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# Anti-Astropolitik – outer space and the orbit of geography

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**Abstract:** This paper aims to establish outer space as a mainstream concern of critical geography. More than half a century after humans first cast their instruments into orbit, contemporary human geography has been slow to explore the myriad connections that tie social life on Earth to the celestial realm. My starting point is a return to an early-modern geographical imagination that acknowledges the reciprocity between heaven and earth. Although other disciplinary engagements are discussed, this project represents the first systematic attempt to explore how outer space both challenges and reanimates the ‘geo’ of geography. The example of Global Satellite Navigation Systems is used to illustrate what is currently at stake in the military contest for geopolitical control of Earth’s orbit. Nigel Thrift’s work on the technological refashioning of precognitive sociality is contextualized within those systems of state geopower that sustain the everyday uplinking and downlinking to and from space hardware. Lastly, the paper offers a critique of the application of classical geopolitics to outer space in the form of ‘astropolitics’ and its will-to-power variant of *Astropolitik*.

**Key words:** *Astropolitik*, geography, geopolitics, orbit, outer space, surveillance.

Although the airplane opened up the sky, and the radio tower filled the air with waves ... neither made the limits of the Earth entirely visible or transparent. Space technology closed the sky again, bounded it from above and sealed it whole. Only then could the sky become fully modern in an active, technological sense, and only then could what lay beyond it become meaningful as space, a vast sea of darkness surrounding a blue and green point of human place. At last the world was one. (Redfield, 2000)

## I Introduction

Let me acknowledge from the outset that this is a slightly odd paper. It deals with what

may seem like a superficial doubling of the word ‘space’: as both the primary analytic of contemporary human geography and as the popular term for the expanse in which solar and stellar systems are located. To put it succinctly, this paper attempts to apply the insights of the former to pressing ‘geo’-political questions about the latter; it is my intention, in other words, to develop an agenda for a critical geography of outer space. Given how adept geographers have become in thinking philosophically about space, one might expect this to be a relatively modest undertaking. We conceive of space as being

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produced through social action (Lefebvre, 1991); space as relational (Massey, 2005); space as a site where justice can be addressed (Dikeç, 2005). Our analyses of space have been among the most significant advances for the discipline, attracting interest from across the humanities and social sciences. But surely I am not the only geographer who, on trying to explain to the uninitiated that our discipline is no longer about maps, has resorted to 'space' as my analytical trump card, only to be met with a quizzical look and a finger pointing upwards: 'what? you mean ... space?'. This, I have concluded, is not such a bad question.

If this undertaking sounds esoteric, then I hope to demonstrate that it is a lacuna in contemporary geographical scholarship that should be addressed with some urgency. Given that outer-Earth has been a sphere of human endeavour for well over 50 years, a critical geography of space is long overdue. Our presence in, and reliance on, space has become one of the enabling conditions for our current mode of everyday life in the west. Yet it lies, for the most part, outside the orbit of geography. I do not want to put at risk a great deal of our abstract thinking about space as an analytic (elegantly manifest, for instance, in Doreen Massey's *For space*) by setting up the cosmos as some great 'out there' (Massey, 2005). It is precisely contemporary human geography's relational understanding of space that makes it a good disciplinary launch pad for considering the meaning and politics of space exploration. Lest anyone think that what follows are the musings of a sci-fi fantasist, let me make clear that I am not really a fan of the genre. My interests are more down-to-earth: I write as a historical geographer who has come to think about outer space through researching test sites for cold-war rocketry (see MacDonald, 2006a). The fact that this paper is written from a modest technical and scientific understanding does not, I hope, constrain the discussion of outer space as a sphere of the social. This essay is borne out of a conviction that what is at

stake – politically and geopolitically – in the contemporary struggle over outer space is too serious to pass without critical comment. As the future conquest of space represents a potentially unprecedented opportunity to enact politicomilitary control on Earth, most plausibly by the world's only super-power, such an awesome concentration of state power demands scrutiny.

What, then, is the status of outer space in 2007? Stanley Kubrick's classic film *2001: A Space Odyssey*, made in 1968, may not have entirely come to pass but neither was it very wide of the mark. Space has been inhabited by humans, with relatively short absences for the last 20 years, and without interruption since 2 November 2000. Our species is now represented in space by the crew of the International Space Station (ISS). At \$100 billion, the ISS is the most expensive piece of technology ever built (Jha, 2006). There are currently around 700 operational spacecraft in continuous orbit of the Earth, serving a variety of military, civilian and commercial uses (Johnson, 2004: 81). Over 60 new launches take place every year, and at least 35 nations now have payloads in orbit. Despite the end of the Cold War, a thaw which is widely thought to have restrained progress in the field (Dolman, 2002), space exploration continues apace. For instance, both American and European unmanned vehicles have explored the surface of Mars, beaming back high-resolution pictures of the Martian surface, including its icefields. Forty years since the first Russian space probe landed on Venus, a new major European Space Agency effort was launched in November 2005 to study the surface and atmosphere of Earth's 'sister' planet. Again, nearly 40 years after the first moon landings and despite numerous setbacks for NASA (Vaughan, 1996; 2004), George W. Bush is planning a symbolic return lunar mission in 2018 – 'a renewed spirit of discovery' – as a means of mobilizing public support for further American investment in space dominance (see Stadd and Bingham, 2004).

Among the technical and logistical advances in space technology too numerous to detail here, there are two tendencies that stand out. First, space – and in particular the Lower Earth Orbit (LEO) – can no longer be considered remote. The journey through the Earth's atmosphere is now made on an almost weekly basis. Such is the steady passage of space vehicles that there is now a growing literature on traffic management (Johnson, 2004; Lála, 2004). The costs of entering space are now so low that students at Cambridge University have tested an 'amateur' rocket that they hope can be readily launched to the edge of space (up to 32 km altitude) for under £1000 (Sample, 2006). Second, space is becoming *ordinary*. Space-based technology is routinely reconfiguring our experience of home, work, education and healthcare through applications in the transport, telecommunications, agricultural and energy sectors (Rumsfeld, 2001). Our everyday lives already extend to the outer-Earth in ways that we entirely take for granted. America's Global Positioning System (GPS), for instance, has become essential to the regular functioning of a variety of machines from bank tellers to supertankers. The space-based science of weather forecasting is now integrated into the day-to-day management of domestic and national affairs. Satellite-based telecommunications, particularly international and cellular telephony, are a mundane part of everyday life in the west (see Warf, 2006). More obvious, perhaps, are the technical advances in space-enabled warfare that have inspired recent American military operations in the Balkans, Afghanistan and Iraq (Graham, 2004; Gray, 2005). Following in the vapour trails of the United States, Europe, Russia and China are also trying to extend their sovereignty into outer space. As I will go on to discuss, terrestrial geopolitics are increasingly being determined by extraterrestrial strategic considerations. More abstractly, I want to argue that through space exploration we are forging new subjectivities and new forms of sociality here on earth (Stern, 2000; Shaw, 2004).

Space is a modality for hypermobile information which, in combination with advanced technologies of 'software-sorting' (Graham, 2005a), has enabled a wider 'automatic production of space' (Thrift and French, 2002; see also Dodge and Kitchin, 2005). Above all, I will make the case that outer space is the next frontier for military–neoliberal hegemony, as an earlier conception of space as common property, enshrined in the 1967 UN Outer Space Treaty (OST), becomes subject to renegotiation. In place of the OST is the prospect of a new space regime, as transformative in its own way as the Bretton Woods consensus, that would oversee the privatization of space resources in the narrow interests of a global elite. Moreover, it is this conquest of space, I will argue, that underwrites much of the dynamic technological shaping and reshaping of Earthly environments recently discussed by Nigel Thrift (2005a).

Against this background, I intend to open up the multiple questions of scale and address the diverse range of sociotechnical phenomena that characterize our own space age. Although I will pay particular attention to the role of geopolitics in space strategy, it is not my intention to narrow this new agenda to, say, the specific frame of critical geopolitics. Rather, my primary objective is to establish geography as a whole as the obvious discipline to carry a broad range of cultural, historical, political and economic inquiries into outer space; inquiries that might freely draw, *inter alia*, on Marxist, feminist, postcolonial, psychoanalytic and deconstructive readings of geopower (this list is not intended to be programmatic; it is only a starting point). One model for this work might be the recent rediscovery of the sea in geographical research (see Lambert *et al.*, 2006). The sea is being reconceptualized in geography not as an undifferentiated emptiness between the land, but as a culturally configured site of knowledge and power where philosophical, scientific and aesthetic discourses intersect with socio-economic, technological and political forces (MacDonald, 2006b: 630).

This comparison is relevant not least because, as I shall later discuss, the current architects of orbital supremacy take their inspiration from the naval geostrategies of Halford Mackinder and Alfred Thayer Mahan (Mahan, 1890; Mackinder, 1902; Gray, 1996; 2005; France, 2000; Fox, 2001; Dolman, 2002; Klein, 2004). Indeed, the classical geopolitical tradition – even its fascist variant of *Geopolitik* – is such an animating force for contemporary strategic thinking on space that it has been refashioned as ‘astropolitics’ and, somewhat more worryingly, as *Astropolitik* (Dolman, 1999; 2002).

This paper sets out to critique the new body of astro-knowledge by engaging the diverse perspectives of critical human geography. One paradox of our current phase of space development is that, unlike in the 1960s, popular imagination and interest has arguably not kept pace with technology. We are uncertain as to whether space exploration is a failed modernist dream or a new window into a transcendent future (Benjamin, 2003). In this gap lies a profound ambivalence that may account for why geographers have neglected the celestial realm. In advocating that geography should take outer space seriously, I do not present this as a new direction but rather, in section II below, I frame this project as a return to a much older early-modern tradition of geographical inquiry. In section III, I consider how the spaces of Earth and Earth’s orbit are coproduced through military strategy, satellite surveillance and the everyday application of space technology. Finally, section IV turns to the emerging field of ‘astropolitics’, particularly the work of Everett Dolman, who has sought inspiration from classical geopolitics in order to strategize a future of monolithic American hegemony in outer space (Dolman, 2002).

## II The orbit of geography

The first and most important point to make here is that the project of this paper is not a search for the new. It is not, I hope, a modish reinvention of geography that trades on the commodious meaning of the word ‘space’. Rather, I want to frame the paper as boldly

going *back* to some of geography’s earlier origins. If outer space is a scale that for the most part feels unfamiliar, such limited disciplinary horizons are, paradoxically, a late-modern tendency. Five centuries ago a more expansive geographical imagination was at work. Tracing the intellectual building blocks of geographical knowledge in the sixteenth century, David Livingstone has shown how astronomical inquiry and the study of cosmography aimed to connect the workings of heaven and earth. In figures like the scholar-mathematician John Dee (1527–1608), Livingstone sees an early effort to explore ‘the intimate relationships between human affairs and the celestial forces of the heavenly spheres’ (Livingstone, 1992: 77). Dee’s conception of the universe, informed by natural philosophy as well as religion and magic, held to the principle ‘as above so below’, thereby forging ‘a chain of continuous causation’ between the terrestrial and the celestial (Livingstone, 1992: 78). Writings on astrology were clearly part of geography’s early-modern heritage, the movements of the stars being afforded significance in the outcome of worldly affairs. The planetary scale formed the background to much geographical teaching in this period and mapping the heavens was a task of no little importance, an endeavour which has continued to the present day. If the astronomical legacy in geography has waned, the geographical legacy in astronomy has remained strong; indeed, the term ‘celestial mapping’ is still used in contemporary scientific parlance. Astronomical geography, it should be stressed, was not always a specialist knowledge. Leafing through the pages of an old geography book, I recently came across a loose insert (Figure 1) advertising a nineteenth-century popular classic: Elijah Burritt’s *Geography of the heavens* with accompanying *Celestial atlas* (Burritt, 1873). The fact that this book was designed for use not only in schools but also in seminaries perhaps says something about the affective qualities of outer space as a site of religious or

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**Figure 1** Advertisement for Burritt's *Geography of the heavens*, found loose in another book  
 Source: the author.

cosmological significance. The night sky has, of course, often been charged with a sense of the afterlife. While it would be unwise to glibly conflate the terms 'space' and 'heaven', there is clearly some interesting work that could be done here, remembering that heaven is no less a geographical imaginary than the Orient or the Occident. Indeed, access to heaven and other seemingly premodern eschatological questions are becoming increasingly prominent geopolitical themes, from American evangelicalism to Wahibi Islam.<sup>1</sup>

My basic claim, then, is that a geographical concern with outer space is an old project, not a new one. A closely related argument is that a geography of outer space is a logical extension of earlier geographies of imperial exploration (for instance, Smith and Godlewska, 1994; Driver, 2001). Space exploration has used exactly the same discourses, the same rationales, and even the same institutional frameworks

(such as the International Geophysical Year, 1957–58) as terrestrial exploration. Like its terrestrial counterpart, the move into space has its origins in older imperial enterprises. Marina Benjamin, for instance, argues that for the United States outer space was 'always a metaphorical extension of the American West' (Benjamin, 2003: 46). Looking at the imbricated narratives of colonialism and the Arianne space programme in French Guiana, the anthropologist Peter Redfield makes the case that 'outer space reflects a practical shadow of empire' (Redfield, 2002: 795; see also Redfield, 2000). The historian of science Richard Sorrenson, writing about the ship as geography's scientific instrument in the age of high empire, draws on the work of David DeVorkin to argue that the V-2 missile was its natural successor (Sorrenson, 1996: 228; see also DeVorkin, 1992). A version of the V-2 – the two-stage 'Bumper WAC Corporal' –

became the first earthly object to penetrate outer space, reaching an altitude of 244 miles on 24 February 1949 (Army Ballistic Missile Agency, 1961). Moreover, out of this postwar allied V-2 programme came the means by which Britain attempted to reassert its geopolitical might in the context of its own ailing empire. In 1954, when America sold Britain its first nuclear missile – a refined version of the WAC Corporal – its possession was seen as a shortcut back to the international stage at a time when Britain's colonial power was waning fast (Clark, 1994; MacDonald, 2006a). Even if the political geography literature has scarcely engaged with outer space, the advent of rocketry was basically Cold War (imperial) geopolitics under another name. Space exploration then, from its earliest origins to the present day, has been about familiar terrestrial and ideological struggles here on Earth.

### *1 Geographies from space*

In this discussion so far, I have been drawing attention to geography's recent failure to engage outer space as a sphere of inquiry and it is important to clarify that this indictment applies more to human than to physical geography. There are, of course, many biophysical currents of geography that directly draw on satellite technologies for remote sensing. The ability to view the Earth from space, particularly through the Landsat programme, was a singular step forward in understanding all manner of Earth surface processes and biogeographical patterns (see Mack, 1990). The fact that this new tranche of data came largely from military platforms (often under the guise of 'dual use') was rarely considered an obstacle to science. But, as the range of geographical applications of satellite imagery have increased to include such diverse activities as urban planning and ice cap measurements, so too has a certain reflexivity about the provenance of the images. It is not enough, some are realizing, to say 'I just observe and explain desertification and I have nothing to do with the military'; rather, scientists need to acknowledge the

overall context that gives them access to this data in the first place (Cervino *et al.*, 2003: 236). One thinks here of the case of Peru, whose US grant funding for agricultural use of Landsat data increased dramatically in the 1980s when the same images were found to be useful in locating insurgent activities of Maoist 'Shining Path' guerrillas (Schwartz, 1996). More recently, NASA's civilian Sea-Wide Field Studies (Sea-WiFS) programme was used to identify Taliban forces during the war in Afghanistan (Caracciolo, 2004). The practice of geography, in these cases as with so many others, is bound up with military logics (Smith, 1992); the development of Geographical Information Systems (GIS) being a much-cited recent example (Pickles, 1995; 2004; Cloud, 2001; 2002; see Beck, 2003, for a case study of GIS in the service of the 'war on terror').

Aside from military space applications, to which I will later return, one of the most significant geographical engagements with outer space is in the sphere of 'planetary geomorphology'. There is a vast literature on surface processes on the moon and on the other inner planets (Mars, Mercury and Venus) in journals such as *Icarus* and *Journal of Geophysical Research* (for an introduction, see Summerfield, 1991). Terrestrial landscapes become analogues for interpreting remotely sensed images of planetary bodies, which has in turn heightened the importance of satellite imagery in understanding Earth surface processes. One of the very few points of common reference in physical and human geographical considerations of outer space is the imagery from the US Apollo space programme. While geomorphologists have examined photographs of the lunar surface to cast light on, for example, cratering and mass movement, Denis Cosgrove has attended to the cultural significance of the now iconic Apollo photographs 'The Whole Earth', 'Earthrise' and '22727' (Cosgrove, 1994; 2001a). Cosgrove outlines the momentous import of the western conception of the Earth as a globe, which culminated in photo-

graphing the earth from space to provide an 'Apollonian gaze' that had been dreamed about since the age of Cicero (Cosgrove, 2001a).<sup>2</sup> Despite his claim that 'geography is not a lunar practice', Cosgrove is rare among contemporary human geographers in thinking beyond the terrestrial (Cosgrove, 2001b; 2004). But even the 'Apollo's eye' views, as James Sidaway (2005: 71) has argued, embody their own particular geography. Sidaway presents a critical visual exegesis of the cover of Hardt and Negri's *Empire*, showing how a photograph of the Earth 'innocently' chosen by the publisher is itself predicated on a matrix of 'geo-political-ecologies' – the Cold War; the aeronautical agency of the pre-eminent capitalist state; corporate copyright controls – whose operations are purportedly the subject of the book (Hardt and Negri, 2000). For Sidaway, the image signifies empire in ways unanticipated by the authors of *Empire*. Another exception to geography's prevailing worldliness, though not one that deals with outer space *per se*, is Rob Kitchin and James Kneale's collection of essays on geographies of science fiction, *Lost in space* (Kitchin and Kneale, 2002). In these essays, literary form quite rightly determines the genre rather than necessarily requiring an outer space setting. The most explicit extraterrestrial treatments by geographers are by Jason Dittmer and Maria Lane who examine how a Martian geography has been produced through particular discourses of scientific advancement, place naming and colonial exploration (Dittmer, 2006; Lane 2005; 2006).

## 2 'Geo'-geographies of space

In all these geographical precedents, the enabling character and production of *space itself* tends to be assumed. This much is also true for some of the literature from Sociology of Scientific Knowledge (SSK) and Science, Technology and Society (STS) concerned with missile or space technology. Both of these fields have done much to expose the contingency of technological outcomes and

to denaturalize the 'inevitability' of technical progress (Mackenzie, 1990; Mack, 1990; Mort, 2002). However, the key monographs on missile and satellite programmes by Donald Mackenzie, Pamela Mack and Maggie Mort, while taking a broadly SSK or STS approach, do not for the most part apply this perspective specifically to outer space. Only Peter Redfield, writing in *Social Studies of Science*, conceives space as a problematic which calls into question some of the cherished tenets of contemporary social theory (Redfield, 2002). Where, for instance, does the study of outer space leave political discourses of 'groundedness' (Massey, 2005) or 'grass-roots'? Or, for that matter, the repeated mantra (especially prominent in sociologies of science and histories of geography) that 'all knowledge is local' (see Geertz, 1983: 4)? 'All knowledges, practices and objects may indeed be local, but are they *equally* local?' asks Redfield (2002: 792). This point also has a bearing on the feminist argument, very familiar to geographers, about the situatedness of knowledge and vision. There is a vast literature in geography which critiques the notion of an Olympian view, arguing instead for a politics and an epistemology of location, positioning and (once again) groundedness. Informed by Donna Haraway's work, it makes the case that partiality rather than universality is the basis from which we should make rational knowledge claims (Haraway, 1991). How will this argument fare in an era when there is no point on the Earth's surface, nor in the Earth's atmosphere (nor even, increasingly, below the Earth's surface) that is not subject to the gaze of satellite surveillance? This is not to question the political necessity of Haraway's disclosure of position – nor to suggest that a view from space is anything other than situated – but to draw attention to the changing circumstances in which this tactic might be deployed, remembering too that a satellite is a great deal more Olympian than Mount Olympus. It seems that, literally and figuratively, it



is this 'god-trick' so explicitly forbidden by Haraway that is now the primary goal of astrostrategy (Haraway, 1991: 195).

Another problem: where does a geography of or from outer space leave the question of scale? Notwithstanding a recent move to abolish scale altogether (Marston *et al.*, 2005), human geography has tended towards a hierarchy of (nested) scales with 'global' always on top: we have global capital, cities, flows, resistance, not forgetting hoary old globalization. The globe itself is a geographical imaginary (Cosgrove, 2001a); as Derek Gregory has argued, 'the global is not the 'universal' ... *but is itself a situated construction*' (Gregory, 1994: 204; original emphasis). Yet the space from which the globe can be apprehended is not given much regard. Moreover, the language of the global seems somewhat ill equipped to come to terms with the ways in which the outer-Earth and other extra-terrestrial spaces are *already* part of our everyday lives. These then are just some of the many questions that a geography of space might un-Earth.

It is worth pausing to consider some of characteristics which enable or constrain human activity in outer space. In this discussion I am primarily dealing with Earth's orbit rather than with the wider realm of inner planetary space (that which contains Mercury, Venus and Mars) or with the entire solar system. Earth's orbit is where most human activity is concentrated and consequently it is the most strategically valuable. So to some basics: in what sense does space have a geography? A helpful description of 'the astropolitical environment' by Everett Dolman suggests that space has 'a distinct and definable geography' and identifies a few salient features (Dolman, 2002: 60).<sup>3</sup> The determinant astropolitical characteristics are: the Earth's mass (which determines its gravitational pull); its orbit; and its relation to other space phenomena. These produce a certain 'topography' of gravitational mountains and valleys. Without going into the detail of celestial mechanics, one can imagine the

Earth at the bottom of a gravity 'well' or 'valley' which any space vehicle must escape, at enormous energy expenditure, to reach a stable orbit or 'plateau'. Most spacecraft aim to secure a stable orbit (an orbit being simply path of a falling object caught in the grip of gravity) which has a precise operational trajectory. Once in orbit, a spacecraft expends no energy: it should be clear, therefore, that the potential for feasibly moving objects through space is almost entirely dependent on harnessing the forces of celestial mechanics. While space might seem like a vast undifferentiated expanse through which a spacecraft could move in any direction, the reality of gravitational pull and the cost of carrying fuel into space means that efficient travel must make use of particular well-worn 'paths'. As with the terrestrial environment, there are 'natural' lines of travel ('Hohman Transfer Routes'), strategically desirable areas of 'high ground' ('geostationary orbits'; 'Lagrange Libration Points') and particular 'choke points' through which one must pass.

Different orbits have different astropolitical purposes. The most crowded portion of space is the *Lower Earth Orbit* (LEO), between 150 and 800 km above the surface of the Earth. This is the most accessible part of space (in terms of energy expenditure), and the most useful for reconnaissance satellites and manned flight missions. *Medium-altitude orbits* (MEO) range from 800 to 35,000 km and are often used for navigational satellites (like the American GPS network). *High-altitude orbits* exceed 35,000 km and provide the maximum coverage of the Earth with a minimum number of satellites. Of particular interest here is *Geostationary Orbit* (GEO) whereby the orbital period is identical to one full rotation of the earth such that a satellite at 0° inclination (ie, above the equator) will appear stationary from any fixed point on Earth. This enables near-continuous contact with the Earth, so it is particularly useful for global communications and weather satellites. These then are some of the 'environmental' features which influence (rather than

determine) the colonization of outer space and the extent to which any aspiring power can maintain astropolitical dominance. I shall return to this when discussing the theory and practice of astropolitics.

The historic relationship between knowing a space and exerting political and strategic dominion over it is entirely familiar to geographers. Just as the geographical knowledge of Empire enabled its military subjugation, colonization, and ultimately its ecological despoliation, this same pattern is being repeated in the twenty-first-century 'frontier'.<sup>4</sup> It is also worth remembering that the geographies of imperialism are made not given. In what follows, I want to examine how the geographies of outer space are being produced in and through contemporary social life on Earth. Such an account inevitably throws up some concerns about the politics and socialities of the new space age. Against this background, I set my argument on a trajectory which is intermittently guided by two key writers on technology with very different sensibilities. It is my intention to hold a line between the dark anticipations of Paul Virilio and the resplendent optimism of Nigel Thrift. This discursive flight may well veer off course; such are the contingencies of navigating space.

### **III Militarization, surveillance and the politics of 'a-whereeness'**

The most striking aspect of the sociality of outer space is the extent to which it is, and always has been, thoroughly militarized. The 1967 UN Outer Space Treaty banned nuclear weapons in space, on the moon or on other celestial bodies, and contained a directive to use outer space 'for peaceful purposes'. But its attempt to prohibit the 'weaponizing' of space was always interpreted in the loosest possible manner. The signatories to the OST in Washington, London and Moscow were in no doubt that space exploration was primarily about military strategy; that the ability to send a rocket into space was conspicuous evidence of the ability to dispatch a nuclear device to

the other side of the world. This association remains strong, as the concern over Iran's space programme (with its Shahab family of medium range missiles and satellite launch vehicles) makes clear. Several commentators in strategic affairs have noted the expanding geography of war from the two dimensions of land and sea to the air warfare of the twentieth century and more recently to the new strategic challenges of outer space and cyberspace (see, for instance, Gray, 2005: 154). These latter dimensions are not separate from the battle-'field' but rather they fully support the traditional military objectives of killing people and destroying infrastructure. Space itself may hold few human targets but the capture or disruption of satellites could have far-reaching consequences for life on the ground. Strictly speaking, we have not yet seen warfare in space, or even from space, but the advent of such a conflict does appear closer.

In post-Cold-War unipolar times the strategic rationale for the United States to maintain the prohibition against weaponizing space is diminishing (Lambakis, 2003), even if the rest of the world wishes it otherwise. In 2000, a UN General Assembly resolution on the 'Prevention of an Arms Race in Outer Space' was adopted by a majority of 163–0 with 3 abstentions: the United States, Israel and the Federated States of Micronesia (United Nations, 2000). Less than two months later, a US Government committee chaired by Donald Rumsfeld<sup>5</sup> issued a report warning that the 'relative dependence of the US on space makes its space systems potentially attractive targets'; the United States thus faced the danger, it argued, of a 'Space Pearl Harbor' (Rumsfeld, 2001: viii). As space warfare was, according to the report, a 'virtual certainty', the United States must 'ensure continuing superiority' (Rumsfeld, 2001: viii). This argument was qualified by obligatory gestures towards 'the peaceful use of outer space' but the report left little doubt about the direction of American space policy. Any difficult questions about the further militarization (and

even weaponization) of space could be easily avoided under the guise of developing 'dual-use' (military/civilian) technology and emphasizing the role of military applications in 'peacekeeping' operations. Through such rhetoric, NATO's satellite-guided bombing of a Serbian TV station on 23 April 1999 could have been readily accommodated under the OST injunction to use outer space for 'peaceful purposes' (Cervino *et al.*, 2003). Since that time new theatres of operation have been opened up in Afghanistan and Iraq, for further trials of space-enabled warfare that aimed to provide aerial omniscience for the precision delivery of 'shock and awe'. What Benjamin Lambeth has called the 'accomplishment' of air and space power has since been called into question by the all too apparent limitations of satellite intelligence in the tasks of identifying Iraqi Weapons of Mass Destruction or in stemming the growing number of Allied dead and wounded from modestly armed urban insurgents (Lambeth, 1999; Graham, 2004; Gregory, 2004: 205). For all its limitations, even this imagery has been shielded from independent scrutiny by the military monopolization of commercial satellite outputs (Livingstone and Robinson, 2003). Yet, far from undermining Allied confidence in satellite imagery or in a 'cosmic' view of war (Kaplan, 2006), it is precisely these abstract photocartographies of violence – detached from their visceral and bloodied 'accomplishments' – that have licensed, say, the destruction of Fallujah (Gregory, 2004: 162; Graham, 2005b). There remains, of course, a great deal more that can be said about the politics of these aerial perspectives than can be discussed here (see, for instance, Gregory, 2004; Kaplan, 2006).

The geopolitical effects of reconnaissance from space platforms are by no means confined to particular episodes of military conflict. Like the high-altitude spy plane, its Cold War precursor, satellite surveillance also gives strategic and diplomatic powers. Unlike aerial photography, however, satellite imagery is ubiquitous and high-resolution, and offers

the potential for real-time surveillance. The emerging field of surveillance studies, strongly informed by critical geographical thought, has opened to scrutiny the politics and spaces of electronic observation (see, for instance, the new journal *Surveillance and Society*). The writings of Foucault, particularly those on panopticism, are an obvious influence on this new work (Foucault, 1977; Wood, 2003), but they have seldom been applied to the realm of outer space. As Foucault pointed out, the power of Jeremy Bentham's panopticon prison design is enacted through the prisoner–subjects internalizing the disciplinary gaze: the presence of the gaoler was immaterial, as the burden of watching was left to the watched. Similarly, the power of panoptic orbital surveillance lies in its normalizing geopolitical effects.

If the geopolitics of surveillance is particularly evident at the level of the state, it applies also to the organization of the daily activities of its citizens (Molz, 2006). GPS technology is perhaps the most evident incursion of space-enabled military surveillance systems into everyday life, becoming an indispensable means of monitoring the location of people and things. For instance, the manufacturer Pro Tech, riding the wave of public concern about paedophilia in Britain, has developed systems currently being trialled by the UK Home Office to track the movements of registered sex offenders (see also Monmonier, 2002: 134). Somewhat predictably, given the apparent crisis in the spatialities of childhood (Jones *et al.*, 2003), children are to be the next subjects of satellite surveillance. In December 2005, the company mTrack launched i-Kids, a mobile phone/GPS unit that allows parents to track their offspring by PC or on a WAP-enabled mobile phone. Those with pets rather than children might consider the \$460 RoamEO GPS system that attaches to your dog's collar, should walkies ever get out of hand. It will surprise no one that the same technology gets used for less savoury purposes: a Los Angeles stalker was jailed for 16 months for attaching a GPS device to his ex-girlfriend's

car (Teather, 2004). What is more startling, perhaps, is that one does not need to be a GPS-user to be subject to the surveillant possibilities of this technology. Anyone who leaves their mobile phone unattended for five minutes can be tracked, not just by the security services, but by any individual who has momentary access to enable the phone as a tracking device. For the purposes of a newspaper story, the *Guardian* journalist Ben Goldacre 'stalked' his girlfriend by registering her phone on one of many websites for the commercial tracking of employees and stock (Goldacre, 2006). The exercise revealed how easily everyday technologies like the mobile phone can be reconfigured for very different purposes. Even this modest labour in tracking a mobile phone will become a thing of the past. Phones will be more specifically configured as a tracking device: Nokia is due to release a GPS phone in 2007, while the Finnish company Benefon has already launched its Twig Discovery, a phone that has a 'finder' capability that locates and tracks other contacts in your address book. Should the user come within range of another contact, the phone will send a message asking whether you are willing to reveal your location to this contact. If both parties are agreeable, the phones will guide their users to each other.

In this way, the gadgetry of space-enabled espionage is being woven into interpersonal as well as interstate and citizen–state relations. If the movements of a car can be tracked by a jealous boyfriend, they can also be tracked by the state for the purposes of taxation: this is surely the future of road tolls in the UK. A British insurance company is already using satellite technology to cut the premiums for young drivers if they stay off the roads between 11pm and 6am, when most accidents occur. Information about the time, duration and route of every single journey made by the driver is recorded and sent back to the company (Bachelor, 2006). The success of geotechnologies will lie in these ordinary re-configurations of life such as tracking parcels, locating stolen cars, transport guidance or

assisting the navigation of the visually impaired. Some might argue, however, that their impact will be more subtle still. For instance, Nigel Thrift locates the power of new forms of positioning in precognitive sociality and 'prereflexive practice', that is to say in 'various kinds of culturally inculcated corporeal automatisms' (Thrift, 2004b: 175). In other words, these sociotechnical changes may become so incorporated into our unconscious that we simply cease to *think* about our position. Getting lost may become difficult (Thrift, 2004b: 188). Perhaps we are not at that stage yet. But one can easily envisage GPS technologies enhancing existing inequalities in the very near future, such as the device that will warn the cautious urban walker that they are entering a 'bad neighbourhood'. In keeping with the logic of the panopticon, this is less 'Big Brother' than an army of little brothers: the social life of the new space age is already beginning to look quite different. And it is to this incipient militarization of everyday life that the emerging literature on 'military geographies' (Woodward, 2004; 2005) must surely turn its attention.

Mention must also be made of 'geofencing' technologies. This is not merely a matter of tracking dogs, children or friends, but an even more active expression of geographic power. Take, for example, the case of networked cows.<sup>6</sup> Zack Butler, an academic computer scientist at the Rochester Institute of Technology, has pioneered a form of satellite herding technology which would allow a farmer to move livestock by means of 'virtual fences' controlled by a laptop computer: 'basically we downloaded the fences to the cows' Butler told the *New Scientist* (2004). Each cow wears a collar with a GPS 'cowbell' that activates a particular electric or sound stimulation which discourages the animal from proceeding in a given direction whenever it arrives at the virtual fence. It is of passing interest to learn that Butler also compares this new era of satellite-guided farming to 'playing a computer game'. This may be a relatively minor example, but it gives some indication of

the potentially wide array of applications that await geofencing technologies.

Many of these space-enabled developments have, unaccountably, been neglected by the mainstream of geography. For instance, Barney Warf makes the comment that 'to date, satellites remain a black hole in the geographical literature on communications' (Warf, 2006: 2). Yet these technologies underwrite an array of potentially new subjectivities, modes of thinking and ways of being whose amorphous shape has recently been given outline by Thrift in a series of original and perceptive essays (Thrift, 2004a; 2004b; 2005a). He draws our attention to assemblages of software, hardware, new forms of address and locatability, new kinds of background calculation and processing, that constitute more active and recursive everyday environments. The background 'hum' of computation that makes western life possible, he argues, has been for the most part inaudible to social researchers. Of particular interest to Thrift is the tendency towards 'making different parts of the world locatable and transposable within a global architecture of address' (Thrift, 2004a: 588), which is, of course, the ultimate achievement of Global Navigation Satellite Systems (GNSS), of which GPS is the current market leader. On the back of the absolute space of GPS – and its ancillary cartographic achievements (Pickles, 2004) – have emerged other (relational) spatial imaginaries and new perceptual capacities, whereby the ability to determine one's location and that of other people and things is increasingly a matter of human precognition (Thrift, 2005a: 472). Dissolving any neat distinction between 'nature' and 'technology', this new faculty of technointelligence can support quite different modes of sensory experience. Thrift offers the term 'a-where-ness' to describe these new spatial modalities that are formed when what used to be called 'technology' has moved 'so decisively into the interstices of the active percipience of everyday life' (Thrift, 2005a: 472; see also Massey and Thrift, 2003: 291).

For all its clunky punnage, 'a-where-ness' nevertheless gives a name to a set of highly

contingent forms of subjectivity that are worth anticipating, even if, by Thrift's own admission, they remain necessarily speculative. Reading this body of work can induce a certain vertigo, confronting potentially precipitous shifts in human sociality. The same sensation is also induced by engagement with Paul Virilio (2005). But, unlike Virilio, Thrift casts off any sense of foreboding (Thrift, 2005b) and instead embraces the construction of 'new qualities' ('conventions, techniques, forms, genres, concepts and even ... senses'), which in turn open up new ethicopolitical possibilities (Thrift, 2004a: 583). It is important not to jettison this openness lightly. Even so, I remain circumspect about the social relations that underwrite these emergent qualities, and I am puzzled by Thrift's disregard of the (geo)political contexts within which these new technologies have come to prominence. A critical geography should, I think, be alert to the ways in which state and corporate power are immanent within these technologies, actively strategizing new possibilities for capital accumulation and military neoliberalism. To the extent that we can sensibly talk about 'a-where-ness' it is surely a function of a new turn in capitalism, which has arguably expanded beyond the frame (but not the reach) of Marx and Engels when they wrote that:

the need for a constantly expanding market for its products chases the bourgeoisie over the whole surface of the globe. It must nestle everywhere, settle everywhere, establish connections everywhere. (Marx and Engels, 1998: 39)

The current struggle for orbital supremacy, as the next section will make clear, is an extension of these relations into space in order to consolidate them back on Earth. Indeed, outer space may become, to use David Harvey's term, a 'spatio-temporal fix' that can respond to crises of over-accumulation (Harvey, 2003: 43). While this might seem like shorthand for the sort of Marxist critique that Thrift rejects (Amin and Thrift, 2005), it is an analysis that is also shared by the advocates of American

*Astropolitik*, who describe space as the means by which 'capitalism will never reach wealth saturation' (Dolman, 2002: 175). The production of (outer) space should, I think, be understood in this wider context.

To illustrate this discussion, it is worth returning to the example of GNSS (GPS and its new European competitor, Galileo), given the centrality of positioning technologies to the tendencies that Thrift describes. Let us not neglect the significance of these changes (which, to his great credit, Thrift is among the earliest in the social sciences to recognize). We are potentially talking about an end to the ordinary meaning of the question 'Where am I?'. In a development comparable to the nineteenth-century standardization of clock time for the measurement of labour, GNSS technology has conquered space; it is becoming part of the computational background to everyday life – 'an epistemic wallpaper' – a form which, like clock time, structures social life but is relatively invisible because of its utter familiarity (Thrift, 2004a). GNSS represents a standardization of space in terms of a Euclidean topology or system of coordinates – 'the most absolute of absolute spaces' (Thrift, 2004a: 600) – which, while not new in its conception, has only been fully realized with the advent of satellites and atomic clocks. From now on, every corner of the globe can be given an address to an accuracy of 4 m, allowing, as we have already seen, for an unprecedented ability to track people and things.

But such technology did not just 'emerge'. Rather, the example of the American GPS shows how military systems for missile guidance were gradually refined for civilian use as the commercial possibilities for innumerable user applications have become more evident. The current global standard for position, velocity and timing information, GPS was forged in the Cold War, originating in the science of monitoring the Russian *Sputnik*. An early version quickly found its principal use determining the exact locations of American submarines in order to accurately deploy the Polaris nuclear missile (Beidleman, 2005: 121).

The potential civilian utility of the technology was not widely publicized until 1983 when a Korean passenger aircraft (KAL 007), bound for Seoul, accidentally strayed over Soviet airspace and was shot down by jet interceptors. Outraged by the episode, President Ronald Reagan announced that when the full GPS constellation was operational the data could be used for civil aviation. However, as GPS was a military support system tailored for missile guidance, the USA was unwilling to make an accurate signal widely and freely available; to do so, it was thought, could assist an enemy in targeting the USA. The civilian GPS signal was therefore deliberately degraded to 100 m or so, until President Clinton eventually authorized access to the 10–20 m signal in 2000.

Since then, GPS has become so hard-wired into social and economic life on Earth that its commercial and military rationales are more evenly weighted. The value of the market at stake is considerable. In 2002, commercial services based on free access to GPS had estimated revenues of \$12 billion; the global market for services and receivers was expected to reach €40 billion by 2005 (Beidleman, 2005: 134). Further, GPS has become crucial to so many of the routine infrastructural operations of nation states, a dependence entirely based on a continuing trust in the American provision. Should issues of (American) national security be at stake, however, the USA has made no guarantee of GPS signal quality. It is in this context that the European Union has pursued its own GNSS, Galileo, whose first satellite (GIOVE-A) started transmission in January 2006 (Figure 2). The pan-European support for Galileo revealed a widespread concern among member states that having such basic infrastructure ultimately subject to the control of a foreign power was a breach of European sovereignty. Indeed French President Chirac went so far as to warn that failing to support Galileo 'would inevitably lead to [Europe] becoming ... vassals of the United States' (quoted in Beidleman, 2005: 129). The initial American response to Galileo was outright diplomatic opposition coupled with a certain



**Figure 2** An artist's impression of European Space Agency's GIOVE-A, being the first satellite of the European Galileo constellation  
 Source: European Space Agency.

doubt that the European Space Agency could manage the political and technical coordination necessary to complete the project. The likelihood that Galileo will be successful has, however, brought about a major challenge to American orbital supremacy. An agreement to standardize signal protocol means that Galileo will not disrupt GPS signals, but the European system makes it much more difficult for the USA to deny positioning data to users with potentially hostile intent. The fact that other non-European states, including China, Israel, Ukraine, India, Morocco, Saudi Arabia and South Korea, have also invested in the project has been disconcerting for the USA. Even more worrying is the anticipated portion of market share that Galileo may acquire before a planned accuracy upgrade to GPS can be completed. The enhanced precision of Galileo looks set to generate new applications as well

as attract new users; a market penetration of 13% in 2010 is expected to rise to 52% in 2020 (Beidleman, 2005: 135).

Although Galileo has been presented as an infrastructural and commercial asset designed 'specifically for civilian purposes', another largely unspoken rationale is undoubtedly EU defence (Wilson, 2002: 5). Galileo will surely underpin a future common European defence policy, even if such a development can be currently subsumed under the guise of 'dual use'. The European Advisory Group on Aerospace notes that 'the well being of the [European space] industry depends on twin pillars, namely civil and defence. These are both complementary and mutually dependent' (quoted in Cervino *et al.*, 2003: 233). The notion of 'dual use' is convenient for governments because it mitigates against declining public defence research budgets. But

there are, I think, grounds for concern about it in this case. Investment in what seems to be civilian infrastructure can easily become, at the same time, an extension of the militarization and, potentially, the weaponization of space, particularly in an era when warfare is increasingly being couched in 'humanitarian' terms. A team of Italian atmospheric scientists have rightly expressed misgivings that the commercial competition in space technology is becoming a de facto arms race that further undermines confidence in UN OST space governance (Cervino *et al.*, 2003).

I should emphasize that I am not advancing some technologically determinist argument to the effect that if something is military in origin it is somehow 'tainted' or forever in the service of militarism. Walter Benjamin reminds us that the meaning of technology has no umbilical link to its origins: he noted that the Eiffel Tower 'found' its purpose as a military radio transmitter long after it had been built simply as a monument to industrial confidence in iron (Benjamin, 1999: 568). But we should be concerned when the needs of basic civilian infrastructure come to be regarded as coterminous with those of military strategy, particularly in circumstances when technologies of the state are so readily adaptable to monitoring the lives of its citizenry. Another consequence of this conflation is that dual-use systems underpinning normal life have become a ready target of military efforts, being exempt from the usual civilian protections of international law (Graham, 2005c). To use Stephen Graham's phrase, US air and space power is increasingly aimed at 'switching cities off' (Graham, 2005c). This may very easily develop from targeting electricity networks (Belgrade, Baghdad, Beirut) to the destruction of satellite provision on which so much of our civilian infrastructure depends. As Tim Luke observed:

many more human beings live highly cyber-organized lives, totally dependent upon the Denature of machinic ensembles with their elaborate extra-terrestrial ecologies of mega-technical economics. This is true for the

Rwandans in the refugee camps of Zaire [sic] as it is for the Manhattanites in the luxury coops of New York City. (Luke, quoted in Graham, 2005c: 171)

I am reluctant to reiterate Paul Virilio's pre-occupation with the crash and the accident as defining features of modernity (Virilio, 2000; Leslie, 2000), but one cannot avoid the fact that systems that have become vital for sustaining our current mode of existence are now obvious and accessible targets. Concerns have even been raised that constellations of satellites are vulnerable to hackers with destructive intent (Kent, 2006). The point of all this gloomy talk is to qualify rather than to overturn the emphases of Nigel Thrift's recent work. Moreover, I hope to contextualize some of the tendencies Thrift describes within the systems of geopower from which they have materialized. In the final section I want to show something of the strategic struggle for space; a struggle that is by no means distant from the discipline of geography.

#### **IV Critical astropolitics**

Two things should now be clear. First, outer space is no longer remote from our everyday lives; it is already profoundly implicated in the ordinary workings of economy and society. Second, the import of space to civilian, commercial and, in particular, military objectives, means there is a great deal at stake in terms of the access to and control over Earth's orbit. One cannot overstate this last point. The next few years may prove decisive in terms of establishing a regime of space control that will have profound implications for terrestrial geopolitics. It is in this context that I want to briefly introduce the emerging field of astropolitics, defined as 'the study of the relationship between outer space terrain and technology and the development of political and military policy and strategy' (Dolman, 2002: 15). It is, in both theory and practice, a geopolitics of outer space. Everett Dolman is one of the pioneers of the field. An ex-CIA intelligence analyst who teaches at the US Air Force's School of Advanced Airpower



Studies, he publishes in journals that are perhaps unfamiliar to critical geographers, like the modestly titled *Small Wars and Insurgencies*. As what follows is uniformly critical of Dolman's work, I should say that his *Astropolitik: classical geopolitics in the space age* (Dolman, 2002) is unquestionably a significant book: it has defined a now vibrant field of research and debate. *Astropolitik* draws together a vast literature on space exploration and space policy, and presents a lucid and accessible introduction to thinking strategically about space. (In the previous section I drew heavily on Dolman's description of the astropolitical environment.) My critique is not founded on scientific or technical grounds but on Dolman's construction of a formal geopolitics designed to advance and legitimate the unilateral military conquest of space by the United States. While Dolman has many admirers among neoconservative colleagues in Washington think-tanks, critical engagements (eg, Moore, 2003; Caracciolo, 2004) have been relatively thin on the ground.

Dolman's work is interesting for our purposes here precisely because he draws on geography's back catalogue of strategic thinkers, most prominently Halford Mackinder, whose ideas gained particular prominence in America in the wake of the Russian *Sputnik* (Hooson, 2004: 377). But Dolman is not just refashioning classical geopolitics in the new garb of 'astropolitics'; he goes further and proposes an '*Astropolitik*' – 'a simple but effective blueprint for space control' (p. 9) – modelled on Karl Haushofer's *Geopolitik* as much as *Realpolitik*. Showing some discomfort with the impeccably fascist pedigree of this theory, Dolman cautions against the 'misuse' of *Astropolitik* and argues that the term 'is chosen as a constant reminder of that past, and as a grim warning for the future' (Dolman, 2002: 3). At the same time, however, his book is basically a manual for achieving space dominance. Projecting Mackinder's famous thesis on the geographical pivot of history (Mackinder, 1904) onto outer space, Dolman argues that: 'who controls the Lower Earth Orbit controls

near-Earth space. Who controls near-Earth space dominates Terra [Earth]. Who dominates Terra determines the destiny of humankind.' Dolman sees the quest for space as already having followed classically Mackinderian principles (Dolman, 2002: 87). Like Mackinder before him, Dolman is writing in the service of his empire. '*Astropolitik* like *Realpolitik*' he writes, 'is hardnosed and pragmatic, it is not pretty or uplifting or a joyous sermon for the masses. But neither is it evil. Its benevolence or malevolence become apparent only as it is applied, and by whom' (Dolman, 2002: 4). Further inspiration is drawn from Alfred Thayer Mahan, whose classic volume *The influence of seapower upon history*, has been widely cited by space strategists (Mahan, 1890; Gray, 1996; see also Russell, 2006). Mahan's discussion of the strategic value of coasts, harbours, well-worn sea paths and chokepoints has its parallel in outer space (see France, 2000). The implication of Mahan's work, Dolman concludes, is that 'the United States must be ready and prepared, in Mahanian scrutiny, to commit to the defense and maintenance of these assets, or relinquish them to a state willing and able to do so' (Dolman, 2002: 37).

The primary problem for those advancing *Astropolitik* is that space is not a lawless frontier. In fact the legal character of space has long been enshrined in the principles of the OST and this has, to some extent, prevented it from being subject to unbridled interstate competition. 'While it is morally desirable to explore space in common with all peoples', writes Dolman without conviction, 'even the thought of doing so makes weary those who have the means' (Dolman, 2002: 135). Thus, the veneer of transcendent humanism with regard to space gives way to brazen self-interest. Accordingly, Dolman describes the *res communis* consensus<sup>7</sup> of the OST as 'a tragedy' that has removed any legal incentive for the exploitation of space (p. 137). Only a *res nullius*<sup>8</sup> legal order could construct space as 'proper objects for which states may compete' (p. 138). Under the paradigm of *res nullius* and *Astropolitik*, the moon and

other celestial bodies would become potential new territory for states. Here Dolman again parallels Karl Haushofer's *Geopolitik*. Just as Haushofer desired a break from the Versailles Treaty (Ó Tuathail, 1996: 45), Dolman wants to see the USA withdraw from the OST, making full speed ahead for the moon (see also Hickman and Dolman, 2002). Non-space-faring developing countries need not worry about losing out, says Dolman, as they 'would own no less of the Moon than they do now' (2002: 140).

To his credit, Dolman does give some attention to the divisive social consequences of this concentrated power. Drawing on earlier currents of environmental determinism and on the terrestrial model of Antarctic exploration, he ponders the characteristics of those who will be first to colonize space. They will be 'highly educated, rigorously trained and psychologically screened for mental toughness and decision-making skills, and very physically fit'; 'the best and brightest of our pilots, technicians and scientists'; 'rational, given to scientific analysis and explanation, and obsessed with their professions' (p. 26). In other words, 'they are a superior subset of the larger group from which they spring' (p. 27). As if this picture is not vivid enough, Dolman goes on to say that colonizers of space 'will be the most capably endowed (or at least the most ruthlessly suitable, as the populating of America and Australia ... so aptly illustrate[s])' (p. 27; my emphasis). 'Duty and sacrifice will be the highest moral ideals' (p. 27). Society, he continues, must be prepared 'to make heroes' of those who undertake the risk of exploration (p. 146). At the same time, 'the astropolitical society must be prepared to forego expenditures on social programs ... to channel funds into the national space program. It must be imbued with the national spirit' (p. 146).

Dolman slips from presenting what would be merely a 'logical' outworking of *Astropolitik* to advocating that the United States adopt it as their space strategy. Along the way, he acknowledges the full anti-democratic potential

of such concentrated power, detaching the state from its citizenry:

the United States can adopt any policy it wishes and the attitudes and reactions of the domestic public and of other states can do little to challenge it. So powerful is the United States that should it accept the harsh *Realpolitik* doctrine in space that the military services appear to be proposing, and given a proper explanation for employing it, there may in fact be little if any opposition to a *fait accompli* of total US domination in space. (Dolman, 2002: 156)

Although Dolman claims that 'no attempt will be made to create a convincing argument that the United States has a right to domination in space', in almost the next sentence he goes on to argue 'that, in this case, *might does make right*', 'the persuasiveness of the case' being 'based on the self-interest of the state and stability of the system' (2002: 156; my emphasis). Truly, this is *Astropolitik*: a veneration of the ineluctable logic of power and the permanent rightness of those who wield it. If it sounds chillingly familiar, Dolman hopes to reassure us with his belief that 'the US form of liberal democracy ... is admirable and socially encompassing' (p. 156) and it is 'the most benign state that has ever attempted hegemony over the greater part of the world' (p. 158). His sunny view that the United States is 'willing to extend legal and political equality to all' sits awkwardly with the current suspension of the rule of law in Guantanamo Bay as well as in various other 'spaces of exception' (see Gregory, 2004; Agamben, 2005).

Dolman's astropolitical project is by no means exceptional. The journal *Astropolitics*, of which he is a founding editor, contains numerous papers expressing similar views. It is easy, I think, for critical geographers to feel so secure in the intellectual and political purchase of Ó Tuathailian critiques (Ó Tuathail, 1996), that we become oblivious to the undead nature of classical geopolitics. It is comforting to think that most geography undergraduates encountering geopolitics, in the UK at least,

will in all likelihood do so through the portal of critical perspectives, perhaps through the excellent work of Joanne Sharp or Klaus Dodds (Dodds, 2005; Sharp, 2005). But the legacies of Mackinder and Mahan live on, and radical critique is as urgent as ever. While this is not the place for a thoroughgoing reappraisal of astropolitics in the manner of Gearóid Ó Tuathail, a few salient points from his critique can be brought out.

- (1) Astrography and astropolitics, like geography and geopolitics, constitute 'a political domination and cultural imagining of space' (Ó Tuathail, 1996: 28). While commentators like Colin Gray have posited an 'inescapable geography' (eg, 'of course, physical geography is politically neutral'), a critical agenda conceives of geography not as a fixed substratum but as a highly social form of knowledge (Gray, 1999: 173; Ó Tuathail, 1999: 109). For geography, read 'astrography'. We must be alert to the 'declarative' ('this is how the Outer Earth is') and 'imperative' ('this is what we must do') modes of narration that astropolitics has borrowed from its terrestrial antecedent (Ó Tuathail, 1999: 107). The models of Mackinder and Mahan that are so often applied to the space environment are not unchanging laws; on the contrary they are themselves highly political attempts to create and sustain particular strategic outcomes in specific historical circumstances.
- (2) Rather than actively supporting the dominant structures and mechanisms of power, a critical astropolitics must place the primacy of such forces always already in question. Critical astropolitics aims to scrutinize the power politics of the expert/think-tank/tactician as part of a wider project of deepening public debate and strengthening democratic accountability (Ó Tuathail, 1999: 108).
- (3) Mackinder's 'end of geography' thesis held that the era of terrestrial exploration and discovery was over, leaving only the task of consolidating the world order to fit British interests (Ó Tuathail, 1996: 27). Dolman's vision of space strategy bears striking similarities. Like Ó Tuathail's critique of Mackinder's imperial hubris, *Astropolitik* could be reasonably described as 'triumphalism blind to its own precariousness' (Ó Tuathail, 1996: 28). Dolman, for instance, makes little effort to conceal his tumescent patriotism, observing that 'the United States is awash with power after its impressive victories in the 1991 Gulf War and 1999 Kosovo campaign, and stands at the forefront of history capable of presiding over the birth of a bold New World Order'. One might argue, however, that Mackinder – as the theorist of imperial decline – may in this respect be an appropriate mentor (Ó Tuathail, 1999: 112). It is important, I think, to demystify *Astropolitik*: there is nothing 'inevitable' about US dominance in space, even if the USA were to pursue this imperial logic.
- (4) Again like Mackinder, *Astropolitik* mobilizes an unquestioned ethnocentrism. Implicit in this ideology is the notion that America must beat China into space because 'they' are not like 'us'. 'The most ruthlessly suitable' candidates for space dominance, we are told – 'the most capably endowed' – are like those who populated America and Australia (Dolman, 2002: 27).
- (5) A critical astropolitics must challenge the 'mythic' properties of *Astropolitik* and disrupt its reverie for the 'timeless insights' of the so-called geopolitical masters. For Ó Tuathail, 'geopolitics is mythic because it promises uncanny clarity ... in a complex world' and is 'fetishistically concerned with .... prophecy' (Ó Tuathail, 1999: 113). Ó Tuathail's critical project, by contrast, seeks to recover the political and historical contexts through which the knowledge of Mackinder and Mahan has become formalized.

## V Conclusion

Stephen Graham, following Eyal Weizmann, has argued that geopolitics is a flat discourse (Weizmann, 2002; Graham, 2004: 12). It attends to the cartographic horizontality of terrain rather than a verticality that cuts through the urban landscape from the advantage of orbital supremacy. Just as, for Graham, a critical geopolitics must urgently consider this new axis in order to challenge the practices and assumptions of urbicide, so too – I would argue – it must lift its gaze to the politics of the overhead. Our interest in the vertical plane must extend beyond terrestrial perspectives; we must come to terms with the everyday realities of space exploration and domination as urgent subjects of critical geographical inquiry. A prerequisite for this agenda is to overcome our sense of the absurdity and oddity of space, an ambivalence that has not served human geography well. The most obvious entry point is to think systematically about some of the more concrete expressions of outer space in the making of Earthly geographies. For instance, many of the high-profile critical commentaries on the recent war in Iraq, even those written from geographical perspectives, have been slow to address the orbital aspects of military supremacy (see, for instance, Harvey, 2003; Gregory, 2004; Retort, 2005). Suffice to say that, in war as in peace, space matters on the ground, if indeed the terrestrial and the celestial can be sensibly individuated in this way.

There is also, I think, scope for a wider agenda on the translation of particular Earthly historical geographies into space, just as there was a translation of early occidental geographies onto imperial spaces. When Donald Rumsfeld talks of a ‘Space Pearl Harbor’, there is plainly a particular set of historicogeographical imaginaries at work that give precedence, in this case, to American experience. Rumsfeld has not been slow to invoke Pearl Harbor, most famously in the aftermath of 11 September 2001; notably, in all these examples – Hawaii in 1941; New York

in 2001; and the contemporary space race – there lurks the suggestion of a threat from the East.<sup>9</sup> All of this is a reminder that the colonization of space, rather than being a decisive and transcendent break from the past, is merely an extension of long-standing regimes of power. As Peter Redfield succinctly observed, to move into space is ‘a form of return’: it represents ‘a passage forward through the very pasts we might think we are leaving behind’ (Redfield, 2002: 814). This line of argument supports the idea that space is part and parcel of the Earth’s geography (Cosgrove, 2004: 222). We can conceive of the human geography of space as being, in the words of Doreen Massey, ‘the sum of relations, connections, embodiments and practices’ (Massey, 2005: 8). She goes on to say that ‘these things are utterly everyday and grounded, at the same time as they may, when linked together, go around the world’. To this we might add that they go around *and beyond* the world. The ‘space’ of space is both terrestrial *and* extraterrestrial: it is the relation of the Earth to its firmament. Lisa Parks and Ursula Biemann have described our relationship with orbits as being ‘about uplinking and downlinking, [the] translation [of] signals, making exchanges with others and positioning the self’ (Parks and Biemann, 2003). It is precisely this relational conception of space that might helpfully animate a revised geographical understanding of the Outer Earth.

As has already been made clear, this sort of project is by no means new. Just as astropolitics situates itself within a Mackinderian geographical tradition, so a critical geography of outer space can draw on geography’s early-modern cosmographical origins, as well as on more recent emancipatory perspectives that might interrogate the workings of race, class, gender and imperialism. Space is already being produced in and through Earthly regimes of power in ways that undoubtedly threaten social justice and democracy. A critical geography of space, then, is not some far-fetched or indulgent distraction from the ‘real world’;

rather, as critical geographers we need to think about the contest for outer space as being constitutive of numerous familiar operations, not only in respect of international relations and the conduct of war, but also to the basic infrastructural maintenance of the state and to the lives of its citizenry.

Geography is already well placed to think about these things; there are many well-worn lines of geographical critique that have their parallel in space. For instance, there are pressing 'environmental' questions about the pollution of Earth's orbit with space 'junk', a development which is seriously compromising the sustainable use of Lower Earth Orbit. This high-speed midden, already of interest to archaeologists (see Gorman, 2005), is coming up for its 50th anniversary in 2007, after the launch of the Russian satellite *Sputnik* on 4 October 1957. Since then, the sheer variety and number of discarded objects is remarkable. From lens caps to astronaut faeces, the number of orbiting articles greater than 10 cm in diameter currently being tracked is over 9000 (Brearley, 2005: 9). The ability to think critically about nature conservation and heritage policy – another aspect of the geographer's remit – may also have an extra-terrestrial transference, as wilderness and 'first contact' paradigms look set to be mobilized in space (Cockell and Horneck, 2004; Rogers, 2004; Spennemann, 2004). One might further speculate that the economic geography of outer space would be a rich, if as yet undeveloped, avenue of inquiry. A cultural and historical geography of space also offers numerous flights of fancy, from questions of astronautical embodiment to the politics of planetary representation. All of this is to say that a geography of outer space should be a broad undertaking, aside from the obvious project of a critical geo/astropolitics.

Lastly, a critical geography must not be overly pessimistic, nor must it relinquish an engagement with space technology on the grounds that this has, to date, been driven largely by military agendas. The means of our critique may require us to adopt such

technologies, or at least to ask what opportunities they present for praxis. One thinks here of various forms of playful and subversive activism, experiment and art-event that have knowingly toyed with space hardware (Triscott and la Frenais, 2005; Spacearts, 2006). GPS receivers can help us think reflexively about position (Parks, 2001); remote sensing can be used to explore political conditions in the world (Parks and Biemann, 2003); amateur radio-telescopes can help us reconceptualize space by attuning us to the sonorous qualities of its scientific 'data' (Radioqualia, 2003); even rocket science can still carry utopian freight (Chalcraft, 2006). Through such means, can space be given a truly human geography.

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#### **Notes**

1. One thinks here of the extraordinary popularity in the USA of the *Left behind* Christian dispensationalist novels of Tim LaHaye and Jerry B. Jenkins, which detail 'end time' geopolitical catastrophes prior to the tribulation that will bring about the end of the world and the reign of heaven (see Frykholm, 2004).
2. Apollo was an Olympian deity considered to be the god of all wisdom whose figure has been carefully charted by Denis Cosgrove from classical Greece to the US space programme. Cosgrove notes that 'Apollo embodies a desire for wholeness and a will to power, a dream of transcendence and an appeal to radiance' (Cosgrove, 2001a: 2). The figure of Apollo continues to work as a metonym for much of what is discussed in this paper.

3. What follows is taken from Everett Dolman's helpful discussion of the space environment. Other writers like Colin S. Gray (2005) also draw substantially on this aspect of Dolman's work.
4. See Brearley (2005) on the pollution of outer space.
5. As well as the chair of this committee, Donald Rumsfeld was better known as the United States Secretary of Defense until his resignation in November 2006. The committee also included LTG Jay Garner, an arms contractor who became the first US-appointed 'Director of Reconstruction and Humanitarian Assistance' in Iraq in 2003 before he was replaced by Paul Bremer.
6. I am grateful to Melanie Thomson for drawing this example to my attention.
7. *Res communis* could be translated as 'a thing for everyone'. It is also conceived as *res communis humanitatis* (common property of all) and *res communis omnium* (space as the heritage of all mankind). The *res communis* legal conception was arrived at as a compromise in negotiations prior to the OST (see Laver, 1986; Johnston, 1992; Hickman and Dolman, 2002).
8. *Res nullius* translates as a 'thing for no one', and is this subject to the ancient legal principle *res nullius naturaliter fit primi occupantis* perhaps more universally recognized in the playground phrase 'finders, keepers!'.
9. I am grateful to Klaus Dodds for this observation.

### Postscript

Since submitting this paper, two key developments have taken place that amplify the significance of my argument. Most notably, President Bush announced a bellicose new National Space Strategy in October 2006 which, while more or less in line with the Rumsfeld Commission report, is also a move in the direction of *Astropolitik*. By way of response, on 11 January 2007 the People's Republic of China confirmed that they had successfully tested an Anti-Satellite Weapon on one of their own ageing weather satellites 500 miles into space.

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