

Full Report

Canada and Ballistic Missile Defence

Report prepared by

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SUMMARY: CANADA AND BALLISTIC MISSILE DEFENCE

Canadian policy has never focused on ballistic missile defence as a credible or even promising response to the threat of nuclear destruction via intercontinental ballistic missiles (ICBM). Even so, Canadian officials are currently engaged in extensive discussions with the United States on how ballistic missile defence (BMD) might protect Canadians and how Canada might link to the ground-based, mid-course interception, ballistic missile defence system now being constructed by Washington (see **Appendix I** for the essential components of the system).

The discussions are appropriate in the sense that, as Prime-Minister Elect Paul Martin said during his first press conference as the leader of the Liberal Party, Canada needs to be at the table when Washington explores military measures affecting the defence of North America. The discussions can also be useful in that, provided they are conducted on the basis of technological and political realism, they will yield overwhelming evidence that:

- the technology to protect us from an ICBM-borne nuclear threat is not now available, and BMD technology is not ever likely to mature to the point of providing comprehensive protection from that peril;
- even the pursuit of the severely limited and uncertain protection promised by Washington's current BMD efforts is making us and the world less secure inasmuch as it exacerbates nuclear proliferation pressures, both horizontal and vertical; and
- mutually-beneficial security cooperation between Canada and the United States neither depends on, nor is advanced by, the Canadian embrace of BMD.

1. BMD and Protection:

Defence Minister McCallum and Foreign Affairs Minister Graham have both insisted that the primary reason for exploring BMD is "the protection of Canadians." Canada is therefore obliged to examine in detail whether the BMD system to be deployed is likely to work as advertised.

1.1 Protection from What Threats?

Even after the ground-based, mid-course interception system graduates from test-bed to an operational defence system sometime in an uncertain future, it will be designed to address only a tiny fraction (never more than about 1 percent) of nuclear warheads capable of hitting targets in North America by means of strategic-range ballistic missiles. It will also have no capacity against short-range ballistic or cruise missiles that could be fired from ships a few hundred miles off North American coasts. The political prominence given the proposed system ignores the myriad of other ways in which weapons of mass destruction could be delivered to North American targets (for

example, smuggled warheads in any one of the thousands of shipping containers that reach North America daily).

1.2 BMD's Protection Mandate and Capacity

The Canada-US discussions should confirm that BMD is based on unproven and unpromising technology:

1.2.1 Ground-based, Mid-Course Interception

As of late 2003, not one of the 10 key technologies identified by the US General Accounting Office as essential to effective missile defence has been operationally tested, and none is ready for production – most are still at the pre-product development stage. Indeed, it is the lack of confidence that the system can ever be made to work that drives Washington's pursuit of exotic weapons based in space and a layered system that is to include boost and terminal phase interceptions.

1.2.2 Boost Phase Interception

The US Missile Defence Agency's efforts to develop a capacity to intercept missiles in their initial launch phase, as they are being boosted into space, requires that the interceptors be based either in close proximity to the launch site, on constantly aloft aircraft, or in space. The first is physically impossible in most cases, and the air- or space-borne options cannot be carried out with existing technology, would be extraordinarily expensive, and in the case of space deployment would violate the Canadian supported norm against weapons in space.

1.2.3 TMD and Terminal Phase Interception

Intercepting attacking missiles or warheads in their final, terminal descent holds no promise for protecting Canadians because in this case the interceptors must be based in close proximity to the target. Thus, even if such interception were technically feasible, a doubtful proposition given that the terminal phase is very brief and the warheads are traveling at great speed, it would require interceptors to be scattered throughout the entire continent (or at pre-selected locations, if political leaders had decided to protect some sites but not others).

1.3 Policy Priorities

The most realistic means of protecting Canadians from nuclear attack are the same means that the rest of the world must rely on – a focus on practical non-proliferation, arms control and disarmament (NACD) diplomacy and implementation, including the de-alerting of intercontinental missiles to prevent unauthorized or accidental launches, as well as the verified prevention of weapons and missile advances in threshold states.

2. BMD and NACD:

Critics of BMD have been accused of trying to have it both ways. On the one hand they claim it doesn't work, on the other hand they claim it is destabilizing, presumably

because it does work. But, in fact, it is destabilizing whether or not it works in the same way that the pursuit of weapons of mass destruction (WMD) and ICBMs by states like North Korea or Iran is destabilizing, whether or not they are successful. Both North Korea and Iran are still a long way from mounting any credible nuclear threat to North America, but simply their pursuit of such a threat has a huge impact on strategic considerations and dynamics. It is the same with BMD. Regardless of its actual capabilities, the pursuit of an effective BMD has serious negative implications. Both Russia and China have concluded that new BMD countermeasures and a sustained offensive nuclear capability will have to be central to a strategic environment that includes BMD – in other words, the arms race and strategic competition between major powers that were not supposed to be part of the post-Cold War strategic environment are already well underway and consuming resources.

2.1 Russia

While Russia's response to US BMD deployment has been muted, its apparently sanguine approach is built on an unambiguous commitment to ensuring that its offensive capacity will always be able to overwhelm any defence effort that the US tries to develop. That means a clear floor on nuclear reductions, contrary to its obligations under the Non-Proliferation Treaty, as well as a clear commitment to maintaining significant elements of its strategic missile arsenal on high-alert (thus increasing the threat of accidental launch).

2.2 China

China is expanding its strategic ballistic missile arsenal, and it too has made a basic commitment to ensuring that its deployed holdings never drop below a level it thinks might be vulnerable to interception. While much of China's missile rearmament may not be directly linked to US missile defence, its current nuclear build-up reflects the continuing instability and volatility of the strategic environment. China is also pursuing a variety of missile defence countermeasures.

2.3 Proliferation Pressures

Whatever BMD's impact on vertical proliferation, its advocates claim BMD as protection in the face of horizontal proliferation. In fact, however, BMD is not an alternative to non-proliferation – it depends on it. For missile defence to be at all feasible, the threat must be successfully restricted to just a few missiles. The US, by its own declaration, will not be able to defend against more than a few missiles – which means that if proliferation were to lead to multiple nuclear-capable states bent on threatening the United States, the BMD system would be easily overwhelmed. In other words, BMD itself depends on effective non-proliferation diplomacy. At the same time, the deployment BMD will drive emerging missile states to deploy many more missiles than they would have otherwise done.

2.4 Policy Priorities

In the context of an NPT regime in trouble, exacerbated by BMD-generated proliferation pressures, Canada needs to return to and rely on the nuclear disarmament fundamentals that it has long articulated: the only reliable protection against nuclear weapons is their elimination; a diplomatic priority must be the delegitimation of nuclear weapons and the encouragement of ongoing, irreversible reductions in strategic arsenals; a doctrine that insists that as long as nuclear weapons exist they have only one role, and that is to deter the use of nuclear weapons by other states; an insistence that nuclear weapons should not be lumped into a category of weapons of mass destruction along with chemical and biological weapons; and a clear reaffirmation of the core principle of the now defunct Anti-Ballistic Missile (ABM) Treaty – that is, the need to prevent a defence-offence strategic nuclear arms race.

3. BMD, Intervention/Pre-emption:

The US National Security Strategy discussion of nuclear use and pre-emption options belies the claim that BMD is a defensive system. Shields may be protective, but linked to swords they are part of an offensive and provocative system. And the US ballistic missile shield that Canada is now considering making its own, is being aggressively linked to an ever-sharpening nuclear sword.

3.1 Defence as Offence

While the US has obviously developed a serious interest in missile defence that would protect the American homeland, a more immediate interest is to draw BMD into support for its intervention objectives. In the first instance, strategic BMD is intended to neutralize the deterrent value of any small strategic attack capability that might be held by states targeted for intervention. In the second instance there is a particular interest in theatre missile defence to protect forward military forces sent to pre-emptively attack states that fall out of favour with US strategic priorities.

3.2 Policy Priorities

Since Canada has now agreed to talks on BMD, it should ensure that the discussions seek explicit clarification and disavowal of those elements of the US national security strategy and nuclear doctrine that appear to assert the prerogative to use or threaten to use nuclear weapons against non-nuclear weapon states. Canada should also remind the United States that a simple way to reduce proliferation pressure would be for it to disavow the pursuit of new nuclear weapons by ratifying the comprehensive nuclear test ban treaty (CTBT) and by an unambiguous recommitment to the “negative security assurances” mandated by the Security Council in 1995 by which nuclear weapon states declare they will not use nor threaten to use nuclear weapons against non-nuclear weapon states.

4. BMD and Space:

US plans and ambitions for BMD extend well beyond the ground-based, mid-course interception system to include the possible deployment of weapons in space. Canada formally rejects the placement of weapons in space, and it is not credible for Canada to seek involvement in some elements of the ballistic missile defence system and claim that such involvement does not imply support for the space-based elements that it knows Washington is actively pursuing.

4.1 Weapons in Space

Cost overruns and technology failures notwithstanding, the US Missile Defense Agency still plans to deploy a weapons test bed in space by 2008 "to determine the feasibility of exploiting the inherent advantages of intercepting threat missiles from space." While its plans to "begin developing a space-based kinetic energy interceptor in FY04," are now certainly in question due to technology challenges, the general intention remains.

4.2 BMD as ASATS

BMD interceptors, whatever their likely rate of success in intercepting ballistic missiles, are effectively also anti-satellite weapons (ASATs). The interceptors that will be deployed in 2004 and in the foreseeable future will have a dubious capacity as missile interceptors (the proponents themselves say that), but they will have a more credible capacity against any satellites in low-earth orbits that pass over US territory.

4.3 Policy Priorities

In the context of its current BMD discussions with Washington, Canada should call on the US to disavow weapons in space by agreeing to the talks at the Geneva-based Conference on Disarmament leading to a space weapons ban, *before* proceeding further with BMD deployment. Canada should also make it clear that it needs assurances that BMD interceptors will not double as a basic ASAT testing (or operational) system, as well as evidence of some US movement toward acceptance of multilateral discussions aimed at developing a global ASAT ban.

5. BMD and Canada-US Security Cooperation:

In a spirit of friendship and continental security cooperation, Canada has fully accepted and honoured the obligation to try to prevent threats to US security from emerging undetected from Canadian territory, and to cooperate on mutual security concerns. Whatever ballistic missile threat the US perceives, it obviously does not emanate from Canadian territory, nor does the US need access to Canadian territory to monitor the nature and level of such a threat and to respond to it in its own way. In other words, Canadian participation in US BMD is not a requirement of ongoing security cooperation, and non-participation would not violate any basic or traditional commitment to security cooperation.

5.1 Canada-US Joint Defence

There is little persuasive evidence that the United States is anxious to have Canada as part of the BMD operation. During the Cold War and as of now, NORAD has performed the task of ballistic missile early warning, with the command and control of retaliatory forces always under US national command. It is likely that the United States will also want to keep its BMD interception forces under national command and so will be unlikely to accede to an apparent wish by the Canadian Department of National Defence to have NORAD carry out the BMD detection and battle management integration role.

5.2 NORAD, Technology, Geography, and the Cooperation Imperative

Canadian territory, technology, and funding are all irrelevant to the US strategic ground-based, mid-course ballistic missile defence operation. Similarly, NORAD is not necessary to the operation of the US BMD interception system. NORAD's relevance and future are linked to the relevance of its air defence role. Air defence is a mutual Canada-US concern and the focus of actual, practical cooperation. It will be a focus of security cooperation as long as it remains a practical, mutual benefit.

5.3 Sovereignty and Security Cooperation

It is important for Canada to nurture constructive security cooperation with the United States. When based on shared concerns and mutual interests, and especially on independent threat assessments, such cooperation can strengthen Canadian sovereignty as well. In the case of BMD it is clear that Canada does not share US threat assessments, and there is certainly no Canadian policy statement that argues BMD should be a primary response to proliferation threats.

5.4 Policy Priorities

Canadian policy should recognize that the ballistic missile threat is a global phenomenon that requires a global approach; that a secure and stable Fortress North America is not achievable in an international environment of nuclear weapons and ICBM proliferation; that North American protection from ballistic missile threats requires that their use be prevented and that their spread be limited; that preventing their use and spread means multilateral diplomacy that also addresses the political and security conditions that currently produce incentives for states to seek nuclear weapons and the means to threaten them over intercontinental distances; and that strategic missile defence is counter-productive in that it contributes to such proliferation pressures. In its current discussions on BMD with Washington, Canada should also be open to returning NORAD to its original function as a mechanism for air defence cooperation, through which each party assures the other that no undetected air threats to the other are emanating from its territory.

Conclusion:

Ottawa should be seriously attentive to the possibility that the BMD project is headed for trouble. A combination of cost overruns, nonperformance of the technology, and some discernable diplomatic progress in mitigating the perceived North Korean and Iranian threats, could lead to a quick reversal in the political favour BMD now enjoys. There are many reasons to believe, September 11 not the least among them, that Washington's security preoccupations with the missile threat could shift to the air threat. Internal air surveillance and control are likely to become more, not less important. For certain hardcore constituencies Washington's long obsession with BMD is not likely to disappear very soon, but White House interest in BMD could wane rather quickly, particularly after the 2004 elections, as its technology challenges persist, as the costs climb and the tangible returns fail to emerge, and as public support turns to indifference or hostility.

CANADA AND BALLISTIC MISSILE DEFENCE

What Canadian would not wish for all the exotic technology being mobilized in the interests of missile defence to work and to deliver to North America credible protection from missile-borne assaults of weapons of mass destruction? What Canadian would not willingly offer up sacrifice, treasure, and access to territory if the safety and security of our neighbors truly depended on it?

Of the various reasons why Canada might seriously consider supporting and participating in American efforts to mount a strategic ballistic missile defence (BMD) system (see **Appendix I** for a basic description of the system that is the focus of current Canada-US discussions), the "responsibility to protect" is obviously the most compelling. Any serious claim that it is actually possible to provide Canadians protection from nuclear attack should surely warrant a second look.¹

1. BMD AND PROTECTION

Defence Minister John McCallum has insisted all along that the primary reason for exploring Canadian participation in BMD is "the protection of Canadian lives." In announcing formal Canada/US talks on the issue, he told the House of Commons "it is the responsibility of government to do its due diligence to ensure that the system is set up and that the system will operate in such a way as to afford Canadians equal protection from such a threat as the protection that is afforded to Americans."² Well into the talks Canadian officials continue to insist that protection of Canadian territory and lives is indeed a key focus. In September Minister McCallum repeated the point to reporters, emphasizing that a crucial objective is ensuring "the protection afforded to Canadians is no less than the protection accorded to Americans."³

¹ Another key reason links to Canada-US security cooperation (see Section 5.1). There are of course additional, more opportunistic, or what some might call more pragmatic, considerations that tempt Canada to participate in BMD in some way, from industrial benefits, to access to intelligence and technology, to the pursuit of favor with the US in order to aid the pursuit of other interests in the bilateral relationship. These are at best secondary, not key, considerations, and in the end they will not, or at least should not, be the ones that determine Canadian policy or action. Industrial benefits would in any event be minimal and roughly limited to the money that Canada would put into the scheme. Access to American technology and intelligence comes on the basis of shared interests and mutually beneficial cooperation, not in response to symbolic gestures, and even the proponents of Canadian involvement keep insisting that Canada has very little of substance to offer that the Americans seriously need with regard to BMD. And, finally, Canadians have long since learned that in the ongoing management of Canada/US relations supportive action in one area (e.g. participation in the war on Afghanistan) does not necessarily yield benefits in other areas (e.g. softwood lumber). See also Jockel at the House of Commons Standing Committee on National Defence and Veterans Affairs (SCONDVA): "While it is true that you have more influence inside the tent than outside the tent, that influence is still going to be extremely limited. As you suggest, looking for influence by agreeing to participate in national missile defence or by deploying armed forces overseas is ultimately going to be a frustrating experience. It will always be a frustrating experience, given the size and power of the United States."

² Speech to the House of Commons, May 29, 2003, in support of an Alliance motion on BMD (Hansard, 37th Parliament, 2nd Session, No. 108). On May 15 Foreign Minister Bill Graham also told the House that the "Government believes it is our responsibility to pursue talks with the United States, in order to ensure the security of Canadians and the future of NORAD."

³ Daniel Leblanc, "Full protection sought under missile shield," *The Globe and Mail*, September 11, 2003.

To the extent protection is a real objective it is obviously necessary to look deeply into the question of whether BMD will actually be able provide protection. The question, "will it work?," becomes the central question (see Section 1.2). And beyond the question of whether it can actually deliver protection to North Americans, the protection claim begs the related question of how the pursuit of such protection for North America is likely to affect the protection of others – that is, how BMD will affect the international security environment (see Sections 2, 3, and 4).

1.1 Protection from What Threats?

The threats from which the ballistic missile defence system is to protect North America are heavily circumscribed. Ronald Reagan would be surprised to learn just how modest the protection claims of Star Wars have become under the current Administration.

Mr. Reagan's vision was at least bold and comprehensive – nothing less than lifting from the American people the nuclear sword of Damocles. But all that is now replaced with tentative hopes that it will become possible to intercept limited, that is, extremely limited, attacks from selected locations, once the system matures (and no one is saying when that will be). The claims for what BMD will some day accomplish do not lack audacity, but the language about deployments now actually underway is laced with references to evolving capabilities, still to be developed technologies, and tentative timelines.

Even when it matures, strategic missile defence is not intended, nor will it ever have the capability, to protect Americans, or Canadians, from the primary arsenals of missiles capable of striking North America. The thousands of nuclear warheads mounted on Russian intercontinental missiles that are still maintained on high alert, or the hundreds of warheads on similar Chinese missiles (though on much lower levels of alert), are specifically not the focus of BMD.

It is only when the strategic nuclear threat is artificially, or artfully, segmented and when the tiniest segment is highlighted for attention that defence can even be contemplated. When the system that is now being assembled is fully operational and working as intended, it will still be aimed at only about 1 percent of the nuclear-tipped missiles that are capable of reaching North American shores.⁴ Protection from the other

⁴ Since planners assume that at least three interceptor missiles are needed to counter each incoming warhead, the 20 interceptors now being prepared for deployment could theoretically intercept about seven missiles (assuming each has only one warhead). As the system matures, over literally decades of development, for both technical and political reasons the capacity is not intended to reach much beyond the interception of a couple of dozen attack missiles. Currently more than 1000 Russian, Chinese, French, and UK missiles (collectively carrying up to 7000 warheads) are capable of reaching North America. Currently no other state, not North Korea nor Iran nor any other of the "states of concern" to the US, has missiles with intercontinental range, nor do they have nuclear weapons that could be delivered by ballistic missiles. Those other states with nuclear weapons – India, Pakistan, and Israel – do not have missiles with intercontinental range.

99 percent of nuclear-armed missiles capable of hitting North America will still depend entirely on prevention. So, after the proposed system becomes operational, and after incurring costs that include the ABM Treaty and over \$140 billion dollars since the 1960s⁵ in BMD research and development, the United States will have managed theoretic protection from a maximum of about 10-20 of the 1000-plus missiles and 7000 warheads capable of hitting North America (provided all 10 or 20 are not fired at the same time).

The system will also not provide any defence against short-range ballistic or cruise missiles that could be launched against North America from ships a few hundred miles off the coast of North America. Such attacks could originate anywhere along the thousands of miles of coast and the missile flight time from a couple hundred of miles off-shore aimed at coastal targets would be just a few minutes. As the Canadian defence scientist George Lindsay told the Standing Committee on National Defence and Veterans Affairs (SCONDVA), "providing defence against short-range missiles all up and down the coasts of North America would be a very heavy undertaking, one that I think would not be practical to do."⁶ It would be impractical because the interceptors would themselves have to be deployed every few hundred miles up and down the same coasts and be constantly kept on the same level of high alert as any theatre missile defence unit in an active war.

Inasmuch as BMD is focused on missile defence, it hardly seems fair to blame it for not providing any protection from the myriad of other ways in which weapons of mass destruction could be used against North America – a warhead stashed in any one of the thousands of shipping containers that daily enter North American ports; smuggled suitcase or backpack bombs; smuggled or clandestinely assembled radioactive materials combined with conventional explosives to create "dirty" bombs; and so on and on. States and non-state actors with an interest in mounting devastating attacks on North America are much more likely to prefer these latter methods since they don't reveal, as do ballistic missiles, the source of the attack. It may not be fair to blame BMD for not responding to such non-missile threats, but it is surely fair to question the relative priority given to the narrow, limited, and unlikely, strategic missile threat when other kinds of threats loom much larger and pose a much more credible danger.

1.2 BMD's Protection Mandate and Capacity

But BMD currently enjoys priority American political and funding attention, and that in turn means that it also has Ottawa's attention. In the debate over how Canada should respond to American BMD planning, it has become fashionable to argue that Canadian policy need not take account of the merits or lack of them of BMD (questions like, will it

⁵ Michelle Ciarrocca, *Missile Defense Policy Brief* (Vol. 8, No.1), World Policy Institute, May 1, 2003 (Foreign Policy In Focus, www.fpif.org).

⁶ George Lindsay, Standing Committee on National Defence and Veterans Affairs (SCONDVA), May 13, 2003 (Number 26, 2nd Session, 37th Parliament).

work? or what are its likely strategic implications?). The Canadian academic and BMD advocate James Fergusson argues that “the issue is not (if it ever truly was) about the merits or demerits of missile defence itself, but the benefits and costs of participation versus non-participation.”⁷ Then again later: “It is time to set aside the merits and demerits of missile defence debate. They are irrelevant.”⁸ Canada needs to get focused, the argument goes, on the fact that BMD is high on Washington's agenda and is coming, whether we like it or not – like the Canadian winter, we need to accept the inevitable and make the best of it.

But if, at the same time, Canadian officials and political leaders insist that Canada's primary interest is the protection of Canadians, then we are under serious obligation to investigate whether the system is likely to work as advertised.

And that really is an open question. **Appendix II** describes the stages of an isolated ICBM attack and the BMD interception effort to illustrate that there is not a single element or step in the ground-based strategic interception system that is not seriously flawed – some elements are simply way behind schedule, while others still await even the development, never mind the certification and production, of critical technologies.

1.2.1 Ground-based, mid-course interceptions

The answer to the question of whether the strategic BMD system now being built will work – that is, whether it will offer any protection from an isolated ICBM attack, never mind an attack of several missiles at one time – is in the science and the technology. And the July 2003 testimony of scientists from the Massachusetts Institute of Technology and the respected US Union of Concerned Scientists is unambiguous:

The system the United States will deploy by September 2004 (nominally to counter North Korean long-range missiles) will have essentially **no** [emphasis in the original] defense capability. The technology needed for an effective midcourse missile defense system still does not exist. It remains in the early states of research and development, and will have undergone only rudimentary testing by the time it will be fielded. In fact, the Pentagon recently cancelled several intercept tests that were scheduled to take place before September 2004. And even if the technology worked perfectly, the ground-based midcourse system to be deployed will be vulnerable to countermeasures that are easier to build than the long-range missile on which they can be placed.⁹

US Senator Jack Reed (Democrat, Rhode Island) also pointed out earlier this year that “the planned fielding date is September 2004, weeks before the presidential elections, but years before the system is scheduled to conduct any realistic operational testing to

⁷ Round Table, p. 112.

⁸ Round Table, p. 121.

⁹ Dr. Lisbeth Gronlund, Dr. David Wright, Stephen Young, *Backgrounder: US Missile Defense Programs*.

prove that it actually works. So the plan is to field a system before we even know if it will work."¹⁰ In April 2003 the Director of Operational Test and Evaluation told the Senate Armed Services Committee that the ground-based midcourse defence element "in essence, at this time has yet to demonstrate operational capability. This conclusion is based on the fact that many essential components of the GMD [ground-based, mid-course defence system] element have yet to be built."¹¹

The Pentagon's own doubts about the system's capacity to meet its radically reduced expectations is reflected in its uncertainty as to whether it is deploying an operational defence system or an experiment and testing apparatus. The White House adds to the uncertainty through its focus on the tentative, evolutionary nature of the system and its failure to clarify whether the system is being "deployed" or "fielded." The most recent White House Fact Sheet puts it this way:

In light of the changed security environment and progress made to date in our development efforts, the United States plans to begin deployment of a set of missile capabilities in 2004. These capabilities will serve as a starting point for fielding improved and expanded missile defense capabilities later. We are pursuing an evolutionary approach to the development and deployment of missile defenses to improve our defenses over time. The United States will not have a final, fixed missile defense architecture. Rather, we will deploy an initial set of capabilities that will evolve to meet the changing threat and to take advantage of technological developments.¹²

What that announcement clarifies is mainly new standards of equivocation. As an account of what exactly the United States will be deploying next year, the White House account merely echoes the ambiguity of the Director of the Missile Defense Agency, Lieutenant General Ronald Kadish: "Instead of building a test bed that might be used operationally, we are fielding an initial defensive capability that we will continue to test."¹³

The tentative, fudging language is trying to honour the President's promise of deployment without running afoul of American law that allows insufficiently tested new weapons to be "fielded" but not "deployed." Democratic Senators Carl Levin and Jack Reed have argued that "any decision to deploy missile defence prior to conducting operational testing would be contrary to current law, fiscally irresponsible and would also call into serious question the effectiveness of the defence." The Administration's references to "fielding" the system and to "evolutionary" approaches have produced what Joseph Cirincione of the Carnegie Endowment for Peace calls a "smokescreen to

¹⁰ Cited in Hitchens, "Technical hurdles in US Missile Defense Agency Programs."

¹¹ David Ruppe, "Pentagon sees \$20 Billion cost growth for the National Defense System," *Global Security Newswire*, (reporting on April 9 testimony), April 16, 2003.

¹² Fact Sheet, Office of the Press Secretary, The White House, May 20, 2003.

¹³ Wade Boese, "Missile Defense Post-ABM Treaty: No System, No Arms Race."

prevent Congressional objections to actually deploying a weapons system that hasn't been tested. And when they clearly got Congress' OK for this, they pulled back the curtain and revealed that this is deployment after all, establishing the precedent of deploying the system without testing it."¹⁴

The concern about deploying premature technology is supported by a series of sober, understated reports by the US General Accounting Office. In April 2003 the GAO found that the "MDA is beginning system integration of its first block [2004] with immature technology and limited testing. While doing so may help MDA meet the President's deadline, it also increases the potential that some elements may not work as intended."¹⁵ Current satellites do not have a capacity to track a warhead once it is in space and separated from its booster. Even though this is regarded as an essential technology, a May 2003 GAO report concludes that "MDA still needs to demonstrate that tracking information can be passed between sensors within a satellite; tracking information can be passed between satellites; missiles can be tracked in the midcourse phase of their flight..." and that "satellites can discriminate warheads from decoys."¹⁶

In August the GAO identified 10 technologies critical to the ground-based mid-course interception system, and found eight of those technologies had not yet reached a level of readiness sufficient to begin product development. Some were in stages of technological development that had been tested in a laboratory environment, while in others the technology was part of a prototype. The GAO concluded that if a round of testing in 2004 is successful most of the technologies (7 of 10) would still only reach the stage to begin product development.¹⁷ Then in October 2003 the GAO reviewed the proposed space-based infrared system (SBIRS-high) to replace the current Defense Support Program satellites, concluding that the "program continues to experience problems that have existed since its inception: cost overruns, schedule delays, and performance limitations..." and that "additional cost and schedule slips beyond the revised acquisition program baseline appear inevitable."¹⁸

BMD remains a concept that is a long way from making the transition to reliable operation. And to a surprising degree, the Pentagon agrees. They just want "to get something out there," says Defense Secretary Donald Rumsfeld. And, he says, when they get something "in the ground, at sea, and in a way that we can test it, we can look at it, we can develop it, we can evolve it, and...learn from experimentation with it."¹⁹

¹⁴ "Faltering Path to Initial US Missile Defence Deployments," *News Review Special Edition*, May 1 – July 10, 2003, The Acronym Institute (www.acronym.org.uk/dd/dd72/72nr08.htm).

¹⁵ GAO-03-441, summary and p. 17.

¹⁶ GAO-03-597, p. 2.

¹⁷ GAO-03-600.

¹⁸ GAO-04-48, p. 22.

¹⁹ Missile Defense New Update, 2/24/03, Council for a Liveable World (www.clw.org/nmd/nmdupdates/030224.html).

In general, says Theresa Hitchens of the Center for Defense Information, "it is safe to say that missile defense technical progress has been slower and more limited than either promised by MDA or commonly expected. Almost all major programs face continued technological obstacles, and most are running behind their originally scheduled testing plans. The fact is that it remains rocket science."²⁰ Elements of Canadian defence science are also doubtful of how well this system can be expected to perform, as reflected in the comments of George Lindsay, who for 20 years was the chief of DND's operation research and analysis establishment, to SCONDVA:

In order to reach the high altitudes attained in the mid-course of an ICBM and to make a successful interception, an interceptor missile needs to be boosted to a very high speed, provided with extremely accurate guidance, and able to manoeuvre in the vacuum of outer space. ...Perhaps it's the most challenging technical undertaking that has ever been taken in the world. This is no mean task.²¹

Indeed, it is the lack of confidence that the system can ever be made to work that drives Washington's current focus on a layered system that would add boost and terminal phase interception efforts and exotic weapons in space, like lasers to zap missiles in their boost phase, or space based kinetic interceptors to increase the credibility of mid-course interception efforts.

1.2.2 Boost Phase Interception

Ground-, sea- or air-based boost phase interception, even if it were available, would add no capacity to the interception of the wayward Russian SS-18 described in the Appendix II scenario. Because the boost lasts only a few minutes, and because it would take almost a full minute after launch to get an adequate fix on the target to establish a track and make a launch decision, and because the interceptor then has to catch up to the target missile already well into its flight, any interceptor must be based in very close proximity to the launch site of the target missile, within a few hundred kilometres, for it have any chance of catching up to an attacking missile before the nose cone separates from the booster rocket and enters its mid-course coast. Besides the fact that none of the boost phase interceptors now in development will have the speed to reach ICBMs, only medium range missiles, there is no possibility of positioning interceptors, whether based on land, on ships, or on aircraft, that close to the Russian arsenal. So a non-space based boost-phase intercept is by definition out. In the case of North Korea, the current Aegis sea-based interceptor would come into play, but the system currently being deployed does not have the speed or range to catch up with an intercontinental missile, only a theatre-range missile.

²⁰ Hitchens, "Technical Hurdles in US Missile Defense Agency Programs."

²¹ George Lindsay, SCONDVA, May 13, 2003.

The challenges to successful boost phase interception are many, and the Report of the American Physical Society Study Groups on Boost-Phase Intercept Systems, released in July 2003, identifies most of them. While the Aegis sea-based interceptor could intercept short or medium range missiles launched in North Korea, the interceptors would have to be positioned within tens of kilometres from the launch location of the attacking missile. The Report suggests that boost phase interception will essentially remain a theatre defence component, potentially effective against slower, short to medium range missiles that are close at hand. Ground-based interception of strategic range missiles that are propelled by solid fuel (meaning a shorter burn time) is unlikely ever to be practical, no matter where or how the interceptors are based.²² For space-based interceptors to be effective they would have to be deployed in huge numbers (because they would be deployed in low-earth orbit, any one interceptor would be over a potential target launch site for only a short time, meaning that large numbers would have to be in orbit to ensure continuous coverage). Just to lift such a system into orbit would require a five to tenfold increase in American launch capacity, and the cost of delivering the interceptors into space, never mind building them, would reach the order of \$50 billion.²³

Another major problem with boost phase interception comes from the fact that the attacking missile would not necessarily be destroyed but would simply be knocked off course. Because the attacking missile would be hit late in the boost phase, experts in missile flight technology point out that it would most likely not be destroyed and would continue roughly along its original trajectory, but would fall short of its intended target – with obvious implications for Canada in the case of missiles targeted on the United States and on a flight trajectory over Canadian territory.

Since boost phase interceptions need to take place within minutes there would also be no time for decision-making, hence it would be necessary to establish the conditions under which an automatic intercept would occur. Such conditions would have to include a pre-launch notification regime – that is, all missiles launched for testing or for launching a satellite, that is for “legitimate” reasons, would be announced in advance and interceptors would then be programmed not to attack them, leaving all unannounced launches to be regarded as hostile (to somebody). Secondly, various levels of alert could be established – at highest level, intercept attack is immediate and automatic in the event of an unannounced launch (in effect, a launch without a filed “flight plan”); at lower levels of alert, boost-phase interception would stand down in favour of mid-course interceptors; at the lowest level of alert, there might be a longer wait and see period; and so on.

²² The study does indicate that a boost-phase interceptor stationed close at hand could develop a capacity against a liquid fuel missile launched from North Korea.

²³ Hitchens, "Space-Based Missile Defense: Not So Heavenly."

1.2.3 Theatre Missile Defence and Terminal Phase Interception

Terminal phase interception also offers no protection from an ICBM attack on North America. To intercept a warhead in its terminal phase, which lasts less than 2 minutes, the interceptor must be stationed in close proximity to the target that is being protected. In other words, terminal defences are essentially point defence operations and the points to be protected must be pre-determined. Terminal defence is by definition local rather than continental. Short of scattering interceptors around the entire continent in an attempt at blanket coverage, terminal phase protection is impractical because there is no way of anticipating the destination of a random attack (whether accidental or deliberate) on North America.

One big advantage of a terminal phase interception is that the warhead is readily distinguished from decoys at that point. However, a mid-course interceptor's kill vehicle cannot operate in the atmosphere (it requires the vacuum of space for its sensors to function and to be able to manoeuvre itself into the path of an oncoming warhead). Furthermore, terminal interceptions of strategic range warheads are extremely difficult, because the speed is great and the time available is brief.

If terminal defence efforts were mounted in North America, the implications for Canada, as Lindsay explains, would be significant:

Interception in the terminal phase will require the intercept missiles to be located in the vicinity of the targets of the ICBMs, presumably mostly in concentrations of American cities. For target acquisition and fire control, it may be necessary to site radars and the means to relay information well ahead of the areas to be protected. This suggests some installations in Canadian territory could become important for the defence of areas in the northern United States, even more so if protection were to be provided for the cities in southern Canada.²⁴

Terminal protection is selective and must be decided in advance. Canada, for example, would have to say, we can protect the Ottawa, Montreal and Toronto triangle, and perhaps the Vancouver/Victoria area, but all parts in between or to the east cannot be protected. Japan is currently facing that very politically difficult problem. Intent on deploying a missile defence system within the next three years, it is discovering that:

budgetary and technical constraints mean Japan cannot deploy enough surface-to-air missile units to cover the entire archipelago in the early years and that hard choices will determine what areas will be defended first. 'Some insist that first Tokyo, Osaka or big cities should be covered, but there are all kinds of discussions,' the official said on condition of anonymity. 'There has to be some kind of compromise because the number of missiles is extremely limited.' Under

²⁴ George Lindsay, SCONDVA, May 13, 2003.

one plan, the Defense Agency will concentrate on first protecting urban areas and strategic bases, Kyodo News reported, citing Defense Agency officials. Ground-based anti-missile batteries would first be placed around six locations, mostly big cities.²⁵

Terminal phase interception is most realistic as theatre missile defence – designed to defend forward based forces from short-range ballistic missile attack. While terminal phase interception offers no protection to the Canadian homeland, short-range theatre defence against both ballistic and air-breathing missiles could be of interest to any state that deploys forces in conflict theatres – for example, Canadian forces engaged in offshore peace operations.

1.3 Policy Priorities

Protection has to work in practise, not in theory. The system to be "fielded" in 2004 will offer no practical protection, and no one can say when it will. The expectations are modest, the chances of ever meeting even those minimal expectations are widely discounted, and the costs are huge and growing. The combination of the extraordinary costs, the modest results, and the irrelevance of the effort to the most serious WMD threats that face North America, make strategic ballistic missile defence a prime candidate for either scandal or quiet marginalization. When Canadian Nobel Laureate John Polanyi briefly reviewed the technology, he concluded: "One does not need to be a rocket scientist to see that this program is headed for embarrassment and subsequent oblivion."²⁶

In the 1970s the Americans had the good sense to turn the lights out on the unworkable Safeguard missile defence systems.²⁷ In the 1980s the Reagan vision evaporated into the first variant of today's more limited system. From the 1990s to the present there has been a combination of lowering expectations in the context of rising rhetoric and rising spending. Sooner or later someone will have to deliver on something, and when that fails to happen, perhaps the best we can hope for is that it will fade into the oblivion predicted by Prof. Polanyi, and that Canada will have stayed far enough removed from the enterprise to avoid the inevitable embarrassment.

In the meantime, inasmuch as the nuclear threat is real, alternative solutions need to be reinvigorated.

²⁵ "Japan's planned missile shield not enough to protect entire country," *The China Post*, August 19, 2003.

²⁶ John C. Polanyi, "It won't work, so why do we play along with U.S."

²⁷ US missile defence research goes back literally to World War II. The Nike Zeus system could by the early 1960s track and attack a single (one at a time) target missile in its terminal phase (using a nuclear warhead). It never reached deployment stage, and was followed by the Nixon Administration's focus on the Sentinel system to protect cities and the Safeguard system to protect missile silos in North Dakota (both also premised on interceptors with nuclear warheads to compensate for lack of accuracy). The Safeguard system was deployed (and was permitted under the ABM Treaty) but was operational for only one day in 1975, after which it was shut down in the face of the recognition that it offered no defence against a serious Soviet missile attack.

- A practical solution to the threat of an accidental Russian launch is certainly available – namely, de-alerting. In fact, other than elimination, it is the only solution available, and it is one that is undermined by BMD inasmuch as BMD induces Russia to keep more of its weapons on high alert as a hedge against a disarming pre-emptive first strike.
- Practical protection from the threat of "rogue state" missiles is also available, namely through prevention. Effective prevention is obviously not as straight forward as de-alerting, but practical measures are available, as ongoing diplomatic efforts related to North Korea and Iran show (see Section 2 below).
- More research may be a prudent response to the missile defence challenge, but it needs to be guided by a reasonable cost-benefit equation and a much deeper respect for international law on intervention than now seems to be the case. The costs are well known – \$8-12 billion (US) per year (more than the entire Canadian defence budget), and this is after the billions already spent in the 1980s and earlier. The benefits are also well known – no protection at all for the North American continent, but growing protection for troops in theatres of war. The protection of military forces engaged in *lawful* interventions on behalf of the international community, for example, in operations to protect vulnerable populations, represents a constructive application of missile defence technology. Outside of lawful, UN-mandated operations, theatre missile defence, especially pursued in the context of evolving US pre-emption and nuclear use doctrines, will be widely and justifiably understood as support for lawless unilateralist intervention in the service of narrow national interests or ambitions.
- Canada does have its own interest in theatre missile defence to the extent that Canadian Forces are called to participate in peace support operations in dangerous, unstable environments. Some military experts point out that the Canadian-built ADATS system (air defence, anti-tank system) includes elements of theatre missile defence and forms the base for further development.²⁸ Such

²⁸ Keith Greenway of the CIIA, in endorsing Canadian attention to terminal phase interception technology, made the point of Canadian industrial capacity already developed: "The Oerlikon plan down on the Richelieu has a very good ADATS system. In fact, it is better than the PAC-3 of the Americans, but there is a political problem with selling it there, as you may know. But that system was good. As you know, that system was used for defence coverage when the G-8 was meeting in various places. It was a Canadian system, which we developed basically from Canadian criteria. We don't hear anything about it. It's been our policy not to publicize weaponry, but it is a defensive system. ... The Oerlikon system has been tested in the fields continuously, and they've expanded it, not only the range for the low-level aircraft but also the vertical range, to include the interception of missiles coming up. These are done, and the firing of them is controlled automatically. The intercept, detection, and the firing are interconnected. It's a very straightforward system.... and I suspect that if we were into any agreement with the Americans on ballistic missile defence, they would be most happy to see us with the Oerlikon-type system as in the terminal defence." (SCONDVA, May 13, 2003) George Lindsay advances a similar argument in support of Canadian research and development. At least one US expert is less than persuaded, arguing that the first Gulf War demonstrated conclusively that it is not effective to use an air defense system to do a ballistic missile defense system's job.

research should be done in cooperation with other states with similar interests in protecting forces on United Nations missions.

2. BMD AND NACD

The pursuit of BMD is destabilizing, whether or not it works. Proponents say the critics are trying to have it both ways – on the one hand, claiming it doesn't work, on the other hand claiming that it is destabilizing, presumably because they think it does work. The proponents logically ask, if it doesn't work, how could it be destabilizing?

But, in fact, it is destabilizing whether or not it works in the same way that the pursuit of WMD and ICBMs by states like North Korea or Iran is destabilizing, whether or not they are successful. Both North Korea and Iran are still a long way from mounting any credible nuclear threat to North America, but simply their pursuit of such a capability has a huge impact on strategic considerations and dynamics. In the same way, the pursuit of an effective BMD capability, regardless of its current or future credible capabilities, has huge strategic implications.

A key premise of strategic BMD advocates is that the spread of nuclear weapons and the missiles to deliver them over intercontinental distances is inevitable. Furthermore, they add, the use of these weapons by particular states is not preventable through deterrence.²⁹ Defence is therefore the only option. Academic Frank Harvey presents the argument in its starkest and least nuanced form. BMD is necessary, he says, because “prevention, conventional deterrence, constructive engagement, economic sanctions, transparency, monitoring and/or verification have all failed in the past to stop proliferation.”³⁰ Ironically, however, for BMD to have any chance at success, non-proliferation must be highly successful. BMD is not something you can turn to if non-proliferation fails; BMD depends on the success of non-proliferation. Yet, at the same time, the very pursuit of BMD undermines non-proliferation efforts, thus helping to create the conditions under which BMD cannot be successful – it is the classic lose-lose scenario.

If the ballistic missile threat is not severely limited, any BMD system will be easily overwhelmed. States that really did develop a capacity to build and mount a nuclear warhead on an ICBM and threaten the North American continent would have overcome all the basic hurdles and would not find it an insurmountable challenge to build enough clones to overwhelm the currently contemplated BMD system. And if in response, BMD systems were simply expanded to try to deal with all the clones, not only could such newly emerging powers be expected to further expand their arsenals accordingly, but

²⁹ The view that states like North Korea are uniquely undeterrable is not new. When the 1960 Defence Secretary Robert McNamara embarked the United States on its first go at missile defence, the argument was that while such a system would not undermine the Russian deterrent and thus the strategic balance, it was needed to defend against the newly emerging Chinese nuclear capability because China, an irrational player on the world stage, was not amenable to deterrence.

³⁰ Round Table, pp. 114-115.

Russia and China would soon rethink their nuclear strategies and abandon their present restraint.

2.1 Russia

For the moment, Russia is focused on its new strategic relationship with the US, and the most recent Russian-US arms control agreement. The May 2002 Strategic Offensive Reduction Treaty, the "Moscow Treaty," is described not only as an arms reduction measure but a strategic reform agreement that changes the fundamental relationship between the US and Russia. Even so, what some have called the semi-ally/semi-rival US-Russia relationship is still fundamentally adversarial when it comes to nuclear arsenals. Russia's acquiescence on the cancelled ABM Treaty and on BMD itself is still based entirely on the assumption that missile defence as it is currently being readied for deployment offers no challenge to Russia's offensive capacity, that is, its ability to mount a credible deterrent. Russia's apparently sanguine approach to US BMD is built on its unambiguous commitment to ensuring that its offensive capacity will always be able to overwhelm any defence effort that the US tries to develop. That means a clear floor on its nuclear reductions, contrary to its obligations under the Non-Proliferation Treaty, as well as a continuing commitment to maintaining significant elements of its strategic missile arsenal on high-alert (thus increasing the threat of accidental launch).

While Russia could still implement substantial additional reductions to its strategic arsenal before getting down to levels that might theoretically be amenable to BMD interception, it will argue that uncertainty whether the US might yet significantly expand its BMD efforts, combined with fears of an emerging first-strike option based on the highly accurate new generations of US Trident missiles, counsel caution regarding further reductions – a development at odds with Step 9 of the NPT's 13-step disarmament agenda agreed to by both Russia and the US: "Further efforts by the Nuclear Weapon States to reduce their nuclear arsenals unilaterally."

To the extent that Russia perceives the US as trying to link a missile defence capacity with a strategic pre-emption capacity, it will certainly take measures to reduce its vulnerability to a first strike attack. And that vulnerability is much greater now than it was during the Cold War, owing primarily to the radically diminished role of its sea-based deterrent.³¹ That leaves its land-based missiles exposed to increasingly accurate American ICBMs.³² A primary response will be to keep its land-based deterrent on high alert, contrary to another element of Step 9, which calls on all Nuclear Weapon States to take "concrete agreed measures to further reduce the operational status of nuclear weapons systems."

³¹ In 2002 none of Russia's strategic nuclear-armed submarines was sent on patrol. *SIPRI Yearbook 2003* (Oxford University Press, 2003), p. 615.

³² The Trident II D5 missile can deliver each of its Mk-5/W88 warheads to home plate, the Navy boasts, whereas the earlier C4 can only guarantee delivery within the base paths of a baseball diamond. ["Nuclear Notebook: U.S. nuclear forces, 2003," *Bulletin of the Atomic Scientists*, May/June 2003, p. 75.]

Finally, Russia is also beginning to mimic the US declaration of its prerogative to use small nuclear weapons pre-emptively and against non-nuclear weapon states (see Section 3). According to the Australian Broadcasting Corporation, in October 2003 Russia announced it would consider the restricted use of small nuclear weapons to deal with regional conflicts and international terrorism in the future.³³

2.2 China

While Russia's deterrent remains in place, China does not enjoy the same level of strategic confidence. Indeed, the Pentagon has also been emphasizing China's ongoing rearmament. China's current arsenal of about 20 ICBMs capable of targeting the US will be expanded to about 30 by 2005 and possibly 60 by 2010.³⁴ China is also pursuing an active program to develop ballistic missile defence countermeasures (electronic countermeasures to confuse X-band radars, as well as PAC 3 and sea-based interceptors; modifications to re-entry vehicles/warheads to counter ground radars; countermeasures to lasers; renewed attention to exploring ASAT capabilities; renewed interest in MIRVs, and so on).³⁵

While much of China's missile rearmament is a response to Japan's theatre missile defence plans, and to Taiwan's interest in acquiring US destroyers with the AEGIS missile defence capabilities,³⁶ its nuclear build-up reflects the continuing instability and volatility in the international strategic environment. North Korea's missile threat fuels Japan's missile defence efforts, and those missile defence efforts in particular, and Japan's more active military posture in general, in turn prompt China's efforts to counter its perceived vulnerabilities.³⁷

The arms race and strategic competition between major powers that were not supposed to be part of the post-Cold War, BMD dominated strategic environment are already well underway and consuming resources.

2.3 Proliferation Pressures

The effort to keep the number of undeterred nuclear-tipped missiles to a very low number is absolutely essential if BMD is going to mount a credible defence. At the same time, the more credible the defence the more it encourages the expansion of a credible threat, thus undermining the non-proliferation effort.

³³ Russian Defence Minister Sergei Ivanov has submitted a revised doctrine to President Putin. (Australian Broadcasting Corporation, October 3/03, www.abc.net.au/news/newsitems/s959107.html)

³⁴ SIPRI reports on US Department of Defense estimates. [*SIPRI Yearbook 2003*, p. 619.]

³⁵ Mike Nartker, "New Report Details Chinese Missile Defense Countermeasures," *Global Security Newswire*, September 25, 2002; Bill Gertz, "Pentagon says China refitting missiles to hit Okinawa," *The Washington Times*, July 30, 2003.

³⁶ Charles Snyder, "US official provides reassurance," *Taipei Times*, September 14, 2003.

³⁷ Tom Allard and Hamish McDonald, "Beijing boosts missile arsenal," *The Sydney Morning Herald*, Sept. 6/03.

There is, of course, a way in which missile defence could become a disincentive to missile proliferation. While states in a position of ongoing dispute with the United States, and who fear that they are vulnerable to American military interference, will be tempted to both acquire a WMD capacity and the ability to strike at American forces and the American homeland in order to discourage direct military intervention in their affairs, the Americans make the counterpoint that if the US can mount a credible defence against anything its "rogue" adversaries can threaten, then their adversaries will think twice before incurring the extraordinary cost of mounting a threat that stands to be immediately neutralized by an expanded defence against it.

It is a compelling logic, and arms races would be a thing of the past if all states followed it, but the scenario ignores some basic realities. One such reality is that American BMD capability is far from certain, and even states with modest resources assume that they will be able to accelerate their offence to keep pace with ballistic missile defence. A second is that, as just noted, states with a capacity to present a minimal but credible threat will also likely have the capacity to expand that threat. The US National Security Strategy makes that very point. It declares that "rogue" states³⁸ "see these weapons [of mass destruction] as their best means of overcoming the conventional superiority of the United States." In other words, the US itself predicts increased proliferation pressures in response to its actions.

BMD, in other words, does not appear to be any more conducive to strategic stability in the post-Cold War world than it was in the Cold War world.

2.4 Policy Priorities

- In the context of a faltering NPT regime, exacerbated by BMD-generated proliferation pressures, Canada needs to return to and rely upon the nuclear disarmament fundamentals that it has long articulated: the only reliable protection against nuclear weapons is their elimination; to pursue as a diplomatic priority the delegitimation of nuclear weapons and continued, irreversible reductions in strategic arsenals; as long as nuclear weapons exist they have only one role, and that is to deter the use of nuclear weapons by other states; and refuse to lump nuclear weapons into a category of weapons of mass destruction along with chemical and biological weapons.
- Improved implementation and enforcement of non-proliferation, arms control, and disarmament agreements must become an international priority in order to preserve, or restore, global confidence in a rules-based arms limitation system. North Korea's withdrawal from the Nuclear Non-Proliferation Treaty and possible acquisition of a nuclear device constitutes a grave proliferation crisis that

³⁸ After switching to the term "states of concern" for a time, the National Security Strategy document uses the term rogue without inverted commas.

demands a vigorous, uncompromising international response.³⁹ But an uncompromising insistence on North Korea's return to verified compliance with its NPT obligations requires cooperation and a willingness to address its security concerns through negotiations and through genuine tests of North Korea's offers to dismantle its nuclear programs in exchange for certain security guarantees.⁴⁰

- Missile control efforts have been prominent on Canada's NACD agenda in recent years. The result is a newly minted code of conduct to limit transfers. While the control regime is based on a double standard that some of its supporters recognize will in the long run not be sustainable, the May 20/03 White House statement on BMD puts Washington's commitment to the code into question. Committing itself to cooperation with friends and allies in the development of missile defence capabilities, it also promises "to eliminate impediments to such cooperation" adding that "the United States intends to implement the MTCR in a manner that does not impede missile defense cooperation with friends and allies." Canada took an active part in establishing principled limitations on transfers of missile technology that are to apply to all suppliers. The standards don't mean much if individual states reserve the right to "missile cooperation with friends and allies" – essentially the definition of missile proliferation.
- The continuing global double standard with regard to nuclear weapons must be rejected. Mohamed ElBaradei, head of the International Atomic Energy Agency, told the German magazine *Stern* that US work on new generations of nuclear weapons represents a double standard: "The US government insists that other countries do not possess nuclear weapons. On the other hand they are perfecting their own arsenal. I do not think that corresponds with the treaty [the Nuclear Non-Proliferation Treaty] they signed." He warned that such a double standard is not sustainable. "Nuclear weapons are more prized than ever. Today, there is serious talk of deploying nuclear weapons. Dictators want to survive."⁴¹ Active pursuit of the policies noted above is crucial to undermining this double standard – namely the policy that says that nuclear weapons must be delegitimized, and until they can be eliminated, they must be understood to have only one function, and that is to deter the use of nuclear weapons by others. As long as nuclear weapons are understood to deliver political and economic advantage and prestige to those who have them, it is not clear how long those states that do have a capacity to pursue them will abide by their Treaty

³⁹ The fact that the United States deployed nuclear weapons to South Korea as early as 1958 and did not remove them until 1992 is not a justification for North Korea's pursuit of nuclear weapons, but it cannot be excluded as a major factor. [See "Nuclear Notebook: North Korea's nuclear program," 2003, *Bulletin of the Atomic Scientists*, March/April 2003, pp. 74-77.]

⁴⁰ For a brief review of negotiations and North Korean interests see: Leon V. Sigal, "Negotiating with the North," *Bulletin of the Atomic Scientists*, November/December 2003, pp 19-25.

⁴¹ "UN nuclear chief slams US for double standards," Agence France Press, August 27, 2003 [www.enn.com/news/2003-08-27/s_7818.asp]

obligation not to pursue them⁴² – particularly when nuclear powers not only retain their weapons, but develop new ones⁴³ – and withdraw from Treaty obligations when that appears to serve short term political interests.

3. BMD AND INTERVENTION/PRE-EMPTION

3.1 Defence as Offence

The United States' claim that it must maintain nuclear-use options against non-nuclear weapon states like Iraq, Iran, Libya, and Syria⁴⁴ is the provocative assertion of a right that it denies all others – a right that has no basis in law and that flies in the face of explicit treaty commitments. Similarly, the statement that, "given the goals of rogue states and terrorists, the United States can no longer solely rely on a reactive posture as we have in the past," lays claim to a right to "act pre-emptively"⁴⁵ that it would deny most others. The point is relevant in the context of ballistic missile defence discussions inasmuch as it belies the claim that BMD is a defensive system. Shields may be protective, but linked to swords they are part of an offensive and provocative system. And the US ballistic missile shield that Canada is now considering making its own, is being aggressively linked to an ever-sharpening nuclear sword.⁴⁶ The United States

⁴² It is worth noting that Brazil's President Luis Inacio Lula da Silva, when he was a presidential candidate, spoke rather audaciously about restarting Brazil's quest for nuclear weapons (Sept 13/02): "Why is it that someone asks me to put down my weapons and only keep a slingshot while he keeps a cannon pointed at me? Brazil will only be respected in the world when it turns into an economic, technological and military power." He later clarified his remarks and gave assurances that Brazil would not develop nuclear weapons, but the point is obvious – unless we build a world in which the broad range of states with credible means to pursue nuclear weapons and intercontinental range missiles are convinced that it would not be in their interests to pursue them, non-proliferation will be hard to maintain. And a key to building such an order is to remove the current double standard. ["Brazil's leader pledges to build nuclear arsenal," National Post, Oct 31/02; "Next nuclear showdown in Western Hemisphere?", December 2, 2002, WorldNetDaily.com.]

⁴³ A September vote in the US Senate failed to uphold an earlier House action to cut funding for the research into new battlefield nuclear weapons and accelerated preparations for resumed underground testing. The Senate did however pass a resolution to ban the development of such weapons unless specifically authorized by Congress. [Ken Guggenheim, FCNL Info Line, 9/17/03.]

⁴⁴ The Dec. 31, 2002 Nuclear Posture Review was submitted to Congress by the Pentagon in response to Congress' request for an account of the "direction for American nuclear forces over the next five to ten years." Elements of the report were leaked to the press and elements were later made public. The Pentagon reports its view that "nuclear weapons play a critical role in the defense capabilities of the United States..." describes three levels of "contingencies" (immediate, potential or unexpected) for which "nuclear strike capabilities" must be prepared. Included in such contingencies are: "an Iraqi attack on Israel or its neighbours" (not necessarily involving nuclear weapons); "a North Korean attack on South Korea" (also no reference to that being a nuclear attack); "the emergence of a new, hostile military coalition against the United States or its allies in which one or more members possess WMD" (not necessarily nuclear weapons). North Korea, Iraq, Iran, Syria and Libya, all non-nuclear weapon states, are listed as states where "unexpected contingencies" could emerge that would require "nuclear strike capabilities." [Nuclear Posture Review Excerpts, www.globalsecurity.org]

⁴⁵ *The National Security Strategy of the United States of America*, September 2002, p. 15.

⁴⁶ On April 22, 2003 the US announced that it had completed the manufacture of the first nuclear weapons pit since 1989, signalling the start of a new production of pits (the fissile core of a nuclear weapon) to keep current stockpiles updated.

continues to explore new generations of nuclear weapons, notably battlefield weapons designed for use against targets in non-nuclear states.⁴⁷

As noted in the previous section, the obvious consequence of the threat to use nuclear weapons against non-nuclear states is to generate in such targeted states a strong desire to acquire their own nuclear deterrent. While such a pursuit is folly, states in situations of enduring conflict with the United States understandably may feel that only a long-range missile capacity and a possible nuclear weapons capability can make them relatively immune to threats of major power intervention. In other words, the threat of pre-emption exerts powerful proliferation pressures.

The US National Security Strategy's assertion of the right to pre-emption is made in the context of what it calls "deadly challenges" from "rogue states and terrorists," and the "likelihood that they will use weapons of mass destruction against us."⁴⁸ To prevent that, the NSS says, "we must be prepared to stop rogue states and their terrorist clients *before they are able to threaten or use weapons of mass destruction* [emphasis added] against the United States and our allies and friends." And among the strategies and assets needed for such a preventive (read pre-emptive) action is: "innovation in the use of military forces [and] modern technologies, including the development of an effective missile defense system."⁴⁹

The reference here to missile defence is not to its use in intercepting an attack on the homeland, but to its role in aiding pre-emptive military strikes – to making pre-emption possible. In that sense, defence of the homeland is only indirectly the point of missile defence because Washington knows that reliable protection of national territory from missile attack is simply not possible, and because, as they have been telling us, adversaries have to be stopped before they ever get to the point of threatening the homeland.

While ideological zeal clouds the objectivity of some of BMD's most ardent proponents, the White House obviously knows that it would be folly bordering on criminal neglect to entrust the safety of the homeland to the largely untested and certainly unproven BMD. Homeland missile defence won't work well enough to give reliable protection. In its National Security Strategy the Bush Administration is telling us that if a "rogue" state is thought to be really and truly acquiring a nuclear weapon and intercontinental range

⁴⁷ In May 2003 the US Senate voted to repeal the 1993 Spratt-Furse law, which banned research and development of low-yield nuclear weapons, opening the way for the development of new, useable nuclear weapons. At the same time, in consideration of the FY 2004 defence authorization bill, the Senate approved a program to research high-yield (at least 10 times the destructive capacity of the Hiroshima bomb) earth penetrating nuclear weapons, known as 'bunker busters'. A summer 2003 US Defense Science Board study calls on the Pentagon to develop a range of lower-yield nuclear weapons because the current arsenal "is not adequate to [meet] future national security needs" and to make the US arsenal "more relevant to the threat environment." (Reported by Andrew Koch, "US panel urges radical nuclear strike balance," *Jane's Defence Weekly*, October 22/03.)

⁴⁸ *National Security Strategy*, p. 13.

⁴⁹ *National Security Strategy*, p. 14.

missile capacity, the Americans will not simply sit back and wait for such weapons to be built and fired and then hold their breath to see whether BMD would manage to intercept it.

Attacking “rogues” *before* they become a threat is the essence of pre-emption – and just to remove any doubts, the Bush strategy document goes on to explain that to prevent hostile acts, “the United States will, if necessary, act pre-emptively.” And pre-emption in turn requires the forward deployment of American forces and the protection of those forces from short to medium range ballistic missiles. While some 10 countries already have operational ballistic missiles capable of ranges up to 600 km, another 20 have missiles with ranges up to about 300 km.

In other words, while the US has obviously developed a serious interest in missile defence that is intended to protect the American homeland and thus attempt to neutralize the deterrent value of small numbers of nuclear armed ICBMs in the hands of states targeted for intervention, a parallel focus of that interest is in theatre defence to protect forward military forces sent to pre-emptively attack any state suspected of developing nuclear weapons and long-range missiles.

3.2 Policy Priorities

- Since Canada has now agreed to talks on BMD, it should ensure that the discussions seek explicit clarification and disavowal of those elements of the US national security strategy and nuclear doctrine that appear to assert the prerogative to use or threaten to use nuclear weapons against non-nuclear weapon states.
- Canada should also remind the United States that a simple way for it to reduce proliferation pressure would be for it to disavow the pursuit of new nuclear weapons by ratifying the comprehensive nuclear test ban treaty (CTBT) and by an unambiguous recommitment to the “negative security assurances” mandated by the Security Council in 1995 by which nuclear weapon states declare they will not use nor threaten to use nuclear weapons against non-nuclear weapon states.⁵⁰

⁵⁰ In 1995 the US, along with other NWS, gave explicit assurances that the United States “will not use nuclear weapons against non-nuclear-weapon States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons except in the case of an invasion or any other attack on the United States, its territories, its armed forces or other troops, its allies, or on a State towards which it has a security commitment, carried out or sustained by such a non-nuclear-weapon State in association or alliance with a nuclear-weapon state.” The statement then goes on to say such aggression with nuclear weapons, or even the threat of such aggression, against NNWS party to the NPT would have to be responded to by the Permanent Members of the Security Council to counter such aggression. Both the National Security Strategy and the Nuclear Posture Review, as well as various Administration statements, have called these assurances into question.

4. BMD AND SPACE

Space is obviously an arena of growing importance to terrestrial stability, and it is an importance that has been recognized and reinforced by the international community in a significant body of agreements that regulate the use of and access to outer space and through a broadly established norm against the deployment of weapons of any kind in earth orbit.⁵¹ Space is also the arena that stands to be most directly affected and changed by strategic missile defence deployments and operations.

4.1 Weapons In Space

America's plans and ambitions for BMD extend well beyond the ground-based, mid-course interception system and include the possible deployment of weapons in space. It is a plan that not only violates Canada's long-standing opposition to weapons in space, but violates a global norm against such weaponization.⁵² It is therefore not credible for Canada to seek involvement in some elements of the ballistic missile defence system, while claiming that such involvement does not imply support for other elements of the system (notably, the possibility of placing weapons in space).

The United States is following an evolutionary approach to BMD development and deployment and remains in pursuit of space-based weapons, including their deployment as soon as the technology becomes available. In fact, the US plans to break the normative barrier to weapons in space well before the technology is available by placing in space a test bed for space-based weapons. The US Missile Defense Agency's 2004/5 Budget projects funding for the deployment of a weapons test bed in space by 2008 "to determine the feasibility of exploiting the inherent advantages of intercepting threat missiles from space." While plans to "begin developing a space-based kinetic energy interceptor in FY04," are now on hold,⁵³ the general intention remains.

A great deal of expert opinion is sceptical about the feasibility of actually deploying a credible weapon system in space, but the US commitment to claiming the prerogative to weaponize space, and thus break the global norm of preserving space for peaceful purposes, is clear, and Washington has been explicit about its intention in that regard. In its description of the 2004 deployments, the recent White House fact sheet also made a point of saying that the approach is to add to measures and technologies, including "development and testing of space-based defenses."⁵⁴ In April 2003 the Missile Defence Agency (MDA) reported that its pursuit of boost-phase interceptors

⁵¹ Weapons of mass destruction are explicitly prohibited from being deployed in space, and the annual (since 1981) UN General Assembly resolution on Prevention of an Arms Race in Outer Space confirms the near-universal opposition to the placement of any weapons in space (in 2003 the First Committee vote on the resolution was 161 in favour, none against, and 3 abstentions – Israel, Micronesia, and the United States).

⁵² See previous note.

⁵³ In August 2003 the MDA announced a freeze in work on a space-based kinetic energy interceptor. [Centre for Defense Information Space Security Update #4, Aug. 22/03]

⁵⁴ Fact Sheet, Office of the Press Secretary, The White House, May 20, 2003.

would initially focus on land- and sea-based interceptors, but that “eventually” interceptors would be deployed on satellites in low earth orbit.

A succession of Pentagon-linked statements from the mid-1990s (the most well-known being the 1997 Vision 2020 of US Space Command) has described space as an up-and-coming battle frontier, declaring that, like its use of land, sea, and air environments before it, humankind will soon be fighting wars in space, into space, and from space. Much of that literature has an air of fantasy about it, and whatever the aims of BMD enthusiasts, the weaponization of space is not going to happen any time soon. In July 2003 the Pentagon acknowledged, “there are some major technology challenges that we need to deal with before we can begin developing a space-based capability that we could affordably deploy in operationally meaningful numbers.”⁵⁵

Canada has opposed the deployment of weapons in space for as long as the issue has been around. This unambiguous position is now facing its most serious challenge. If the space elements of ballistic missile defence ambitions continue to be pursued it will explicitly and intentionally violate Canada’s policy and the global norm against the weaponization of space that has prevailed since the space age began almost 50 years ago. It is a norm that will either fail or finally prove its worth in the 21st Century.

Advocates of Canadian participation in BMD have more recently been arguing that while US ambitions and intentions include the placement of weapons in space as part of a multi-layered system, Canada can sign on to the current mid-course interception phase of the system without compromising its long-term commitment to preventing the weaponization of space. Joseph Jockel points out that the US system now slated for deployment certainly does not include concrete plans for weapons based in space and that Canada could “sign on to missile defence...for the duration of a ground-based system. The NORAD agreements only last for five years, and you can get out of them even before that...”⁵⁶

Fergusson takes a similar line, and by going further to suggest that Canada needs to rethink its opposition to weapons in space, arguing that it is in Canada’s interests to buy into some element of American military space development because it is in Canada’s interests to have access to information and technology related to space, he displays the true implication for Canadian space policy of support for BMD. He suggests that Canada not confine its participation to the ground-based, mid-course missile interception elements in order to “keep the outer space door open a bit more, thereby keeping Canada’s future options open.”⁵⁷

⁵⁵ “Pentagon slows space-based interceptor development,” *Global Security Newswire* (www.nti.org), Quoting *Aerospace Daily*, July 3, 2003.

⁵⁶ Jockel, SCNDVA, June 3/03.

⁵⁷ Fergusson, SCNDVA, May 27, 2003.

4.2 BMD as ASATS

While preventing the weaponization of space must remain a redline issue for Canada, and the rest of the world, space security and terrestrial stability must go further to also protect space from becoming a battle theatre for terrestrial weapons. Whether or not space weapons are actually deployed, the deployment of a ground-based, mid-course BMD system could be a decisive move toward converting space into the kind of combat zone envisioned by some Pentagon planners. BMD interceptors, whatever their likely rate of success in intercepting ballistic missiles, are effectively also anti-satellite weapons. The interceptors that will be deployed in 2004 and in the foreseeable future will have only limited capacity as missile interceptors (the proponents themselves say that), but they will have a more credible capacity against any satellites in low-earth orbits that pass over US territory.

The ground-based missile defence interceptors which the US plans to field in Alaska will have the capacity to carry the kinetic kill vehicle into lower space, and this kill vehicle will in turn be equipped with its own small rockets designed to steer it into the path of an oncoming warhead. The same capacity, that is, the onboard rockets to steer it and the sensors to identify its target, will also be available to identify satellites and to steer the kill vehicle into the path of an adversary's satellite. In fact, as Wright and Grego point out, satellites in low-earth orbit travel at roughly the same speed as an intercontinental range warhead in its mid-course coast.

Furthermore, the Alaskan BMD interceptors will have the capacity to lift a kill vehicle to a height of about 6,000 kilometres, while most low-earth orbit satellites are within the 1,200 km range – meaning the interceptors would be able to use some of their capacity to extend their lateral range and thus to deliver a kill vehicle to reach a very large fraction of satellites in low-earth orbit, especially those in orbit above American territory.⁵⁸

⁵⁸ David Wright and Laura Grego point out that the BMD interceptors planned for deployment in 2004/5 “will consist of a three-stage rocket booster that carries a kill vehicle into space. The kill vehicle, which is intended to intercept above the atmosphere, carries its own fuel for manoeuvring, as well as optical and infrared sensors, which are intended to allow it to track and home on an object, destroying it by direct impact.... It appears that these interceptors could be effective as ASATs against a large fraction of satellites in low-earth orbit. The planned burnout speed of the ground-based interceptors is reported to be 7 to 8 km/s. If launched straight up, this interceptor could lift the kill vehicle to a height of roughly 6,000 kilometres. It could therefore reach satellites in low-earth orbit, which are typically at altitudes less than 1,200 km, but not satellites in geosynchronous (36,000 km) or semi-synchronous orbits (20,000 km). If launched against satellites in low-earth orbit, the interceptor could use some of its speed to reach out laterally thousands of kilometres, allowing it to hit satellites on orbits that do not pass directly over the launch site. Thus, even interceptors at fixed ground sites in Alaska and California could reach a large fraction of satellites in low-earth orbit—especially those in orbits that pass over the United States.”
...“As part of this system, satellite kill vehicles would be placed in orbit, where they would remain until a missile launch was detected. A kill vehicle near the missile launch site would then use its onboard propulsion and sensors to accelerate out of its orbit and home on the missile, attempting to destroy it by direct impact. The orbital speed of the kill vehicle would be roughly 8 km/s, and the propulsion system is intended to accelerate it an additional 6 km/s to allow it to reach a boosting missile in the relatively short time available. As a result, the kill vehicle would have a total speed of up to 14 km/s. Calculations show that such a speed would allow it to travel from low-earth orbit to

ASAT weapons are not currently explicitly prohibited, but a variety of legal constraints on states exist to prohibit interference with other states' satellites used for disarmament verification or for "activities in the peaceful exploration and use of outer space."⁵⁹ The current use of space assets to manage and control terrestrial combat already builds interest in space combat inasmuch as adversaries will increasingly be tempted to seek advantage in terrestrial wars through the destruction of an adversary's space-based war-fighting assets (command and control as well as communications and surveillance efforts). For now, most combatants will find it easier to attack the ground-based links to space assets (communications terminals and so on) rather than the space assets themselves, but with the deployment of mid-course interceptors the United States is signalling an intention to develop significant capacity to threaten the space assets of others.

While the United States and the Soviet Union maintained a variety of Cold War anti-satellite research and testing programs, and even deployments (such as the Soviet Co-Orbital ASAT system), both have observed a *defacto* testing moratorium since 1983.⁶⁰ Research into related technologies is ongoing, however, including high energy lasers,

geosynchronous orbit in just over an hour, and still have a speed of nearly 10 km/s at that altitude. Whether a kill vehicle designed solely for missile defense could be used to attack satellites in this way depends on details of its design, such as the type of sensors it contains, the amount of fuel for manoeuvring it carries, and the length of time it is designed to operate (a matter of minutes to reach a boosting missile versus an hour to reach geosynchronous orbit). It is clear, however, that these are design decisions and that these capabilities could be built into the kill vehicle to give it the capability to be an effective high-altitude ASAT." [Union of Concerned Scientists and Citizens and Scientists for Environmental Solutions, December 9, 2002.]

⁵⁹ US Ambassador Jonathon Dean, former arms control negotiator and now adviser to the Union of Concerned Scientists, identifies a range of legal measures against ASAT systems: "The concept of non-interference with national technical means of verification first appeared in the SALT I Treaty of 1972 and was taken over into the INF Treaty, which is of indefinite duration, as well as into the START I Treaty, which has been prolonged to 2009. The intent of this measure is to preserve from attack or interference technical means of verification, including space orbiting means. As I read it," says Jonathon Dean, "It would be a violation of the provisions on non-interference with means of verification in the INF and START I Treaties to use weapons against any early warning, imaging, or intelligence satellite and, by extension, against any ocean surveillance, signals, intelligence or communications satellite of the US or Russia. This non-interference obligation was made multilateral in the Conventional Forces in Europe Treaty, which has thirty NATO and East European participants and is of unlimited duration. It is true that satellites must be used to verify specific treaties, but in most cases, it will not be feasible to determine which satellites are being actually used or could be used for this purpose. Hence all are protected."

...Article VII of the Outer Space Treaty "makes treaty parties that launch objects into outer space liable for damage to the property of another treaty party – the procedure is spelled out in the Liability Convention of 1972. The Liability Convention foresees the establishment of a Claims Commission to determine the extent of liability for damage by the space objects of one country to the space objects or property of another state. Article IX of the Outer Space Treaty provides for consultations if any treaty party believes an activity planned by another treaty party could cause "potentially harmful interference with activities in the peaceful exploration and use of outer space." [Jonathon Dean, Nov. 26-27, 2002.]

⁶⁰ On August 18, 1983 the USSR announced a unilateral moratorium on testing of ASAT weapons, and on March 31, 1984 the US issued a report saying that a ban on ASAT weapons was not possible and that it was not willing to enter into negotiations to ban ASAT weapons. It has, however, not tested ASATS since the start of the USSR moratorium. [The Arms Control Reporter 2001, Institute for Defense and Disarmament Studies, Cambridge, Mass, page 840.A.26.]

high-powered microwaves, kinetic kill vehicles, improved sensing and surveillance, and so on.

The Government of Canada has long held that a ban on weapons in space should ultimately be supplemented by an ASAT ban,⁶¹ recognizing that such a ban must be part of a broader ban on weapons in space to avoid creating a *de facto* sanctuary for satellite based weapons.⁶²

4.3 Policy Priorities

- In the context of its current BMD discussions with Washington, Canada should call on the US to disavow weapons in space by agreeing to the talks at the Geneva-based Conference on Disarmament (CD) leading to a space weapons ban, *before* proceeding further with BMD deployment. The CD is the primary UN disarmament negotiating body, but talks on a space weapons ban have been stalled in recent years due to an ongoing agenda dispute that the United States could end by simply agreeing to good faith negotiations on the item, “preventing an arms race in outer space.” While the CD is not the only, nor necessarily the most effective, venue for such negotiations, any move by Canada to support BMD without a clear public challenge to the Americans to commit to negotiating a space weapons ban would represent an abandonment of Canada’s historic commitment to space as a weapons-free zone.
- Canada should also make it clear that it needs assurances that BMD interceptors will not double as a basic ASAT testing (or operational) system, as well as evidence of some US movement toward acceptance of multilateral discussions aimed at developing a global ASAT ban.

⁶¹ “A ban on ground (or air) to space anti-satellite weapons would over time be a desirable adjunct to any accord prohibiting spaced-based weaponry... Given that both ballistic missiles, and anti-ballistic missile interceptors under development, possess an inherent ASAT capability; the difficulty of arriving at a comprehensive ASAT ban is evident. A ban on space-based weapons, would, however, encompass any orbiting ASAT, and could provide a basis of confidence for negotiating further arrangements to prohibit anti-satellite testing and use which would secure satellites from deliberate harm by earth-based weapons deployed on the land, sea or in the air. Moving in succession to negotiate both a space-weapons ban, and an ASAT ban would provide a “sanctuary” for artificial satellites consistent with the principle of the non-aggressive peaceful uses of outer space.” [Meyer]

⁶² “An outright ban on ASAT deployments at this juncture poses particular problems for the international community. On the surface, such a ban would seem to promise enhanced security for satellites in orbit about the Earth, but a convention to enact an ASAT ban negotiated before all weapons are banned from orbiting the Earth would effectively give sanctuary to prospective space-based weapons.” [DFAIT, Food For Thought]

5. BMD AND CANADA-US SECURITY COOPERATION

5.1 Canada-US Joint Defence

Canada-US defence cooperation was shaped in the lead-up to and during World War II. It included not only a commitment to joint defence of North America, but also an undertaking by Canada to take the measures necessary to give the United States credible assurances that threats to its security would not emerge undetected from Canadian territory. The North American Aerospace Defence Agreement, or NORAD, is regularly described as the core of that security relationship, but that does not do justice to the broad range of shared security requirements and interests that link our two countries.

Canada's security obligations to the United States are serious, and throughout the Cold War Canada met its strategic security obligations through measures such as the installation of early warning radars in northern Canada, linked to NORAD, which gave Americans assurances that Soviet bombers would not arrive at America's northern frontier without warning. Between friends there will always be debates over whether each is doing enough, or the right thing, in support of common security interests, but Canada has traditionally carried out the level of surveillance and monitoring of Canadian territory and frontiers that was commensurate with the threat and that satisfied its basic obligation – the requirement that Canada provide the US with credible assurance that threats to US security are not emanating undetected from Canadian territory.

But this obligation to give Americans credible assurances (which of course is reciprocal) does not mean that Canada must uncritically acquiesce to every demand, wish, anxiety, or political fashion that Washington happens to generate. What Canada does on its territory must obviously be decided in Ottawa, not Washington. Ottawa surely must listen closely to Washington's concerns, but it is concerns and preferences, not instructions, that need to be seriously addressed, and balanced against other considerations and interests.

An important dimension of shared security interests, especially in the context of frequent differences in approach to security issues, is the continuing need for a common table at which the two countries can consult on common security concerns. One argument advanced in favor of Canada "joining" the US BMD system is that this would give Canada "a seat at the table" when the United States plans for defence systems designed to protect the continent. In fact, more than one table already exists. The Canada-US Permanent Joint Board on Defence has been around since World War II and in December 2002 the Binational Planning Group was established. The latter is separate from but located at NORAD headquarters in Colorado Springs and is a forum through which to address a broad range of Canada-US security issues. In addition, a

BMD Bilateral Information Sharing Working Group has been meeting twice a year since 2000.⁶³

The BMD debate is contentious not for lack of venues in which to advance it but because in Canada it gets to the heart of the question of where Canada's security is grounded. One prominent, even traditional, view sees Canada as protected in the most fundamental sense by international law and multilateral cooperation (and as shielded from undue US influence by the same); a contrasting and also prominent view sees Canada relying fundamentally on the protection of the United States in a world that is inherently unstable and unreliable.

For some Canadian officials the BMD problem has less to do with worldview than with the practical management of a complicated set of Canada-US relations. By that reckoning, even though the United States has not formally requested Canadian support for or participation in BMD, if the United States views Canadian participation as a test of Canada's commitment to North American security cooperation, then Canada will have little option but to go along with BMD in some way, whatever we may think of its merits or implications.

Much of the Canadian eagerness to participate in Washington's BMD experiment, and thus to radically change Canada's anti-ballistic missile and space policy, is rooted, not in the embrace of those changes, but in fear of change in the Canada-US security relationship in general. In DND in particular, the embrace of BMD is primarily an attempt to forestall changes to the Canada/US NORAD relationship. The way that fear is most often stated is that without BMD, NORAD will decline in importance, which in turn will lead to a decline in Canadian access to US military intelligence and to the US military market – the two being closely connected. For this school of Canadian security thought, BMD is not so much an opportunity to protect Canadians as it is to repair much of what they think has gone wrong in the Canada/US security relationship. Because they regard Canada's fate in the world as being inextricably connected to that of the United States, they assume that the primary objective of Canadian security must be to secure an ongoing place of favour within the American orbit.

For those in the other prominent school of security thought, the threatened proliferation of weapons of mass destruction and intercontinental range ballistic missiles should lead Canada to re-emphasize that its security is inextricably linked to a stable, rules-based international order that needs to function, not according to the whims of the powerful, but in the service of the common good. Canada/US friendship and mutual security interests are a prominent reality that must be managed within a global perspective and interest.

⁶³ DFAIT, "Backgrounder: Canada and Ballistic Missile Defence."

But both approaches acknowledge that the Americans are destined to remain Canada's best friends, as Robert Thompson famously put it, whether we like it or not. In that spirit of friendship or inevitability, Canada has fully accepted and honoured the obligation to try to prevent threats to US security from emerging undetected from Canadian territory, and to cooperate on mutual security concerns. Whatever ballistic missile threat the US perceives, it obviously does not emanate from Canadian territory, nor does the US need access to Canadian territory to monitor the nature and level of such a threat and to respond to it in its own way. In other words, for Canada not to participate in BMD would not violate any basic or traditional commitment to security cooperation.

It is also important to note that it is not at all clear that the United States is particularly anxious to have Canada as part of the BMD operation. While Canada's political support would certainly be welcomed, some Canadian officials imply that in the current discussions Canada is actually lobbying the US to name NORAD as the agency that integrates the ballistic missile early warning function and the command and control of interceptors. During the Cold War and as of now, NORAD has performed the former, but the command and control of retaliatory forces is under national command. It is likely that the United States will also want to keep missile interception forces under national command and so is unlikely to accede to a Canadian wish to have NORAD play the BMD detection and battle management integration role.

In the end, it is clear that any Canadian move toward support of BMD would not be based on an American need for such support, it would not be a response to American pressure, and it would not be based on any clear Canadian policy that declares BMD to be a compelling or intrinsically helpful response to proliferation.

The Government's own account of the priority it places on missile defence as a response to the missile threat certainly offers no endorsement of BMD as a reasonable response. The primary focus is properly on missile non-proliferation measures that include engagement with potential proliferators and attention to multilateral arms control mechanisms, concluding that it is also "examining the employment of defensive capabilities."⁶⁴ The most positive supportive official policy statement it has so far managed came in an "explanation of vote" at the UN following its abstention on a paragraph critical of the non-proliferation implications of BMD:

The Government is of the view that current developments in missile defenses do not presume a negative impact on nuclear disarmament and non-proliferation. Given the new threats of the proliferation of missiles and WMD that the international community faces, we believe that cooperation in this area could complement non-proliferation efforts.

⁶⁴ DFAIT, "Backgrounder: Canada and Ballistic Missile Defence."

While this statement is an ominous indication of the direction in which the Government is moving on BMD, it is well short of a ringing endorsement. Jack Granatstein's comment to the Standing Committee on Foreign Affairs and International Trade that, "if the [BMD] research failed to produce a useful defensive system, almost no one would weep,"⁶⁵ probably captures the Canadian view. In other words, if Canada decides to support BMD, it won't be on its perceived merits.

5.2 NORAD, Technology, Geography, and the Cooperation Imperative

The importance of Canadian territory to American security priorities has been steadily declining since the early years of the Cold War. The early post-World War II Soviet bomber threat made Canada America's strategic fore field in that the protection of major North American population centres from Soviet airborne nuclear attacks required that such attacks be intercepted as far north as possible. The northern, or distant, early warning line of radars (the DEW Line, later updated as the North Warning System) provided early warning of Soviet nuclear bomber approaches, while more southerly Canadian radars – the Mid-Canada Line and the Pinetree Line – offered follow-on tracking of the incoming bombers and control and navigation to the Canadian and American aircraft and, for a short time, missiles that were to intercept them.⁶⁶ These air defence operations required close cooperation between Canada and the United States, and joint air defence command through NORAD provided the institutional framework, but the decline of the bomber threat in favour of the ICBM threat meant a progressive decline in the US focus on bomber interceptions in the Canadian north and increasing attention to ballistic missile early warning facilities (emphasizing satellite surveillance, assisted by ground-based radars and related communications systems, none of which employed Canadian assets or required sites for American assets on Canadian territory).

Throughout the Cold War, however, Canada-US cooperation continued in the air surveillance of the continent, especially the air approaches to the continent. While America's high profile security attention during the Cold War was on strategic issues in which Canadian territory was of less and less interest to Washington, in the Post-Cold War era of the 1990s issues such as the drug trade, terrorism, and illegal entries into North America came increasingly into the purview of NORAD's air surveillance and control activities, as well as a key focus of maritime surveillance. Then, after September 11, 2001, not only did domestic air surveillance become more important (with new emphasis on patrolling not only the air approaches to North America but internal North American airspace as well), it also became part of the high profile US security preoccupation. In December 2002 Gen Campbell identified for SCNDVA, in response to a question about the changing role of NORAD, some operational implications:

⁶⁵ "Partners in North America: Advancing Canada's Relations with the United States and Mexico (Report of the Standing Committee on Foreign Affairs and International Trade, December 2002).

⁶⁶ Throughout much of this period Canadian interceptor aircraft were equipped with nuclear-tipped rockets. Nuclear warheads were used to make up for the lack of accuracy of the air-to-air missiles, and there are those who suggest that ballistic missile interceptors might best be equipped with small nuclear warheads to make up for the difficulty in distinguishing between warheads, decoys and debris.

One [change] has been the deployment of aircraft around the country on a regular and routine basis, to ramp up our alert capabilities throughout the country rather than just focusing on the externally based threat. The second has been a look at ways in which we can ensure that our radar and other sensor coverage internally is better. NORAD is taking the lead on a study to try to do that and to make sure that we're very much connected with our civilian counterparts at NAV CANADA to make sure we use their facilities as well.⁶⁷

In other words, while Canadian territory and air space have had varying levels of relevance to American security interests in the past, and while they have received more attention since September 11, 2001 they remain marginal to current US BMD interests. Canadian territory is certainly irrelevant to the current mid-course interception effort and Washington's focus on a North Korean threat. That could change if Washington's focus shifted heavily to Iran's potential missile capabilities. The Alaskan interceptor launch site is very far from the path of any missile originating in the Middle East and headed for North America, which means interceptors would have to be launched very early upon warning of an attack, especially if they wanted to have a second and third try at the intercept. Given this distance, the Americans could yet look for an interceptor launch site in northeast Canada. Such a request is not imminent, but it cannot be ruled out entirely.⁶⁸

Just as Canadian territory is marginal to BMD, so too, as noted above, is NORAD. Indeed, some Canadians who still push for BMD to be managed through NORAD, now acknowledge that NORAD's future is not linked to BMD – essentially for the reasons put forward by Gen.Campbell.⁶⁹

NORAD's relevance, and future, is linked to the relevance of its air defence role. Air defence is a mutual Canada-US concern and the focus of actual, practical cooperation. It will be a focus of security cooperation as long as it is a practical benefit. Ballistic missile early warning and assessment are currently a NORAD activity and involve Canadian personnel, but there is no requirement that it be bilateral – it is an American role, using American technology. The US national focus of that activity will be reinforced

⁶⁷ Campbell, SCONDVA, Dec 11/02.

⁶⁸ If Canada were keen to focus on BMD against attacks on selected Canadian cities, by adding terminal phase interception forces, that would obviously require interceptions on Canadian territory. Even if Canada chose not to become formally involved in BMD, we could still face some tough choices. It could happen, for example, that the Americans would conclude that an unstaffed communications facility in Northern Canada would aid their BMD operation. They and Canadian supporters would certainly argue that Canadian permission would simply be part of fulfilling the WWII joint defence pledge.

⁶⁹ "If Canada says no to missile defence, NORAD is not going to die. NORAD will have to change. The United States will remain interested, as we are, to cooperate on air space, not aerospace. They will say we need to cooperate on air space. There are lots of reasons to continue close cooperation. And NORAD is an important vehicle.... But of course NORAD will be less important in the US scheme of things because it simply will have a smaller role to play. Certain roles that NORAD plans, of course, with regard to the space component...will close on us."(Fergusson, SCONDVA, May 27, 2003.)

by BMD as the warning and assessment role becomes fully integrated with the command and control of the interceptors. Proponents of Canadian involvement in BMD make the same point: "There's no functional role for Canada in ballistic missile early warning. There is no need for us to be involved in the space aspect at all."⁷⁰ To involve Canada is largely a courtesy, maybe even a political convenience, but certainly not an operational necessity – and the Americans may doubt the political convenience of Canadian involvement if Canada starts to attach more conditions.

5.3 Sovereignty and Security Cooperation

A primary justification for the Cold War NORAD was that it strengthened Canadian sovereignty – not independence, but sovereignty. The line of argument was essentially that because the vital security interests of the United States could not be separated from military installations and action (like interception of Soviet bombers) within Canadian territory, it was clear that the United States would look after its security interests, whether or not Canada agreed. For the US to come into Canadian territory without explicit permission from Canada, would obviously compromise Canadian sovereignty. To prevent that, Canada agreed to take certain actions that the US considered essential (like early warning radars), so that the US would not do it for us (hence, the famous defence against help). In addition, because the United States would come into Canadian territory in certain circumstances, it was better to formalize those arrangements and for Canada, as a sovereign state, to formally grant permission. NORAD was the product, and while it is not a tribute to Canadian security independence, it does recognize our sovereign right to grant, or refuse, security cooperation.

Some have argued that Canada is once again in a similar spot. By formally entering into a BMD relationship Canada exercises its sovereign prerogative to formalize and approve the details of such cooperation. In fact, the situations are not parallel, as this Canada-US defence expert explains:

...if you take a stricter definition of sovereignty, to limit it to control over territory, airspace, and waters, not participating in missile defence should have very little impact on Canadian sovereignty. Even without missile defence cooperation, air defence cooperation between Canada and the United States and naval cooperation would continue. In fact, without missile defence, we would be restructuring our bilateral defence relationship to concentrate just on those areas. I don't think it's sovereignty, at least as traditionally concerned, that's the question here. It's whether or not Canada wants to be involved at the very core of aerospace defence operations, which have been questions about the broader relationship, political relationship, the military relationship, and possibly the economic relationship.⁷¹

⁷⁰ Fergusson, SCONDVA, May 27, 2003.

⁷¹ Jockel, SCONDVA, June 3, 2003.

It is important for Canada to nurture constructive security cooperation with the United States. When based on shared concerns and mutual interests, and especially on independent threat assessments, such cooperation can strengthen Canadian sovereignty as well. In the case of BMD it is clear that Canada does not share US concerns or threat assessments, and certainly does not share the American view that BMD should be a primary response to proliferation threats. There is no elaborated Canadian policy that argues that BMD is an effective response to proliferation, or that nuclear missile strikes by what the US national security strategy calls "rogue states," are an imminent threat. Ours is a different understanding of both the threat and an effective response. Non-participation in BMD would simply confirm that Canada's priorities continue to lie elsewhere and would not in any way undermine American capacity to pursue the priorities it has chosen.

5.4 Policy Priorities

- There is no need for Canada to make any decision specifically related to US ballistic missile defence. Canada has never regarded BMD as a compelling response to the ICBM threat and there is certainly no need to endorse this or any other American weapons system, particularly one as immature and experimental as this one. At the very least the Government should heed the advice of the Standing Committee on Foreign Affairs:
The Government should not make a decision about missile defence systems being developed by the United States, as the technology has not been proven and details of deployment are not known. However, the Government should continue to monitor development of this program with the Government of the United States and continue to oppose the weaponization of space.⁷²
- Canada should obviously continue practical cooperation with the US on shared security matters, including air defence, as well as on maritime and border concerns, in ways consistent with Canadian interests and international peace and security.
- Canada should re-emphasize that the ballistic missile threat is a global phenomenon that requires a global approach; that a secure and stable Fortress North America is not achievable in an international environment of nuclear weapons and ICBM proliferation; that North American protection from ballistic missile threats requires that their use be prevented and that their spread be limited; that preventing their use and spread includes addressing the political and security conditions that currently produce incentives for states to seek

⁷² "Partners in North America: Advancing Canada's Relations with the United States and Mexico (Report of the Standing Committee on Foreign Affairs and International Trade, December 2002).

nuclear weapons and the means to threaten them over intercontinental distances; and that strategic missile defence contributes to proliferation pressures.

- In the current Canada/US discussions on BMD, Canada should be open to returning NORAD to its original function as a mechanism for air defence cooperation, through which each party assures the other that no undetected air threats to the other are emanating from its territory. Whether a NORAD-style joint command is necessary is an open question – but cooperation is. North American air defence should be cooperatively addressed in a manner commensurate with the threat. If there is no credible air threat, air defence will be of minor importance; if the air threat escalates, the importance of the air defence cooperation arrangement will grow within the overall North American security calculus.

CONCLUSION

Ottawa should be seriously attentive to the possibility that the BMD project is headed for trouble. A combination of cost overruns, nonperformance of the technology, and discernable diplomatic progress in mitigating the perceived North Korean and Iranian threats, could lead to a quick reversal in the political favour BMD now enjoys. There are many reasons to believe, September 11 not the least among them, that Washington's homeland security preoccupations could move strongly toward North American air defence. Internal air surveillance and control are likely to become more, not less important. For certain hardcore constituencies Washington's long obsession with BMD is not likely to disappear very soon, but White House interest could wane rather quickly as its technology challenges persist, as the costs climb and the tangible returns fail to emerge, and as public support turns to indifference or hostility.

Indeed, why is it in Canada's interests to elevate BMD into a major policy question at this particular moment in Canada-US relations? There is nothing in the 2004-5 American deployment time frame that makes the present situation any more of a deadline or occasion for Canadian decision-making than any other period of BMD's tortured history. US deployments of new weapons systems don't require, and are in any event not responsive to, any Canadian "yea" or "nay," and there is no reason why this one should require a Canadian policy decision. In fact, the United States, by its own reckoning, is not yet sure whether it is *deploying* a new weapons system or simply *fielding* an experiment – the same unsuccessful experimentation that it has been engaged in for decades. Canada can appropriately question the wisdom of Washington's priorities, we should register concern that its single-minded pursuit of BMD is causing important disruptions in the global security environment, we can agree that certain ongoing levels of related scientific research are prudent, but just as Canada is under no obligation to pass formal judgment on any number of other American undertakings, whether foolish

or prudent, there is no need for Canada to feel obliged to draw this experimental BMD program into a formal policy declaration.

Current Canadian interest in BMD may well be a reflection of a perceived Canadian vulnerability, not so much to missiles as to Washington, but it is important that Canada manage its bilateral anxieties in ways that do not support some of Washington's more destructive and uncooperative international objectives and actions.

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Appendix I

THE GROUND-BASED, MID-COURSE BMD SYSTEM IN BRIEF

When you spend \$10 billion (US) a year (more than the entire Canadian Defence budget) just to research and develop a weapons system, you know it's going to be complicated. Ballistic missile defence (BMD) is a truly dizzying array of programs, technologies, and organizations and its various elements have been re-organized, restructured, and re-named so often that most but the truly obsessive might think better of trying to sort it out. We are grateful for those valiant few who persist and put it into some basic order for the rest of us.⁷³

In the end, there are three basic elements to ballistic missile defence: interceptors to take out the attacking missiles; sensors and radars to provide the information needed to carry out an intercept attempt; and the command, control, and communications elements to manage and run the system.

Interceptors

Interceptors are at the core of missile defence, since it is the interceptor that actually takes out the incoming missile during one of three phases of its flight (in the **boost** phase when it is being lifted into space, in **mid-course** when the warhead separates from the missile and coasts in space toward its destination, and in the **terminal** phase when the warhead re-enters the atmosphere in its final descent to its target). The American *strategic* BMD system – the part of the system that is designed to intercept intercontinental ballistic missile (ICBM) attacks on North America (missiles with a range of more than 5,500 km), and the system that is the focus of the current Canada/US discussions – will consist of only one set of interceptor missiles when it becomes operational, still scheduled for late 2004:

- 20 ground-based interceptors (initially 6 based in Alaska, with 10 to be added soon, and four in California) to defend against strategic missile warheads in mid-course.

But there is also a *theatre* component to the American BMD system that is intended to engage shorter, or theatre-range missiles (short range missiles – less than 1,000 km; medium range – 1,000 to 3,000 km; and intermediate range – 3,000 to 5,500 km), so the Pentagon is planning to deploy two such systems in the next year or two years as well:

⁷³ The references included in this paper indicate some of the organizations, documents and web sites that help to sort out the complexities of BMD and that are the main sources for this paper.

- Aegis Sea-based interceptors to defend against short to intermediate range missiles during midcourse, focusing on the early or ascent phase of the midcourse coast;
- Patriot (PAC-3) missiles fired from mobile units to intercept short to medium range missiles in their terminal phase (already deployed and used in the invasion of Iraq).

Other interceptors are in earlier stages of development for later deployment:

- Mobile Theater High Altitude Area Defense (THAAD) interceptors to engage short to medium range missiles at the end of the mid-course phase and in the terminal phase (at higher altitudes than the PAC-3);
- Airborne Lasers to attack theatre and strategic missiles in their boost phase, using a chemical laser mounted on a modified Boeing 747 aircraft.

Space-based interceptors have received a lot of public attention (not to mention public funds), but the concept is still in impractical infancy and development funding has recently been reduced due to problems with the basic technology, though research funding and an active fantasy life in Washington continue to propel political commitments to weaponize space.

Sensors and Radars

The interceptors cannot locate the missiles they are to attack on their own. For that they need the help of a series of sensors, radars and communications systems to transmit the data that is to guide them:

- Defense Support Satellites (DSP) in geosynchronous orbit use infra-red sensors to detect missile launches; these are to be replaced by satellites with upgraded sensors – the Space-Based Infrared System in geosynchronous orbit (SBIRS-high) and the Space Tracking and Surveillance System (STSS) in low earth orbit – to track attacking missiles and warheads through all phases of their flight.
- The strategic BMD system relies on five ground-based early warning radars (in Massachusetts, California, Alaska, Greenland, and the United Kingdom), all of which are scheduled to be upgraded to enhance their capacity to track missiles and to determine their destination.
- A new X-band radar which is to have improved capacity to distinguish between warheads, decoys and debris, is to be deployed on a sea platform at the extreme western end of the Aleutian Islands.

Communications, Command, and Control

The detection and tracking of an attacking missile must then be integrated with the firing of the interceptor missile, allowing for political and tactical decision-making in the

process. The nerve centre of these functions is the ballistic early warning and assessment installation in Cheyenne Mountain Operations Center in Colorado, which is also the home of NORAD and which also links to STRATCOM and NORTHCOM as the central data collection and coordination center for the Pentagon's worldwide system of satellites, radars, and sensors that provide early warning of any missile, air, or space threat to North America.

The United States has yet to make final decisions regarding the overall management of the system – in particular whether the bi-national command in NORAD will be involved, or whether it will manage the system through national commands: STRATCOM which includes space operations, and/or NORTHCOM which is responsible for responding to external threats to North America. Theatre ballistic missile defense operations involve the relevant regional commands.

Appendix II

A GROUND-BASED, MID-COURSE INTERCEPTION SCENARIO

The scenario below describes the stages of a missile attack and its interception, showing how it is intended to work (in **bold** type), with commentary on the technology and why it is unlikely to work (in *italics*).

Introduction

The current Canada-US discussions on ballistic missile defence relate to just one element of the BMD system – namely, the ground-based, mid-course interception system that is to consist of 16 ground-based interceptors in Alaska and four in California, linked to an array of radars, sensors and command and control facilities. This still experimental, only partially tested, element is now in development and is being deployed, or "fielded," with a view to it becoming a combined operational around late 2004 and 2005. It is the only element of current BMD deployments that is focused on strategic interceptions, i.e. interceptions of inter-continental or long-range ballistic missiles directed toward targets in North America.

When this initial land-based, mid-course strategic interception system does become operational, it will function primarily as a test-bed for further evaluations and technology development, but the Administration does insist that it will also have some modest capacity against incoming missiles.

In 2004, and for the foreseeable future after that, there will in fact be only one active threat against which the system could theoretically offer protection, and that is the threat of the accidental, unintended, or mistaken launch of an isolated Russian missile with a nuclear weapon on board – a real threat inasmuch as the reliability of Russia's early warning and command and control systems are increasingly questioned (of course, it is also a threat that could be readily mitigated by the de-alerting of all strategic missiles, as called for by the 2000 NPT Review Conference).

The current and primary US focus is on the interception of an isolated attack from North Korea, but the North Korean threat will not be in play in 2004-5 or any time soon after that. North Korea, or Iran, or any other countries that might be regarded as having nuclear ambitions combined with an enduring enmity towards the United States, and deemed not to be amenable to deterrence, do not now have nuclear weapons or the missiles capable of delivering them to targets in North America.

The scenario thus focuses on an isolated, wayward Russian missile, a threat from which the Department of National Defence Backgrounder says BMD is to protect Canadians:

"The ballistic missile defence system is also meant to respond to unauthorized or accidentally launched missiles."⁷⁴

The Scenario⁷⁵

1. Through a set of unlikely circumstances, ranging from catastrophic technological malfunction to a misguided decision to launch a missile in response to what turns out to be a false warning of an American attack, a Russian SS-18 missile lifts from its launch site at Kartaly, Russia (south-east of Moscow near the Kazakhstan border).

The SS-18 is capable of carrying either one or 10 warheads, each with a yield of about 500 kt. Under START II, which is not in force, Russia was to end deployments of missiles with 10 warheads. Some of each variant are currently still deployed. [SIPRI Yearbook 2002, pp. 540-541].

2. The heat of the missile's thruster exhaust catches the attention of the infrared sensors of at least one of five US Defense Support Program (DSP) satellites stationed high above the earth in geosynchronous orbit.

The DSP satellites use a mature infrared technology but have a limited tracking capacity. They are to be replaced by new generations of Space Based Infrared Systems (SBIRS) in high and low earth orbits to provide improved early warning, as well as tracking through the mid-course and target discrimination. A new US GAO report on SBIRS-high says the "program continues to experience problems that have existed since its inception: cost overruns, schedule delays, and performance limitations...[A]dditional cost and schedule slips beyond the revised acquisition program baseline appear inevitable."⁷⁶ The first satellites will not be launched before 2006.⁷⁷ The SBIRS-low program, a companion set of satellites in low-earth orbit, was restructured in 2002 as the Space Tracking and Surveillance System. Cost estimates have gone from \$10 billion to \$23 billion and it may not provide the target discrimination capacity promised. Operational testing will not begin before 2007.⁷⁸ According to another GAO study, the 2007 launch is premature: The MDA "is uncertain as to whether some of the activities ... to

⁷⁴ Department of National Defence, May 8, 2003 Backgrounder on *Canada and Ballistic Missile Defence* (BG-03.026; www.forces.gc.ca/site/Newsroom/view_news_e.asp?id=1064).

⁷⁵ This interception scenario relies in general on interviews and a review of BMD literature, and in particular on specific summary descriptions of the operations of the ground-based, mid-course, missile defence system: on several United States General Accounting Office Reports issued in 2003; Union of Concerned Scientists, *Countermeasures*, April 2000.

⁷⁶ *Defense Acquisitions: Despite Restructuring, SBIRS High Program Remains at Risk of Cost and Schedule Overruns*, United States General Accounting Office Report to the Subcommittee on Strategic Forces, Committee on Armed Services, U.S. Senate (GAO-04-48, October 2003), p. 22.

⁷⁷ *Space News* reported Oct. 20/03 that the system which was to cost \$2.1 billion with the first launch in 2002, is now estimated at \$8 billion with the first launch in 2006, with still unresolved technology problems.

⁷⁸ Philip Coyle, "Is Missile Defense on Target?", p.4.

integrate and test legacy satellite systems can be completed in time for the 2007 launch."⁷⁹

3. The DSP satellites begin transmitting data regarding the Russian missile into the Command, Control, Battle Management and Communications (C2BMC) architecture, the point of entry being one of a network of communications facilities that pick up the satellite's signal. The data from the DSP satellites will identify the launch point and the general direction of the missile.

While an effective BMD system will require space-based tracking of missiles, the GAO reports that such "capabilities have not yet been demonstrated in space," and critically important communications and systems integration capabilities to permit data to flow from sensors so that it can be effectively used in missile defense operations also remain unproven. A few key challenges are: developing data processing at fast rates; reliable communications links; and materials that can withstand radiation and cold temperatures.⁸⁰ A November 2003 report indicates that the Pentagon lacks the capacity to even simulate operational conditions, meaning that the basic command and control system is to be deployed without full testing.⁸¹

4. The BMD system goes to alert status as the communications stations relay the data to the Cheyenne Mountain Operations Center in Colorado, the NORAD ballistic missile early warning and assessment facility, where the missile's speed and likely trajectory begin to be calculated. The results are then transmitted to the relevant command centres (in this case NORTHCOM and STRATCOM), which will be in charge of managing the interception, and to ground-based radars that will also become engaged in more detailed tracking of the Russian missile.

NORAD is headquartered at Cheyenne Mountain and could become involved, depending on how the Pentagon decides to manage the integration of the early warning function with interceptor command and control functions. While NORAD has to date managed the ballistic missile early warning role, the current assumption, even among Canadian officials who would like the bi-national NORAD command to be involved, is that NORAD will not be assigned the BMD command and control functions.

5. Within a maximum of 6 minutes the Russian SS-18 rocket engine shuts down and separates from the payload, having completed its task of boosting

⁷⁹ *Missile Defense: Alternate Approaches to Space Tracking and Surveillance System Need to be Considered*, United States General Accounting Office Report to the Subcommittee on Strategic Forces, Committee on Armed Services, U.S. Senate (GAO-03-597, May 2003), p. 16.

⁸⁰ GAO-03-597, pp. 6, 8-9.

⁸¹ *Inside Missile Defense*, Nov. 12/03; Center for Defense Information, Nov. 19/03.

the nose with its warheads into space and setting it on its course. Thus the boost phase of the attack is over.

BMD planners are trying to develop boost-phase interceptions, but none is currently possible for strategic range missiles (see further discussion in the paper).

6. The SS-18's payload, now unpowered and in the initial stages of its mid-course coast, opens to release its warhead(s) along with an unknown number of decoys. The whole cluster of warhead(s), decoys and discarded nose cone pieces begins to coast through space toward the pre-programmed target. This mid-course phase of flight will last 15 to 20 minutes, and it is during this time that the BMD mid-course system must accomplish the intercept.

If this happens to be one of the SS-18s with 10 warheads, it would of course release all 10 (and perhaps additional decoys), making successful interception even less likely.

7. Without the heat of the rocket engine, the DSP satellites cannot track the warhead(s), which means that other surveillance and tracking facilities must take over. Minutes after the end of the boost burn, the up-graded ground-based radars at Fylingdales in the UK, and then Thule (two of five ground radars linked to the Ballistic Missile Early Warning system currently operated through NORAD), will have identified the Russian missile, relying on feedback information from Cheyenne Mountain on the basic trajectory of the Russian attack.

If the incoming missile was from North Korea, the first radar to see it would be the Cobra Dane on the Shemya Island at the western end of Alaska's Aleutian chain.

The upgrades of the Fylingdales and Thule⁸² radars involve primarily more powerful computers to enable them to calculate with greater speed and precision the path of a missile payload, and to create some capacity for distinguishing between warheads and decoys.⁸³ The upgrades will not be sufficient to guide an interceptor directly to its target – for that final guidance the interceptor will rely on its on-board detection and guidance systems.

A new, sea-based (installed on a modified oil rig) X-band radar, which has been described by the Pentagon as essential to tracking the incoming warhead and for distinguishing it from decoys, is planned but will not be deployed as part

⁸² The Thule upgrade has become embroiled in an important Inuit landclaim in Greenland. In 1953 the Inuit were forcibly evicted from their ancestral lands, enabling the construction of the American base. In 1999 the Danish High Court ruled the eviction was illegal, but denied them the right of return. The Court is now addressing the right of return and Inuit leaders are insisting that there should be no work on the Thule upgrade until the issue is settled. Many still expect their right of return to be honoured and believe that the base will have to close. (Malcolm Brabant, "Inuit battle to shut US air base," November 2003, <http://news.bbc.co.uk/2/hi/europe/3236083.stm>.)

⁸³ RAF Fylingdales Upgrade to Early Warning Radars: Environmental and Land Use Report, June 16/03 (UK Ministry of Defence, http://www.mod.uk/linked_files/publications/other/fylingdales/update_report.pdf).

of the 2004 system. Construction is now slated for completion in 2005, after which it must undergo seven months of testing and then be towed from the east coast around South America and up to Alaska.⁸⁴ Hitchens reports that in 2002 MDA officials told Congress that without the X-band radar the mid-course interception system would essentially have no capability.⁸⁵

8. The cluster of warhead(s), decoys and debris is now tracked by radar and a more accurate calculation of the attack trajectory and destination gradually becomes available. The data from the DSP satellite will already have made it clear that this event is not a test launch and that it's payload is heading toward North America. Soon new data from the radars will indicate where in North America the impact is intended to be.

9. At about this time, perhaps still less than 10 minutes into the flight of the Russian (accidental) attack, officials in Cheyenne Mountain have alerted the political masters in Washington of the situation, namely the possibility that there is a real nuclear warhead(s) on its way to a devastating detonation on North American soil. The launch of one or more of the 10 interceptor missiles based in Alaska and California (20 by 2006) will already be a priority consideration.

The sooner the interceptors can be launched, the better the chance of follow-on launches in the event that the first is not a successful intercept. Indeed, in this scenario, the second shot may well have to be fired before it has been possible to verify the results of the first shot because of the distance the interceptors from the extreme West of the continent have to travel to reach a target coming along a more northerly trajectory. The interceptors to be deployed in 2004 are more specifically intended to respond to a missile of North Korean origin.

10. Because of the limited time for decision-making, because the interceptor must be fired as early in the attack as possible, and because an interceptor fired in response to a false alarm would have limited consequence, the launch of an interceptor will be close to automatic – in other words, there will be a human in the loop to make the decision, but it will have to be a person on station in the BMD system – there will not be time for an external political decision.⁸⁶ The interceptor is thus sent aloft, heading for the flight path of the incoming cluster of warhead(s) and debris released by the Russian missile.

The launch of an interceptor obviously does not carry with it the grave implications and consequences of a retaliatory attack. In the event of a false

⁸⁴ Coyle, "Is Missile Defense on Target?"

⁸⁵ Hitchens, "Technical Hurdles in U.S. Missile Defense Agency Programs."

⁸⁶ The August 2003 GAO Report (GAO-03-600, p.7) says "The concept of operations assumes release authority has been previously granted by the President of the United States or the Secretary of Defense. Missile flight times may be too brief to ask for permission to launch interceptors and engage the enemy."

alarm or a miss, the kinetic kill vehicle, which does not have a warhead, will simply continue to coast in space and gradually be pulled to re-enter the earth's atmosphere where it will burn up and disintegrate.

The two versions of a ground-based interceptor rocket booster will not receive "operational" testing until 2004, after its initial deployment in Alaska.⁸⁷ The modified ICBM booster used in the tests to date has been unreliable, so the Pentagon is developing two new prototype boosters (one by Lockheed Martin⁸⁸ and the other by Orbital Sciences Corporation).⁸⁹ Each of the boosters will likely be put through only one intercept test before deployment.⁹⁰ Arms Control Today (June 2003) reports that "the Pentagon has essentially been repeating the same test at a lower altitude and slower speeds than what a real intercept is likely to demand. The Target in all the tests has been equipped with a C-band transponder, and data from that transponder is used to calculate the intercept plan guiding the interceptor into space toward the target. MDA justifies this practise as necessary due to the lack of a radar in the testing area to track the target in its early stages of flight. Information on the target is also fed into the EKV before the intercept attempt so that it can identify the mock warhead from among the other objects, including decoys, in the target clusters. The decoys used in testing, balloons that are not vaguely similar to the mock warhead, are also largely considered unrepresentative of the foils a potential enemy might employ."⁹¹

11. Based on the information received from the DSP satellites and ground radars, the interceptor is aimed into the path of the oncoming warhead(s), decoys, and debris and when it comes within a certain distance of its target it releases its own kill vehicle. The kill vehicle itself must now identify the cluster of targets coming toward it and distinguish between the warhead(s) and the decoys. If, in fact, the oncoming missile has a payload of 10 warheads the chances of intercepting them all are remote.

If the payload is one warhead and multiple decoys, the chances are not a lot better. As long as heavy warheads and light decoys are coasting in the vacuum of space they behave identically and are not readily distinguishable. But the radars and the sensors on the interceptor kill vehicle must

⁸⁷ "Development tests, especially in the early years of a program, may be heavily scripted with unrealistic or artificial limitations. Operational testing, on the other hand, must be realistic with the systems operated by real soldiers, sailors, airmen, or Marines, as they would be in battle." Philip Coyle, "Is Missile Defence on Target?," *Arms Control Today* (October 2003).

⁸⁸ Two fires last summer at the Lockheed Martin plant, one of them killing a worker, were caused by exploding propellant for the booster. Development is now deployed further, and the initial set of boosters will not include the Lockheed Martin variant. (Center for Defense Information, Nov. 19/03; Defense Daily, Nov 19/03; Aerospace Daily, Nov 11/03).

⁸⁹ The GAO rates both boosters as having a technical readiness level of "6" out of 9, one that has been tested in laboratory or simulated operation environment – in other words, the boosters are still in the developmental stage without any operational testing yet.

⁹⁰ Philip Coyle, "Is Missile Defence on Target?," *Arms Control Today* (October 2003).

⁹¹ Wade Boese, "Missile Defense Post-ABM Treaty."

nevertheless identify the real target. The upgraded radars have some limited capacity to discriminate between warheads and decoys, and the US is in the process of developing an X-band radar on a sea platform off the coast of Alaska. Though it is especially focused on missiles that may be launched from North Korea, it would also be able to track a missile launched from Russia and add to the data needed to distinguish between warheads and decoys and debris.

Analysts generally assume a requirement for three interceptors per target, but in the 2004-2005 period there will only be 10 interceptors available. By 2006 an additional 10 interceptors are to be available. The single most challenging element of the intercept is not so much to develop a kinetic hit-to-kill capability (that capability has been around ever since the capacity to strike a satellite was acquired some 15 years ago). The problem "is the inability to come up with sensors and software that can discriminate between real warheads and either cheap decoys or launcher debris."⁹²

It is only at the end of the mid-course and beginning of the terminal phase, when all the objects begin to enter earth's atmosphere, that they are readily distinguishable by weight and changing speed and temperature as the lighter objects quickly lose speed and burn up as they enter the earth's atmosphere.

12. The sensors on board the interceptor kill vehicle are key to monitoring and assessing the oncoming space borne objects, trying to find the warhead among the decoys and space debris, and then using its on board computers and "divert" propulsion systems to steer itself into the particular path of the warhead.

To distinguish between the oncoming warhead and the decoys that accompany it, the kill vehicle has three kinds of capacity on board – an infrared sensor and telescope to identify the targets; on-board discrimination processor to carry out the calculations on data received from the sensors; and a guidance and navigation system capable of steering itself directly into the path of the warhead, rather than a decoy. These are only partially tested systems, tested essentially under laboratory conditions, with the first test in "a real world environment" coming in 2004.⁹³ Even that test will not bring it to production readiness, emphasizing again that what is being deployed is an experiment, not a defence system.

13. If everything works the way technology and hope have envisioned it, the interceptor's kinetic kill vehicle collides with the warhead. The combined speed of the two (each travelling at more than 7 kilometres per second) produces an impact so enormous that the kinetic energy released upon impact produces a major explosion. The warhead is not detonated but is

⁹² Douglas Ross, Round Table, p. 124.

⁹³ GAO Report (GAO-03-600, August 2003), p. 12.

destroyed (along with the kill vehicle) by force of impact and the two are shattered into a cloud of debris. Most of this material, travelling at less than orbital speed, gradually loses altitude, enters the earth's atmosphere and burns up.

The qualifier, "if everything works," is necessary because there is no evidence available to suggest that it will work. As the General Accounting Office studies keep repeating, until there is real world operational testing there is no foundation for assuming that what is deployed will work.

14. The ground-based radars witness all this and signal a successful hit – or the interceptor misses and it's time for a second shot. There could be as many as three interceptors launched at each incoming target. The system preference would be for a "shoot-look-shoot" sequence, that is, an interceptor is fired, the sensors indicate whether there has been a successful hit, and if not, a follow-up interceptor is fired. In practice, and particularly in this scenario of the wayward Russian missile, because of the limited time and the long distances to be covered, the follow-up interceptor would probably have to be fired before the success or failure of the first shot has been confirmed.