The missile threat

Although the missile threat was reduced after the end of the Cold War, missile proliferation and its link to weapons of mass destruction (WMD) remains an international security concern. Nuclear weapons could potentially be delivered by a number of systems, including aircraft, ballistic missiles, cruise missiles, artillery, and unmanned aerial vehicles (UAVs), as well as a wide range of low-technology options, such as civilian cars, ships, or even suitcases.

Ballistic missile technology has spread to more than 30 countries, many of which have access only to Scud variants of short range (below the “Scud barrier” of 1000 km). Other than the nuclear Non-Proliferation Treaty (NPT)-recognized nuclear weapon states, only North Korea, India, Iran, Israel, and Pakistan have produced or flight-tested intermediate-range ballistic missiles with a range of between 1000 km and 5500 km (the “INF [Intermediate Nuclear Forces Treaty] barrier”). For the time being, only the five nuclear weapon states—the United States, Russia, the United Kingdom, France, and China—have ICBMs. All those states continue to develop and test their missile arsenals. More countries have access to missile technology, such as Germany and Japan, but did not follow that path.

To overcome the Scud and INF barriers is a challenging and costly task, particularly as key components (e.g. accurate guidance, composite materials, thrust vector control, reentry technology) are not easily available on the market. Instead of going ballistic, countries could rely on cruise missiles,
which cost much less and are easier to acquire and to maintain, require less training and logistical support, and perform with better accuracy and reliability than ballistic missiles. Even more accessible are UAVs, which have a high civil-military dual-use potential, and which are relatively cheap, available, and easy to handle.

The use of artillery rockets and UAVs by Hezbollah against Israel demonstrates that the use of such weapons no longer is the exclusive privilege of technologically advanced state armies; it has become an option for low-tech states and non-state actors. This represents a significant addition to the missile threat.

Prospects will remain dim for reducing, rather than merely slowing the growth, of missile threats so long as those states that already possess sophisticated missile capabilities continue to improve them. And in missiles and other long-range delivery systems, as in most areas of military technology, the United States far outstrips all other states in the scope and ambition of its efforts. Further, the United States remains the preeminent military power in several of the regions where missile proliferation is of greatest concern, capable of targeting adversaries in Northeast Asia and the Middle East with its own unparalleled arsenal of nuclear-capable missiles and long-range bombers, while confronting them directly with superior conventional forces.

It is against this background that we must view the wide-ranging US effort to develop the next generation of long-range delivery systems, from bombers and ICBMs to new kinds of reentry vehicles deliverable by missile or perhaps in the future from versatile re-useable launch vehicles. Although some of these systems currently are envisioned as exploiting advances in accuracy to deliver conventional weapons by missile at heretofore impracticable distances, they will also be capable of being used to deliver nuclear weapons. The development of conventional weapons with global reach, furthermore, will give the United States a capability to inflict devastation from afar that few states if any can match. This will make the elimination of nuclear weapons and other WMD—viewed by many as a relatively cheap equalizer for superior conventional power—yet more difficult.

While explicitly retaining a spectrum of “[n]uclear attack options that vary in scale, scope, and purpose,” US military planners also hope to exploit advances in space technology, missile accuracy, computing, and communications to develop conventional weapons that can strike anywhere on earth
in a matter of hours. To this end, the US is both modernizing existing forces and, with the aim of achieving a capability of “prompt global strike,” taking the first steps towards development of next-generation delivery systems.

In 2008, General Chilton, Commander of the United States Strategic Command, said in a briefing before the House Armed Service Committee subcommittee on strategic forces, “While our nuclear capability remains vital, our ability to integrate conventional long-range precision weapons is every bit as important.... We have a prompt global strike delivery capability on alert today, but it is configured only with nuclear weapons, which limits the options available to the President and may in some cases reduce the credibility of our deterrence.”

With Strategic Command’s full support, the Pentagon and its contractors are poised to begin development of a new generation of long-range delivery systems capable of carrying conventional warheads that would allow the United States to strike any target on earth within 60 minutes or less.

Russian security analysts have raised concerns that these conventional US “alternatives” to nuclear weapons might pose an obstacle to US-Russian nuclear arms control negotiations. According to Alexi Arbatov, a scholar in residence at the Carnegie Moscow Center, “nuclear weapons states like China and Russia are primarily concerned about growing American conventional, precision-guided, long-range capability, [or] Prompt Global Strike systems.” Arbatov added that what he termed “threshold states,” nations with potential for developing a nuclear weapon, are similarly concerned about US conventional capabilities.

Without adequate arms control strategies broadly supported by the international community, the risks of missile proliferation are likely to increase as long as technical capabilities are spreading and regional conflicts provide incentives to acquire advanced weapons.

Missile “defence” is not the answer

So far, the United States has sought to counter the growing missile threat with improved capabilities for preemptive strikes and for missile defence, both of which are fuelling the missile arms race. The latter, examined here, is not only outrageously expensive and prone to repeated development set-
backs, but also impedes both nuclear and conventional disarmament and arms control efforts on a broader scale.

While the Obama administration cancelled Bush administration plans to build missile defence sites in Poland and the Czech Republic—which were to be ostensibly targeted against a hypothetical Iranian missile threat—President Obama also noted that his new plans for missile defence in Europe “will provide stronger, smarter and swifter defenses of American forces and America’s allies.” Secretary of State Robert Gates explained that the Bush plan was no longer the best military “architecture” for the current “threat” from Iran, pointing out that the new system would be operational seven years earlier than the Bush plan. He noted, “Those who say we are scrapping missile defense in Europe are either misinformed or misrepresenting the reality of what we are doing.”

Several NATO member states and European companies are developing missile defence systems in cooperation with the United States, as are non-NATO states, including the Republic of Korea, Japan, Australia, and Israel. India has tested a system designed to intercept short and medium-range missiles. This activity is underway despite the fact that strategic missile defence still is not a proven technology and has yet to be tested in operationally realistic conditions.

Missile defence has potentially negative impacts on prospects for the reduction and elimination of nuclear forces. In particular, the Russian government has objected strongly to US plans to establish missile defence systems in Europe, arguing that the system could be used against Russia’s ICBMs and thus would undermine strategic stability. This controversy contributed to Russia’s decision to “suspend” implementation of the Conventional Forces in Europe Treaty and the threat to abandon the 1987 Intermediate Nuclear Forces Treaty and has prompted belligerent statements from the government that Russia would target the missile defence sites. Missile defence is also proving to be the main obstacle to completing a follow-on to the Strategic Arms Reduction Treaty between Russia and the United States.

Military responses to the missile threat, such as nuclear deterrence, pre-emption, counter-proliferation, and missile defence, may aggravate the risks and provoke proliferation rather than prevent it. An offense-defence missile race could undermine international stability and disrupt regional balances. Removal of these weapons is an urgent issue on the international agenda.
Towards international missile control

To reduce the emerging missile threat, the time to take political action is now. The NPT preamble emphasizes “the elimination from national arsenals of nuclear weapons and the means of their delivery pursuant to a Treaty on general and complete disarmament under strict and effective international control,” but the NPT does not further specify how this ultimate goal could be achieved for delivery systems.

Besides US-Russian agreements, there are no treaty constraints on the acquisition, development, and deployment of missiles. The Missile Technology Control Regime is largely based on export controls among potential missile suppliers and has been able to slow down or even end some missile programmes, but its effectiveness is limited if motivation to acquire missiles persists.

Limited efforts to curb missile proliferation have been undertaken, such as the Hague Code of Conduct, the Proliferation Security Initiative, and UN Security Council Resolution 1540. More far-reaching ideas, like the Russian proposal for a Global Control System and a Global Monitoring System on missile technology, have not been implemented. The UN Panels of Governmental Experts on Missiles have failed to reach agreement on substantive recommendations. It is unlikely that really effective measures to stop missile proliferation will be taken absent progress on limiting, reducing, and eliminating existing holdings, particularly those of the original nuclear weapon states. However, in recent years, arms control and disarmament have not been seriously considered for missiles, and other delivery systems have also been largely neglected.

The key for further progress is to find mechanisms that restrain both capabilities and motivation to acquire missiles. At the 1986 Reykjavik summit, Presidents Reagan and Gorbachev considered proposals for global elimination of ballistic missiles that were revisited after the end of the Cold War, for instance, in the Zero Ballistic Missiles concept put forward in 1993 by the Federation of American Scientists and supported by Paul Nitze and others. In 1996, the Canberra Commission called for a “global treaty controlling longer range ballistic missiles” and, as an interim step, exploration of a missile flight test ban. Test restrictions would effectively prevent new missile designs and limit modification of traditional technology. To address con-
cerns about asymmetries and discrimination, a “missile freeze” could cover offensive and defensive missiles.

The feasibility of missile control has been explained in Beyond Missile Defence, a 2002 briefing paper of the International Network of Engineers and Scientists Against Proliferation and the Western States Legal Foundation. The US-Soviet/Russian arms control experience shows that the deployment and storage of missiles can be monitored by satellite, and their destruction per agreement can be verified by on-site inspection. Missile tests can be monitored, and much of the infrastructure for missile development—e.g., production facilities, test ranges, missile containers—is susceptible to monitoring.

In addition to controlling the weapons, building international and regional security regimes, combined with political and economic cooperation, would provide incentives to diminish reliance on missile arsenals. Regional approaches for arms control could include confidence-building measures like launch notification and exchanges of information, establishment of data centres, and conversion programmes. Diplomatic initiatives are required to reduce the role of ballistic missiles in critical regions (Northeast Asia, South Asia, Middle East) and to develop an international norm against ballistic missiles. The importance of regional approaches to disarmament and confidence building was demonstrated in South America (Argentina and Brazil) and South Asia (India and Pakistan).

A control regime on ballistic missiles could be extended to the international control of ballistic missile defences, reversing the US withdrawal from the Anti-Ballistic Missile Treaty in 2002 and fulfilling the 2000 NPT commitment to the preservation and strengthening of that Treaty. The terms of a new treaty could be made more precise and verifiable and/or be universalized. Such limits would relate to the altitude, relative distance, and velocity of interceptor tests, and to limits on laser brightness or to the aperture of sensors and mirrors.

Prevention the weaponization of outer space

There is also a dangerous synergy at work between the development of missile defence and the threat of space weaponization. Missile defences, af-
ter decades of being sold as an “alternative” to the terrible dilemma of nuclear “mutually assured destruction,” carry an ideological weight virtually independent of any rational argument. At the same time, the everyday use of satellite-based technologies by military forces at war around the world continues to grow, providing credibility to claims that further development of military space technologies is both essential and practical. The high-tech appeal particularly for the United States of both missile defences and military space generally as “the ultimate high ground” help to sustain budgets for technologies such as space launch and hypersonic flight, contributing to a steady flow of incremental improvements in already highly dangerous and inherently destabilizing strategic weapons, such as highly accurate long-range missiles.

All advanced military powers, and the United States most of all, increasingly rely on satellites for surveillance, communications, navigation, and the targeting of weapons. Even terrestrially-based US ballistic missile defence programmes call for massive upgrades in space-based sensing, and the United States has ambitious plans to expand the advantages it already derives from its global network of satellites and ground stations. A main justification for exploring space weapons in the near term is to defend “space assets” that US ground forces depend on, purportedly requiring technologies with the capability to detect and if need be destroy anti-satellite weapons that might operate in or through space. The second application for space-based weapons that the US appears to be seriously considering is missile defence, employing either kinetic-kill devices or directed energy.

Attack on terrestrial targets from space occasionally is mentioned in long-range planning documents, attracting a disproportionate amount of attention due to its sci-fi glamour. However, other new capabilities for weapons delivery to ground targets are emerging, with greater range and global coverage for nuclear or highly accurate conventional payloads. This implies that attacks on terrestrial targets likely can be accomplished more easily with upgraded ballistic missiles and re-entry vehicles, perhaps supplemented by re-useable launch vehicles that could either place satellites in orbit or deliver several weapons payloads at once from a sub-orbital trajectory.

The combination of increased use of space technologies for surveillance, communication, and navigation by terrestrial military forces, additional sensing and targeting demands from evolving missile defences, and the ex-
tremely profitable nature of high-end military space technologies are likely
to drive the continued development of fundamental space technologies—
cheaper and more reliable space launch, space-hardened materials, efficient
means of generating and storing energy in space, etc. All of this increases
the potential for space-based weapons of some kind to become practical at
some time in the future.

While challenging, on-site monitoring of space rocket programmes can
minimize the risk that they will contribute to ballistic missile development.
The case for a regime to control and monitor space launchers is greatly
strengthened in the context of preventing an arms race in outer space. Since
human-made objects in orbit would enter space through space launchers,
a monitoring system at space launch facilities could not only search for in-
dications of ballistic missile use, but also for the space-weapon usability of
the payload. This would provide increased transparency concerning space
activities in general, and would effectively exclude the deployment and test-
ing of space weapons using ground-based space launchers.

Since both missiles and missile defences have a capability to attack satel-
lites, their control relates directly to the protection of space-based objects.
Destruction of satellites using ground or sea-based missiles or anti-missiles
was demonstrated by the United States and the Soviet Union in the 1980s,

Outer space has been widely acknowledged as a common heritage of hu-
mankind, which should be used for the benefit of all countries. The interna-
tional community has long been calling for the prevention of an arms race in
outer space, seeking to strengthen international space law and arms control
in space by introducing provisions against the weaponization of space. Russia
and China presented a “draft treaty” in February 2008 at the Conference on
Disarmament that was rejected by the United States, which continues to seek
space dominance. The draft treaty, the first on outer space to be submitted to
the multilateral negotiating body, was far from satisfactory in its approach
to a possible ban on space weapons. It did not address ground-based weap-
ons aimed at attacking space assets; space weapon testing or development;
the problems of “dual-use technologies”; or the current militarization of
outer space. It also avoided discussion altogether of the issue of verification.7

Regardless of the merits of this particular text, the draft treaty has
prompted much discussion about the possibilities for a space weapon ban.
Consideration of such a ban should not be written off based on the first draft. The US media and Bush administration reacted hysterically to the introduction of the draft treaty, accusing China and Russia of a “diplomatic ploy ... to gain a military advantage.” The media reported that the United States is committed to ensuring the use of space for peaceful purposes, but insists that it will pursue programmes to ensure that its satellites and other spacecraft are protected. However, the US delegation stood alone in voting against the annual resolution on space security in the UN General Assembly in 2005–2008, and released a National Space Policy in October 2006 opposing “the development of new legal regimes or other restrictions that seek to prohibit or limit US access to or use of space,” arguing it will continue to “dissuade or deter others from impeding [its right to operate in space] . . . and deny, if necessary, adversaries the use of space capabilities hostile to US national interests.” In addition, its programmes to “protect” its satellites and other spacecraft include some of the most aggressive technologies yet to be unleashed on the international community.

In October 2009, the US delegation to the UN General Assembly First Committee on Disarmament and International Security indicated that the Obama administration is conducting a comprehensive Space Policy Review to determine its approach to multilateral arms control measures in the context of space security. The US delegation said that this review will include a “blank slate” analysis of the “feasibility and desirability” of transparency- and confidence-building measures (TCBMs) and of “effectively verifiable arms control measures” in outer space that “advance the national security interests of the United States and its allies, as well as of all spacefaring nations.” However, the US delegation also continued to stress that the United States “will continue to reject any limitations on the fundamental right of the United States to operate in, and acquire data from, space.” The fact that it was able to say this before completing its space policy review is troubling—for the past 30 years, the US government has considered any arms control measure to be a limitation on its right to operate in space. Also troubling is the fact that the US Strategic Command now describes its components and personnel as “Leaders in Strategic Deterrence and Preeminent Global Warfighters in Space and Cyberspace.”

The rest of the international community, however, is coming together in its recognition that action is needed to preserve the peaceful use of outer
space. The European Union and Russia, who both support the development of TCBMs for outer space, managed to support each other’s initiatives in 2009, with Russia welcoming the EU Code of Conduct on outer space activities and all EU member states joining as co-sponsors of Russia’s annual TCBM resolution at the United Nations General Assembly. While the debate between those supporting voluntary TCBMs and those supporting a legally-binding treaty on the prevention of an arms race in outer space or prevention of the placement of weapons in outer space continued throughout 2009, some governments have tried to bridge the gap between these two paths, arguing that these approaches are not mutually exclusive. The Canadian government has suggested the development of an “encompassing approach to space security that includes not only addressing environmental, commercial and civil dimensions of space, but also its military and national security dimensions.” These proposals included: a ban on the placement of weapons in space; the prohibition of the testing and use of weapons on satellites so as to damage or destroy them; and the prohibition of the use of satellites themselves as weapons.”

Overall, most governments continue to recognize that taking measures to prevent an arms race in outer space is more effective, less complicated, and less expensive than taking measures after an arms race is underway. Many governments and space technicians highlight the changes in aerospace technology and use of space that make the current space legal regime insufficient to preserve the security of space objects. Given the increasingly complex situation in outer space, commercial space operators have begun to develop a data centre for sharing orbital data amongst themselves, without waiting for governments to take the lead.

Vulnerabilities and threats would be considerably increased with advanced space weapons, such as maneuverable space mines, micro-satellites, kinetic kill vehicles, chemical and nuclear explosives, or particle, microwave and laser beams. Transforming space from the “common heritage” of humankind into a “high frontier” for space warfare where weapons are used “to, from, in and through” space, contains considerable risks for all states, including the United States.

To avoid these risks, the transition from the militarization to the weaponization of space needs to be prevented. Comprehensive space arms control would seek to ban weapons against objects in space and from objects
in space against any target, and would prohibit development, testing, and deployment of such systems altogether before more advanced weapons are tested or become operational. A comprehensive approach could integrate risk reduction measures and partial agreements in a phased approach. This would be also attractive to the general public and require an unprecedented degree of international cooperation.

Recommendations

- The United States should abandon the quest to maintain long-term military supremacy through modernization and development of missiles and other strategic delivery systems, anti-missile systems, and possible deployment of space-based weapon systems. As a starting point, the United States should re-join the Anti-Ballistic Missile Treaty.

- All governments should support the establishment of international controls on delivery systems and anti-missile systems as part of a global process of reducing and eliminating nuclear forces, banning weapons in space, limiting strategic weapons generally, and implementing a policy of “non-offensive defence”.

- To this end, governments should pursue a global treaty controlling missiles, and, as an interim step, explore a missile flight test ban, which would prevent new missile designs and limit modification of traditional technology.

- Governments should work with commercial and civilian space operators to develop best-practice “rules of the road” for outer space activities. They should also commit to transparency- and confidence-building measures guiding space activities while simultaneously discussing the nuts and bolts of a legally-binding treaty that would prohibit the weaponization of outer space.