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## The cultural landscape of interplanetary space

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### **ABSTRACT**

Since the launch of Sputnik 1 in 1957, interplanetary space has become filled with human material culture. A 'spacescape' now exists including terrestrial space sites like rocket ranges, satellites and space junk in Earth orbit and planetary landing sites. The significance of this material is usually understood within a 'Space Race' framework that emphasizes high technology and the Cold War rivalry between the USA and the USSR. However, appropriate management of the cultural heritage of space exploration requires a broader scope and this can be provided by a cultural landscape approach. The heritage significance of space exploration is explored through three cultural landscapes which illustrate complex and conflicting perspectives on space: Peenemünde in Germany, Woomera in South Australia and Tranquility Base on the Moon.

### **KEYWORDS**

cultural heritage management • cultural landscape • Peenemünde • space exploration • space race • space tourism • Tranquility Base • Woomera



It reminds me of Knossos on Crete, where you go visit the site and then go straight to the museum to see the artifacts; who knew the 'space age' would become archaeology so soon?

(Mindell, 1999)

## ■ INTRODUCTION

For most of human existence, space has been an imaginary place, given solidity by scientific predictions of its features, popular representations and occasional intrusions of extraterrestrial matter such as meteorites. This imagined place was an integral part of how humans constructed cosmogonies and how they interpreted their own place in the universe. At least from the time of the earliest rock art, where there appears to be representations of the sun, moon and stars, the heavens have played a part in the creation of the Earth (D'Errico, 1989; Hawkins, 1992; Marshack, 1964).

With the launch of Sputnik 1 in 1957, human interaction with space was no longer confined to the imaginary realm. In the last 60 years, parts of interplanetary space have become filled with human material culture in the form of functioning and non-functioning satellites, upper rocket stages, probes, landers, modules, organic human remains, orbital debris and 'space junk'. The space landscape now stretches from the surface of the earth, including launch facilities, tracking stations, research centres and domestic satellite dishes, out into earth orbit, to the surface of other planets and moons and even outside the solar system where the Voyager spacecraft are envoys to the unknown. No longer the last wilderness or the final frontier, interplanetary space can be seen as a cultural landscape forged by the organic interaction of the space environment and human material culture (Gorman, 2003).

The significance of space exploration is usually understood within a 'Space Race' model (Gorman, 2003; Jones and Benson, 2002; Schefter, 2000), with a strong focus on the technological achievement of the USA and the Cold War relationship between the USA and the USSR. In this popular and compelling version of space history, the interests of largely white male American astronauts, space administrators, scientists and politicians are presented as universal human values. The military, nuclear, nationalist and colonial aspirations of space-faring nations are eclipsed by a 'master narrative' in which heroic acts of discovery in space are the outcomes of a natural human urge to explore (Bryld and Lykke, 2000). In this article, I will investigate three places where these aspects of space history collide: Peenemünde, regarded by many as 'the cradle of space-flight'; the Woomera rocket range in South Australia, where Indigenous people had a close encounter with the Space Age, and Tranquility Base, the lunar landing site of the Apollo 11 mission. The significance of material

culture in interplanetary space must necessarily be grounded in an understanding of terrestrial antecedents; and these places represent successive phases in the development of space exploration through the latter half of the twentieth century.

## ■ A CULTURAL LANDSCAPE APPROACH

In recent years, there has been a shift in cultural heritage management away from assessing sites as discrete locations, towards seeing heritage places, objects and values as embedded in a cultural landscape (Cleere, 1995; Gosden and Head, 1994; Hirsch and O'Hanlon, 1995; Knapp and Ashmore, 1999; Lennon, 1997; McBryde, 1997; Von Droste et al., 1995). In environmental terms, the concept of the cultural landscape has superseded the notion of the pristine and untouched wilderness.

### Some definitions

The Operational Guidelines for the Implementation of the World Heritage Convention (1998: 36) define cultural landscapes as 'the combined works of nature and man [sic]':

They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.

Within this broad concept three principal categories of cultural landscape are recognized:

- 1 The designed or intentionally created landscape, such as a garden or parkland.
- 2 The organically evolved landscape, resulting from human actions within the natural environment, both past and ongoing.
- 3 The associative cultural landscape, with religious, artistic or cultural associations rather than evidence of material culture alone.

### Wilderness and the cultural landscape

A principal aspect of the cultural landscape approach is the reformulation of the notion of wilderness, the idea that a landscape can be untouched by the ravages of modern industrial society, virgin and pristine, and is worth preserving precisely because there has been no human interaction with it. In an ongoing engagement with natural environment managers, cultural



heritage managers have been promoting the recognition that most environments have been impacted by human activities and that what many consider to be 'wildernesses' are actually the homelands of Indigenous peoples (Denevan, 1992; Jacques, 1995; Taylor, 2000). The cultural landscape approach moves away from the polarization between wilderness and civilized and allows values to be perceived in human interactions with the natural environment.

Of all landscapes, perhaps space alone can claim to be a true 'wilderness'. Before 1957, there were no material traces of human activity. And while there may yet be life in the solar system, there has been no human life; no autochthons, no Indigenous inhabitants. Interplanetary space was a real *terra nullius*, the land belonging to no-one. It was, nonetheless, a powerful associative landscape, central to diverse cultural beliefs, creation stories, mythologies and scientific enquiry.

### The significance of the spacescape

The places associated with space exploration form a three-tiered vertical landscape, starting from designed space landscapes on Earth (launch facilities, tracking stations, etc.), organic landscapes in orbit and on the surface of celestial bodies (satellites, rocket stages, landers, debris) and beyond the solar system, where only the Voyager spacecraft have yet ventured, a realm rich with associations though devoid of human material culture. Looking back on the Earth from space has even given us a new perspective on terrestrial landscapes through the concepts of Gaia and 'Spaceship Earth' (Cosgrove, 2001; Hargrove, 1986; Lovelock, 1979). These places, things and ideas could be called the spacescape.

The spacescape has powerful political, social and emotional associations for people on Earth, despite a general lack of direct experience or memory of space. The process of understanding the associative aspects of this landscape, the non-material or components which give it meaning, is a component of the assessment of its significance as defined by the Burra Charter (ICOMOS Australia, 1999):

Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups.

So for whom is this spacescape significant and why? If space exploration is an achievement to be celebrated for its global relevance, as the space industry believes, it is important to understand its significance for those outside the spacefaring élites. Understanding this significance is the basis of effective and appropriate management of both the tangible and intangible aspects of space exploration. A cultural landscape approach offers a framework for studying the relationship between places, associations and



**Figure 1** Wernher von Braun in the 1950s, holding a model V2. (Photograph courtesy of NASA)

material culture. In the following sections, I look at how significance can be understood and managed at the space landscapes of Peenemünde, Woomera and Tranquility Base.

## ■ THE SECRET AT THE HEART OF THE SPACE AGE: CONFLICTS OF MEANING AT PEENEMÜNDE

In 1936, Germany set up an unusual facility at Peenemünde on the Baltic Sea: a research and development complex aimed at producing a rocket for use as a weapon. This rocket was the V2, precursor of the Saturn V that took US astronauts to the moon. The project was directed by the young Wernher von Braun (Figure 1). In the last year of the Second World War, V2 rockets bombarded London, Paris, Antwerp and other European cities. After

the war, von Braun became the linchpin of the US space programme. Both then and now, the depth of his involvement with the National Socialists and the use of slave labour from concentration camps in the German rocket programme have been contentious issues (Barth, 1997; Bennett, 2003; Brysac, 2002; Neufeld, 1996; Paterson, 2001; Sellier, 2003).

In June 1943, the Peenemünde administration requested 1400 detainees from SS concentration camps to work on the V2 assembly line (Neufeld, 1996: 188–9). But then the Allies bombed Peenemünde (Figure 2) and a more secure location for rocket development was sought. It was found in a series of tunnels under the Kohnstein Mountains near Nordhausen in central Germany. Here, in the Mittelbau complex, rockets were manufactured using the slave labour of Dora and other concentration camps (Biderman, 1996; Sellier, 2003). Wernher von Braun, who remained based at Peenemünde, visited concentration camps to select workers (Neufeld, 1996: 228, Sellier, 2003: 105). Of 60,000 prisoners employed at Mittelbau, over 20,000 died of assault, starvation and sickness (Neufeld, 1996: 264). A far greater number died in the manufacture of the V2 rockets than were killed in their deployment.

In itself, the V2 was not such a spectacular success as a weapon. However, the potential of combining rocket and nuclear technology was lost on no one by the end of the war (Morton, 1989). As the Allies advanced



**Figure 2** View of Peenemünde from the air, 1943, showing the V2 test area. (Photograph courtesy of the Australian War Memorial)

into Germany in 1945, both the USA and the USSR aimed to secure rocket technology and rocket scientists. In Project Paperclip, the Americans sent teams specifically to capture the V2 and its staff (Lasby, 1971) while Wernher von Braun and Walter Dornberger, leaders of German rocket science, arranged to surrender to the USA (Neufeld, 1996: 265). Both sides used their new captives to develop ballistic missiles.

Then, in 1957, the declaration of the International Geophysical Year challenged those with the technology to launch a satellite into Earth orbit. Sputnik 1 gave the USSR the early lead, but not for long. On 31 January 1958, the USA launched the Explorer 1 satellite on von Braun's Jupiter C rocket. The Cold War had moved into space.

### The ethics of science

Despite the successes of the US space programme, the issue of the origins of rocket technology in the slave labour of concentration camps has refused to vanish. In 1965, satirist Tom Lehrer (Lehrer and Searle, 1981: 124–5) highlighted these ethical ambiguities in his song *Wernher von Braun*, contrasting sinister lyrics with a nursery rhyme tune:

Gather round while I sing you of Wernher von Braun,  
 A man whose allegiance is ruled by expedience,  
 Call him a Nazi, he won't even frown,  
 'Nazi Schmazi', says Wernher von Braun.

Some have harsh words for this man of renown,  
 But I think our attitude should be one of gratitude,  
 Like the widows and cripples in old London town,  
 Who owe their large pensions to Wernher von Braun.

Don't say that he's hypocritical,  
 Say rather that he's apolitical,  
 'Once rockets are up, who cares were zey come down?  
 That's not my department', says Wernher von Braun.

You too may be a big hero,  
 Once you've learnt to count backwards to zero.  
 'In German oder English I know how to count down,  
 Und I'm learning Chinese', says Wernher von Braun.

In a recent article, Colin Bennett is even more openly critical. In Bennett's analysis, the myth of the heroic conquest of space requires the suppression of the human torture that 'built not only Peenemünde, but also every single one of von Braun's rockets' (Bennett, 2003: 38).

By contrast, Barth (1997) sees the Peenemünde facility as the 'Cradle of Spaceflight'. Barth is careful to avoid mention of concentration camp labour at Peenemünde, claiming that the site is tainted by association with Mittelbau (1997: 175). In the end, Barth skates over the crevasses by stating that:

Because of an almost brotherly sharing of the technological spoils of war of Peenemünde, both superpowers – the USA and the USSR – came into possession of intercontinental ballistic missiles at almost the same time, a fact which, together with subsequent 'nuclear statement', has prevented the superpowers from starting a new world war for more than 50 years. (Barth, 1997: 175)

The Cold War becomes a benign gentlemen's agreement and Peenemünde is sanitized to take its place in the story of the origins of spaceflight. Barth concludes, 'the biggest winner was spaceflight'.

### **Space tourism and the meanings of Peenemünde**

Today, Peenemünde is a destination for space tourists: *Spaceflight* magazine regularly advertises guided trips to the site. Visitors can see V2 test stands, tunnels and observation bunkers, rail tracks for transporting rockets and fuel, the remains of the liquid oxygen plant and the traces of housing for officers and concentration camp prisoners. Craters from V2 tests are



interspersed with those of the 1943 Allied bombing and trenches dug by USSR troops, while stripping the site of its assets after the end of the war.

In the early 1990s, a project backed by the German government sought to create a missile park at Peenemünde. This attempt to present the site to the public was 'a paean to Wernher von Braun and the start of the space age' (Bryson, 2002) that disguised the V2's military purpose and ignored the use of slave labour in its manufacture. According to German historian Dr Johannes Erichsen,

Wernher von Braun's post-war involvement in the American space programme provided an excuse to glorify Peenemünde as the place where the technology for the Moon landings was developed. The fact that the Nazis used the place to build missiles to win the war was regarded as an unfortunate aberration (quoted in Paterson, 2001).

After many objections to the 'whitewash' of Peenemünde's history (Bryson, 2002), the museum was redeveloped to present a wider range of meanings and interpretations. This is how visitor Roland Speth (2000) described his experience:

Wandering from one exhibit to the next, the visitor is being dragged back and forth between admiration for the technical solutions already developed in the 1940s and the disgust of the objectives they were supposed to achieve and of the means by which they were put into reality involving the forced labour of captives . . .

Sometimes you can read about Peenemünde being the birthplace of rocketry for the exploration of outer space – and in the end, this is perhaps true. But the spirit in which this development was performed, was very much a military, i.e. a destructive one.

Wernher von Braun and Peenemünde illustrate some of the conflicting meanings that can centre on both people and places in understanding the significance of space heritage. The physical structures and location of Peenemünde have many associations: as a landscape of war, a landscape of oppression, a landscape of science and a landscape of space. It is not necessary, as Barth clearly believes, to privilege one of these over another. Peenemünde's significance as a place inheres in all of these aspects and its management as a cultural heritage place also reflects them. The Burra Charter (ICOMOS Australia, 1999: Article 6.3) states that the . . .

Co-existence of cultural values should be recognised, respected and encouraged, especially in cases where they conflict.

In other places, the ideas of 'negative heritage' (Meskell, 2002) and memorialization of conflicting values of the landscape (Birch, 1996; Buruma, 1994; Graham et al., 2000: 93; Lydon, 2003) enable the interpretation of values that are not always easy or palatable. Highlighting the complexity of Peenemünde opens a space for the voices of those for whom



‘the cradle of spaceflight’ was the cause of death. These voices are deeply entangled with the social significance of space technology.

## ■ THE WOOMERA ROCKET RANGE: INDIGENOUS INTERACTION WITH SPACE EXPLORATION

Within a decade of the end of the war, rockets designed to deliver nuclear warheads became powerful enough to reach escape velocity. At the same time, the great European colonial empires were disintegrating. In the new world order that emerged, the former frontiers of Earth were translated vertically to interplanetary space. But in order to reach the ‘High Frontier’, the emerging spacefaring states had to rely on resources provided by their colonial possessions.

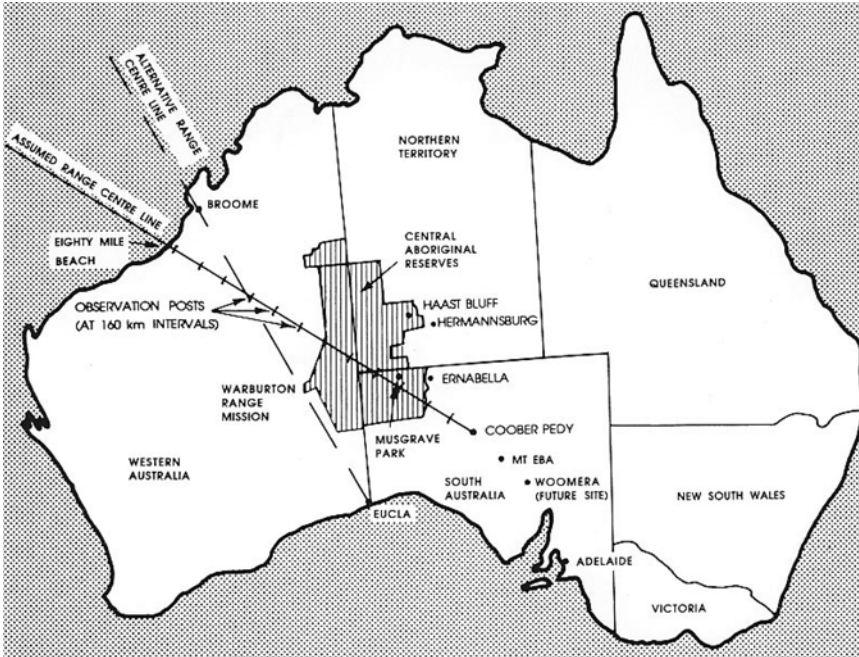
### Space activities in the colonies

In 1947, a joint agreement between Britain and Australia established the Woomera Rocket Range on a stony gibber plain, approximately 450 km north of Adelaide. The area of the range within South Australia alone was greater than the size of the UK. Between 1949 and the mid-1970s, Woomera saw the launching of scientific rockets, defence missiles and satellites from nine launch areas. Woomera played a vital role in the development of the USA, UK and European space programmes (Morton, 1989). In 1967, Australia became the third country in the world to launch a satellite from within its national borders when the Australian-designed WRESAT-1 attained orbit (Morton, 1989; Dougherty and James, 1993).

The Island Lagoon tracking station was set up at Woomera in a joint agreement with the USA in 1960. Throughout the next decade, Island Lagoon received signals from the Mercury and Apollo missions, as well as the Lunar Orbiters, Mariner 2 and the Ranger series. Woomera was also used to test nose cone materials on the US Redstone rocket developed by Wernher von Braun at the Army Ballistic Missile Agency in Alabama.

ELDO, the European Launcher Development Organisation, was established in 1962 to develop a satellite launch vehicle. The British *Blue Streak* rocket became the first stage of a joint European launch vehicle called *Europa*. In return for providing a launch site at Woomera, Australia became the only non-European member of ELDO. However, the Europa programme was ultimately unsuccessful. In the final launch in 1970, all the rocket stages fired, but the satellite failed to orbit.

By the early 1970s, the heyday of space activity at Woomera had passed. The Island Lagoon tracking station was dismantled with the end of the



**Figure 3** The Central Aborigines Reserve and the rocket range (Commonwealth of Australia, reproduced with permission)

Apollo programme. After the failure of the Europa programme, the new European Space Agency established its principal launch facility at Kourou in French Guiana. However, amateur and research rocket launches still take place at Woomera and there are proposals to redevelop it as a commercial launch facility. Remains in the Woomera rocket range include infrastructure at the nine launch areas, of which the most impressive are the ELDO launch pads on the edge of a vast salt lake, roads, instrumentation buildings, workshops, blockhouses, security checkpoints, tracking stations (Island Lagoon, Red Lake, Mirikata) and the Woomera township which still supports a population of around 200 people.

### Woomera and Indigenous people

A number of factors made Woomera a good choice for a rocket range in 1947. Not least among them was the perception of the area as remote, arid and devoid of people. In reality, the vast restricted area overlapped with the Central Aborigines Reserve and was the traditional country of Kokatha and Pitjantjatjara people (Basedow, 1929; Tindale, 1965; Wilson, 1980).

The Kokatha are the Traditional Owners of the area around the Woomera township. The Central Aborigines Reserve lay to the north-west of Kokatha country and crossed the borders of South Australia, the Northern Territory and Western Australia (Figure 3). European access to the Reserve was prohibited, so that Aboriginal people could pursue their lifestyles without interference. In 1937, the Ernabella Mission was established outside the Reserve, by the Presbyterian Church's Board of Missions on the recommendation of Dr Charles Duguid, as a place where Pitjantjatjara people could come safely to receive medical attention, education and other services (Duguid, 1972). At Ernabella, Pitjantjatjara children were taught in their own language, a right that many Aboriginal people are still fighting for today.

The location of the range on Aboriginal country was acknowledged, however, through the process of naming. Although not a local word, the rocket range was called 'woomera' after the spear-launching tool used in many parts of Australia (Beadell, 1975). The streets of Woomera village, surveyed in 1947, were given Aboriginal names. A verse from the *Rocket Range Song*, recorded in *A Sense of Urgency* (Woomera High School, 1978), makes reference to this as a distinctive feature of the settlement:

We know the place name from the Abos first came  
And it means just a launcher, they say;  
But now, I'll be blowed, each street and each road  
Has been christened the native's own way

However, a combination of drought, the expansion of missions and the dangers of the rocket range meant that many Kokatha people were under pressure to leave their country. They are now centred around Port Augusta and Coober Pedy (Andrew Starkey, 2004, personal communication).

Within the Central Aborigines Reserve, there was a constant tension between the white scientists, tourists and bureaucrats and the Pitjantjatjara people. Drought forced Aboriginal people into proximity with whites at places like the Giles Meteorological Station. Once the roads were built, people entered the prohibited area whether permitted or not; and tourists could apply for permits to travel in the Reserve area, obtaining them quite readily from the white administration (Morton, 1989). Despite the efforts of the Native Patrol Officers, the Pitjantjatjara people were adversely impacted.

### **The protest movement**

From the moment the rocket range project was initiated, there were concerns over the impact on the Traditional Owners. A protest movement uniting a broad range of groups and individuals mobilized across the country. It was spearheaded by Dr Charles Duguid. Duguid was primarily



concerned about the impact on the Pitjantjatjara people, but also about issues such as military control of nuclear power and the escalating rate of armament across the world (Duguid, 1947). He was not alone.

In 1947, Dr Duguid, with the full backing of the Presbyterian Church, was joined by others equally horrified by the Australian Government's proposed actions. One of these was Pastor Doug Nichols. Nichols was an outstanding athlete and Aboriginal activist who later became the Governor of South Australia. In 1936, Nichols, together with William Cooper, Bill and Eric Onus and others, founded the first all-Aboriginal political organization, the Australian Aborigines League (Foley, 1999). Nichols travelled to South Australia, spoke at meetings and even met with the Governor-General to express his concern about the proposed rocket range (Wilson, 1980).

On 31 May 1947, a protest meeting organized by the Presbyterian Church and the Woman's Christian Temperance Union was held in Melbourne. At that meeting, the Rocket Range Protest Committee was formed, comprising up to 50 groups including trade unions, women's groups, the Communist Party of Australia (CPA) and Aboriginal rights organizations such as the Australian Aborigines League. The Committee sent resolutions to the Federal Government, requesting that it respect the rights of Aboriginal people (Wilson, 1980). Duguid's speech at this meeting was published as *The Rocket Range, Aborigines and War*. Other protest publications were contributed by Dr Donald Thomson (1947), an anthropologist from the University of Melbourne (*The Aborigines and the Rocket Range*), and Alf Watt (1947), Secretary of the South Australian branch of the CPA (*Rocket Range Threatens Australia*; see Figure 4). All voiced their objections to the ease with which the Government set aside the rights of the Traditional Owners in order to develop defence missiles for Britain. Nevertheless, the rocket range proceeded. In later years, the infrastructure provided by Woomera was a major factor in Britain's nuclear testing programme at Emu Field and Maralinga, which had such devastating effects on Aboriginal people (Morton, 1989: 86; Andrew Starkey, 2004, personal communication).

## Indigenous significance

For Indigenous people, the site of Woomera has a significance that is very far from the scientific contribution to international space exploration. In the Cold War era, Aboriginal people were forced from their traditional lands in order that Britain and white Australia could pursue nuclear and missile defence strategies. Woomera was perceived as a wilderness, a treeless plain scarcely capable of sustaining human life and thus fit to develop weapons.

Kokatha people have a very different view of this supposedly remote and barren landscape. In a recorded interview ('Humps not Dumps', n.d.),



**Figure 4** Cartoon from Alf Watt's *Rocket Range Threatens Australia* (1947). (Image courtesy of the Communist Party of Australia)

Kokatha spokesperson and Indigenous Liaison officer with the Australian Department of Defence at Woomera, Andrew Starkey, spoke of how Kokatha people regard the desert:

Well the land through here, although it looks pretty harsh and uninviting and all the rest of it, does sustain plenty of wildlife, it's not dry and parched all the time. Looking across here it is void of trees and vegetation, it is like that for a reason, it was created like that in one of our dreamtime stories. It is a sacred story for the men so we can't [talk] about that but the country still does have a use, because the land is so flat and void like this doesn't mean it's useless. When you look across here you can see little patches of green grass and green bushes, they are there because when it does rain they are the places that the water goes, it stays in those little gullies. They are claylines so the water stays there for a while and as a result of that only 2 or 3 days and you have green shoots and vegetation. This entices the game out onto the plains like Kangaroo and Emu and hence they are out on the plain and a lot easier to hunt.



Pitjantjatjara people also have a particular view of this country, described by Tindale (1974) as one of the most inhospitable in Australia. In a story told to Roland Robinson by Pitjantjatjara elder, Minyanderri, an amorous old man pursued seven sisters. As they moved through the landscape they established rituals, created natural features such as valleys and sandhills and camped at water holes. Eventually, the spirits of the sisters went to the sky where they became the stars of the Pleiades constellation (Robinson, 1966 [1977]: 91–93). The creation of both the heavens and the landscape of Central Australia are linked through this Dreaming story.

The protest at Woomera had an important role in the development and growth of Aboriginal political activism, through the Australian Aborigines League. It was also a catalyst for debate about the participation of Aboriginal people in contemporary Australian society. The 1947 protests were only the beginning, as the Woomera area remains a favoured place for the Australian Government to locate unpopular installations, such as the US military surveillance base, Nurrungar, nuclear tests, nuclear waste dumps and detention centres for asylum seekers. Kokatha people do not distinguish the impact of the missile and rocket programme from nuclear testing or nuclear waste dumps; they see them as part of the same process (Andrew Starkey, 2004, personal communication). For them, Woomera is a landscape of continuing protest. This is an intangible heritage of high significance.

In the landscape, the history and perspectives of Indigenous people are inseparable from Woomera's significance for the heritage of space exploration. The supposedly barren desert is scattered with the stone tools, ceremonial sites and rock art of Kokatha and Pitjantjatjara people and ceremonies related to Dreaming stories continue to be performed today (Andrew Starkey, 2004, personal communication). The appropriation of Woomera for military and then space development purposes did not mark the end of Indigenous custodianship of the country; rather, it added another layer of experience and memory. The Indigenous perspective understands space exploration as one strand of a colonial process that led to alienation from their country and deprivation of their human rights.

Managing cultural heritage at Woomera means incorporating Indigenous perspectives into the interpretation of space exploration. The Heritage Centre is being re-designed and there are plans to acknowledge Indigenous culture and history in the displays (Geoff Spiers, 2004, personal communication), which currently focus on aviation, space exploration and military artefacts and history. Woomera is an example of a kind of space site where Indigenous people and the space industry intersect in the same landscape. The issues discussed here may also have relevance for other terrestrial space sites, like the rocket launch facilities at Colomb-Béchar and Hammaguir in Algeria, Kourou in French Guiana and White Sands in New Mexico.

As the example of Woomera demonstrates, the development of space

industry is embedded in colonial history and economic relationships. From a colonial perspective, both interplanetary space and the lands of 'primitive' people are *terra nullius*, empty wildernesses, or moral vacuums, into which civilized sea-faring or space-faring nations can bring the right moral order. The colonial aspects of space exploration are a mirror of those same aspirations played out on Earth.

## ■ 'THE COMPELLING URGE OF MAN TO EXPLORE' AND THE COLONIAL ENTERPRISE IN SPACE

In March 1958, after the launch of Sputnik 1, the US President's Science Advisory Committee submitted a report identifying factors which made space development urgent. The first of these was 'the compelling urge of man [sic] to explore and to discover' (Logsdon, 1983: 3). In this widely held and popular view, the Space Age was the spontaneous flowering of an age-old imperative, an emergent property of 'man'. The 'compelling urge' had led *Homo erectus* out of Africa and Columbus to the New World; now it was going to take man to the stars (Bova, 1992: 20; Hawkins, 1992):

During the 1950s, the idea of space travel became very popular in the United States, not because conquering space would give us a better chance to win the Cold War, but because of its connection with the human need to explore, to find out what was out there. (Jones and Benson, 2002: 62)

Because it was presented as a natural inclination, the need to explore concealed other motives for space exploration, such as military advantage, national prestige (Logsdon, 1983: 3), access to resources and colonization.

### The conquest of space

Space was often referred to as 'the high frontier' in the USA and the parallels with the conquest of the American West were explicitly drawn (McCurdy, 1997: 159). It was a new untamed wilderness, a virgin landscape, a 'moral vacuum' (Nash, 1967: 24) waiting to be filled with value:

Since its early beginnings, a central theme of the master fable of both American and Soviet space flight has been the 'conquest of space', which means that the crucial driving force of the space adventure is to leave marks in outer space – to imprint the cosmos with human meaning. (Bryld and Lykke, 2000: 53)

The Cold War in space contested which ideology would be dominant. In the early years, the success of Sputnik 1, Yuri Gagarin and Valentina Tereshkova (the first woman in space) indicated that communist values



were the most likely to fill the moral vacuum. In 1962, US President John F. Kennedy indicated the USA's perspective when he said, 'We mean to lead [the exploration of space], for the eyes of the world now look into space, to the moon and to the planets beyond and we have vowed that we shall not see it governed by a hostile flag of conquest, but by a banner of freedom and peace' (*NASA News Release*, 12 September 1962).

Despite the outwardly benign motivation for 'conquest' of space, the implications were readily apparent. As fear grew that the USSR would achieve control of Earth orbit and even the moon, the United Nations moved to set in place the principles that govern space exploration today. In 1958, the year after Sputnik 1 was launched, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) was formed. In 1959, it became a permanent UN committee and the UN adopted its recommendation that the UN Charter, including human rights, be extended to outer space. By 1966, the COPUOS had formulated a *Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies*. It was adopted and opened for signature in 1967. Among other things, the treaty proclaims that outer space is the common territory of all humanity and sovereignty or ownership cannot be claimed over space or celestial bodies.

### **National symbols in space: the American flag on the moon**

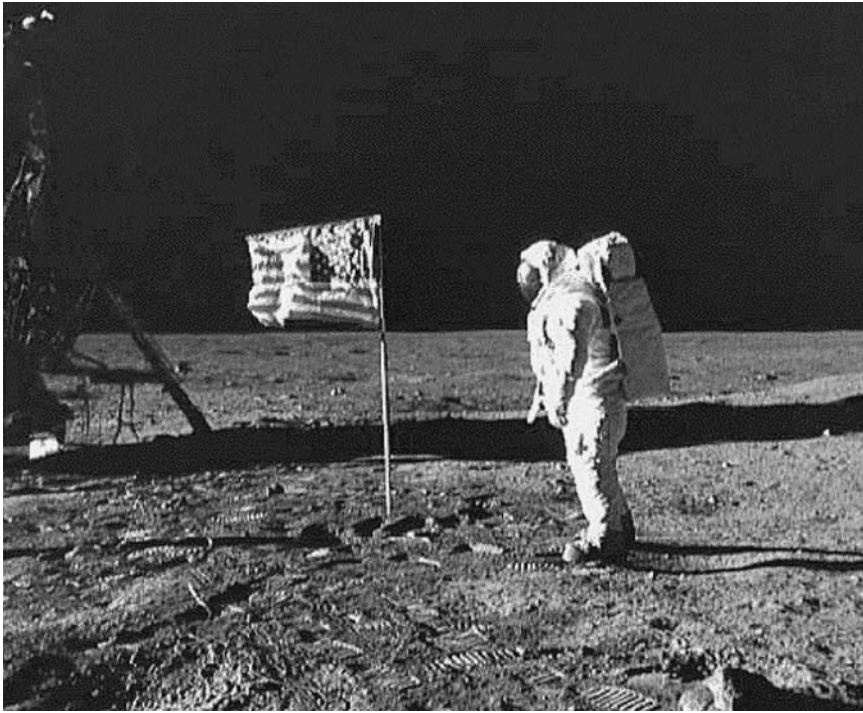
One of the most enduring images of the Apollo 11 moon landing, on 20 July 1969, is the series of photographs showing astronauts with the US flag. The flag has also become a focal point for those who speculate that the Apollo 11 mission was an elaborate deception. The flag and the image reflect the metaphor of conquest and unarticulated colonial aspirations of the Cold War antagonists (see Figure 5).

The use of a flag in this way is a widely understood symbol of claiming sovereignty over territory, despite non-colonial precedents such as the use of national flags on Mt Everest and in the Antarctic. However, in the lead-up to the Apollo 11 mission, there was domestic and international concern about creating the impression that the USA was making a territorial claim in violation of the United Nations Treaty (Platoff, 1993).

NASA's Committee on Symbolic Activities for the First Lunar Landing considered using a UN flag, but in the end recommended a national flag. Congress backed this decision and altered NASA's appropriations bill to prevent flags of other nations, or international associations, from being placed on the moon on expeditions funded solely by the USA. After the event, there were no formal protests, although some published articles expressed regret that a UN flag had not *also* been used (Platoff, 1993).

In this instance, the national symbol of the US flag was interpreted by the international community as 'an historic forward step for all mankind that has been accomplished by the United States' (Platoff, 1993). However,





**Figure 5** Buzz Aldrin and the American flag on the Moon. (Photograph courtesy of NASA)

the nationalistic and colonial connotations of this symbol have the capacity to change. President George Bush Snr, speaking of long-term objectives of the US space programme, said in 1989:

The Apollo astronauts left more than flags and footprints on the Moon. They also left some unfinished business. For, even 20 years ago, we recognized that America's ultimate goal was not simply to go there and go back – but to go there and go on.

In January 2004, President George Bush Jnr announced not only that the USA would return to the Moon, but that the Moon would be used as a base for the human exploration of Mars.

### **A wilderness no longer**

Tranquility Base, the Apollo 11 mission's lunar landing site, was also the first site where humans physically set foot on another celestial body. As a cultural heritage site, it is easy to make a case that it has an enormous global significance, even a species-based significance, as one might argue for the 3.6 million-year-old Laetoli footprints (Leakey and Hay, 1979). Despite



this, its integrity is under threat from future lunar ventures and from the lack of any accepted national or international protocols for protecting human cultural heritage in space (O'Leary et al., 2003).

The physical remains at the site consist of the famous flag, the descent module, cameras, gloves, cables, lanyards, Mylar fragments, canisters, bootprints, scoop marks, furrows and blast marks, among many other objects and traces (Burton, 2000; Figure 5). They join numerous other remains and craters from soft and crash landings of Soviet and USA spacecraft on the lunar surface (Johnson, 2003). Perhaps insignificant in themselves, the Tranquility Base artefacts represent one of the major motivations of the space race: to imprint a specific national, ideological and colonial meaning on the Moon.

Although so far from the Earth and effectively inaccessible for the present, Tranquility Base is not necessarily an isolated place. It is linked to a series of terrestrial and orbital places: a global network of tracking stations; research and manufacturing facilities; and the Intelsat III-series satellites, which provided the first global broadcast. The effort to conquer the High Frontier required a massive infrastructure. Thus, assessing the significance of this site must begin with places on Earth and the historical and ideological trajectory that determined the complexion of human interaction with space.

Any management strategy for the site must recognize both the global and national aspects of the site's significance and, in particular, that the artefacts are now part of a new lunar cultural landscape. The artefacts and marks are significant because of their location, and removal for either commercial or environmental purposes would rupture the integrity of the landscape and its meanings.

## ■ CONCLUSION: MANAGEMENT AND POLICY OBJECTIVES

As concerns about the impact of 'space junk' on space operations increase, it is likely that ideas about cultural landscapes and wilderness in space will be engaged in the same way they have on Earth. In assessing the cultural value of space heritage, a long-term view is helpful. What might have significance 100 or 1000 years from now and for whom? What will future generations curse the present ones for destroying? Archaeology has often proved that material culture can tell a very different story from documentary or literary evidence and, sometimes, the fragmentation or manipulation of written evidence leaves only the material or the landscape to bear witness to human events.

Interplanetary space can be seen as a cultural landscape because it illustrates a phase in human history arising from particular social, economic and cultural forces. The cultural landscape of space has designed elements, such

as launch facilities on Earth, organically evolved elements, such as the lunar landscape, and Earth orbit and intangible elements, such as the ideologies, cultural representations and associations of the people who participated in or were impacted by space exploration. All these elements may have cultural heritage value. To manage these values appropriately, their significance must be assessed in a way that allows multivocality. This entails moving beyond the 'Space Race' model, which assumes a global and uniform significance for places associated with the development of space exploration:

A global heritage can only exist in a significant form when it is globally valued to the same extent and that will not occur until the unlikely event of consumption priorities being similar throughout the world. Thus equality of valuation of heritage presupposes other more fundamental equities such as those of economic welfare. (Graham et al., 2000: 239)

Inevitably, power imbalances between spacefaring and non-spacefaring states must affect how the significance of space heritage is interpreted. The three places examined in this article, Peenemünde, Woomera and Tranquility Base, demonstrate that there are conflicting meanings of space heritage that are not captured within the interpretive framework of the 'Space Race'. The 'Space Race' model presents the exploration of space as a natural human urge to conquer new frontiers, an almost biological imperative that is independent of the Cold War and colonial structures that sustained it. To manage these places in a way that represents those who created the cultural landscape, it is necessary to allow conflicts of meaning to co-exist, or even be highlighted, as recommended by the Burra Charter (ICOMOS Australia, 1999).

Space sites and landscapes on Earth and in interplanetary space are increasingly under threat through redevelopment, destruction and neglect. At present, interplanetary space is regarded more as a resource to be exploited than an environment to be managed. However, in 1999, an environmental symposium at the UNISPACE conference made the recommendation that the concept of international environmental impact assessments be developed, required for all proposed space projects 'that might interfere with scientific research or natural, cultural and ethical values of any nation' (Sullivan, 1999). Such an environmental impact assessment might involve the same processes that are considered best practice in cultural heritage management on Earth:

- Assessment of the extent of the cultural resource
- Identification and consultation with stakeholders
- Significance assessment including aesthetic, historic, scientific, social or spiritual value for past, present or future generations (Burra Charter, ICOMOS Australia, 1999).
- Formulation of management recommendations and procedures.



A cultural landscape approach has direct and practical implications for managing the cultural heritage of space exploration. In orbital space and on the Moon, it is not possible to simply remove human material to return the spacescape to its pre-1957 'wilderness' state. Commercial salvage, de-orbiting, or destruction of material culture in space has the capacity to damage the integrity of cultural landscapes that present or future generations may consider highly significant. On Earth, space places are located within existing cultural landscapes that demonstrate the continuity of space exploration with terrestrial colonial enterprises. A cultural landscape approach to places associated with space exploration has the potential not only to present a more accurate view of the impact of space exploration, but also to be inclusive of cultural diversity in a context of increasing globalization.

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