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Warfare in Space

Some moral philosophers argue that space exploration was “born in sin,” and that the original “rocket scientists” had blood on their hands or were accessories in conspiracy to commit mass murder. In such a view, this far-from-immaculate conception of space travel consequently taints all subsequent activities based on the original evil.

The “rocket’s red glare” was that of weapons attacking the United States, the same Congreve-style rockets used by the British to torch non-combatant Copenhagen, Denmark. The first rocket which actually reached outer space was the German A-4, which in 1944, as the V-2 weapon, killed thousands of people in London and elsewhere and cost thousands of more lives in the slave-labor factories. And the mainstay boosters of much of today’s Russian and American space program—the Soyuzes, Protons, and Tsiklons, the Titans, Thors, and Atlases, were originally designed and built to kill millions of civilians in a nuclear exchange.

Opposing this condemnation are arguments both philosophical and practical. First, the Nazi V-2 program severely damaged the Third Reich’s war-making capability, consuming a third of Germany’s fuel alcohol production and major portions of other critical technologies that might instead have gone into jets, tanks, or other far more efficient killing machines. Without the V-2 program, the result may well have been that the war in Europe would have lasted months longer, another million people may have died, and the first city atomic bombed may have been Hamburg, not Hiroshima. Secondly, the intercontinental thermonuclear missile weapons introduced in the late 1950s seem to have accomplished what millennia of preachers had failed to do—make major wars “unthinkable” and hence obsolete. Thus there are no moral or philosophical grounds for which space engineers need be at

all apologetic, especially after the inspirational conversion of such “swords” into the plowshares of today’s space exploration.

The issue of space and war, of “weapons in space,” or of weapons designed for use in space, is a highly volatile one. There have been both emotional and cynical arguments, appeals to optimism and pessimism, and mutually conflicting interpretations of historical lessons. Few advocates of either extreme can be expected to change their minds, but national policy will be swayed by the most practical and soundly reasoned arguments.

After all, the sanctuary of space has already been transgressed, not merely for passive military applications, but also for surface-to-surface weapons in transit, and the archaic but effective Soviet killer-satellite system. Guns have been in space for a long time and are probably there as you read these words; they were in the survival kits of Mercury, Gemini, and Apollo astronauts and are currently in the survival kits of cosmonauts (though not shuttle astronauts). While in theory they are accessible in flight, they have never been used in space and threaten nobody in space. But they are there, needing only a requirement or a mission to set new precedents of space law and space conflict.

Predicting Space Combat

There are four basic approaches to predicting future human events: extrapolation from current trends, intuition, the use of analogies and an appreciation of what cannot change. None can offer more than crude approximations of the shape of things to come. Each suffers from serious drawbacks as a forecasting device. The truth is that no human being possesses the gift of prophecy and any accuracy in such matters is little more than fortuitous.

However, human nature seems immutable. By knowing the standard range of reactions that individuals and groups display in different situations and relating that understanding to such stable factors as scientific laws, accurate historical information, and the practical limits of technological change, it is possible to make a number of educated guesses about events a few decades hence. Combining such guesses with the first three forecasting methods

mentioned previously is the closest one can come to a rational approximation of what may happen.

The truth is that, while neither a human being nor even a large group of highly educated human beings can know what is going to happen, people and governments can only make plans as if they do enjoy a degree of the true prophet's vision. However, looming over all frail human attempts to part the veil of the future is the reality that history is full of surprises.

National security and military planning largely function along the lines mentioned above. Analogies can be useful, so long as the appropriate ones are chosen and not pushed too far. Dr. Brian Sullivan³¹ points out that after all, history never repeats itself in a precise manner. Extrapolation from current trends also quite often proves less than ideal: if it worked, we would all be millionaires from playing the stock and commodities markets. Even the most careful and well-educated attempts at projecting the influence and pace of ongoing developments into the future have led their practitioners to wildly inaccurate conclusions.

Intuition can be amazingly precise about what is going to happen. The science fiction of Jules Verne and Arthur C. Clarke proves that. On the other hand, for every example of a person successfully intuiting the course of coming events, there seem to be at least a thousand glaring failures. Witness the failures of the hunches, visions, dreams, and gut feelings of Nostradamus, Benedict Arnold, Father Divine, Elizabeth Claire Prophet, Saddam Hussein, and all those who bet their farms on pork belly futures. With these caveats firmly in mind, let us consider the possible nature of aspects of space warfare in the 21st Century.

The following observations may or may not prove relevant to the possible shape of future warfare and the applications of military space power in future conflicts. Their relevance heavily depends on correctly identifying the most important factors which will affect armed conflict in the 21st Century and on the degree to which military history might "repeat itself," although only in a very rough fashion.

31 Sullivan, Dr. Brian R. 1998. *Tomorrow the Stars*. (Working title of a draft for US Space Command.)

History is not shaped by any single factor or even by a few major perpetual influences. It is molded by a myriad of such factors, even though some may be a good deal more important than others. This is as true for military history as it is for the history of any other human activity.

This means that the “history of the future,” to use a paradoxical phrase, will be no more the result of any single factor than has been true for the past or the present. Nonetheless, in hazarding the following picture of the future of warfare, heavy reliance will be placed on a relatively narrow band of possible developments to make forecasts about the whole range of activities that constitute war.

The Debate Concerning Weapons in Space

Weapons for use in space, stationed in space, have been discussed since before space exploration began. The most common ideas were hopelessly ill conceived, crippled by forced analogies with terrestrial history. For decades, since there were so few good ideas and sound arguments for space weapons, it was easy enough to assume that there never would be, and that space should remain weapons-free forever.

The impetus of recent reconsideration of this question is chiefly an awareness of the increasing importance of space to the conduct of US military operations. Moreover, there is also a growing recognition by the general public of the overall economic importance of space systems, given the emergence of civil applications and a commercial space market. Hence, some have seized an opportunity in which to trot out an old formerly discredited concept that has long been regarded as taboo, one that essentially runs counter to the US stance as it has been espoused practically since the advent of space flight.

But as already stressed, there are no constant truths or eternal policies for space. Rather, the rapidly changing space operations environment demands that former assumptions always be subjected to profound reassessments when situations change.

To Arm or Not to Arm?

At its core, the notion of weapons in space is one that pits military pragmatists against idealistic futurists. Or, put another way, it is a

conflict between those that espouse the immutable nature of human beings against those that believe they are slowly, but definitely and irreversibly, moving toward an era of greater cooperation and unity; it is the idealists versus realists, the political hawks versus the doves, and it is an argument probably as old as humanity.

Space-based weapons proponents take as their argument the historical proof that, wherever there has been advantage and profit, there followed efforts to usurp it. Where caravans plied their trade over the Silk Road, they did so under a series of tributes and constant threat of plunder. As sailing ships constituted the vital link to trade centuries later, piracy, often state-sponsored, was common. Attacks on commerce were not always rational, they sometimes were designed to harm the parent societies. So as space enterprises look to gain commercial advantages, there too will emerge entities seeking to capture or spoil what part of the profits they can.

More important to space weapons proponents is the recognition of the medium as an emerging linchpin for the threat and application of force and of the conduct of war. As such, the ability to negate US space systems offers a key to success for would-be enemies. The fear is that, as US forces increasingly come to rely on space, its potential to serve as its Achilles Heel increases.

The logic essentially boils down to the belief that weapons in space are an inevitability. Since weaponization of space is inevitable, the United States, as the country with the historical opportunity to be the first to field them, would be foolish not to do so. And, should it not afford itself of the opportunity, it will likely find itself held hostage to the state that does.

This argument,³² however, also finds opposition in history, for although it is true that national policy evolves to accommodate prevailing conditions, it is also a creature of its past. Arguments for the shifting of US policy regarding weapons in space often omit the underlying reasons for its existence. Forgotten—or conveniently

32 Much of this section is derived from Lt. Col. Bruce M. DeBlois' article in the Winter '98 *AirPower Journal*, Vol. XII, No. 4, "Space Sanctuary" A Viable National Strategy." Lt. Col. DeBlois would disagree with my conclusion, but he does a very good job of developing the logic trail for both sides of the argument.

ignored—is the reality that the current US space weapons policy was not foisted upon the United States by the United Nations. Neither was the current policy imposed at the urging of allies, nor was the current policy adopted at the insistence of our erstwhile Cold War nemesis. Rather, it was, and remains, a policy entirely of our own making, with our own interests and benefits as the primary motivators.

The current US stance against the fielding of space-based weapons is the result of decisions made during the Cold War, based on a belief in the USSR's ability to counter them, and on their ultimate destabilizing effect on carefully wrought nuclear relations. Though this policy was later hedged somewhat during the pursuit of the Strategic Defense Initiative, the popular view of space as a sanctuary, is one carefully crafted by the United States.

And, while it is true that America now enjoys a position of space hegemony, it is only as a result of the recent demise of an adversary of equal stature. For the United States to change the rules of the game, simply because it can, may be viewed, by governments and citizenry alike, as needlessly provocative. In a world now comprised of global trade organizations, multinational coalitions, and cooperative UN security relations, the necessity to single-handedly extend the boundaries of warfare by the world's lone superpower may be politically indefensible.

Space sanctity proponents, on the other hand, couch their arguments on the basis of various movements toward the goal of a global polity. They take heart from the rhetoric of UN treaties and resolutions regarding the use of space as well as the current reluctance of nations to field space-based weapons. This state of affairs results more from the strategic military concerns of superpowers than noble-minded bureaucrats. The essence of the belief in space sanctity is a contention that the medium, due to its sheer enormity, is a logical unifying element for mankind.

Supporters of the sanctity of space also point to the sanctuary status that Antarctica currently enjoys. The inference is that, if the global community puts its mind to it, such stances can and do succeed. However, this example suffers from the absence of the crucial criteria that drives national acquisition: strategic military and economic value, which is a deficit the space surrounding our planet does not suffer from.

Oddly, the organizational unification likely to most influence the politics for space sanctity is not governmental, but corporate. As the world political structure becomes increasingly democratic and a global capital market increasingly drives the financial well being of the population, state wealth and economic assets will be increasingly hard to define.

The most striking example of this comes from the wholly derived, erstwhile US asset of the Internet. Now occupying a truly global expanse, and interconnecting a dizzying and continually expanding array of users, the system represents the ultimate blurring of boundaries that is quickly overtaking traditional commerce. The United States is only now beginning to discover the enormous difficulty of defining national assets and protecting them within such a complex, far-flung system. As the ownership of more and more business becomes multinational, servicing an increasingly global customer base, a single nation's pursuit or protection of gain continues to lose relevance.

Regardless of their rational premise, however, arguments for the exclusion of weapons in space are nevertheless doomed to fail against the irrationality that is human conflict. Arguments pertaining to the incorrigible nature of humanity have a rationality of their own. And, in a circular type of logic, the argument for fielding space-based weapons becomes self-justifying. The need to place weapons in space as a defense against weapons in space begets the scenario from which the original contention was based. Against this paradox, those who support the sanctity of space have no recourse. As a result, despite every conceivable argument that can be thrown against it, the simple historical inevitability of war, warfare, and arms cannot be overthrown.

A Prognostication

It is almost certain that sometime early in the 21st Century, the fielding of space-based weapons will occur under the auspices of defense, in much the same manner as the nuclear weapon buildup that occurred within the latter half of the 20th. And, like nuclear weapons, once fielded, there will be no reversing course. This too is an historical lesson of warfare. As the world now grapples with the proliferation of

nuclear weapons that were once the province of superpowers, so too will it see the initial weaponization of space be followed by increasingly sophisticated armaments as proliferation occurs there as well. A sobering thought is the prospect that as launch costs go down per unit of mass, the opportunity for other actors to put weapons into orbit about the Earth will go up.

Given this prediction, what nation or military force would shun the opportunity to prepare itself for the inevitable? And, if one's charter is the control of space, as is the US Defense Department's, how can you be expected to enthusiastically deny yourself the means to more competently conduct your mission? The directive to "ensure freedom of action in space and, if directed, deny such freedom of action to adversaries"³³ clearly conjures images of space weapons. Although the caveat "consistent with treaty obligations," somewhat blurs this directive, the statement nevertheless maintains the effect of an open-ended clause under which the placing of weapons in space is virtually assured.

Having said this, however, the means by which the placement of space-based weapons will likely occur is under a second US space policy directive—that of ballistic missile defense. It is under this rubric that the United States is most likely to act unilaterally, although a more probable scenario will see overtures to include US allies in fielding such a system. This could preempt any political umbrage from most of the world's influential nations while positioning the United States as a guarantor of defense from a universally acclaimed threat. It would also serve to discourage allies from fielding other systems in the same fashion that the Global Positioning System (GPS) succeeded in forestalling the fielding of rival navigation and timing systems.³⁴ Additionally, this could also serve as a mechanism for the pooling of resources of the United States and its allies: an action that presently enables them to dwarf the remainder of global military spending. The result would be the unlikely fielding of a peer system for a generation.

33 *National Security Space Guidelines*. National Space Policy, Office of the President, National Science and Technology Council, September 1996, Para 6(g).

34 The notable exception being the Soviet Global Navigation Satellite System (GLONASS) launched beginning in 1982; four years after the initial GPS launch.

Regardless of the dual usage inherent in such a system, its assured success lies in the fact it appeals directly to the euphemism under which war resides, that of national defense. The notion of a protective space shield for America's troops and general population has already generated significant public discussion during the funding of the Strategic Defense Initiative (much of the public is apparently under the impression that such a shield already exists). Any other nation, facing a realistic threat to national survival which passes through space would consider a protective defensive shield, and would not shy away from basing all or part of that defense in space, if that were the most effective location.

This is hardly the outcome hoped for by proponents for space sanctuary. It does, however, move the issue toward the realm of a unified, semi-global agreement.

Although it is doubtful the United States could be induced to relinquish control of such a system, there is some precedent for globally extending the use of a US-developed military space system. As noted, a strategic concern for providing service to allies through a US-financed, satellite-based, positioning system included forestalling the production of a competing system. Once operational, the recognition of its overall utility for civil purposes provided the impetus to extend the system to maritime and aviation agencies five years later. And, as it has further migrated to the commercial marketplace, the result has been near ubiquitous use throughout the world.

Although the extension of protection from a US weapons constellation clearly has its limits, the point is that there is precedence for a shared-use system. And, with regard to proliferation concerns, such a shared system continues to answer certain US strategic interests.

Though this analogy holds out some hope for the cooperative use of a space-based defensive weapon system, the nature of weapons differs greatly from that of a passive system such as GPS. This is because the benign, defensive nature of a ballistic missile killer is not the only facet of such a system—it also has inherent offensive capability against satellites.

This will give rise to two practical effects: the first will be an innate capacity for the control of space from space; the second will be the eventual acquisition of a like capability by other would-be world players. While nations might be content to rely upon a US military system for ballistic missile protection, they are unlikely to long tolerate a de facto US control of space. For the same reasons our allies and other nations possess a separate nuclear capability, they will also desire space-based weapons. Prudence, pride, and individual concerns will drive countries to field their own systems.

The Use of Space Weapons

Once in place, the use of space-based weapons, unlike nuclear weapons, will likely be unreserved, at least in their initial incarnation. This is in view of several factors. The first lies with their probable targets, low-earth-orbiting satellites, which are a relatively vulnerable prey whose remoteness and lack of human presence make them excellent candidates for preemptive strike. Lacking the stigma of the loss of life resulting from most other types of attack, the destruction of a satellite carries far less risk of earthbound retaliation. Popular sentiment—at least throughout the industrialized world—does not equate the loss of life against the loss of machinery, no matter how vital.

The second factor lies in the disproportionate loss of war-making capability such a strike could inflict upon an adversary. Due to their vantage point, global reach, and station-keeping qualities, space systems enable system characteristics that would be expensive, if not impossible, to replicate by terrestrial systems if lost. Even if only LEO systems were lost, the combination of terrestrial and GEO systems required to replace LEO systems would be nearly as expensive. Thus, the side suffering a preemptive strike is faced with a very narrow set of options. A counter-attack in space could be launched, provided the attacker has not greatly limited his ability to do so. This would deprive the attacker of his vital space systems and provide a more level playing field for the conduct of an earthbound war. Or, a proportionate earthbound attack could be carried out that would deprive the attacker of enough non-space capability to compensate for his space advantage.

Either option would likely prove difficult to effect in the wake of a no-notice opening engagement. The employment of space weapons for counterattack, provided they survive an opening salvo, will likely be limited by the destruction of supporting space-based communications, surveillance, and targeting systems. Unless there is a marked increase in system redundancy and replenishment capability, this equates to an initial and continued deficit of space support. Alternately, the conduct of massive earthbound operations is equally problematic due to its perceived escalation of the conflict.

A possible third solution might take its cue from the nuclear strategy of assured mutual destruction. By pre-targeting an adversary's critical space systems, a nation could deter a first strike through an implied mutual destruction of each side's space assets. The problem with this strategy lies in the guaranteed operation of a nation's space-based weaponry. To make this strategy a viable threat, the delivery of a crippling counterattack must appear to be certain. Unlike the nuclear scenario of the Cold War, the warning time of an attack in space would be greatly reduced and the redundancy of space-based counterattack systems would be limited. Augmenting space-based weapons, however, with ground-to-space and air-to-space weapons would function as a type of antisatellite triad in much the same way that a nuclear triad continues to serve as the cornerstone of US nuclear strategy. But this analogy to nuclear deterrence also suffers from the inability of space warfare to provide the ultimate trump card that a nuclear threat does. Absent the force-wide destruction that nuclear weapons promise, an adversary might willingly choose to eliminate space assets from the battlefield, perceiving himself to be disadvantaged in that arena.

A further complication of the issue of space warfare is concern regarding the contamination of space resulting from physical destruction of a satellite. Depending upon the destructive force used to annihilate a satellite, the resulting debris from the breakup of a number of systems, would entail a risk of rendering certain orbits useless. In this respect the analogy with nuclear weapons is appropriate. Here too, the use of weapons has the potential to corrupt the physical environment long after the conclusion of any conflict, leaving behind a bitter legacy.

To mitigate this effect, a space weapon must function in a more benign fashion by neutralizing a target without physical fragmentation. A weapon that would blind a satellite's optics through the use of laser technology is one such candidate. Another might direct an alternate focused source, such as microwaves, to simply overheat a satellite's internal components. To counter such attacks, the owner of a satellite could include an explosive package. Then, if an attack on the satellite was proven, the owner could blow up the satellite, providing the command circuitry survived the initial attack.

However, once again, a precedent within US Cold War nuclear strategy can serve to illustrate some of the ramifications inherent in this line of reasoning. The enhanced radiation weapon (ERV), or neutron bomb, was based upon a similar premise of preserving the use of the battlefield while effectively negating an adversary's systems.³⁵ First proposed in the early 1960s, the weapon produced a relatively small blast, greatly reduced radioactive fallout, and increased killing power through the release of neutrons. By localizing destruction, limiting battlefield contamination, and maximizing the killing zone, the practical effect was to spare equipment and structures while eliminating the personnel within them. Intended for tactical use in the defense of Western Europe, production commenced in the mid-1970s. Public debate within the United States quickly escalated over the ethical implications of such a device. But, more to the point, European allies viewed the weapon as less of a deterrent than offering a more palatable means for conducting nuclear war in Europe. Eventually, in the face of strong opposition, the United States abandoned plans to deploy the weapon.

Although many argued otherwise, the neutron bomb almost certainly represented an increased likelihood for the use of nuclear weapons. Aside from its stigma as a nuclear weapon, the neutron bomb contained features that moved it closer to the realm of traditional military weaponry. Its destructive power could be more precisely directed over military targets rather than creating a large, collateral swath over adjacent civilian population centers. The battlefield would remain inhabitable, minus large scale fallout of

35 In this case, through the killing of personnel manning those systems.

fissile material. Protected conventional operations could, at least in theory, proceed in conjunction with their use.

Likewise, the presence of space weapons, which can be employed without fear of orbital debris, will result in the increased likelihood of their use. Without the fear of contaminating space to the detriment of future operations, the use of such weapons loses its remaining constraint outside of strategic warfare considerations. And, without that constraint, the possibility of a preemptive strike in space will become all too likely. The strategic military gain, system vulnerability, and detachment from an earthbound public's concerns, will combine to render space a target much too tempting to pass over.

Final Caveat

Yogi Berra is quoted as having said that predicting is hard to do, particularly about the future. The development of a strategic theory of space power is in a formative stage. We, the United States, all spacefaring nations, mankind, do need an underlying theory from which we can proceed to develop policy. We need some foundation philosophy from which to start. We have accumulated some small cache of facts from conducting space operations for forty years. We have the accumulated insight of 4,000 years of human history.

This and the previous chapter has attempted to lay out some of the attributes, truths, and beliefs about the exercise of space power for national security, up to and including the application of force. We have also attempted to frame some of the debates of the late 20th Century about space activities in the context of national security.

Space power is real and it is extremely relevant to national security. It must be protected like all other important and valuable assets. At some time, weapons will be placed in space, when the need for them is irrefutable: this may be merely a domestic political need. In light of all this, what should the United States, or another spacefaring country, do to gain or maintain status as the world's premier space power? That is the subject of the next and final chapter.