Four Myths about Space Power

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The satellite gap between America and every other nation in the world is universally recognized, and the significance of this fact is also unquestioned. America's unparalleled investment in space, in satellites, the infrastructure that goes with them and the precision weapons that best exploit them is appreciated as having made possible its successful campaigns against Iraq, Yugoslavia, and Afghanistan.

If anything, the gap seems certain to grow steadily greater in the coming years. In the three years between Yugoslavia and Afghanistan, American airpower went from being effective principally against fixed targets like infrastructure to routinely devastating moving formations using real-time intelligence with the help of faster satellite relays. The Army and Navy as well as the Air Force have been directed to devote increasing attention to space, specifically to "establish requirements, maintain a cadre of space-qualified officers, and research, develop, acquire, and deploy space systems unique to each service."[1] The United States is even slated to begin testing space-based weapons, starting with space-based interceptor missiles in 2006. The implicit technical possibilities have compelled some to envision the United States going even further and seizing outright the highest ground of all (happily unoccupied by anyone else) to impose a Wilsonian international order on the planet. With an invincible space force keeping the peace between nations, war as it has traditionally been known theoretically becomes impossible.

On paper, the scenario (no longer limited to government reports, think tanks, and military and policy journals, but increasingly appearing in mainstream magazines like last April's issue of *Wired*[2]) looks like a masterstroke, a geopolitical checkmate against all future aggression. While some acknowledgment is given to the fact that satellites are not invulnerable, the thornier problems and profound limitations of an "astrocop" system rarely get the consideration they require. In particular this sort of thinking about space power takes four dangerous myths for granted.

***Myth #1: America's capacity to exploit space and deny
its use to opponents will be virtually unquestioned.***

At first glance this proposition appears to be true, as the United States has no large peer competitors, actual or even potential. China's military remains one to two generations behind the United States technologically.[3] Russia continues to possess the infrastructure for mounting a challenge to the United States, but is likely to remain cash-strapped for a long time to come.[4] Japan's stagnating economic growth and reluctance to increase its military expenditures makes its rise as a space power unlikely. Western Europe has yet to develop a coherent defense and foreign policy, and is slowed further by its skepticism about information warfare.[5] In the meantime, European militaries are falling technologically behind the United States to such a degree that the interoperability of NATO forces seems threatened.[6]

While the satellite gap may now appear to be unbridgeable, the wide array of communications, navigation, reconnaissance, and weather satellite services commercially available means that other states can meet much of their need for space power in the marketplace. The imagery offered by the French Systeme Pour l'Observation de la Terre (SPOT) corporation is good enough that the United States relied heavily on it in the Gulf and Kosovo and has developed the Eagle Eye Vision program to facilitate its use.[7] Militaries that can not afford communications satellites of their own can lease transponders on the satellites orbited by other countries, and some—like Australia—have already done so. Navigation aids like the Global Positioning System can be used by anyone with a cheap receiver. The commercialization of space is also likely to progress even more rapidly over the coming years.[8]

Given the usually civilian character of such services, it may be more politically difficult to cut off their signals or attack them outright than would be the case with dedicated military satellites. Attacking a commercially owned satellite, even one which is partially leased to or providing information to a belligerent's military, would be broadly equivalent to attacking neutral shipping in wartime. A conflict in which this became a regular practice would be comparable to the unrestricted submarine warfare of the world wars.[9] (It also would represent a practical inconvenience for the United States given the reliance of its economy and military on commercial services.) The number of such services available may offer such redundancy as to make it impossible to totally deny a sophisticated enemy access, even after it has executed its initial strike.

The declining price and widening availability of satellite construction and space launch capabilities suggest that more states will be able to establish a

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presence in space, increasing their redundancy. Over earlier US objections, the European Union is pressing ahead with its Galileo project with the help of Canadian and Russian finance and expertise.[10] (Unlike the Global Positioning System, Galileo is a civil project funded from mainly private sources.) Russia has the Global Navigation Satellite System (GLONASS). China is pursuing its own equivalent in the Beidou system. Japan is launching its first constellation of reconnaissance satellites over the next few years. There is also a widespread interest in missile defense not only on the part of major states like those just mentioned but also in small countries like Israel and Taiwan which could lead to their pursuing greater space capabilities.

Moreover, America's technical lead could be rendered less important even where it does not shrink. America's advantage over Iraq and Yugoslavia was that it was an information-age power fighting an industrial-age power, and the disparity between two information-age powers is likely to be less significant than that. The theft or import of technology may be no substitute for homegrown research and development, but a cheap knock-off may in some cases be good enough to get the job done. This is especially so if the knock-off can be produced in large numbers. The dual-use character of so much space technology and the fact that others are likely to be able to imaginatively combine various technologies, improvise, adapt, and even innovate mean it can not be assumed that other states will always field inferior systems.[11]

Finally, it has been widely acknowledged that a power disadvantaged in satellites and space-based weapons could use a variety of cheaper weapons and tactics to reduce American space superiority. High-flying drones can provide a partial substitute for a shortage of adequate satellites, at least regionally. Such a capability may be less extensive, secure, or reliable in particular respects than what the United States possesses, but it will be there nonetheless.

At the same time, low-budget powers can use a variety of techniques to attack American satellites, including hacker warfare or earth-based laser weapons which will have advantages over the space-based variety. Earth-based weapons do not have to be as compact as systems launched into space, and thus they can be built by a less-sophisticated enemy. They can be deployed more cheaply, without the infrastructure required for space launch and ground control. The communications links on which they depend are less susceptible to disruption, and they are much more accessible to those whose job it is to maintain and resupply them. The same goes for directed-energy weapons based on ships or inside wide-bodied aircraft, which may also have the capacity to attack US satellite-based systems.[12]

Consequently, while no other power can match the United States satellite for satellite, states can have many of the benefits of a space infrastructure without launching a single satellite of their own. The availability of so many services on the market also reduces the number of systems they need to build themselves, compensating for economic or technological disadvantages. An op-

ponent capable of launching a limited satellite network of its own, supplementing it with drones and commercially available data, and able to make life harder for the United States by knocking out some of its own satellites is certainly conceivable over the next quarter-century. Like the German navy before World War I or the Soviet navy in the Cold War, it would be a "risk fleet." It is also conceivable that a number of states with limited space capabilities could come together in an attempt to counterbalance the United States. Even without any such opponents appearing, the United States may have to accept that sophisticated opponents in the future will have at least a limited ability to deny space to the United States and to exploit space for their own ends throughout a conflict.

Myth #2: Other states cannot neutralize American space power without directly attacking its space assets.

While space power is crucial to the unprecedented military capability the United States now enjoys, the space-based infrastructure is its nervous system. The muscle is in its air, land, and sea forces, and will remain there for many decades to come. Supporting those forces is the first mission of the military space program.[13] Nonetheless, the tail in space counts for little if the planetary teeth can be neutralized. Some of the ways in which potential adversaries can go about doing this are reasonably obvious, such as the construction of facilities underground, the targeting of ground control and downlink stations, or the use of electronic warfare to cut off American military forces from their supporting space assets. However, they also can fight American forces in ways which diminish the value of their presently unmatched capacity to monitor the battlespace and strike with precision.

One way is through special forces actions. Given the growing power of small groups of people to inflict destruction, states may turn to developing massive special operations forces for spreading chaos behind an enemy's lines. The Soviet Union had a force of 25,000 Spetsnaz troops who would have been unleashed en masse against Western targets from communications and transport systems to nuclear weapons facilities in the event of a third world war.[14] North Korea has over 100,000 soldiers in its own special forces units, presumably intended to wreak havoc behind South Korean lines in a future conflict.[15] It goes without saying that the chaos created by the most destructive attack a terrorist group like al Qaeda could stage pales compared to what such robust forces could accomplish given the chance.

A second method is to emphasize submarine forces. The undersea world remains impervious to aerospace surveillance, the sea surface presenting a barrier that cleaves the battlespace in two. Short of a breakthrough in non-acoustic submarine detection, space power will be incapable of defeating submarines. The result is that the submarine, once it has been deployed, may retain much of its ability to attack ships and even fire missiles at targets inland. Consequently, powers seeking to challenge US space power could concede superiority on the surface to the Americans, build up their submarine force, and unleash it on shipping lanes and coast-

lines much as Germany did in the world wars. The advent of underwater "arsenal ships," supercavitating cruise missiles that will minimize flight times by "popping up" out of the water near their targets, and facilities and weapons based on the seabed will only enhance such prospects.

A third way is to create air defense systems capable of neutralizing aerospace power and particularly precision-guided munitions. A system capable of reliably stopping a ballistic missile is likely to be that much more capable against conventional aircraft. Network-centric air defenses linking multiple launchers to multiple sensors will be much more difficult to suppress. Directed-energy weapons also hold out the possibility that even when aircraft cannot be shot down, the munitions they deliver can be destroyed before landing. The Tactical High Energy Laser is intended to shoot down not ballistic missiles but low-cost air threats like Katyusha artillery rockets or, conceivably, bombs, shells, and tactical missiles.

Directed-energy weapons will force munitions to become stealthier and perhaps better protected against directed-energy attacks by being bigger, heavier, or armored. This will drive up the cost of individual units and the number of them that have to be used to achieve a particular effect. If a defense system could stop 95 percent of the bombs or shells fired or dropped on it, 20 or more bombs or shells would have to be allowed for every target. This would dramatically reduce the economy of even a munition accurate enough to approach the ideal of "one-shot, one-kill" and help render the smart bomb senile.

It may appear that the deployment of weapons in space is a solution to this problem. However, it is one thing to launch space-based laser weapons capable of defeating a limited ballistic missile attack or crippling a satellite and quite another to launch into orbit the firepower necessary to destroy an army on the ground. Since laser weapons may be inherently inefficient, missiles will likely have to deliver the bulk of the firepower, and the same goes for earth-based laser weapons.[16] Additionally, the difficulties inherent in ballistic missile defense (like the absence of a margin for failure) suggest that the space-based weapons likely to be deployed in the foreseeable future will be dedicated strictly to strategic defense while more economical methods are used to attack conventional forces.

A fourth method is to recognize that precision is not "a straightforward substitute for mass or attrition" and again to look to the latter as a way of defeating the former.[17] It has been suggested that countries like Russia or China could respond to the creation of a National Missile Defense by building more missiles, outfitting their missiles with multiple warheads, or equipping their missiles with decoys or other countermeasures to confuse fire control systems. This can also be done with conventional weapon systems. The proliferation of unmanned vehicles on land, sea, and in the air, of stealthy materials and designs, and incorporating the "net-centricity" of future warfare, could make the generation of an overwhelming number of targets more feasible. A net-centric tank like the US Army's Future Combat System will consist of a system-of-systems, several vehicles where there used to be only one. If these vehicles are also stealthy in design,

protected by active and passive countermeasures, and carefully coordinated to maximize their rate of advance and minimize their vulnerability to air attack, the challenge to air power will increase accordingly. More munitions will have to be expended to hit each target, and more targets attacked—so many more that they could overwhelm the ability of air power to halt their advance. The same could perhaps be said of an air force employing vast numbers of small, cheap, stealthy, drone aircraft or naval vessels. Swarms of attack microbots or nanobots would allow this approach to be taken to an extreme.

Singly these approaches may not be enough to change the balance of power, but a sophisticated enemy is likely to employ them in combination while enjoying some use of space and some ability to deny its use to American forces. Particularly in a localized or limited conflict, this could be enough to substantially narrow the gap between the United States and its future foes. Conventional land and sea battles of some sort will therefore remain at least technically possible.

Myth #3: America's assumption of the role of dominant space power can end armed conflict between states.

A common feature of scenarios built around the "omniscient, unobstructed lethality" of an "astrocop" system is that it will stop any tank, plane, or missile from crossing borders, effectively ending interstate war. Unfortunately, such a plan assumes a billiard-ball model of international relations in which states are unitary, self-contained actors, an idea which appears increasingly quaint. (The proponents of such a system, after all, often claim that interstate war is largely a thing of the past, which raises the problem that this enormous investment is being justified through reference to a problem that is supposed to have already disappeared.)

Most of the conventional conflicts where such weapons may be effective are civil wars which spill across borders, involving neighboring states. A better question than "How will the United States manage interstate wars?" may be "How will the United States manage intrastate wars?" and few have had much to say on that score. The reality is that as in the Cold War, internal and interstate conflicts are likely to feed off each other. American control of space will not in and of itself prevent antagonisms between states from finding their expression in proxy wars. At the same time, internal conflicts can complicate American relations with other great powers because these do have geopolitical significance, and because they often occur along ethnic lines. If Samuel Huntington's "clash of civilizations" thesis was an overstatement, it was nonetheless a factor in Russian hostility toward NATO action in the former Yugoslavia during the 1990s.[18]

Even assuming that America's role as global policeman could somehow remain limited to border security, the fact remains that the delineation of borders is not always clear. An American commitment to guarding the borders of all nations means that the United States will take a position on every border dispute. The problem is even greater on the oceans, where disputes could sharpen as

the seas are "territorialized." Already fishermen and oil drillers are routinely charged with violating the claims of other countries, and littoral navies have repeatedly clashed over the delineation of claims in the South China Sea. Will the protection of borders include the use of force to keep fishermen from one country from poaching inside another state's claim? Such a policy would imply a remarkable and unprecedented expansion of American responsibility. Matters also are likely to become worse as new ways are found to exploit the seas, from power generation to ocean mining to cheap desalinization.

There is also little reason to believe that American space power will eliminate the conflicts that produce wars any more than British sea power did, let alone abolish realpolitik. If anything, the extension of American space power could heighten realpolitik by exacerbating the anxieties of countries like Russia and China, which already have paid more than lip service to counterbalancing American power.

Whatever their ability to do so in the immediate future, history suggests that other states will not accept American dominance of space indefinitely any more than Britain's dominion over the seas was tolerated indefinitely. As the rising power in Europe in the late 19th-century, Germany had by the 1890s turned to building a fleet of its own, initiating a naval arms race that contributed to the outbreak of World War I. While Germany did not win that conflict, it is worth remembering that while the German High Seas Fleet lost strategically at Jutland, it took the tactical honors. German U-boats, "bypassing" Britain's superiority on the surface to strike at its shipping, nearly brought Britain to its knees. The pursuit of multiple satellite navigation systems, for instance, is partly a response to the control of the Global Positioning System by the US military. Such challenges could grow more frequent and bolder in the years to come.

Myth #4: The threats to American security which space power does not similarly eliminate can be regarded as lesser dangers.

Some might have us believe that American space dominance would eliminate the entire spectrum of warfare between Intifada and Armageddon by leaving potential adversaries hopelessly outmatched. But even if that fantasy were so, if conventional warfare ceased to be a consideration, such a situation would nonetheless present a return to brinkmanship against not one but several different enemies.

Recent work on the study of deterrence suggests that the limitations of deterrence will be more pronounced in the future, in single situations and perhaps generally. Deterrence must not only be seen as credible, but as speaking to the values of an enemy both willing and able to change his course of action, something that may be less likely in dealings with rogue states than it was with the Soviet Union.[19] The reality is also that other states will use their nuclear and other weapons of mass destruction to deter American action, as well as be deterred by the United States, and they may be able to do this with fewer resources than is generally appre-

ciated. An enemy which sneaks its nukes into the United States rather than lobbing them across the ocean atop an ICBM (which may now be the more plausible threat) simplifies the problem of its acquiring a delivery system and bypasses missile and other conventional defenses.[20] It also sows confusion as to the origin of the attack, which is perhaps its best hope for warding off a devastating counterattack.

The threats of Intifada and Armageddon also become the same threat when terrorists possess weapons of mass destruction. As 11 September 2001 reminded the world, large-scale terror is a very real danger, and in addition to the other problems they pose (from threats to investment to refugee flows) failed states are increasingly seen as sanctuaries for those who would commit such acts. The United States is incapable of single-handedly eliminating the problem of failed states. Indeed, managing that problem is not something that can be accomplished solely through military instruments, since the main effort has to be preventative.[21] When the time comes for military action, the real test is less whether planes can smart-bomb bandits than whether ground troops can keep the peace.

In fact it is possible that an extension of space power would *diminish* America's ability to deal with these other problems. One way would be through the fostering of a false sense of invulnerability: the perception will be that the United States can neglect very real problems because it has its fortress in the sky. The sense that wars can be won swiftly from the air will enhance this by reducing the tolerance for more protracted operations, especially when they incur casualties: the success of Desert Storm made Somalia's costs appear all the more unacceptable.

Another way in which a drastically enlarged investment in space-based assets could weaken American power is through the diminution of its resources. It would mean less money for other functions and missions like intelligence-gathering or peacekeeping, let alone attempts to attack the economic and ecological roots of many present and future conflicts.[22] The hostility with which other states could greet American space dominance may also lessen American influence abroad, making it more difficult to jointly tackle with other states problems like the proliferation of weapons of mass destruction.

Conclusion

Space is not a substitute for all forms of military capability nor for the economic, diplomatic, and political power on which not only American security in general but space power specifically depends. To that end there should be a greater wariness of further militarizing space, not only because of the political and military risks it entails or the ethical questions it raises, but because it may be a case where "increases in complexity provide diminishing returns."

Moreover, security is not the sole consideration of American space policy. Weather monitoring, earth surveillance, scientific research, current navigational techniques, and the telecommunications that have made the modern economy possible depend heavily on a growing infrastructure in space—one which will become only more important over time. While this raises questions

about the ability to protect this infrastructure, turning space from a conduit of information into a scene of active conflict may do more harm than good. Given the serious limitations of space power, America's lead in space may be best used to prevent or at least slow the further militarization of space.[23] The Clausewitzian reasoning remains as valid today as ever: war is a political act. Military policy should therefore be directed by rational political ends, not by the outer limits of what appears to be technically possible.

NOTES

1. Department of Defense, press release, 8 May 2001, "Secretary Rumsfeld Announces Major National Security Space Management and Organizational Initiative."

2. Bruce Sterling et al., "Astrocop," *Wired Magazine*, April 2002. Ralph Peters also elucidates such a conception of the future in the last chapter of *Fighting for the Future: Will America Triumph?* (Mechanicsburg, Pa.: Stackpole Books, 1999).

3. Xu Yufan, "China Military Brings Up the Rear," *Asia Times*, 7 July 2000.

4. Sam J. Tangredi, "All Possible Wars? Toward A Consensus View of the Future Security Environment, 2001-2025," *McNair Paper 63* (Washington: National Defense University, 2000).

5. Yves Boyer, "The 'American Revolution in Military Affairs': A French Perspective," in *Toward a Revolution in Military Affairs?* ed. Thierry Gongora and Harold von Reikhoff (Westport, Conn.: Greenwood Press, 2000), pp. 84-85.

6. Myron Hura et al., *Interoperability: A Continuing Challenge in Coalition Air Operations* (Santa Monica, Calif.: RAND, 2000). Also see Phillip S. Mellinger, "Force Divider," *Foreign Policy*, No. 128 (January-February 2002), pp. 76-77.

7. SPOT Corporation, press release, 8 August 2001, "SPOT/Eagle Vision Deliver Imagery in 30 Minutes!"

8. Todd J. Black, "Commercial Satellites: Future Threats or Allies?" *Naval War College Review*, 52 (Winter 1999), 99-114.

9. Norman Friedman, *Seapower and Space* (Annapolis, Md.: Naval Institute Press, 2000), p. 312.

10. Jennifer Lee, "Europe Plans to Compete With U.S. Satellite Network," *The New York Times*, 26 November 2001.

11. Martin Libicki, "Rethinking War: The Mouse's New Roar," *Foreign Policy*, No. 117 (Winter 1999), pp. 30-32. Also see Charles J. Dunlap, Jr., "21st-Century Land Warfare: Four Dangerous Myths," *Parameters*, 27 (Autumn 1997), 27-37.

12. Matthew Mowthorpe, "The Revolution in Military Affairs and Directed Energy Weapons," *Aerospace Power Chronicles*, 8 March 2002.

13. J. W. Kelly, *Air Force 2025* (Maxwell Air Force Base, Ala.: Air Univ. Press, 1996).

14. James Adams, *Secret Armies* (New York: Atlantic Monthly Press, 1988).

15. *North Korean Military* (Republic of Korea: National Intelligence Service, 1999).

16. The radical improvement in power sources necessary to change this may also be much less likely than proponents of the RMA thesis would argue. Michael O'Hanlon, "Modernizing and Transforming U.S. Forces: Alternative Paths to the Force of Tomorrow," *Quadrennial Defense Review 2001* (Washington: National Defense Univ. Press, 2001).

17. Edward A. Smith, Jr., "The Navy RMA War Game Series, April 1995-November 1996," *Naval War College Review*, 50 (Autumn 1997), 17-31.

18. Samuel Huntington, *The Clash of Civilizations and the Remaking of World Order* (New York: Simon & Schuster, 1996).

19. Keith Payne, *Deterrence in the Second Nuclear Age* (Lexington: Univ. Press of Kentucky, 1996). For the opposing view, see Martin van Creveld, *The Future of Nuclear Proliferation* (New York: Macmillan, 1991).

20. *Foreign Missile Development and the Ballistic Missile Threat Through 2015* (Washington: National Intelligence Council, 1999).

21. Richard Norton and James Miskel, "Spotting Trouble: Identifying Faltering and Failing States," *Naval War College Review*, 50 (Spring 1997), 79-91.

22. Thomas F. Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security*, 16 (Fall 1991), 76-116.

23. For a summary of the space arms control issue, see James Clay Moltz, "Breaking the Deadlock on Space Arms Control," *Arms Control Today*, 32 (April 2002).