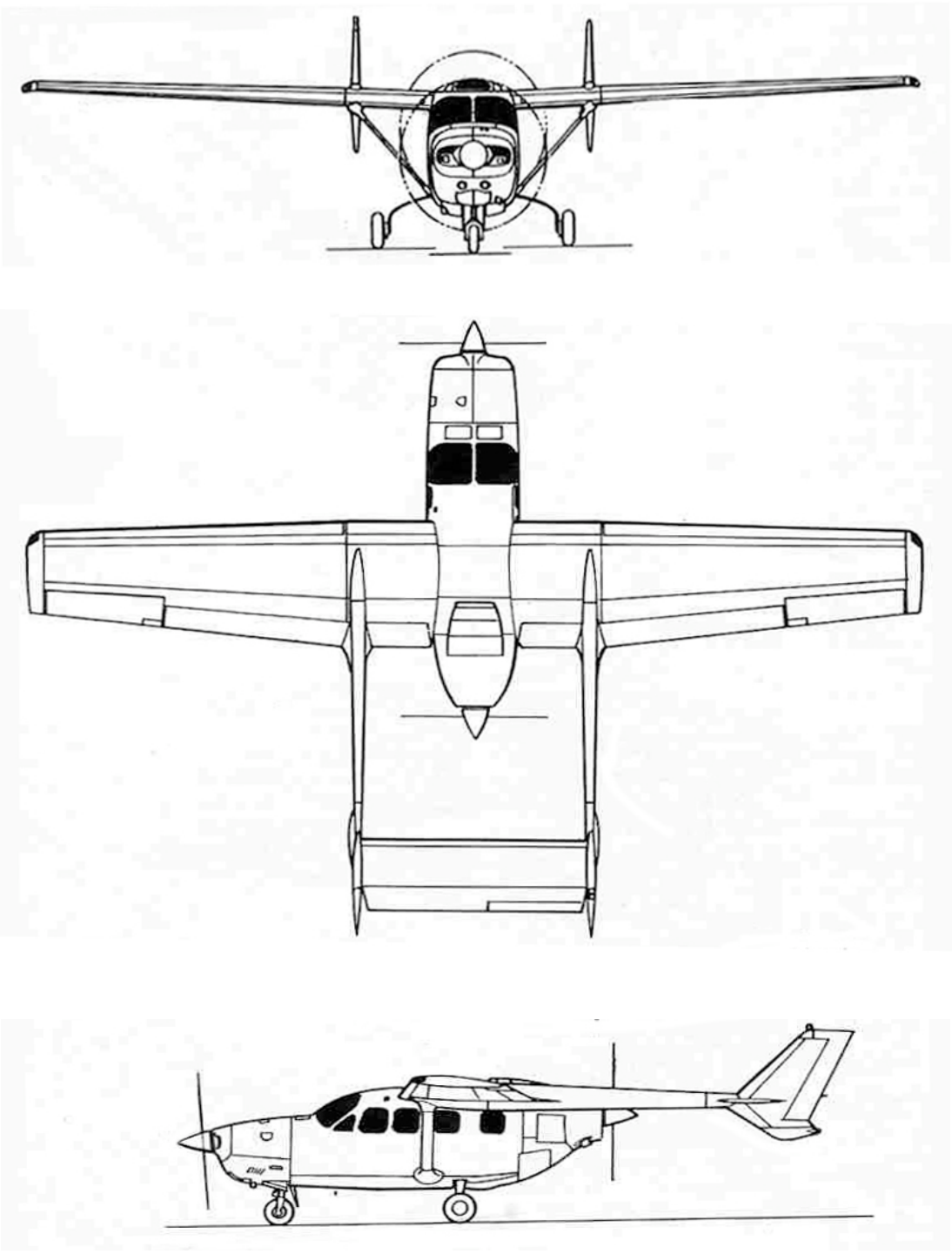
- Crew: 1
- Capacity: 5 passengers
- Length: 29ft 9in (9.07m)
- Wingspan: 38ft 0in (11.58m)
- Height: 9ft 4in (2.48m)
- Wing area: 201sq ft (18.7 sq m)
- Empty weight: 2,655 lb (1,204 kg)
- Max takeoff weight: 4,400 lb (2,000 kg)
- Power plant: 2 Continental Rolls Royce IO-360-C piston engines, 210 hp (157 kW) each

Performance

- Maximum speed: 200 mph (174 kn, 320 km/h)
- Range: 764 miles (664 nmi, 1,220 km)
- Service ceiling: 19,500 ft (5,944 m)
- Rate of climb: 1,200 ft/min (6.1 m/s)

Reference

http://cessna337.com/c337info.html



Cessna Super Skymaster 337 – Blueprint Plan and Elevation depicting the airborne platform of the 'flight view' perspective.

Looking beyond the true horizon
Exhibition asks: is seeing really believing?

BY MARTIN STEVENSON
09 Jul, 2005 01:00 AM

The result is The Slightly Bizarre Optical Laboratory, a complex array of lenses, wires and sophisticated technology designed to project images on to a screen for his project entitled World Beyond The Horizons.

Mr Bourke's work is part of Research 3 - Exhibition, work in progress by MFA and PhD research candidates at the University of Tasmania at Launceston on display at Inveresk's Academy Gallery.

"The research was supported by a case study of the Mt Erebus aviation disaster in Antarctica in which 257 people were killed on November 28, 1979," said Mr Bourke, a former RAAF pilot .

"It was caused by clear air whiteout, a malevolent trick of polar light and, even though the pilots and crew were initially blamed, two programming errors had actually occurred, which led to mis-programming of the internal navigation computer and mis- programming of the crew so that the airliner and Capt. Collins had different destinations.

"The unfolding story of this accident is one that relates to my own sensory perception, in particular that of the `flight view'."

Mr Bourke said that he wanted to examine the orientation of phenomenology as it dealt with the process of `believing is seeing'."

"The equipment has been designed and constructed to transmit layered imagery by means of projected light diffused by refractory glass elements and shields," Mr Bourke said.

"The resultant image conveys a sense of perceived experience, memories built up over time separated into mental and psychological sets."

Nine other exhibitions of PhD and masters students are on show at the gallery.

The exhibitions run until July 29.

»Simon Bourke with his research project, The Slightly Bizarre Optical Laboratory. Picture: Phillip Biggs

Disaster fixes attention on light and nature

BY JO MCINTYRE
23 Jul, 2005 01:00 AM

Bourke is one of 10 post-graduate students exhibiting at the gallery.

Fascinated by illustrations of light refracted through a prism, thus producing colour, Bourke experimented with atmospheres, electrical charges and spectra.

Always finding refuge in nature, his time as a pilot enabled him to observe intimately the phenomena of weather - clouds, sky, wind, light and the landscape - their interrelationships and their illusory qualities, typified by the Mt Erebus disaster of 1979.

He concurs with Robert Irwin (1972): "To be an artist is not a matter of making paintings or objects ... what we are really dealing with is the state of our consciousness and the shape of our perception."

He also draws on Rorschach tests, the various interpretations of atmospheres and perceptions by artists including Turner, Monet, Rothko, Malevich, Cezanne, Henson and Mahon and the philosophers Merleau-Ponty, Casey, Noe, Deleuze and Little (who analysed the Mt Erebus disaster).

Real (external) and remembered (internal) experiences, believing as seeing, playing with earth/sky relationships, Bourke reconstructs the Mt Erebus disaster using a complex system of lenses, projectors, shields and refracted glass, which, in abstracted, layered, digital imagery, convey mental and psychological `sets'.

This stage of his extensive research will eventually encompass an interpretation of the mountain ranges of the Northern Midlands which are his home and inspiration.

Simon sees the light
Bourke's unique machine now on show

ART REVIEW BY JO MCINTYRE
13 May, 2006 01:00 AM

The exhibition has been coordinated by Damien Quilliam.

Fascinated by Earth/sky relationships, the evolution of Max Planck's quantum theory (1900), Einstein's assumption that the photoelectric effect was caused by the collision of light particles with electrons (1905), and the illustrations of light refracting through prisms, Fresnel lenses and lighthouses, Bourke designed and constructed his unique machine from salvaged materials.

Fully functional, the device has enabled him to layer creative thought by transmitting images by means of projected light, diffused and manipulated by refractory glass elements, lenses, prisms, shields and grates, thereby conveying a sense of optical illusion, which is metaphysical, architectural, environmental, surrealistic, cosmic and thought-provoking.

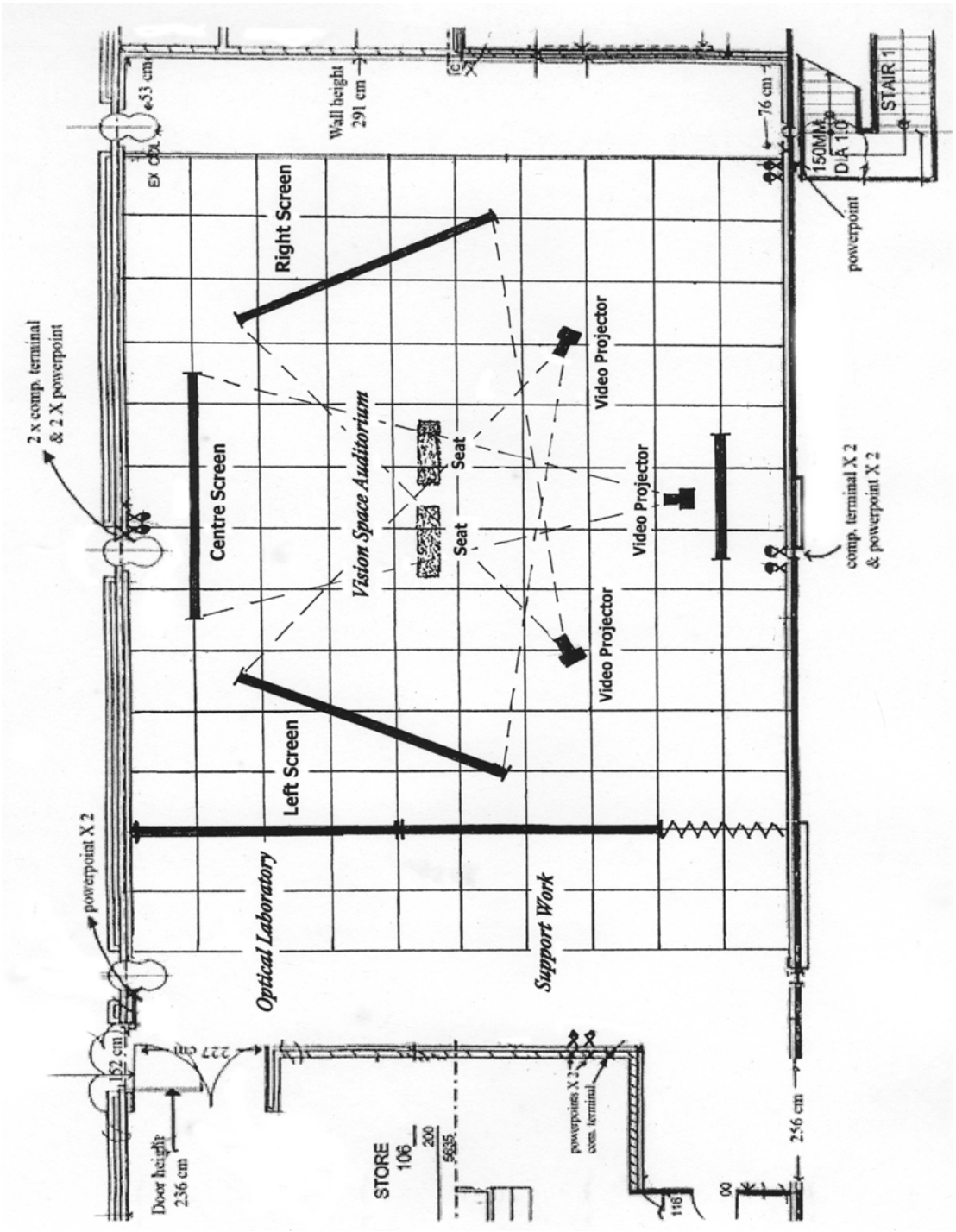
Having recently participated in the Macquarie University World Year of Physics Art Prize 2005, Bourke amalgamated art, science and technology by utilising the physical installation of his Optical Laboratory to create this two-dimensional, film- based, pigment-ink-on- canvas triptych, in which the viewer is transported through space.

The dramatic and illusory effects of chiaroscuro (light and dark) as used by Rembrandt and Caravaggio, Blake's rejection of "this infernal machine" but effective utilisation of visionary light and Turner's use of light as a "vengeful cosmic force" and romantic symbol, have influenced Bourke's investigations, as have Archipenko's Futurist and dynamic machines in which sequential images combined both emotion and science.

Bourke's integration of mind, matter and machine in his inspired, dramatic and forceful representation suggests nature's awesome might and man's insignificance.

«The Slightly Bizarre Optical Laboratory video installation by Simon Bourke.

APPENDIX H: Installation Layout – Vision Space Facility
Academy of the Arts
University of Tasmania, Inveresk



World Beyond the Horizon, 2010
Video Sound Installation
Photograph: Evan Starkey

World Beyond the Horizon, 2010
The Optical Laboratory
Photograph: Evan Starkey

The Optical Laboratory generating imagery for the *World Beyond the Horizon* project.
Photograph: Simon Bourke