### NC (4)

#### 40] Security is a psychological construct- the aff’s scenarios for conflict are products of paranoia that project our violent impulses onto the other. Claims of war and conflict create a false dichotomy between the good us and the evil them, ignoring our role in provoking the aggression.

Mack, MD @ Harvard, 91

(John, former Professor of Psychology at Harvard and Pulitzer Prize Winner, <http://johnemackinstitute.org/1988/08/the-enemy-system-short-version/>) BW

The threat of nuclear annihilation has stimulated us to try to understand what it is about mankind that has led to such self-destroying behavior. Central to this inquiry is an exploration of the adversarial relationships between ethnic or national groups. It is out of such enmities that war, including nuclear war should it occur, has always arisen. Enmity between groups of people stems from the interaction of psychological, economic, and cultural elements. These include fear and hostility (which are often closely related), competition over perceived scarce resources,[3] the need for individuals to identify with a large group or cause,[4] a tendency to disclaim and assign elsewhere responsibility for unwelcome impulses and intentions, and a peculiar susceptibility to emotional manipulation by leaders who play upon our more savage inclinations in the name of national security or the national interest. A full understanding of the “enemy system”[3] requires insights from many specialities, including psychology, anthropology, history, political science, and the humanities. In their statement on violence[5] twenty social and behavioral scientists, who met in Seville, Spain, to examine the roots of war, declared that there was no scientific basis for regarding man as an innately aggressive animal, inevitably committed to war. The Seville statement implies that we have real choices. It also points to a hopeful paradox of the nuclear age: threat of nuclear war may have provoked our capacity for fear-driven polarization but at the same time it has inspired unprecedented efforts towards cooperation and settlement of differences without violence. The Real and the Created Enemy Attempts to explore the psychological roots of enmity are frequently met with responses on the following lines: “I can accept psychological explanations of things, but my enemy is real. The Russians [or Germans, Arabs, Israelis, Americans] are armed, threaten us, and intend us harm. Furthermore, there are real differences between us and our national interests, such as competition over oil, land, or other scarce resources, and genuine conflicts of values between our two nations. It is essential that we be strong and maintain a balance or superiority of military and political power, lest the other side take advantage of our weakness”. This argument does not address the distinction between the enemy threat and one’s own contribution to that threat-by distortions of perception, provocative words, and actions. In short, the enemy is real, but we have not learned to understand how we have created that enemy, or how the threatening image we hold of the enemy relates to its actual intentions. “We never see our enemy’s motives and we never labor to assess his will, with anything approaching objectivity”.[6] Individuals may have little to do with the choice of national enemies. Most Americans, for example, know only what has been reported in the mass media about the Soviet Union. We are largely unaware of the forces that operate within our institutions, affecting the thinking of our leaders and ourselves, and which determine how the Soviet Union will be represented to us. Ill-will and a desire for revenge are transmitted from one generation to another, and we are not taught to think critically about how our assigned enemies are selected for us. In the relations between potential adversarial nations there will have been, inevitably, real grievances that are grounds for enmity. But the attitude of one people towards another is usually determined by leaders who manipulate the minds of citizens for domestic political reasons which are generally unknown to the public. As Israeli sociologist Alouph Haveran has said, in times of conflict between nations historical accuracy is the first victim.[8] The Image of the Enemy and How We Sustain It Vietnam veteran William Broyles wrote: “War begins in the mind, with the idea of the enemy.”[9] But to sustain that idea in war and peacetime a nation’s leaders must maintain public support for the massive expenditures that are required. Studies of enmity have revealed susceptibilities, though not necessarily recognized as such by the governing elites that provide raw material upon which the leaders may draw to sustain the image of an enemy.[7,10] Freud[11] in his examination of mass psychology identified the proclivity of individuals to surrender personal responsibility to the leaders of large groups. This surrender takes place in both totalitarian and democratic societies, and without coercion. Leaders can therefore designate outside enemies and take actions against them with little opposition. Much further research is needed to understand the psychological mechanisms that impel individuals to kill or allow killing in their name, often with little questioning of the morality or consequences of such actions. Philosopher and psychologist Sam Keen asks why it is that in virtually every war “The enemy is seen as less than human? He’s faceless. He’s an animal”.” Keen tries to answer his question: “The image of the enemy is not only the soldier’s most powerful weapon; it is society’s most powerful weapon. It enables people en masse to participate in acts of violence they would never consider doing as individuals”.[12] National leaders become skilled in presenting the adversary in dehumanized images. The mass media, taking their cues from the leadership, contribute powerfully to the process. The image of the enemy as less than human may be hard to dislodge. For example, a teacher in the Boston area reported that during a high school class on the Soviet Union a student protested: “You’re trying to get us to see them as people”. Stephen Cohen and other Soviet experts have noted how difficult it is to change the American perception of the Soviet Union, despite the vast amount of new information contradicting old stereotypes.” Bernard Shaw in his preface to Heartbreak House, written at the end of World War I, observed ironically: “Truth telling is not compatible with the defense of the realm”. Nations are usually created out of the violent defeat of the former inhabitants of a piece of land or of outside enemies, and national leaders become adept at keeping their people’s attention focused on the threat of an outside enemy.[14] Leaders also provide what psychiatrist Vamik Volkan called “suitable targets of externalization”[10] – i.e., outside enemies upon whom both leaders and citizens can relieve their burdens of private defeat, personal hurt, and humiliation.[15] All-embracing ideas, such as political ideologies and fixed religious beliefs act as psychological or cultural amplifiers. Such ideologies can embrace whole economic systems, such as socialism or capitalism, or draw on beliefs that imply that a collectivity owes its existence to some higher power in the universe. It was not Stalin as an individual whom Nadezhda Mandelstam blamed for the political murder of her poet husband Osip and millions of other citizens but the “craving for an all-embracing idea which would explain everything in the world and bring about universal harmony at one go”.[16] Every nation, no matter how bloody and cruel its beginnings, sees its origins in a glorious era of heroes who vanquished less worthy foes. One’s own race, people, country, or political system is felt to be superior to the adversary’s, blessed by a less worthy god. The nuclear age has spawned a new kind of myth. This is best exemplified by the United States’ strategic defense initiative. This celestial fantasy offers protection from attack by nuclear warheads, faith here being invested not in a god but in an anti-nuclear technology of lasers, satellites, mirrors, and so on in the heavens.

#### 45] Their scripts of escalation and threat in space are dangerous and ensures securitization to continue American space dominance.

Peoples 11

Peoples, Columba (PhD international politics & Critical Security Expert), 2011, “The Securitization of Outer Space: Challenges for Arms Control” Contemporary Security Policy, 32(1), 76–98. doi:10.1080/13523260.2011.5568 // HW AW

It is worth noting that the securitization of outer space – in terms of the identification of space with security – is, in itself, not a novel phenomenon or development. The extent to which **ostensibly civil uses of outer space have been linked implicitly and explicitly to national security** functions historically – or, as in the case of the space race between the United States and Soviet Union, have **acted as a surrogate for direct military engagement** – is well documented.50 Similarly, the characterization of the Sputnik launch in 1957 as placing the United States ‘in the greatest danger in its history’ suggests that the representation of space technologies as potential existential threats is not entirely new either.51 What is of significance, though, is the intensification, expansion and entrenchment of securitizing moves as features of national space policies. The Space Security Index report Space Security 2009, in its overview of national policies, explicitly noted that, on the one hand, ‘National space policies consistently emphasize international cooperation and the peaceful uses of outer space’, but on the other hand that there is a ‘Growing focus within national policies on the security uses of outer space’.52 The report cited as evidence: THE SECURITIZATION OF OUTER SPACE 83 Downloaded by [University of Tennessee, Knoxville] at 06:10 01 January 2015 Japan’s 2008 space law framework, which lifted its previous ban on national security and military space activities; China’s 2006 National Defense White Paper, which identifies national security as principle of China’s emerging space programme; France’s White Paper on Defense and National Security, which calls for an overhaul of its national space strategy; and the renewed priority on ‘space for security’ within EU policy.53 Within recent **United States space policy securitization has been most noticeably prevalent and institutionalized, which is significant given the continued preeminence of the United States as a space power**. As is noted in one recent assessment, around 50 countries, intergovernmental consortia, and nongovernmental organizations have at least one satellite in space, ‘mostly for reasons that have more to do with economic performance and Earth monitoring than with military applications.’54 However, in spite of the increasing diversity of interests in space and the increased range of functions space-based technologies now fulfil, the United States defence budget still remains the single largest source of investment in space technologies. In part this sustained investment arises out of American deployment and development of missile defence systems. Space and missile defences have been intimately connected issues historically and there are obvious technological overlaps between the two. Missile defence systems, including the ground-based system (Ground-Based Midcourse Defence or GMD) currently deployed by the United States at sites in Alaska and California, are dependent on satellite and space-based tracking technologies to detect and track incoming missiles, and there is a possibility that the future connection between missile defence and space will be even stronger if current plans for missile defence are pursued to their fullest extent. Two such systems are already in the early stage of their development: the Space-Based Laser (SBL), which, like the Strategic Defence Initiative or Star Wars proposals of the 1980s, envisages using lasers to shoot down missiles in flight;55 and the ‘NFIRE’ or Near Field Infrared Experiment, a proposal to launch interceptor missiles not from the ground, as in the currently deployed GMD, but from space.56 Even if the developmental status of space-based missile defence interceptors remains uncertain (not least due to the budgetary constraints involved), the currently deployed ground-based system also poses a complex issue in terms of arms control. Though ostensibly intended for defensive purposes, ground and sea-based components of American missile defence could theoretically be employed as an ASAT – Anti-Satellite attack – device, and the use of sea-based Aegis ballistic missile defence capabilities and its Standard Missile 3 (SM3) to shoot down the malfunctioning USA-193 spy satellite in February 2008 has done little to dispel concerns over the offensive applications of current missile defence capabilities.57 In addition, the United States also conducts research into more exotic forms of space weaponry, and funds a variety of technologies aimed at creating a force application capacity from space. The Department of Defense has reportedly explored several highconcept space weapons systems such as Hypervelocity Rod Bundles (tungsten rods dropped on targets from space that would theoretically use gravity as accelerant in a manner akin to a meteor, or Rods from God as they are also colloquially known), the Experimental Spacecraft System (XSS) (a manoeuvrable microsatellite weighing 84 CONTEMPORARY SECURITY POLICY Downloaded by [University of Tennessee, Knoxville] at 06:10 01 January 2015 only 100 kilograms which could prospectively be used to attack other satellites), and the Common Aerospace Vehicle or CAV (this so-called Spaceplane would be unmanned and would orbit the earth, entering the atmosphere when needed to deploy precision guided munitions against selected targets). 58 Such programmes with possible space weapons applications (beyond ground-tospace ASAT capabilities) are still in their relative infancy, and the technical prospects for such technologies, as with the more exotic missile defence proposals outlined above, are far from certain.59 Yet **much of the rhetoric emanating from the United States in recent years has made expansive claims to space dominance far beyond existing capabilities.** In short, rather than seeking to control the means of violence in and from space, much of the military discourse on space has generally cast the United States as a trailblazer in this regard, with exotic systems cited as a necessity for future military dominance in and from space.60 Historically these claims have tended to emanate primarily from the Air Force and Air Force Space Command. In 1998, Space Command defined the control of space (‘space control’) as ‘The ability to assure access to space, freedom of operations within the space medium, and an ability to deny others use of space, if required’61, and space was also considered as part of the remit for ‘full spectrum dominance’ in Joint Vision 2020. 62 Space warriors within and beyond the United States military also make frequent reference to the ‘...importance of dominating space in peace and war’.63 Yet, ‘The **decision to weaponize space does not lie within the military** (seeking short-term military advantage in support of national security) **but at the higher level of national policy** (seeking long-term national security, economic well-being, and worldwide legitimacy of US constitutional values).’64 **Instances of the securitization of outer space within military circles are hardly surprising, given vested interests and the perceived utility of space support for American forces; what is more significant though is the extent to which national policy, though stopping short of explicit advocating of space weapons, has tended to similarly maintain the centrality of space for national security.** 65 As Moore’s ‘biography’ of the idea of unilateral space dominance in the United States attests to, this school of thought has long held a prominent place in American strategic circles.66 Of significance, though, is the extent to which this type of thinking has migrated into official policy, portraying American access to, and dominance of, outer space as key to national survival in the process. The tenure of the George W. Bush administration in particular saw military and policy discourse move much closer in terms of goals and language used, entrenching securitization within United States space policy as a whole. In the terms used above, **the views of space warriors made much greater inroads under the Bush administration, and this has had a significant bearing on how the United States has positioned itself in terms of arms control and how other states – particularly China and Russia – have subsequently defined their own positions**.67 The evolution of official American discourse on outer space over the past decade attests to this subtle shift. In 2001, the Commission to Assess United States National Security Space Management and Organization (or Rumsfeld Space Commission as it is often referred to owing to Donald Rumsfeld’s position as chair) pointed out that a number of states hostile to the United States could attain ASAT capabilities, and, THE SECURITIZATION OF OUTER SPACE 85 Downloaded by [University of Tennessee, Knoxville] at 06:10 01 January 2015 infamously, warned that if the United States did not secure space it would face a Space Pearl Harbor. Members of the Bush administration subsequently went on to effectively endorse the space control concept, asserting the primacy of space for security by openly linking its potential civil and military uses (and thus suggesting only a minimal distinction between the two). Then Deputy Secretary of Defense Paul Wolfowitz argued in a 2002 speech on missile defence that ‘as we look ahead we need to think about areas that would provide higher leverage. Nowhere is that more true than in space. Space offers attractive options not only for missile defense but for a broad range of interrelated civil and military missions. It truly is the ultimate highground.’68 The culmination of this line of thinking in policy terms came with the release of the National Space Policy (NSP) in August 2006, which stated that: The United States considers space capabilities – including the ground and space segments and supporting links – vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either those rights or developing capabilities intended to so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to US national interests.69 The framing of the arguments from those within the Bush administration thus **clearly aligns with the dynamics of securitization as identified by Buzan et al**. The idea of a Pearl Harbor from Space invokes the nightmare scenario of a surprise attack on American interests in or from space, and was accompanied in the Rumsfeld Commission’s report by the sense of urgency characteristic of securitizing moves: ‘the present extent of US dependence on space [and] the rapid pace at which this dependence is increasing and the vulnerabilities it creates, all demand that US national security space interests be recognized as a top national security priority’.70 The Pearl Harbor analogy implied a focus on a surprise attack itself, but the rest of the report stressed the radical implications of such an attack, suggesting a **potential existential threat** to American commerce, society and, ultimately, way of life. As the report noted, ‘Space enters homes, businesses, schools, hospitals and government offices through its applications for transportation, health, the environment, telecommunications, education, agriculture and energy. Much like highways and airways, water lines and electric grids, services supplied from space are already an important part of the US and global infrastructures.’71 In turn, the NSP of 2006 repeated many of these same securitizing moves. It elevated national security functions of United States space policy, declaring these as vital to national interests, and national security as ‘critically dependent upon space capabilities... this dependence will grow.’ Similarly, the NSP described United States space systems as critical to ‘...a wide range of civil, commercial, and national security users’, identifying the wider security implications of space as well as its more direct military uses.72 **Crucially, this securitization of space was then used to justify exceptional measures with regards to arms control and the previous era of multilateral space agreements**. Among the ‘actions necessary’ to protect space capabilities the NSP declared that: 86 CONTEMPORARY SECURITY POLICY Downloaded by [University of Tennessee, Knoxville] at 06:10 01 January 2015 The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit US access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations of other activities in space for US national interests.73 This sentiment had effectively been put into practice even before its formalization in the NSP 2006, with the United States abstaining from votes on the UN General Assembly PAROS (Prevention of an Arms Race in Outer Space) resolution in 2000 and an amended version in 2003, and then voting against it in 2005.74 In this sense the 2006 NSP functioned as a kind of retrospective justification of the exceptional stance adopted – on security grounds – by the Bush administration in relation to space law and arms control. In addition, and moving away from a purely textualist understanding of securitization, the destruction of the USA-193 satellite in 2008 might be seen to constitute an extra-discursive instance of securitization. Although this action was not defined explicitly in terms of a military security rationale (government agencies stressed the rationale for the shoot-down in terms of preventing the malfunctioning satellite from crashing to Earth), it left clear room for interpretation, intended or not, of American willingness to display military space capabilities and further embellished the connection between space and (military) security.75

#### 15] The ASAT threat is constructed through a logic of “capabilities as intentions” that infects US security policy – ensures unbalanced military response – reject “no link” arguments- it’s never explicit

Cameron 18

Hunter Cameron, (PhD public policy), 2018, "The Rise of China in Space Technopolitical Threat Construction in American Public Policy Discourse," https://research-information.bris.ac.uk/ws/portalfiles/portal/183271194/Final\_Copy\_2018\_09\_25\_Hunter\_C\_PhD.pdf, // HW AW

The logic of “capabilities as intentions” was most pronounced in the United States Congress. It was rarely qualified or even made explicit, strong evidence itself that its **validity was truly taken for granted knowledge.** **Claims tended to be unsupported with evidence, and where it was offered, capabilities were often offered up to those listening as prima facie evidence that China was a threat in space, and since these claims usually went unchallenged, it is clear that these explanations were uncontroversial.** The content of the arguments which articulated the meaning of the Chinese space program stayed remarkably consistent both before and after the events of 2003 and 2007, and many of the **Chinese anti-satellite tests** went unnoticed in the Congressional record.34 This may be in part because some discussions took place in closed hearings, but it is still remarkable that the public congressional statements on China’s space program remained so consistent throughout the Bush and Obama administrations, despite the various shifts in the composition of Congress and the leaders of the executive branch. The State Department was also a powerful contributor to the logic of “capabilities as intentions,” specifically in its important regulatory role in defining the legal boundaries of military and non-military space technology. Although far less bombastic than congressional rhetoric, the technopolitics espoused by the International Trade in Arms Regulation (ITAR) provided no grounds for Chinese intentions to be taken into account in American space policy. Once again, this state of affairs was consistent through both the Bush and Obama administrations.

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#### 50] State-centric security frames ensure that the aff’s benign attempt to resist insecurity reproduces the biopolitical imperative that compels liberal regimes to make catastrophic war on difference – the impact is extinction. Evans 16

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Liberal War as Divine Violence Despite universal claims to peaceful co-habitation, liberal regimes have been compelled to make war on whatever threatens it40 . This is why the liberal account of freedom has depended upon a lethal principle, which discursively wrapped in the language of rights, security and justice, inaugurated planetary state of warfare and siege. It has promoted an account of freedom that, in the process of taking hold of the problem of the planetary life of political subjects, linked human potentiality to the possibility of its ruination. If liberal violence has then produced a necessary lethal corollary in its mission to foster the peace and prosperity of the species in order to alleviate unnecessary suffering; so it has also needed to foster a belief in the necessity of violence in the name of that suffering and vulnerability to which it continually stakes a claim. The Liberal wars of the past two decades in particular have revealed a number of defining principles41 . Aside from relying upon technological supremacy and universal claims to truth, they have been overwhelmingly driven by a bio-political imperative, which has displaced concerns with Sovereign integrities with forms of violence carried out in the name of an endangered humanity. In this regard, they have destroyed the Westphalia pretence, seeing the catastrophes of our global age in fact as a condition of possibility to further the liberal will to rule. Since incorporation in this setting has proceed on the basis that all life should necessarily be included within its strategic orbit, the veritable evisceration of any sense of “the outside” (as conceived in terms of its political imaginary) has led to the blurring of all conventional demarcations between friends/enemies, citizens/soldiers, times of war/times of peace. What is more, as life itself became increasingly central to questions of security, issues of development as broadly conceived would no longer be regarded as peripheral to the war effort. It would in fact become a central motif as most notably articulated in the strategic mantras “War by Other means” and “War for Hearts and Minds”. Not only would this point to new forms of de-politicisation which, less about Schmittean exceptionalism, were more explicable in terms of the fundamental political and social transformation of societies. It would also lead to the production of violent subjects, as the recourse to violence became sure testament to a conception of humanity realised through the wars fought in its name. Liberal violence, in other words, proved to be unbounded, unlimited and without conventional Sovereign warrant – namely revealing of the fundamental principles of what Benjamin once elected to term “the divine”. Diagnosing the liberal wars of the past two decades as a form of divine violence offers a more disturbing reading of the violence of the liberal encounter. If the violence of political realism, at least in theory, appreciated the value of limits and boundaries, what seems to define the lethality of liberal freedom has been a commitment to war without boundaries, hence limitless. As Dillon and Julian Reid acutely observed: [L]iberal peacemaking is lethal. Its violence a necessary corollary of the aporetic character of its mission to foster the peace and prosperity of the species ... There is, then, a martial face to liberal peace. The liberal way of rule is contoured by the liberal way of war ... Liberalism is therefore obliged to exercise a strategic calculus of necessary killing, in the course of which calculus ought to be able to say how much killing is enough... [However] it has no better way of saying how much killing is enough, once it starts killing to make life live, than does the geopolitical strategic calculus of necessary killing’42 . This brings us to Steven Pinker’s Better Angels of Our Nature43 . Reworking the well-rehearsed liberal peace thesis, for Pinker, the reason we have become less warlike today can be account for in terms of our liberal maturity. Leaving aside the evident theological undertones to Pinker’s work, along with the numerous empirical flaws in his thesis, his not so original thesis at least accredits its all too Euro-centric sources of inspiration on matters of civility: ‘The reason so many violent institutions succumbed within so short a span of time was that the arguments that slew them belong to a coherent philosophy that emerged during the Age of Reason and the Enlightenment. The ideas of thinkers like Hobbes, Spinoza, Descartes, Locke, David Hume, Mary Astell, Kant, Beccaria, Smith, Mary Wollstonecraft, Madison, Jefferson, Hamilton and John Stuart Mill coalesced into a worldview that we can call Enlightenment humanism’. John Gray has been rightly suspicious of the entire project and claims being made here: The idea that a new world can be constructed through the rational application of force is peculiarly modern, animating ideas of revolutionary war and pedagogic terror that feature in an influential tradition of radical Enlightenment thinking. Downplaying this tradition is extremely important for Pinker. Along with liberal humanists everywhere, he regards the core of the Enlightenment as a commitment to rationality. The fact that prominent Enlightenment figures have favoured violence as an instrument of social transformation is—to put it mildly—inconvenient... No doubt we have become less violent in some ways. But it is easy for liberal humanists to pass over the respects in which civilisation has retreated. Pinker is no exception. Just as he writes off mass killing in developing countries as evidence of backwardness without enquiring whether it might be linked in some way to peace in the developed world, he celebrates “re-civilisation”... without much concern for those who pay the price of the re-civilising process44 . Gray showed his evident concerns here with the promissory nature of liberal violence. Indeed, what he elsewhere terms the violence of the liberal missionary, reposes Nietzsche’s further instance that ‘god is dead and man has killed him’ with a devastating humanistic critique45 . Such violence, in the end, however has proved to be politically, ethically and economically narcissistic. Just as liberal advocates in the zones of crises now increasingly find themselves operating within fortified protectorates as part of a great separation from the world46 , this has been matched, albeit it ways that initially appear disconnected, by new forms of violence which also takes place almost exclusively at a distance. Indeed, as liberal actors increasingly give up on the idea that the world may be transformed for the better, new modalities of violence are emerging which seem to be more logically in fitting with the new politics of catastrophe that increasingly defines our terrifyingly normal times. As the promise of violence and catastrophe now appears inescapable, insecurity is becoming normalised, dystopian realism becoming the prevailing imaginaries for political rule, and once cited claims to emancipation, unending progress and lasting security for peoples all but abandoned47 . The politics of catastrophe and its relationship to “end of times” narratives adds another layer to our theological enquiry. As Jacob Taubes once noted48 , there is perhaps something theologically different at work here between the pre-modern apocalyptic movements and the catastrophic reasoning now defining the contemporary moment. For all their nihilism and monotheistic servitude, at least the apocalyptic movements of yesteryear could imagine a better world than already existed. There is therefore a vast difference between the subjects which names its disaster ‘apocalypse’ to that which reads disaster in terms of ‘catastrophe.’49 Unlike apocalypse, there is no beyond the catastrophic. Its mediation on the “end of times” is already fated. Catastrophe denies political transformation. It demands instead a forced partaking in a world that is deemed to be insecure unto the end. The upshot being, as all things become the source of endangerment, the human becomes the source of our veritable undoing. Angels of History Every war produces its casualties. Some of these stand out in terms of the sheer body count. The horror of mass warfare reduced to the most banal forms of inhuman quantification. Others, no less important, are its political and philosophical losses. What is increasingly clear is that the past two decades of liberal warfare, punctured but not initially determined by the tragedy of the events of September 11th 2001, ultimately put the very concept of war into question. The reluctance to officially declare war, even when our involvement in the politically motivated violence appears to be all too evident, now demands a move beyond the dominant frames which have shaped discussions for the past two decades. There is an important caveat to address here. What happened during last decade of the Global Wars on Terror cannot simply be inserted into a post 9/11 frames for analysis. Much of what passed for post 9/11 justice or military excessiveness was slowly maturing in the global borderlands for some considerable time. If there is a departure it needs to be accounted for against this broader post-Cold War humanitarian sensibility through which liberalism absorbed local crises into its political fabric to further condition its violent interventions. It has been all too easy for political and social theorists to put the blame for the violence and atrocities of the Global Wars on Terror onto the shoulders of George Bush and Dick Cheney. This has allowed liberals to appropriate Schmitt as one of their own, hence reducing the entire war effort to the reductionist measures of “US hegemony/exceptionalism”. Such retreats back into state centric models have not only proved unhelpful in terms of questioning the normalization of violence, they have failed to grasp the complexity of war – especially how questions of universality, economy, power and the formation of political subjectivities can be rethought through violent encounters. What is more, the limits of these analyses have been further evidenced by the complete lack of engagement with political theology, failing to recognize the violence of universal ambitions, along with the need to put the contemporary legacy of Kant on trial. Let us not forget Tony Blair and Barack Obama have embodied

#### 30] The alternative is to reject the AFF’s security representations as a critical intellectual labor that makes imagination of a more peaceful future possible. Neocleous 08

(Neocleous 8 — Prof of Government @ Brunel University; London (Mark, Critique of Security, pg. 184-5)

Anyone well versed in history or with experience of university life will know about the shameful ways in which large numbers of academics have elevated venality into the cardinal academic virtue, complying with the demands of those in power and the wishes of those with money: witness the political scientists, historians, anthropologists, geographers, cartographers, sociologists, linguists and many others who reworked their disciplines according to the principles and myths, and the principle myths, of fascism.' 'Academic life under fascism', notes Christopher Hutton, 'is a dismal ... episode in an unedifying story of relations between the modem academic and the state, and between academics and power both within and outside the university. But this part of the history of fascism is merely the worst moment in the wider and equally unedifying story of relations between academics and the state more generally, merely one way m which intellectuals have kowtowed to the principles and myths, and the principle myths, concerning security and the state. Spouting the jargon of security and enthralled by the trappings of power, their intellectual labour consists of nothing less than attempts to write hand-books for the princes of the new security state. The death of countless numbers in a more 'efficient' bombing of a city, the stationing of troops halfway around the World in order to bring to an end any attempt at collective self-determination, the use of military machines against civilians, the training of police forces in counter-insurgency practices, but more than anything the key concepts and categories used to explain and justify these things - all defended, supported and even ‘improved” by security intellectuals for whom, ultimately, intelIecua1 labour boils down to little more than the question of the most efficient manner. In which to achieve the security demanded by the state and bourgeois order. In rationalizing the political and corporate logic of security, the security intellectual conceals the utter irrationality of the system as a whole. The security intellectual then is nothing less than the security ideologue, peddling the fetish of our time. The only way out of such a dilemma, to escape the fetish, is perhaps to eschew the logic of security altogether - to reject it as so ideologically loaded in favour of the state that any real political thought other than the authoritarian and reactionary should be pressed to give it up, That is clearly something that can not be achieved within the limits of bourgeois thought and thus could never even begin to be imagined by the security intellectual. It is also something that the constant iteration of the refrain ‘this is an insecure world’ and reiteration of one fear, anxiety and insecurity after another will also make it hard to do, but it is something that the critique of security suggests we may have to consider if we want a political way out of the impasse of security. This impasse exists because security has now become so all-encompassing that it marginalizes all else, most notably the constructive conflicts, debates and discussions that animate political life. The constant prioritizing of a mythical security as a political end - as the political end - constitutes a rejection of politics in any meaningful sense of the term. That is, as a mode of action in which differences can be articulated, in which the conflicts and struggles that arise from such differences can be fought for and negotiated, in which people might come to believe that another world is possible - that they might transform the world and in turn be transformed. Security politics simply removes this; worse, it removes it while purportedly addressing it. In so doing it suppresses all issues of power and turns political questions into debates about the most efficient way to achieve ‘security’, despite the fact that we are never quite told - never could be told – what might count as having achieved it. Security politics is, in this sense, an anti-politics,” dominating political discourse in much the same manner as the security state tries to dominate human beings, reinforcing security fetishism and the monopolistic character of security on the political imagination. We therefore need to get beyond security politics, not add yet more ‘sectors to it in a way that simply expands the scope of the state, and legitimizes state intervention in yet more and more areas of our lives. Simon Dalby reports a personal communication with Michael Williams, co-editor of the important text Critical Security Studies, in which the latter asks: if you take away security, what do you put in the hole that’s left behind? But I’m inclined to agree with Dalby: maybe there is no hole. The mistake has been to think that there is a hole and that this hole needs to be filled with a new vision or revision of security in which it is re-mapped or civilised or gendered or humanised or expanded or whatever. All of these ultimately remain within the statist political imaginary, and consequently end up re-affirming the state as the terrain of modem politics, the grounds of security. The real task is not to fill the supposed hole with yet another vision of security, but to fight for an alternative political language which takes us beyond the narrow horizon of bourgeois security and which therefore does not constantly throw us into the arms of the state. That’s the point of critical politics: to develop a new political language more adequate to the kind of society we want. Thus while much of what I have said here has been of a negative order, part of the tradition of critical theory is that the negative may be as significant as the positive in setting thought on new paths. For if security really is the supreme concept of bourgeois society and the fundamental thematic of liberalism, then to keep harping on about insecurity and to keep demanding ‘more security’ (while meekly hoping that this increased security doesn’t damage our liberty) is to blind ourselves to the possibility of building real alternatives to the authoritarian tendencies in contemporary politics. To situate ourselves against security politics would allow us to circumvent the debilitating effect achieved through the constant securitizing of social and political issues, debilitating in the sense that ‘security’ helps consolidate the power of the existing forms of social domination and justifies the short-circuiting of even the most democratic forms. It would also allow us to forge another kind of politics centered on a different conception of the good. We need a new way of thinking and talking about social being and politics that moves us beyond security. This would perhaps be emancipatory in the true sense of the word. What this might mean, precisely, must be open to debate. But it certainly requires recognizing that security is an illusion that has forgotten it is an illusion; it requires recognising that security is not the same as solidarity; it requires accepting that insecurity is part of the human condition, and thus giving up the search for the certainty of security and instead learning to tolerate the uncertainties, ambiguities and ‘insecurities’ that come with being human; it requires accepting that securitizing an issue does not mean dealing with it politically, but bracketing it out and handing it to the state; it requires us to be brave enough to return the gift.

**30] Interpretation: The 1AC is an object of research. The role of the neg should be to disprove or challenge the representations and discourse the AC engages in prior to consequential analysis.**

**Plan focus restricts the debate to a ten second statement and leaves the rest of the aff unquestioned. They should be responsible for the way their knowledge is constructed and used because that produces the best model for activism and ethics in the context of the topic which is a unique education net benefit to our interpretation**

**Debate doesn't pass policies but it does alter the way we think about the world and about systems of power – turns their policy research standards because it's a question of how their research is oriented and whether it's for an ethical purpose – only our model of engagement accesses that education**

**Begs the question – if we win their justifications are repugnant that necessarily implicates the conclusion which means defense of their research model is a prior question to weighing the material consequences of the aff – also solves plan focus because the links necessarily implicate aff solvency**

## Laser Cannon PIC

### Shell (50)

#### CP –

#### [the aff] except for the development of single-use debris-limiting laser cannons and gossamer sails

#### the US and Japan ought to divert funds to build a laser cannon for the International Space Station and require gossamer sails on all future satellites

#### No laser cannon or gossamer sail r&d now due to cost, but it’s possible with the proper funding and the profit motive from private entities like RIKEN – solves extinction and future space junk permanently

Powell 15

Corey S Powell (science journalist and editor in chief at discover magazine, wrote 3 books with Bill Nye!!), May 20 2015, "Space Junk is a Problem. Is a Laser Cannon the Solution?," https://www.discovermagazine.com/the-sciences/space-junk-is-a-problem-is-a-laser-cannon-the-solution#.VV4ENGRViko, // HW AW, bracketed cause I don’t like reading big numbers

There’s a general rule in media reporting called Betteridge’s Law: Whenever a headline poses a question--especially a sensational one--the answer is “no.” I’m going to break the law this time. **An orbiting laser cannon is not only an intriguing technology but, yes, it’s one of the most promising ways to clean up the ever-thickening cloud of dangerous debris surrounding the Earth**. And just to be clear, space junk is a danger. There are about 25,000 human-made objects larger than your fist flying around in orbit, and about half a million pieces bigger than a dime. If you include millimeter-scale shrapnel, the number of rogue bits reaches deep into the millions. Typical speeds in low-Earth orbit are about 30,000 kilometers per hour (18,000 miles per hour), ten times the velocity of a rifle bullet. You see the problem: A little impact can pack a big wallop. So far, there have not been any space-junk catastrophes remotely resembling the sensationalized events in the movie Gravity, but the reality is still disconcerting. In 2009, a $50 million Iridium communications satellite was destroyed by a collision with a defunct Russian satellite. Three years later, the [Fermi space observatory](https://www.nasa.gov/mission_pages/GLAST/news/bullet-dodge.html) had a near miss with another Soviet-era satellite. NASA had to clad the International Space Station in shielding to protect it from repeated small impacts, and the agency sometimes moves the whole station to dodge larger pieces of junk. Orbiting debris adds cost and risk to the space business.The proposed space-station laser cannon (upper left) would work in conjunction with a telescope called EUSO to track and destroy space debris. (Credit: RIKEN) The amount of junk in orbit is increasing rapidly, meaning that those costs and risks are increasing, too. Once junk gets up there, it takes a long time to come back down: years to centuries in low orbits, and essentially forever in geosynchronous orbit (40,000 kilometers up, where many communications satellites are located). Most disconcerting, collisions in orbit create more junk, which leads to more collisions. Potentially this could lead to a runaway process called [Kessler Syndrome](http://en.wikipedia.org/wiki/Kessler_syndrome). **This is where the laser cannon comes in**. Toshikazu Ebisuzaki and a team of researchers at the RIKEN lab in Japan have [formulated a plan](http://www.riken.jp/en/pr/press/2015/20150421_2/) to clear out near-Earth space by zapping pieces of space junk with a high-power blast of focused radiation. The laser doesn’t need to be able to destroy the whole piece of debris. All it has to do is vaporize enough of the object to slow its orbit and send it spiraling into Earth’s atmosphere, **where it will burn up harmlessly before reaching the ground. It’s an ingenious solution**. Ebisuzaki’s concept was inspired by a science project called the Extreme Universe Space Observatory, currently under development for the International Space Station. [EUSO](http://jemeuso.riken.jp/en/), which will be installed on the station in 2017, is a fascinating instrument in its own right; it will study extremely high-cosmic rays by watching the light they create when they collide with air molecules. But EUSO’s sensitive, wide-field optics also make it well suited to spotting and tracking small bits of space debris, which are hard to locate from the ground. Finding targets is the crucial first step toward getting rid of them. The next step, of course, is the laser. RIKEN’s concept (which is not yet funded) would start with a 10-watt laser prototype, mounted on the International Space Station, capable of firing 100 laser pulses a second. That would pave the way for a larger system powerful enough to blast away any pieces of space junk within a 100-kilometer range, and eventually lead to a dedicated garbage-cleanup satellite equipped with a [five-hundred-thousand]500,000-watt laser that can fire [fifty-thousand]50,000 times per second. Such a satellite could remove 100,000 pieces of junk a year, the Japanese researchers claim, **fast enough to bring the whole orbital debris problem under control.** The fast-growing population of space debris. "LEO" refers to low-Earth orbit. (Credit: Surrey Space Centre) There are significant technical hurdles to overcome, including the data-processing capacity needed to spot the bits of debris and the considerable energy supply needed to keep such a powerful laser operating for years. Building a giant laser-cannon satellite would not be cheap, either. But this is exactly the kind of ambitious thinking needed to tackle the space-junk mess. Several additional cleanup technologies are also under development. A separate Japanese-led team has proposed trapping and eliminating space debris with a huge [electromagnetic tether](http://www.academia.edu/1265073/Space_Demonstration_of_Bare_Electrodynamic_Tape-Tether_Technology_on_the_Sounding_Rocket_S520-25http:/). A European project called [e.DeOrbit](http://www.esa.int/Our_Activities/Space_Engineering_Technology/Clean_Space/How_to_catch_a_satellite) would snare big pieces of space junk using a net or harpoon and dispatch them Earthward. Other concepts under study would use puffs of [pressurized gas](http://www.nasa.gov/directorates/spacetech/niac/gregory_space_debris_elimination.html), large [magnetized nets](http://www.spacesafetymagazine.com/space-debris/debris-removal/electrodynamic-debris-eliminator-receives-funding/), or a [slingshot-style satellite](http://aero.tamu.edu/news/removing-space-debris-tamu-sweeper-sling-sat). The laser cannon has some obvious advantages over all of these options, however. It could tackle the small fry, not just the big pieces, and it could deal with far more targets than would be possible for any spacecraft that is going after them one by one. If all of these ideas sound a little wacky, there's a good reason: Getting rid of space junk is a really, really hard problem. There is a lot of space to scour for debris. The individual pieces are mostly small and nearly invisible, and they each follow a unique orbit. Hard problems call for creative (and sometimes wacky) solutions. Further complicating things, nobody has devoted much money to cleanup, and any mission that can remove space junk could potentially remove active satellites as well--a delicate political issue. **If the RIKEN laser cannon never happens, it will more likely be due to budget** and political **obstacles than to technical ones**. In the long run, the best way to deal with space junk is never to create it in the first place. One of the most important principles here is what is called [design for demise](http://www.esa.int/Our_Activities/Space_Engineering_Technology/Clean_Space/Space_debris_mitigation)--that is, engineering satellites so that they will automatically de-orbit and remove themselves from the trash pile within, say, 25 years of the end of their mission. A simple way to do this is to equip a satellite with a small sail that would pop open when it is no longer needed. The so-called [gossamer sail](https://theconversation.com/cleaning-up-space-debris-with-sailing-satellites-20384) would act like a space parachute, using the pressure of sunlight and the extremely thin traces of atmosphere in orbit to create drag. The drag would then pull the satellite down to a fiery demise. Simulated view of Earth from the Planetary Society's new LightSail, launched on May 20. Space sails could be used to clear away satellite debris--or to take humanity on great ventures of exploration. (Credit: Josh Spradling/Planetary Society) A gossamer sail is very similar in function to a solar sail--like the prototype [LightSail](http://sail.planetary.org/) launched today by the Planetary Society. That creates a neat kind of symmetry to the story. Powerful space lasers may be useful for clearing debris, but they could also be used to launch high-speed spacecraft. Solar sails could be used to de-orbit satellites, but they could also provide new ways to navigate to new worlds. In short, the kinds of technological solutions needed to clear a path through our local garbage dump could be the exact same ones needed to blaze a path to the stars.

## Renewable Rockets CP

#### CP: Governments and private entities ought to switch to renewable rocket fuel

#### Solves all environmental impacts, rockets can be carbon neutral with no impact to the environment + NB of the Australian economy and education which the perm kills

**Mandow 20**  
(Rami Mandow is the founding director and editor of space australia and is currently in the last year of his Masters of Astronomy (Astrophysics) with Swinburne University of Technology. “Renewable Rocket Fuels – Going Green and into Space.” Spaceaustralia, 21 Aug. 2020, https://spaceaustralia.com/feature/renewable-rocket-fuels-going-green-and-space. || SW)  
Whilst the wonderful vertical take-off and landing engines we see in science fiction technology (like fusion drives) are still a long way off, and considerable amounts of experimentation over the last 60 years have outlined the best energy density fuels that are used in rockets today, it seems that propellants used to leave Earth’s gravity might not be fully green with zero environmental impact for some time. But that does not mean they cannot be carbon neutral. Prof. Wojciech Lipiński, Leader of the Australian National University (ANU) Solar Thermal Group, recently outlined new methods of creating carbon neutral fuels for the aerospace and aviation industries, designed to offset carbon/climate impacts. Prof. Lipiński describes carbon neutral fuel as synthetic fuels produced from solar energy, water and renewable carbon sources (such as biomass or air captured carbon dioxide), which would enable sustainable aerospace transportation, compatible with existing infrastructure. “Australia has great potential for the development of domestic aerospace and renewable fuel industries. This is linked to the country's geographical location and local climate conditions. Australia will always depend on air and sea transportation to stay connected with the world.” “Our conditions are geographically favourable for mission launches, and there’s growing domestic space ambition to work with foreign space industry partners. Australia’s renewable energy resources, in particular solar and wind, are unparalleled at the global scale but not effectively used yet. Thus, growing the sustainable aerospace fuel sector can improve national energy security, economic prosperity and, in the context of renewable fuel exports, protect the global environment” said Prof. Lipiński. Synthesising fuel from renewable sources of energy to use in rockets can be achieved through a number of different methods. One example is the production of high volumes of hydrogen and oxygen (which form hydrolox fuel sources for rockets) by using solar power to carry out large-scale electrolysis (the splitting of water into its hydrogen and oxygen components through a photochemical process). Given Australia’s large surface area and favourable climate (for solar and wind renewable energy production), Prof. Lipiński thinks we could utilise our geographic potential to be a global production leader for renewable fuels. “Solar energy harvested from a square of 600 km x 600 km somewhere in the Australian outback could cover the entire global energy demand

## CASE

### Asteroid Mining

#### Asteroid mining enables space colonization – even if Earth species goes extinct, we can escape if we mine asteroids

Ravisetti 21

Monisha Ravisetti (science writer @ CNET BA in philosophy NYU), 10-4-2021, "Rare asteroids near Earth may contain precious metals worth $11.65 trillion," CNET, https://www.cnet.com/news/rare-asteroids-near-earth-may-become-targets-for-space-mining/, // HW AW

Scientists just calculated that one of two metallic asteroids floating in Earth's vicinity may contain precious metals worth about $11.65 trillion. The expensive nugget, in fact, could boast more iron, nickel and cobalt than the entirety of our global metal reserves. Called metal-rich near-Earth asteroids, these rare, hefty mineral deposits measure over a mile wide. The one reckoned to be a metal motherlode is labeled 1986 DA, and the other, 2016 ED85. The duo "could be possible targets for asteroid mining in the future," according to the [new analysis published Friday](https://iopscience.iop.org/article/10.3847/PSJ/ac235f) in The Planetary Science Journal. Space mining has gained traction in the scientific community because experts believe the feat could provide [cost-effective metals](https://science.howstuffworks.com/asteroid-mining.htm) for a lunar or Mars-based colony, ultimately extending humanity's reach in exploring space. With a cosmic mine, building materials wouldn't have to withstand the expensive shuttle from Earth to space. Further, the team behind the math suggests these unique floating orbs may shed much-needed light on the authenticity of another metallic treasure NASA is [headed to in 2022](https://www.jpl.nasa.gov/missions/psyche) -- the mysterious shiny space globe known as 16 Psyche. 16 Psyche has its own allure for space mining enthusiasts. An artist's illustration shows what asteroid 16 Psyche might look like. Maxar/ASU/P.Rubin/NASA/JPL-Caltech Instead of trees, oceans or stretches of soil, the bizarre body is thought to consist of hills and valleys made of pure metal. Scientists contend it's the remaining core of an ancient rocky planet that was once destroyed. Interestingly, Earth's covered-up core looks awfully similar. Aptly dubbed "mini Psyches," the valuable smaller asteroids described in the new study are presumably pieces that have broken off from a similar naked center, though the research team notes they don't think these fragments are offshoots of 16 Psyche in particular. Still, 16 Psyche has become a rather hot topic of discussion among [scientists](https://earthsky.org/space/asteroid-psyche-metal-or-rubble-pile/) and even the [public](https://www.forbes.com/sites/jamiecartereurope/2020/12/05/a-bizarre-trillion-dollar-asteroid-worth-more-than-our-planet-is-now-aligned-with-the-earth-and-sun/?sh=689f08431c9a) -- it's suspected to hold minerals worth $10,000 quadrillion. Let that sink in. The exorbitant figure, however, has generated [considerable doubt](https://www.cnet.com/news/10000-quadrillion-asteroid-psyche-may-not-be-as-valuable-as-first-thought/) because scientists can't be sure what 16 Psyche is made of until a spacecraft inspects it. It's too far away for precise spectrum analysis, a scientific method that leverages electromagnetic emission and absorption signals to learn about objects' compositions. Until such an examination can happen, something NASA's mission intends to perform, researchers have to consider the option that it's merely some sort of rubble. That's what makes data from the "mini Psyches" indispensable -- they may offer a first look at their namesake's features. Proximity to our home planet deems it much easier for scientists to capture the rocks' spectral info from Earth. "It is rewarding that we have discovered these 'mini Psyches' so close to the Earth," Vishnu Reddy, associate professor at the University of Arizona's Lunar and Planetary Laboratory and principal investigator of the NASA grant that funded the work, said [in a statement](https://www.eurekalert.org/news-releases/930288). Sifting through the collected data, researchers found the orbiting blocks are made of 85% metal, such as iron and nickel, and only 15% silicate, which is basically regular rock. As such, some ambiguity about 16 Psyche might soon be alleviated thanks to the baby versions of it -- including whether it'll add to the crew of treasure troves for future space miners. Regardless, while the trio of metallic hunks definitely seem to hint at our sci-fi fantasies of space mining inching toward reality, one thing is absolutely certain: They're a pretty hard-core squad.

#### We’re still lightyears away from lunar mining — even Elon acknowledges the immense difficulties that we’re nowhere near solving

Mining Technology 17

Mining Technology (mining news and in-depth feature articles on the latest mining company deals and projects covering trends in mineral exploration); “Mining the Moon”; *Mining Technology*; December 4, 2017; <https://www.mining-technology.com/features/mining-the-moon/>; HW-EMJ

The concept of mining on the Moon has been around for decades, and while political and scientific endeavour has ebbed and flowed, it has never gone away. Almost all current space exploration programmes – American plans to go back to the Moon and Elon Musk’s SpaceX programme included – factor in mining resources in some way or another. “The basic idea is to extract materials from the Moon that create new capabilities in space,” says lunar scientist Paul Spudis. “To this end, people have envisioned a wide variety of mining and resource utilisation activities on the Moon. Broadly, most plans involve the collection of granular material, running it through some type of processing, e.g. thermal, chemical – the extraction of useful stuff and the discarding of the waste.” Scientific advances are bringing commercial space travel ever closer. At the same time, terrestrial resources are beginning to wane and dreams of making use of the 7.3 x 1022kg of material circling the Earth that make up the Moon have gained greater traction. So, realistically, how close are we to mining the Moon? Water, metals and REMs The Moon’s resources could be put to a number of uses, such as a source of fuel for farther flung journeys through space, or providing an alternate source of rare metals and minerals for use on Earth. “There is a hierarchy of material resources, arranged according to their ease of acquisition and their utility,” says Spudis. “The easiest stuff is bulk regolith (lunar soil), which can be used to backfill installations on the moon and to make shielding to protect habitats thermally and from radiation.” Regolith would not be transported to Earth, but for missions such as SpaceX’s, which include building a lunar base, it could be very beneficial. When, in 2008, samples from the 1970s Apollo 15 and 17 missions were re-examined, the presence of water brought greater hope of establishing lunar habitations. Since then, multiple studies have confirmed that the Moon has water in abundance. “Water ice (and other volatile substances) is found in the dark areas near the poles and have many uses, including life support and rocket propellant,” says Spudis. For any future mining activities water will be necessary, both for operations and for sustaining a crew. “Water is the oil of the solar system and those companies who are able to harvest and harness extraterrestrial deposits of water will make Exxon look like a lemonade stand,” says founder and CEO of Moon Express, Robert Richards. Along with water, the Moon has a number of other materials which would be useful for space exploration. “Metals can be extracted from the oxides in the soil by chemical reduction – iron, titanium and aluminium are the principal useful metals to be manufactured on the Moon,” says Spudis. But like regolith, it wouldn’t be profitable to bring these metals back to Earth where they can be mined far more easily. Currently, China produces more than 90% of the rare earth metals (REM) we need for electronics. But reserves are running out fast with some elements, including dysprosium, neodymium and lanthanum, expected to be depleted within the next 20 years. In order to feed the world’s seemingly insatiable appetite for technology, new sources of REMs must be found, as recycling alone will be unable to meet demand. “Rare and unusual elements and isotopes (rare earths, thorium, helium-3) may be accessed and mined,” says Spudis. “Some of these uncommon materials may be of such high value as to merit their importation back to Earth for sale in terrestrial markets. But these are in very low concentrations and will likely be the targets for mining in the future, after a long-term presence on the Moon has been established.” It is these which provide the greatest hope for profitable mining companies and shipping to Earth. There and back again Many hurdles remain before mining the Moon can happen, not least getting there. In all of human history only 12 people have ever walked on the Moon. This is, in part, due to the colossal expense of such a venture, so the cost must come down before industry can proceed. Conventional thinking is to create reusable rockets, something SpaceX is currently working on with its Dragon craft. “If one can figure out how to effectively reuse rockets just like airplanes, the cost of access to space will be reduced by as much as a factor of a hundred,” says SpaceX founder and CEO Elon Musk. “A fully reusable vehicle has never been done before. That really is the fundamental breakthrough needed to revolutionise access to space.” Once commercially affordable lunar transport has been developed and the Moon reached, then the challenges intensify.