The final frontier: missile defence in space?

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Since President George W. Bush took the oath of office in 2001, concerns have grown about the possibility that the United States will develop and deploy space platforms capable of striking both on Earth and in outer space. Much of the anguish was based on memories of efforts conducted by the Reagan Administration to design space-based missile defence systems—the Brilliant Pebbles programme of small, satellite-based interceptor missiles—and on existing research efforts on space-based lasers. Official US documents, such as the United States Space Command's *Vision for 2020,* insisting on the dominance of space for military purposes, did nothing to alleviate these concerns, as everybody drew the conclusion that Washington's plan was to assure dominance by being able to wage war in and from space.[1] Ugly terms such as "arms race in space" were used to describe the grim future that the policy, as perceived by arms control experts, was promising.

Beijing felt it was directly threatened and garnered support for its idea of establishing an ad hoc committee of the Conference on Disarmament to discuss a treaty on the prevention of an arms race in outer space (PAROS). China argued in particular that it felt the deployment of missile-defence systems in space would threaten its deterrent and would consecrate the United States' domination of space.[2] The US government steadily opposed the creation of such a committee for fear that a treaty would reduce its ability to operate in space and undermine its security interest.[3] It is improbable that such a position will change in the coming years—or ever—as US military dependence on its space assets is becoming ever more important.

This article argues that even if the United States is likely to continue resisting attempts to reinforce the existing treaty on the militarization of space (the Outer Space Treaty) since most of its future security and defence will be based on space-based platforms, the deployment of space-based weapons does not seem to be its aim. Therefore, it seems possible to find a way to balance US security concerns and the necessity to prevent an arms race in space.

Facts die hard

Arguably, PAROS negotiation having so far proved impossible, an arms race in space should have started. So where are the space lasers and doomsday machines?

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More than six years after President Bush's election, no real work on sending weapons into space seems to have started. The proponents of the deployment of space-based interdiction[4] capabilities to complement ground- and sea-based missile defence assets even noted that "the administration has so far done little to revive the cutting-edge technologies developed under the administrations of President Ronald Reagan and George H.W. Bush".[5]

The Missile Defense Agency's budget for fiscal year 2007 actually gives little emphasis to the space-based weapons programme;[6] from a total budget of about US$ 10 billion, the budget for the programme barely exceeds US$ 200 million. This is more consistent with a research plan than with a fully fledged design and development programme.[7] (One of the Clinton Administration's most disputed programmes, the Space-based Laser, was even cancelled.) Taking into account air force and army efforts in this domain would bring the total figure for directed-energy weapon research to a little more than US$ 400 million.[8]

If one takes a closer look at US guideline documents, such as the 2001 US Space Commission Report,[9] it is hard to find anything that actually pushes for the deployment of weapons in space. As Richard Garwin argues, "[i]n fact the commission does not specifically advocate the development of offensive weaponry for deployment in space".[10]

All the same, it cannot be denied that the US National Space Policy, published in 2006, fuels concern about Washington's future policy on the use of space. The principles declared in this document could be considered as milestones in the future development and deployment of space-based weapons:

- The United States considers space capabilities—including the ground and space segments and supporting links—vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests;
- The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests.[11]

But again these principles do not call for an open, immediate weaponization of space. In fact, other principles put forward in the same policy document actually act as limits to further deployment of space-based weapons. By promoting "the rights of passage through and operations in space" of space systems and by stating that it will "seek to cooperate with other nations in the peaceful use of outer space to extend the benefits of space", the National Space Policy somehow structures the limitations that the United States would be willing to accept on any future use of space for military purposes. In particular, these principles seem to virtually rule out the deployment of anti-satellite weapons, as they would infringe on the right of passage and peaceful use of space.

The National Space Policy does not ultimately rule out any future deployment of space-based weapon systems.

Nonetheless, the National Space Policy does not ultimately rule out any future deployment of space-based weapon systems for purely defensive purposes, whether for the protection of the US homeland or of US space-based assets.

Security in a proliferated world: a need for every means necessary?

By funding programmes to research weapon systems that could be used in space, the United States government is leaving open options to develop and deploy such systems. This may appear to some as "facts in orbit"; that is, a drive to create and deploy space weapons without public debate. But if one looks at the existing security situation, the development of every possible means of defence should perhaps not be rejected without further examination.

The proliferation of weapons of mass destruction is a fact, illustrated by the present crises with Iran and with the Democratic People's Republic of Korea (DPRK), which could lead to a dramatic increase in security threats to the world in general and to the United States and its allies in particular.

In the realm of missiles, the development of more efficient, longer-range weapons is gaining pace, as illustrated by the launch on 4 July 2006 of a Taepodong-2 from the DPRK. Pyongyang possesses a large ballistic missile arsenal, comprising mainly Scud-type missiles in addition to longer-range systems.[12] According to some assessments, the DPRK today possesses between 300 and 400 Scud-B and Scud-C missiles as well as 60 mobile launchers deployed north of the Demilitarized Zone and capable of reaching most of the Republic of Korea and in particular Seoul. With its Nodong missile arsenal, the DPRK can strike most of Japan in a matter of minutes, including US assets deployed there. Today, worst-case assessments give the DPRK a total capability of about 200 Nodong missiles and 10–15 mobile launchers.[13] More disturbing is the willingness of Pyongyang to sell such weapons to literally any state willing to pay for them. Its cooperation with Syria and its assistance to Iran's Shahab programme must today be considered as one of the most worrying trends in missile proliferation.

Indeed, Iran's missile programme has reached an unprecedented level of sophistication and size for a proliferant country. Tehran is reported to possess a tactical arsenal comprising several hundred Shahab-1 and Shahab-2 missiles[14]—equivalent to Scud-B and Scud-C.[15] The quest for longer-range systems reportedly started at the beginning of the 1990s with support from the DPRK. The first flight test of the 1,300km-range Shahab-3 in 1998 started a long series of tests and the official deployment of the missile in 2003.[16] With such a missile Tehran gains the ability to threaten Israel as well as part of Europe. Iran has also conducted the development of modern anti-ship cruise missiles, culminating with the announcement from Tehran of the deployment of a Raad anti-ship cruise missile in 2004.[17]

Furthermore, Iran allegedly illegally acquired six AS-15 missiles from Ukraine in 2001.[18] The transfer was revealed by Hryhoriy Omelchenko, member of the Ukrainian parliament, in February 2005, and since then has been the subject of a legal investigation in Ukraine. According to this investigation, intermediaries of the operation—including a Russian national employed by the Oboronexport weapons export company—apparently used false end-user certificates to circumvent Ukrainian export control regulations. This missile, with a theoretical range of 2,500km, was apparently part of a batch of Soviet missiles for which the nuclear warheads had been returned to Moscow as part of a bilateral agreement in the middle of the 1990s. It would seem realistic to believe that Tehran has attempted to copy the received missiles since the sale, particularly the propulsion and navigation systems. On the other hand, considering information available about the state of the missiles as received by Iran[19] and the relative inexperience of military units in the use of ground attack missiles, it seems improbable that they were immediately deployed.

Everything tends to demonstrate a dramatic acceleration in the spread of missile weapons.

Whatever the virtues of arms control, one must conclude from an analysis of today's ballistic missile arsenals that their threat is very real and that only limited ways to curb them exist today. Furthermore, everything tends to demonstrate a dramatic acceleration in the spread of missile weapons.

Two trends are of particular concern:

- The increase in short- to medium-range systems, not to mention very short-range—less than 100km—rockets such as those used by Hezbollah against Israeli cities in the 2006 conflict.[20]
- The emergence of longer-range systems that have the potential of giving countries a larger spectrum of possible targets, particularly in the DPRK and Iran.

Defending against large numbers of missiles or long-range systems poses a number of challenges that cannot be ignored. And the 2006 hostilities in Lebanon and Isreal have shown the limit of classical kinetic means to defeat large salvos of incoming missiles. Only two possible responses to these threats remain.

- Direct action against launch capabilities. The number of launch platforms is usually very limited compared to the volume of missiles, the usual ratio being 1:30. Destroying launch platforms would certainly curb the ability of an adversary to make full use of its complete arsenal. Yet to accomplish such a deed a state would need a very rapid detection–action loop so that it could strike and destroy launch capabilities as they are used.[21]
- An almost endless number of interceptions. For a defence system to rely on shooting down incoming missiles, it will need a large supply of interceptors at its disposal.[22] This implies energy weapons such as lasers, which expend only power in their operation.

Space-based assets could clearly play a role in both responses. Space-based sensors could give the necessary alert and tracking data to the interception network that land-based sensors would not be able to obtain. More important, space-based interceptors could be the most appropriate means to target long-range missiles fired from deep within a country's territory or to rapidly destroy the launch capabilities of a rogue state set on defeating limited land-based interception system inventories.

Space-based interceptors could be the most appropriate means to target long-range missiles.

The latter clearly lies at the core of the debate on the non-weaponization of space as it means the deployment of a space-to-Earth strike capability. However, it is doubtful that weapon platforms will be deployed in space in the near future. Orbiting weapons capable of striking land-based systems are neither economically nor technically interesting for the moment, and other means to conduct anti-launcher operations already exist, such as piloted or unmanned airborne systems. Indeed, the proponents of missile defence are not asking for space-to-Earth strike systems. Rather, they are advocating the development of space-based interception capabilities,[23] which would have only a very marginal—and probably no—offensive potential against Earth targets.

What about the future?

Considering the current global security situation and trends, any debate on the deployment of weapons in space should be focused on finding a balance between all states' security needs rather than on trying to find a way to ban the larger spectre of military application platforms in space. Future US administrations may be willing to engage in a debate—even negotiation—on the weaponization of space if US security concerns could really be addressed by it. To make this possible, a tentative first step would be to recognize that not all space-based weapons constitute a threat to international security. Some may even enhance it—such as a future global capability to intercept in-flight missiles fired from a rogue state. Failure to make any concession on the reality of the proliferation concern and the potential of space systems to address this concern will probably lead to the continuation of the present US policy and ultimately to the absence of any progress in the prevention of an arms race in space.

Notes

1. United States Space Command, 1997, *Vision for 2020,* available at <www.fas.org/spp/military/docops/usspac/visbook.pdf>.
2. Kori Urayama, 2004, "China Debates Missile Defence", *Survival,* vol. 46, no. 2.
3. Eric M. Javits, 2002, "A US Perspective on Space", in James Clay Moltz (ed.), *Future Security in Space: Commercial, Military, and Arms Control Trade-Offs,* Occasional Paper no. 10, Monterey Institute of International Studies, Center for Nonproliferation Studies and University of Southampton, at <cns.miis.edu/pubs/opapers/op10/op10.pdf>
4. Interdiction is the capability to intercept missiles in flight or to strike missile launchers.
5. Independent Working Group on Missile Defense, the Space Relationship and the Twenty-first Century, 2006, *2007 Report,* Washington, DC, The Institute for Foreign Policy Analysis, at <www.ifpa.org/publications/IWGReport.htm>, p. ix.
6. Although development of space-based detection systems has continued.
7. Theresa Hitchens, Mickael Katz-Hyman and Victoria Samson, 2006, *Space Weapons Spending in the FY 2007 Defense Budget*, Center for Defense Information and Henry L. Stimson Center, at <www.stimson.org/space/pdf/FY07SpaceWeapons.pdf>.
8. Knowing that some of the army and air force's money will go to non-space applications.
9. *Report of the Commission to Assess United States National Security Space Management and Organization,* 2001, Washington DC, at <www.defenselink.mil/pubs/space20010111.html>.
10. Richard L. Garwin, 2003, *Space Weapons: Not Yet*, Pugwash Meeting no. 283, workshop on "Preserving the Non-weaponization of Space" held at Castellón de la Plana, Spain, 22–24 May 2003, at <fas.org/RLG/030522-space.pdf>, p. 6.
11. *US National Space Policy,* 31 August 2006, at <www.ostp.gov/html/US%20National%20Space%20Policy.pdf>.
12. Joseph S. Bermudez Jr, 1999, *A History of Ballistic Missile Development in the DPRK,* Monterey Institute of International Studies, Center for Nonproliferation Studies, Occasional Paper no. 2, at <cns.miis.edu/pubs/opapers/op2/op2.pdf>.
13. General B.B. Bell (Commander US Forces Korea), *Statement before the Senate Armed Services Committee,* 7 March 2006, p. 7, at <armed-services.senate.gov/statemnt/2006/March/Bell%2003-07-06.pdf>, and Joseph S. Bermudez Jr, 1999, op. cit.
14. G. Samore (ed.), 2005, *Iran's Strategic Weapons Programme: A Net Assessment,* London, International Institute for Strategic Studies and Routledge, p. 89.
15. The average production rate of Scuds in Iran could be assumed to be an average of three missiles a month. It is reported to have started at some point in 1988.
16. "Iran's Missile Show for Domestic Audience", *Asia Times Online,* 24 July 2003, at <www.atimes.com/atimes/Middle_East/EG24Ak02.html>.
17. S. Jones, 2004, "Ra'ad Cruise Missile Boosts Iran's Military Capability", *Jane's Intelligence Review*, April.
18. For more on the transfer, see *X-55 Long Range Cruise Missile,* at <www.globalsecurity.org/wmd/world/iran/x-55.htm>; and "Iran and China linked to Ukraine missiles", *Financial Times,* 2 February 2005.
19. These would be missiles delivered to Soviet forces in Ukraine in 1987 to be fitted on long-range bombers. Before being able to use them, Tehran would have to design an appropriate warhead and also make modifications to launch from another launching platform.
20. David Makovsky and Jeffrey White, 2006, *Lessons and Implications of the Israel-Hizballah War: A Preliminary Assessment*, Washington Institute for Near East Policy, Policy Focus no. 60, October, at <www.washingtoninstitute.org/pubPDFs/PolicyFocus60.pdf>, p. 41.
21. James A. Russell, 2002, "WMD Proliferation and Conventional Counterforce: The Case of Iraq", *Strategic Insights*, vol. 1, no. 5, July, at <www.ccc.nps.navy.mil/si/july02/middleEast2.asp>.
22. Even taking into account a tracking capability to downsize the number of interceptions to be made.
23. Independent Working Group on Missile Defense, the Space Relationship and the Twenty-first Century, 2006, op. cit., p. xi.