Weaponisation of Space and India's Options

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During Cold War era, space became an essential adjunct for war-fighting on the ground, without becoming another theatre of combat. While militarization of space proceeded rapidly, the weaponisation of space was avoided. Because the weaponisation of space was avoided during the Cold War, it does not necessarily follow that weaponisation will continue to be avoided in a new era of asymmetric warfare. We can improve protection of satellites against some threats, but satellites will remain easy targets for space weapons designed to kill on impact. Space has been free from warfare. No weapons have ever been used in or from space, and no satellites have been destroyed in combat. A glance at the global strategic situation reveals that many nations are rushing to develop space capability. The capabilities in development around the world are largely dual use and will have profound effects on the balance of power. The issue at hand is how to effectively manage the security dilemmas that will inevitably arise due to weaponisation of space. Many space faring nations think that future wars will/may be fought in all medium including space. The laws of aerodynamics cease to apply in space and one is therefore obliged to consider it as a medium different from air. It is still far easier and more likely for surprise attacks to be carried out on the ground than in space. During the Cold War, nuclear-tipped missiles were always ready to fire. We will be safer if we can prevent elevating this hair-trigger situation into space. If India has to look at the threat to its space assets, it can be concluded that though there is a threat to space assets from our perceived adversary, it is neither critical nor alarming. Indian defence forces primary dependence on space based systems if any, can easily be transformed to secondly by developing alternates for both ground and aerial platforms. In future the dependence on space based systems can be further reduced by India by inducting state-of-the-art alternate systems to supplement the space system as alternates.

Background

The satellites are increasingly being utilised as dual-use (can be used for both military and non-military purposes). A number of countries own between 10-20 satellites, but at least 115 countries in total own a satellite or a share the resources of one. There are about 150 operational dedicated military satellites

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At the end of 2009, there were over 926 active satellites in various orbits. The United States (US), Russia, and China are the three countries with the most satellites owned outright; having 437, 94, and 57 satellites respectively[1].

worldwide, with the US operating approximately 114 and Russia approximately 30 satellites followed by China. At the end of 2009, there were over 926 active satellites in various orbits. The United States (US), Russia, and China are the three countries with the most satellites owned outright; having 437, 94, and 57 satellites respectively[1]. Space is emerging as an important 'arena' and integration of space support systems will play a crucial role for the future military operations of the nations as well as in the world economics. The capabilities in development around the world are largely dual use and will have profound effects on the balance of power. Many space faring nations think that future wars will/may be fought in all medium including space. The issue at hand is how to effectively manage the security dilemmas that will inevitably arise due to weaponisation of space.

A distinction must be made between "militarisation of space" and the "weaponisation of space". These terms are sometimes used as if they were interchangeable, but they are not. While there are no specifically deployed weapons in space yet, there are satellites that could be manoeuvred to act as weapons to disable or destroy the space assets of others. Therefore, when considering questions of space security, it must be recognised that though space has not yet been specifically weaponised, it is already heavily militarised[2]. The laws of aerodynamics cease to apply in space and one is therefore obliged to consider it as a medium different from air. As an operating medium, space is entirely different from the terrestrial mediums of sea, air and land. It requires specific operational means and doctrines that take into account its unique physical characteristics. One major consideration, for instance, is that space assets are obliged to follow pre-determined orbital trajectories to remain close to earth and motion in space knows no geographic boundaries[3]. One can exploit space assets without the support of space based weapons or space weapons. Both the United States and the Soviet Union developed and tested rudimentary anti satellite weapon (ASAT) systems during the Cold War. It was the ability to destroy enemy surveillance satellites in low earth orbit that drove the ASAT programme in both the Unites States and the Soviet Union. Both superpowers developed anti-satellite interceptors, but then abandoned their ASAT programme. Some insist that space has already been weaponised, rendering the subject of this discussion irrelevant[4]**.** The various issues concerning the theory of weaponisation of space, threat and the possible options for India are discussed in succeeding paragraphs.

Weaponisation of Space

The major driver behind space weaponisation is missile defence. Paul Wolfowitz, US Deputy Secretary of Defence, noted in October 2002, 'Space offers attractive options not only for missile defence but for a broad range of interrelated civil and military missions. It truly is the 'ultimate high ground'[5]. The issue of weaponisation of space raises the important yet ultimately intractable question of whether the migration of combat operations to orbital space is bound to take place sooner or later or it is a perception of few scholars and military brass. Many regard such an eventual development simply as a given. Former US Air Force General Joseph Ashy declared during his incumbency as C-IN-C SPACE Command, "it's politically sensitive, but it's going to happen. Some people don't want to hear this, and it sure isn't in vogue . . . but absolutely we're going to fight in space. We're going to fight from space, and we're going to fight into space."[6] This widespread belief in the eventual inevitability of space weaponisation stems in part from air analogies and, in particular, from a conviction that the space experience will naturally repeats the air experience.

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Rumsfeld Commission Report on US Space Security Policy

The latest debate on US space weaponisation plans began in 2001 with the publication of the Rumsfeld Commission Report on US space security policy[7]. This Commission was chaired by Donald Rumsfeld, who was soon to become US Defence Secretary, and included an overwhelming majority of retired high-ranking USAF officers, its purpose being to investigate the United States overall space security structure, report on its deficiencies and propose ways to rectify them. The report powerfully evoked the image of a potential "Space Pearl Harbour". This debate strongly resembles that of the mid-1980s on President Reagan's SDI. In fact, we find the same opinion groupings now as then, often with the same advocates. One could say that the current debate is considered by weaponisation supporters to be a second chance to convince people of the merits of their case. The Report argued that the US government should pursue the relevant capabilities "to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against attacks on US interests"[8]. This report concluded that the US Government was not militarily prepared to deal with a possible

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space aggression and that the expansion of conflicts into space was historically inevitable[9]. The Rumsfeld Commission Report on US space security policy brought out that "every medium air, land, and sea has seen conflict. Reality indicates that space will be no different." In order to avoid a "Space Pearl Harbour", this report called for the United States to develop "superior" capabilities for "power projection in, from, and through space" in order to "negate the hostile use of space against US interests."[10] The Commission argued that US military capabilities would need to be transformed in the areas of[11]:

- Assured access to space and on-orbit operations.
- Space situational awareness.
- Earth surveillance from space.
- Global command, control and communications in space.
- Defence in space.
- Homeland defence.
- Power projection in, from and through space.

The deputy commander-in-chief of US Space Command, General Anderson, in 2001, put the dilemma this way: "Right now there is no need to deploy weapons in space, but . . . we are tasked with the responsibility for examining force application. It is reasonable that we should do that. . . . This is not easy technology. It is something that does take time. You can't wait until you decide you need it and then not have it. It seems to me we would be failing our obligations to the nation."[12]

The threat to space assets is directly proportional to degree of nation's dependence on the assets. Higher the dependence the greater will be threat and the vulnerability. Given disproportionate reliance on space assets, it is no wonder that the US is worried about the vulnerability of these assets, but the fundamental question US advocates of space weaponisation have to answer is why they think weaponising space would be a sensible response to such vulnerabilities. In fact, the United States possesses the essential wherewithal in principle to begin weaponising space today. It is only a question of leadership choice, societal acceptance, and which particular force-employment alternatives to pursue first. Yet it is also true that the United States retains the power of the initiative in this respect and has at least some basis for guardedly hoping that if it continues

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to show restraint, others may also follow suit. Even though the issue is far from being decided, the Pentagon has already allocated considerable funds to the development of space-based anti-satellite weapons (ASATs), indicating that space weaponisation is considered an option[13].

Russia and China's Views on US Pursuit for Space Weaponisation

Russia and China believe that they must respond to this strategic challenge by taking measures to dissuade the US from pursuing space weapons and missile defences[14]. A staff background paper to the Rumsfeld Commission prominently featured a Xinhua news agency report on how China's military plans on defeating the US military in a future conflict. The Xinhua article noted, "For countries that could never win a war by using the method of tanks and planes, attacking the US space system may be an irresistible and most tempting choice"[15]. In January 2000, the Sing Tao newspaper based in Hong Kong quoted Chinese sources saying that China was developing a "parasitic satellite" to be used in an anti-satellite (ASAT) mode[16]. In Jan 2007 China demonstrated ASAT capability by destroying its disused weather satellite[17.] The US on 23 Apr 2010, launched an unmanned spacecraft, X-37B which can remain in the orbit for approximately nine months, has triggered concerns in China over a new arms race in space as the small shuttle is feared to have a platform to launch new space weapons with ability to carry out anti satellite operations. A China state-run daily featured the launch of the unmanned space craft X-37B as one of the lead stories on the front page with a headline "US spacecraft sparks arms race concerns"**.**[18]

The Inevitability of Militarization, not Weaponisation

Most would agree that space weaponisation is not inevitable in the near term. Indeed, there is scant observable evidence to suggest that the military use of near-earth space will be substantially different in 2020–2025 than it is today, at least regarding the development and fielding of new technologies and systems that would broaden the use of our on-orbit assets from force enhancement to force application.

Moreover, it is quite possible that if a potential enemy did want to develop the ability to attack space systems, it would choose to do so in ways that would not involve weaponising space such as investing in computer network attack capabilities, non-space weapons to attack the terrestrial elements of space systems, or ASAT capabilities that are not weapons in the conventional sense and against which the logical defensive countermeasures would not involve deploying space weapons. For military as well as commercial satellites, a transition to redundant networks of satellites would do much to reduce their vulnerability, perhaps together with supplementing satellite platforms for some military functions with new types of terrestrial systems, such as high endurance unmanned aerial vehicles (UAVs)[19]. In the end, most of the inevitability arguments are weak. Even

the best one that space weapons will provide irresistible military advantages for those who employ them, are plausible but not decisive. Many of those who assert it probably harbour exaggerated expectations about the capabilities that space weapons will offer. Inspite of the many people who apparently believe the inevitability thesis to be true, there is good reason for prudent policy makers to assume that the weaponisation of space is not in fact predestined, and that military space policy of space faring nations especially US, will be one of the factor, other than technological and financial hurdles, that will shape the likelihood of space weaponisation by other countries. Moreover, if the weaponisation of space is a virtual certainty, it also follows that arms control efforts, whether broadly or narrowly defined, to foreclose this competition are without merit.

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Policy Perspectives on US Space Weaponisation[20]

Pro-sanctuary Perspectives

Idealists. Oppose all space (and typically other new) weapons, for reasons transcending defence policy considerations.

Internationalists. Oppose space weapons because they would cause or contribute to general, arms race, and crisis instability.

Nationalists. Seek to avoid space weaponisation because it would reduce US power and/or security relative to potential adversaries.

Pro-weaponisation Perspectives

Space Racers. Seek to avoid rivals gaining military or political advantage by the United States developing space weapons before they do.

Space Controllers. Favour development of space weapons when and insofar as they would usefully enhance US military capabilities.

Space Hegemonists. Favour intense development of US space weapons in order to make US military and political preponderance unassailable.

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the weaponisation of space may seem a somewhat arcane, The advocates of weaponisation of space often give arguments of asymmetric attack on satellite, use of nuclear weapon in space, and counter space capability, to support the inevitability of weaponisation of space. These issues are briefly discussed in succeeding paragraphs.

Asymmetrical Attack on Satellite

Our cities remain vulnerable, as are our ports, mass transit centres, and airports to variety of attacks from terrorists or other organisations/nations. Our computer networks continue to invite hackers. These terrestrial targets are far more accessible to adversaries than satellites orbiting the earth. Conventional explosives which account for the greatest number of victims resulting from asymmetric warfare, are far easier to acquire than ASAT capabilities. Fissile material, combined with conventional explosives, can cause longer lasting disruption than acts to interfere with satellite signals. The use of a radiological weapon or a "dirty" bomb in a city is likely to cause more profound psychological injury than the covert, temporary disruption of pagers or cell phones. Asymmetric warfare in space does not favour the weak against the strong. The strong have greater means to reduce their weaknesses in space and to exploit the weaknesses of others. Moreover, weaker states have a greater chance of causing harm to the ground systems than in space. Attacks by weaker states against satellites would initiate military campaigns, but it would not change the outcome of warfare. Acts of warfare initiated in space do not grant to the perpetrator greater dispensation or relief from retaliatory strikes. Most would therefore agree that asymmetric attack is far more probable and worrisome on Earth than in space.

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Use of Nuclear Weapon in Space

The use of nuclear weapons in space warfare would be a widely reviled act. It would break the taboo against nuclear warfare. Nuclear testing in atmosphere was stopped four decades ago against the backdrop of public revulsion generated by increased radiation levels. A "Space Pearl Harbour," whether or not it involves nuclear detonations in space, would leave the attacker with little international protection to face a near-term, devastating military response. Current preoccupations about

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sneak attacks in space revolve less around nuclear detonations than on covert, small satellites that could serve as space mines. These satellites could be manoeuvred to "park" nearby satellites, where they could be detonated on command. Alternatively, disabling attacks could be carried out in a more limited, covert, and plausibly deniable fashion. However, the more limited the attack, the less militarily effective it is likely to be.

Counter Space Capability as Deterrent

Many scholars and military officials believe that having a counter space capability will act as a deterrent and will thereby protect own space assets. The presumed additional deterrent value of space weapons is however questionable. If existing conventional military and nuclear superiority prove insufficient to deter, it is doubtful if the addition of space warfare capabilities would make an appreciable difference in an adversary's calculus of decision. The search to strengthen or supplant nuclear deterrence by means of space warfare capabilities will therefore appear to many as a quest to escape from, rather than "enhance," deterrence. When viewed though this lens, the pursuit of space weapons appears, less for strengthening deterrence and more for negating the deterrents of potential adversaries. These arguments appear to be without any basis.. The question is whether flight-testing and deployment of space warfare capabilities are the best way to protect the space assets. Common sense suggests that the flight-testing and deployment of space warfare capabilities would neither be conducive to security of space assets nor to commerce that depends on the unhindered utilization of space. As per Space Report 2009, the space economics accounts for $257 billion industry[21]. The drive toward space weaponisation will have adverse effect on space commerce. Since the vulnerabilities of commercial satellites are very great and the costs of protective measures are open-ended, cost-benefit calculations of commercial investments in space would become more problematic. Space commerce requires the minimisation of space debris. The growth of commerce in space therefore requires a peaceful environment. This environment has been nurtured over the past decade by the absence of space weapons' flight-testing and deployment.

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None of the above scenarios can be dismissed out of hand, but all appear to be far less plausible than a wide variety of asymmetric attacks that could cause widespread disruption or death by covert means on Earth. Attacks by a weaker adversary in space would not yield military gains, except perhaps for the most temporary kind. Nobody actually knows with confidence what will happen if and when space is weaponised and what shape weaponisation takes, and its consequences[22]. As noted above, the space weaponisation rest on three assumptions: inevitability, vulnerability and control. The higher the level of reliance on space assets for military purposes, the greater will be the vulnerabilities. Moreover, states with the capabilities to launch intercontinental ballistic missiles (ICBM) or put satellites in space will also be capable of launching an ASAT attack[23]. Many space faring nations are concerned that the pursuit of space weaponisation would be expensive, provocative and escalatory[24]. The only argument for space weaponisation that can plausibly stand on its own" relates to military utility[25]. The remote possibility of a "Space Pearl Harbour" should not serve as the basis for a national policy that calls for the weaponisation of space.

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Threat to Space Assets

The world community should note that ASAT weapons proliferation will become a major international problem comparable to nuclear proliferation. For countries that currently have rudimentary ASATs will engage in developing more sophisticated ones, while others that never before imagined acquiring them will begin to think about it[26]. Space industry worldwide, will be severely affected by the disastrous affects of space weaponisation and that the resulting decline in private investment will confront the industry with serious financial difficulties. As brought out earlier that the threat to space assets is directly proportional to degree of dependence, higher the dependence the greater will be threat and the vulnerability. The tables A and B, below analyses the threat to satellites by space weapons and suggest the best mitigation strategy without use of space weapons:

Table A: Threats to satellites by space weapons[27]

Threats in order of decreasing detection difficulty	Threat maturity	Impact	Best mitigation strategy
Small satellites/ space mines	Co-orbital space mine technology not yet available to threat countries	Damage to one or more satellites in GEO. Resulting debris may damage many satellites.	International treaty governing " rules of the road" in space. Improved space surveillance for verification and enforcement.
Ground-based directed energy ASAT	Can hit satellites in LEO.	Temporary or permanent damage to vulnerable satellites, particularly reconnaissance satellites.	Installation of detection sensors, protective circuits and electro/optic systems. banning ASAT international treaty. Retaliatory steps, sanctions.
Ground-based kinetic energy anti-satellite weapon (ASAT)	Can hit satellites in LEO.	Each launch can damage a single satellite.	Quick launch of replacement satellite, if critical. Conventional attack on launch site. International treaty banning ASAT.
Nuclear explosion in space	Countries with SCUD-type missile can damage LEO satellites.	Immediate damage to satellites in line of sight. All LEO satellites over a period of weeks to months	Improved models to help estimate appropriate radiation hardening levels. Radiation-hardened military satellites. Quick launch of replacement Satellites.

Table B: Threats that cannot be addressed directly

Threats in order of decreasing likelihood	Threat Maturity	Impact	Best mitigation strategy
Jamming of GPS signals	Localized jamming available	GPS system quite robust. Effect of local jamming small.	GPS guided weapons are being made robust. Sanction offenders in peacetime.
Jamming of satellite links	Wide band jammers available	Commercial satellites systems susceptible	Enforcement through international norms and sanctions, and eventual threat of military action.
Orbital Debris	N/A	Debris from space weapons in LEO not serious problem now. Could be serious in GEO.	Better surveillance, international control of disposal, penalties for littering in space.

Threat Analysis (Indian Space Assets)

As far as India is concerned, China which is an emerging space power can adversely affect India's use of space systems. India has about 21 satellites (communication satellites- 10 in Geo-stationary Earth Orbit, surveillance/imagery satellites with resolution less than 2.5 metre – 04 in Low Earth Orbit, and met/other earth observation satellites- 07), for use by civil and Government agencies[28]. Though defence forces can use the ISRO assets which are of dual use, however as of now there is no dedicated military satellite for Indian defence forces[29]. To meet the specific space based communication requirements of defence forces dedicated military satellites have been planned by Navy, Air Force and the Army. Navy will have the satellite by end 2010/2011, followed by Air Force and Army[30].

The adversary will choose the target for attack only if it is of value to its user, which will be governed by user's dependence on it.

The ASAT weapons are generally effective at the low earth orbit satellites. Therefore, in low earth orbit the satellites that could be of value for military use are four in number, and the future population of these satellites will not increase drastically. The adversary will choose the target for attack only if it is of value to its user, which will be governed by user's dependence on it. Therefore, level of threat can be well equated to degree of dependence as;

low, medium and high. For threat analysis the space capability of both the nations are summarised as under:

	India	**China**
First Satellite	1975[31]	1970[32]
First Astronaut Planned by	2017[33]	2003[34]
First Anti-Satellite	Can develop capability	2007[35]
Weapon Test	if required	
Satellites in Orbit	21	57
Launch Sites	01[36]	04[37,38]

From the above data it is evident that India and China space assets are comparable, with respect to necessity and requirements to support their military operations. The threats to space assets, therefore, will be governed by the degree of dependence of forces on these assets. At the time of on set of actual hostilities, for both the countries, it will be more easy and economical to attack the ground support systems of space assets than ASAT attack on satellites. It will be more prudent for us to protect our system on ground and develop the capability to hit the space support systems of adversary both on ground and sea. Indian defence forces utilise space assets mainly for communication and to some extent surveillance. If we have to grade our military dependence factor for space assets vis-à-vis availability of other systems to support our operations, then the pointer will fall in the area of low dependency unlike US, whose dependence is very high; implying low level of vulnerability and threat. The Indian defence forces primary dependence on space assets in future is likely to be or can be further reduced especially in the field of communication in view of induction of latest state-of-the art other systems. For surveillance, more sophisticated and alternate means of surveillance system would also be procured/ inducted that will supplement and complement space systems. Therefore our short term and long term policy should be formulated based on these factors rather than following US and other nations policy perceptions. The aim of our development of instrument of force should be to increase the cost to adversary and reduce the same to self. This can be achieved by reducing the dependence on particular system, and in our case it is possible to do so.

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Recommendations

Space based weapons could potentially help protect satellites by attacking some type of ASAT weapons. On the other hand Space based weapons could create even greater insecurity and even greater debris. These systems would take years to develop and deploy and could be a very costly proposition both economically as well as politically. Attacking ground based ASAT systems prior to launch might be effective against known high power lasers and other ASAT platforms, but would have only limited utility against possible mobile ASAT systems.

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As discussed, satellites are vulnerable to many types of attack and defending them is inherently difficult. The vulnerability is a function of dependence higher the dependence on space system the higher will be the vulnerability. Indian defence forces use space assets for two main applications, communication support and surveillance (imagery), and these applications will remain dominant even in future. Therefore, the space assets that are of concern are communication and earth observation satellites, and associated ground systems. As far as communication is concerned, the satellite systems are generally being used as overlay or an alternate media of communications, to act as primary when other form of communication systems are not available. Communication is always planned in number of layers therefore the dependence or vulnerability is reduced that much for communication satellites. For imagery data, satellites are required for strategic and tactical targets, and a number of earth observation satellites are employed in collecting data. In addition, imagery data from friendly countries are either purchased or obtained on mutual basis. To disable all satellites simultaneously is not an easy task for an adversary. The dependence at the time of actual operations can be reduced by earmarking other aerial sources viz: UAVs, AWACS, recce aircrafts etc and mapping the strategic targets during peace time and before the onset of hostility till actual disruption occurs. In view of the above analysis it is recommended that the India should adopt the following policy steps to meet its short term as well as long term goals:

Space Weapons

No space weapons should be developed in the next ten to fifteen years, although R&D should continue at an appropriate level.

Employment of Satellites that are Harder to find and Harder to Hit

A number of small satellites for surveillance/earth observation in Low Earth Orbit would reduce the vulnerability to loss of single satellite and complicate the effort to target.

Greater Use of non-space Tactical Reconnaissance Systems

Aircraft and unmanned aerial vehicles could substitute for some space based assets and would potentially be harder to target, especially at the time of onset of hostilities.

Use of Foreign Satellites to Increase the Costs of Attack

Use friendly nations' satellites, especially for imagery, to take advantage of adversaries' reluctance to target foreign satellite due to obvious political implications.

Reduce Dependence on Space System

Develop alternatives to support the requirements. This will ensure better exploitation of space assets.

Space Security Treaty

Unify as large a group of states as possible behind a coherent concept for a space security treaty, and maximise the effective engagement of global civil society around achievable goals and viable strategies.

Conclusion

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Satellites are intrinsically vulnerable to attack and interference. Moreover, air and ground-based backup systems can provide some of the militarily relevant, time-urgent capabilities that would be lost if the satellite system was disrupted or destroyed. Because there is no place to hide in space, satellites are inherently vulnerable to interference and direct attack. However, steps can be taken to reduce the vulnerability of the system, including hardening satellite components, employing anti-jamming techniques, building redundant ground stations, developing the capability to quickly replace satellites, and distributing the task of a single satellite among clusters of smaller satellites. The commercial communications satellite industry routinely deals with the failure of satellites. It places spare satellites in orbit to allow rapid substitution when satellites fail, and can reroute communication traffic around a failed satellite. Moreover, for many military missions, ground and air-based components can serve as a backup on a regional level, and Indian defence forces are most capable of building alternative air and ground-based backup systems. The nation that starts a space war would

have great difficulty protecting its satellites. Secondly, space warfare would cause debris, and debris lingers and kills indiscriminately in space. Every nation would be harmed by a space war. Space is widely viewed as a global commons that should remain a sanctuary blessedly free from the disputes that plague us on planet Earth. Space-faring nations can sign up to a Code of Conduct to promote the peaceful uses of outer space and to prevent dangerous military activities in the heavens. The most dangerous activities and those easiest to verify are the flight-testing and deployment of space weapons.

Space is widely viewed as a global commons that should remain a sanctuary blessedly free from the disputes that plague us on planet Earth.

One way to try to protect satellites is by testing and deploying space weapons to serve as "bodyguards" in space. But then other nations will follow suit. Many people think that the best defence is a strong offence, but in space the rules of warfare are different, where an act of destroying someone else's satellite could create the debris that kills your own. Weapons cannot protect satellites. Better protection comes from a verifiable ban on testing anti-satellite weapons. The last Cold War test of a space weapon occurred two decades ago. Continuing this moratorium makes more sense than breaking it. We must assume that Russia, China, and other countries are working behind closed doors on anti-satellite weapons just like the US. But if none of these weapons are flight-tested and deployed, everyone's satellites will be better off. It is still far easier and more likely for surprise attacks to be carried out on the ground than in space.

Many people think that the best defence is a strong offence, but in space the rules of warfare are different, where an act of destroying someone else's satellite could create the debris that kills your own.

During the Cold War, nuclear-tipped missiles were always ready to fire. We will be safer if we can prevent elevating this hair-trigger situation into space. Security in space requires minimizing space debris and stopping space warfare tests. No nation has more to lose if space becomes a shooting gallery than the United States. Satellites save lives. Therefore instead of opposing any legally binding treaties to protect the space from weponisation the US should take the lead to implement such treaties by all nations, their assets being the most vulnerable. idsa

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Notes:

1 http://www.ucsusa.org/nuclear_weapons_and_global_security/space_weapons/technical_issues/ucs-satellite-database.html

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8 Report of the 2001 Space Commission p 12. This echoes US SpaceCom's Long Range Plan, which stated: "At present, the notion of weapons in space is not consistent with US national policy. Planning for this possibility is the purpose of this plan should our civilian leadership later decide that the application of force from space is in our national interest." United States Space Command, Long Range Plan, March 1998, p 8. Cited by Rebecca Johnson, The Simons Centre for Peace and Disarmament Studies, Liu Institute for Global Issues, UBC, Canada. Outer Space and Global Security, conference; 26-27 November 2002; Space Security: Options and Approaches available at : http://www.ploughshares.ca/libraries/Abolish/OuterSpaceConfGeneva02/JohnsonConf2002.htm

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25 Mueller Karl P, "Is the Weaponization of Space Inevitable?" p. 10

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29 http://battakiran.wordpress.com/category/isromilitary-missiles/ Battakiran's Weblog, October 22, 2008; Bhaskaranarayana the senior scientist of ISRO says that Antrix has made the most of the IRS system and achieved global success, with a business of Rs 10 billion ($231.9 million). He claims that the IRS is the best remote sensing satellite system, with ground stations across 23 nations. The IRS provides services in establishing international ground stations (IGS) and the international reseller network to receive, process and market IRS data products and IRS image processing. Bhaskaranarayana says that Antrix provided these services only on a commercial or civilian basis, and not for defence purposes. The defence services may use the data, he says, but Antrix doesn't have any specific services for them. Antrix recently launched CARTOSAT-2, which offers the facility to receive data products to international users. It has already launched a series of commercial satellites – Kitsat (Korea), Tubsat (DLR – Germany), BIRD (DLR – Germany), PROBA (Verhaert, Belgium), Lapan Tubsat (Indonesia), Pehuensat-1 (Argentina) aboard ISRO's polar satellite launch vehicle (PSLV) in addition to the dedicated launch of Agile (Italy).

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