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**Ballistic Missile Proliferation:
What Goes up Must Come Down**

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What Goes Up Must Come Down

"Fortunately for the world, so far wars since the coming of the nuclear age have remained conventional and limited. Nobody has yet faced the daunting prospect of fighting a conventional war under the threat that nuclear weapons might be used at any time, and no nation possessing nuclear weapons has fought another that also possessed them."¹

Michael Carver

Introduction

In the origins of modern war, science and warfare have always been closely related. For many new technologies developed for societal use, there has been a practical use in warfare. Consequently, for every new weapon introduced, there has been a new defensive system conceived.² One might even venture to say that the arrow was likely developed before the shield. Martin van Creveld writes that the arrow, a primary ballistic weapon of sort, was considered an unfair weapon because it could effectively kill from a distance and from behind cover.³ As the threat of the arrow was by and large neutralised by the shield, there was a requirement for new, more powerful offensive weapons, which in time, would be countered by the development of yet, other effective defensive systems.

¹ Michael Carver, "Conventional Warfare in the Nuclear Age", in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed by Peter Paret (Princeton: Princeton University Press, 1986), p 813.

² Martin L. Van Creveld, *Technology and War* (New York: The Free Press, 1989), p 71.

³ *Ibid*, p 71.

A few hundred years later, the advent of manned flights brought new defensive systems but perhaps not as effective as the shield was to the arrow. Science progressed further and the unmanned German V-1s and V-2s further extended the range of artillery or air power. However, although the British knew that the German missiles were inbound, they were otherwise defenceless against such offensive weapons. On 16th July 1945, the first explosion of a nuclear device in the White Sands desert of New Mexico (Alamogordo) would mark a significant chapter in the history of mankind. This nuclear fission discovery would eventually mesh with the German rocket technology and yield an unstoppable weapon system, the nuclear ballistic missile. Lawrence Freedman articulates that the ballistic missile represented a weapon that not even the most cohesive and substantial society could withstand.⁴

Notwithstanding the alarming proliferation of nuclear weapons, the proliferation of the technologies surrounding their delivery vehicles and their launchers may have been the catalyst for the emerging threats to national and international security. The 1991 Gulf War revealed that Iraq's ballistic missile capability, albeit limited in range, presented a new threat to regional and international stability. Iraq's Scud campaign also stressed the growing nature of ballistic missile proliferation to rogue states. David E. Mosher writes that rogue states can be defined as: “countries whose behavior does not conform to international norms and may not be deterred by the threat of conventional or

⁴ Lawrence Freedman, "The First Two Generations of Nuclear Strategists", in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed by Peter Paret (Princeton: Princeton University Press, 1986), p 736.

nuclear retaliation.”⁵ Pre-war diplomatic efforts and deterrence based on a massive conventional retaliation by the United States led-coalition did not deter Iraq, a rogue state, from launching its ballistic missiles. Although initially designed as an air defence weapons system, the Patriot missile proved to be an effective ballistic defence system during the Gulf War.⁶ The Patriot missile was a key element in controlling regional stability, thereby limiting the conflict. As nuclear weapons and ballistic missiles continue to proliferate among rogue states, there is an urgent need to address the requirement for defence mechanisms that will ensure stability in the New World order.

This paper will argue that ballistic missile defence systems represent the best course of action for aligned states to counter the current threat posed by the proliferation and the use of ballistic missiles. The paper looks at the evolution of offensive and defensive weapon systems and describes a treaty and a regime, which were designed to limit the use and proliferation of weapons of mass destruction. The paper then concentrates on the proliferation of ballistic missiles and nuclear, biological, and chemical weapons of mass destruction. Following a detailed threat analysis, the paper identifies three courses of action to counter the threat posed by the proliferation of ballistic missile and their associated weapons of mass destruction. The following courses of action are examined: elimination of all weapons of mass destruction, deterrence, and ballistic missile defence systems. Finally, the paper concludes that ballistic defence

⁵ David E. Mosher, "The Grand Plans", *IEEE Spectrum*, September, 1997, p 30.

⁶ Although there is documented evidence that the Patriot missiles were not as effective as advertised, their deployment to Israel when combined with their perceived effectiveness were crucial in keeping Israel out of the conflict.

US, Department of the Air Force, Gulf War Air Power Survey, Vol II, (Washington, DC: Government Printing Office, 1993), p 180.

systems represent the best course of action. For the purposes of this paper, nuclear, biological, and chemical weapons of mass destruction will only refer to the deployment of these weapons using ballistic missiles as their primary delivery systems. As such, transnational threats⁷ associated with weapons of mass destruction will not be discussed.

Evolution of Technology

Over time, it became evident that science would always play an important role in the conduct of warfare and that the military had to become more scientifically oriented. Machiavelli, a military and political thinker, is believed to have introduced a new era in the development of political thought as he proclaimed: "...new military institutions and new processes in warfare are the most urgent and the most fundamental requirement..."⁸ In the wake of the Italian wars of Machiavelli's time (1469-1527), the newly organised military education of the 18th century lead some interesting technological developments in the field of defensive systems, perceived in fact as a revolution of the science of military architecture.⁹

Under the effective threat of the new siege cannon employed by the French artillery, which could destroy the high-walled medieval fortifications of the Italian towns,

⁷ Transnational threats comprise any transnational activity that threatens the national security of a country, including international terrorism, narcotics trafficking, the proliferation of weapons of mass destruction and the delivery systems for such weapon, organised crime, and any individuals or group that engages in any such activity.

US Defence Science Board, DoD Responses to Transnational Threats, Vol I Final Report, (Washington DC: Government Printing Office, October 1997), p 3.

⁸ Felix Gilbert, "Machiavelli: The Renaissance of the Art of War", in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed by Peter Paret (Princeton: Princeton University Press, 1986), p 11.

⁹ Ibid, p 69.

the Italians invented a new fortification. This regular polygon shape enclosure "included bastions projecting from each angle, in such a manner as to subject the attacker to an effective crossfire."¹⁰ This method of defence prevailed in Europe until the early 19th century.¹¹ So far, the threat of a new offensive weapon was normally countered by the development of an effective defensive system.

However, the evolution of nuclear weapons did not result in the immediate development of an effective defensive system. Following the Soviet Union's first nuclear explosion on 29th August 1949 in Kazakhstan, both the United States and the Soviet Union depended on a large fleet of bomber aircraft for the delivery of nuclear weapons. These methods of delivery were hampered by long distances, problems with the penetration of adversary air defence systems, and poor protection while on the ground in case of a first strike by the enemy. The forecast high attrition rate during a first strike also necessitated a much larger number of weapon systems.¹² Although the development of long range detection systems and airborne interceptors would provide advanced warning and some defence capability, they did not shield the opponents against potential nuclear devastation.

This incapacity to defend against such weapons other than by mutual deterrence lead to a nuclear arsenal build-up and to the development of the thermonuclear

¹⁰ Henry Guerlac, "Vauban: The Impact of Science on War", in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed by Peter Paret (Princeton: Princeton University Press, 1986), p 69.

¹¹ Ibid, p 69.

¹² Martin L. Van Creveld, *Technology and War* (New York: The Free Press, 1989), p 255.

(Hydrogen) bombs. The launch of Sputnik, the first man-made object in orbit, would precipitate a race by the two superpowers to develop an even more powerful offensive weapon system, the Intercontinental Ballistic Missile (ICBM). ICBMs reached operational status in the early sixties.¹³ This technical evolution led at last to the development of a defensive system and as Freedman reports: "[t]hus although both sides made major efforts to build up their defences against long range bombers during the 1950s, long range missiles were proceeding through their final stages of development. In anticipation of this new challenge, work was already well underway on antiballistic missiles."¹⁴

Treaties and Regimes

Since 1958, a year after the successful launch of Sputnik on 4th October 1957 and the follow-on developments of ICBMs, numerous agreements, treaties and regimes were established. They restricted the testing, the use, and the proliferation of weapons of mass destruction, ballistic missile systems, antiballistic missile systems, and ballistic missile defence systems. For the purpose of this paper, only two will be discussed in some details: the Anti-Ballistic Missile (ABM) treaty and the Missile Technology Control Regime (MTCR).

¹³ Ibid, p 255.

¹⁴ Lawrence Freedman, "The First Two Generations of Nuclear Strategists", in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed by Peter Paret (Princeton: Princeton University Press, 1986), p 755.

Soviet General-Secretary Brezhnev and United States President Nixon signed the ABM Treaty on 26th May 1972.¹⁵ The ABM Treaty was part of the Strategic Arms Limitations Talks (SALT I) which began in 1969 and pledged the United States and the Soviet Union to refrain from deploying space-based weapons as part of any anti-ballistic defence system.¹⁶ More specifically, the ABM treaty prohibited: the development, testing, or deployment of space-based ABM systems and components; the deployment of ABM systems or components except as authorised in the treaty; and the interference with the national technical means a party uses to verify compliance with the treaty.¹⁷

It is important to note that theatre defence systems or limitations for these systems are not addressed in the ABM treaty. Furthermore, at the Helsinki summit in April 1997, "Russia agreed in principle to accept the US position that a defence system will not be considered strategic if it is tested only against targets moving slower than 5 km per second and with ranges less than 3500 km."¹⁸ Although supporters of the treaty consider it as the corner stone of nuclear

general, also supports that point: " The ABM treaty made sense in a cold war context, but you wonder if it has merit in the New World."²⁰ Regardless, the United States and Russia administrations are still supporting the treaty but the United States are seeking more negotiations oriented toward a limited National Missile Defence system.²¹

The MTCR aimed at controlling the global nuclear missile proliferation. The regime was formed in 1987 by the G-7 governments (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States). The MTCR has 29 signatories, Russia being the latest country to join. All of these countries are considered as the world's most advanced suppliers of ballistic missiles and related technologies and support equipment.²² The regime is implemented through the respective governments' export control mechanisms for the denial of sales related to ballistic missiles or cruise missiles capable of carrying a 500 kilogram payload over a distance of 300 kilometers or more.²³

In 1993, the MTCR was expanded to include all delivery systems for chemical and biological weapons. It excludes space systems but not the delivery systems capable of carrying weapons of mass destruction. In 1994, a no-undercut policy was agreed upon whereas the denial of a sale to a non-member country by one signatory must be respected

²⁰ General Charles A. Horner, "New-Era Warfare", in *Battlefield of the Future*, ed by Barry R. Schneider and Lawrence E. Grinter, (Alabama: Air University Press, 1995), p 51.

²¹ David E. Mosher, "The Grand Plans", *IEEE Spectrum*, September, 1997, p 32.

²² Department of National Defence, C/PS/MSS/J/MSS/E-13 Exercise Strategic Options, *Extract from Arms Control and Disarmament, Arms Control and Disarmament*, (Ottawa: Library of Parliament, 1994).

²³ Ibid.

by all other MTCR partners.²⁴ Furthermore, the MTCR members must reach a consensus for every new membership application. Finally, although the MTCR is not a binding treaty, " ... the regime and associated national legislation have been extremely effective in curbing missile proliferation."²⁵

Proliferation of Missiles and Weapons of Mass Destruction

Although the MTCR may have been somewhat successful in controlling nuclear capabilities and missile proliferation, there are at the present time 44 nuclear capable countries²⁶ of which only five possess ICBMs (China, France, Russia, the United Kingdom, and United States).²⁷ Other countries such as Brazil, India, Israel, Japan, and Saudi Arabia have long-range missiles or space-launch vehicles.²⁸ Moreover, a total of 20 countries have acquired or developed short-range ballistic missiles.²⁹

Out of the five countries possessing ICBMs, only China, Russia, and the United Kingdom currently have long range nuclear weapons that could reach the continental

²⁴ World Wide Web. Lora Lumpe, "The Last Fifteen Minutes, Part C: Bans on Missile Technology", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap3c.htm>], May 1996, p 2.

²⁵ Ibid, p 1.

²⁶ Nuclear capable countries are defined as countries having a nuclear technical capacity, operate nuclear reactors or have stocks of weapon-usable nuclear material.
World Wide Web. David Krieger, Ending the Nuclear Weapons Era, [<http://www.napf.org/EndNucWeap.html>], p 5.

²⁷ World Wide Web. Lora Lumpe, "The Last Fifteen Minutes, Bans on Missile Technology", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap3c.htm>], May 1996, p 2.

²⁸ World Wide Web. Lisbeth Gronlund and David Wright, "The Last Fifteen Minutes, Threat Assessment Part A: Third World Missiles", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap2a.htm>], May 1996, p 1.

²⁹ David E. Mosher, "The Grand Plans", *IEEE Spectrum*, September, 1997, p 29.

United States. ICBMs, the ultimate terror weapons,³⁰ are very large and complex weapon systems. The development and maintenance costs of these weapons are such that only a few countries can afford the investment. Given their size, it is not perceived that the theft or unnoticed sale of ICBMs is feasible, hence, the chance of a rogue country acquiring them is very remote. The United Kingdom has acquired Trident and Polaris ICBMs from the United States; it is the only ever-recorded sale of ICBMs.³¹ Furthermore, the United States intelligence experts report that "it is very unlikely that additional countries will build ICBMs within the next fifteen years."³²

However, North Korea, Iraq, and Iran have been trying to develop longer range ballistic missiles that may well fall into the ICBM category before the 15 year period is over and may change the current threat posed by rogue states significantly. On 22nd September 1998, an Australian newspaper reported the concerns of the United States and Japan: " The 31st August missile launch by North Korea presents a serious threat to the security interest of our two countries and to the region."³³ That missile is reported to have flown roughly 6,000 kilometers, before it crashed in the sea near Alaska.³⁴ In 1991,

³⁰ World Wide Web. Joseph Cirincione and Frank von Hippel, "The Last Fifteen Minutes Ballistic Defense in Perspective", Washington DC. [[<http://www.clw.org/pub/clw/coalition/intro.htm>], May 1996, p 1.

³¹ World Wide Web. Lora Lumpe, "The Last Fifteen Minutes, Bans on Missile Technology", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap3c.htm>], May 1996, p 2.

³² World Wide Web. Joseph Cirincione and Frank von Hippel, "The Last Fifteen Minutes Ballistic Defense in Perspective", Washington DC. [[<http://www.clw.org/pub/clw/coalition/intro.htm>], May 1996, p 2.

³³ World Wide Web. Australia, "Japan Seal Pact on Missile Defence System", The Australian, [<http://www.theaustralian.com.au/world/4216650.htm>], September 22, 1998, p 1.

³⁴ World Wide Web. Electronic Telegraph, "North Korea missile has range of 4000 miles", [[wysiwyg://12http://www.telegraph.co.uk:8...00114765117162&pg=/et/98/9/18/wkor18.html](http://www.telegraph.co.uk:8...00114765117162&pg=/et/98/9/18/wkor18.html)], September 18, 1998, p1.

North Korea sold Scud-C missiles to Iran and Syria, and there are currently justified concerns that North Korea, a non-member state of the MTCR, may offer the sale of its longer range missiles when they have reached full operational status.³⁵ China, another non-MTRC member, has also sold long range (3,000 km) missiles to Saudi Arabia in 1988 and " caused an international uproar."³⁶ Since then, the MTCR measures have been reinforced and no further sales of long-range missiles have taken place.

Out of the 20 countries possessing short-range missiles, five are considered to have hostile views against the United States and represent a missile threat: Iran, Iraq, Libya, North Korea, and Syria.³⁷ With the exception of North Korea, it is believed that none of these countries currently have weapons with ranges greater than 600 kilometers. However, Russia is surrounded by countries whose respective weapons and proximity can pose a threat to its national security: North Korea, China, Pakistan, India, Syria, Iraq, Iran, and Afghanistan.³⁸

Threat Analysis

While Russia and China have nuclear arsenals capable of reaching the United States, it is not believed that their weapons of mass destruction would be used against the

³⁵ World Wide Web. Lisbeth Gronlund and David Wright, "The Last Fifteen Minutes, Threat Assessment Part A: Third World Missiles", Washington DC. [<http://www.clw.org/pub/clw/coalition/chap2a.htm>], May 1996, p 2.

³⁶ World Wide Web. Lisbeth Gronlund and David Wright, "The Last Fifteen Minutes, Threat Assessment Part A: Third World Missiles", Washington DC. [<http://www.clw.org/pub/clw/coalition/chap2a.htm>], May 1996, p 1.

³⁷ Ibid, p 1.

³⁸ General Charles A. Horner, "New-Era Warfare", in *Battlefield of the Future*, ed by Barry R. Schneider and Lawrence E. Grinter, (Alabama: Air University Press, 1995), p 58.

United States.³⁹ Russia suffers severe economic problems and may in the near future have to decrease its nuclear arsenal and state of readiness beyond the terms of the SALT agreements. David Hoffman of the Foreign Post Foreign Service reported on the 18th September 1998 that: " Western analysts and Russian officials say the plan [Strategic Weapons Review] envisions continued shrinkage of the strategic arsenal but that the actual decline may even be deeper and faster than the Kremlin foresees."⁴⁰ The Cold War is over and the chances of Russia deliberately attacking the United States is far remote; the NORAD detection and early warning systems are fully active and deterrence is still being achieved through the threat of a massive nuclear retaliation by the United States.

However, the current Russian economic crisis when combined with the dissatisfaction of Russian missile commanders responsible for nuclear assets and the deterioration of Russia's early warning systems may lead to accidental, inadvertent, or unauthorised launches of ICBMs.⁴¹ As such, North Korea's recent demonstration of a long-range missile when combined with their former nuclear research capability could pose a serious threat to the national security of the United States. Although a United States and North Korean agreement on a framework to freeze their nuclear development

³⁹ World Wide Web. Steven Fetter, "The Last Fifteen Minutes, Overview: Desirability and Feasibility of Ballistic Missile Defenses", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap1.htm>], May 1996, p 1.

⁴⁰ The strategic weapons review is a top-secret Russian document designed to lay out priorities for its forces into the next century. The document was recently signed by President Boris Yeltsin. World Wide Web. US, "Russia's Nuclear Force Sinks With the Rubble, Economic Crisis Erodes Strategic Arsenal", The Washington Post, [<http://www.washingtonpost.com/wp-srv/Wpcap/1998-09/18/055r-091898-idx.html>], September 18, 1998, p 1.

⁴¹ Ibid, p 3.

programme is still in force, it is believed that North Korea has enough nuclear materials for one or two weapons.⁴² Hence, the threat of a deliberate nuclear attack by a rogue state on the United States or any other member of a coalition is of concern.

The threat posed by short-range and long-range ballistic missiles may be even more predominant. The MTCR has been successful in reducing the proliferation of these weapons but non-member states are not obligated to abide by the terms of the regime. The tests of ballistic missiles are easily detectable and can provide advanced warnings that a given rogue country is being successful in its missile development programme. However, it would be unwise to assume that MTCR will stop all ballistic missile proliferation, and not at all prudent to wait for test results before taking decisive actions as to how such threats can be best countered.

North Korea has provided a good example by testing their new ballistic missile; the missile range of 6,000 kilometers is of grave concern to the United States and Japan. It triggered the two countries to sign a pact on a research programme for a missile defence system.⁴³ The threat will worsen if North Korea exports its ballistic missile to Iran and Libya, and it will intensify if these missiles are modified from carrying conventional payloads to carry nuclear, chemical or biological warheads. The threat will be further aggravated if these missiles, even those with short-range capabilities, are

⁴² World Wide Web. Lisbeth Gronlund and David Wright, "The Last Fifteen Minutes, Threat Assessment Part A: Third World Missiles", Washington DC. [<http://www.clw.org/pub/clw/coalition/chap2a.htm>], May 1996, p 2.

⁴³ World Wide Web. Australia, "Japan Seal Pact on Missile Defence System", The Australian, [<http://www.theaustralian.com.au/world/4216650.htm>], September 22, 1998, p 1.

modified to be launched from ships or submarines capable of maneuvering within a striking distance of an adversary.

A similar logic applies to the proliferation of nuclear technologies and capabilities. Nuclear research programmes can be developed in isolation and under total secrecy. The United Nations inspectors were quite surprised about the advanced state of the Iraqi's nuclear programme.⁴⁴ Recent nuclear explosions in India and Pakistan demonstrate the weaknesses of the moratorium on nuclear testing and the increasing willingness for Third World countries to possess weapons of mass destruction. Furthermore, Iran, Libya and North Korea are still suspected of having active nuclear weapons programmes.⁴⁵ This is further emphasized by the revolutionary technical changes and where “ the bipolar, relatively stable world of the Cold War has given way to a less certain one where regional powers, subnational groups, and terrorists organisations are no longer constrained by the superpowers. Furthermore, the technology and know-how to build weapons of mass destruction are more available than ever before.”⁴⁶ With an estimated 37,000⁴⁷ nuclear weapons in the world today, there is cause for concern. The threat is indeed real.

⁴⁴ World Wide Web. Lisbeth Gronlund and David Wright, "The Last Fifteen Minutes, Threat Assessment Part A: Third World Missiles", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap2a.htm>], p 3.

⁴⁵ World Wide Web. "The Last Fifteen Minutes, Nuclear Status of States, 1996", Appendix C, Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap2a.htm>], May 1996, p1.

⁴⁶ David E. Mosher, "The Grand Plans", *IEEE Spectrum*, September, 1997, p 30.

⁴⁷ World Wide Web. "The Last Fifteen Minutes, Nuclear Status of States, 1996", Appendix C, Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap2a.htm>], May 1996, p1.

Although nuclear weapon programmes can be developed in secrecy, few rogue states can afford the costs related to the research and development associated with that technology. Rogue countries have better opportunities of developing chemical and biological weapons. These weapons of mass destruction are cheaper than nuclear weapons and can also be developed in secrecy. The biological and chemical conventions have not been so successful in controlling the proliferation of these agents. As well, the existing international and legal laws are not as binding as the ones for the possession or use of nuclear weapons.⁴⁸ Iraq's threat to use chemical weapons during the Gulf War demonstrated the reality of the threat presented by chemical and biological ballistic missiles; the Scuds had a psychological impact on Saudi-Arabia, Israel and the Coalition.⁴⁹ This example also serves at demonstrating that when a coalition deploys to a theatre of operations, it might expose its troops, the surrounding countries, and the nations forming the coalition to the threat of weapons of mass destruction. This stresses the importance of a defensive mechanism.

Another threat has emerged as all ICBMs and some other ballistic missiles could be used as satellite killers, and could reach altitudes of 1,400 kilometers.⁵⁰ They can be quite effective against satellites, especially if they are equipped with a nuclear warhead. A possible scenario can be explored around the Gulf War. The coalition used around 60

⁴⁸ World Wide Web. Amy E. Smithson, "The Last Fifteen Minutes, Part B: Bans on weapons of Mass Destruction", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap3b.htm>], May 1996, p 1.

⁴⁹ P. Anson and D. Cummings, "The First Space War: The Contribution of Satellites to the Gulf War", *RUSI Journal* (Winter 1991), p 51.

⁵⁰ Capt Justin Schmidt-Clever, "Beyond the Line: Strategy in Support of Space Control", in *The Changing Face of War*, ed by Allan D. English, (Kingston: McGill-Queen University Press, 1998), p 220.

Western military satellites during the war for communications, reconnaissance, weather, imagery, etc... As reported by Anson and Cummings, space assets were critical: “It [Space] enabled a fully secure and effective trunk and tactical communications network, large enough to support a 400,000 strong army, to be established in-theatre in a few weeks and provided detailed images of Iraqi forces and the damage inflicted by Allied air attacks.”⁵¹ Out of a list of 21 satellites used for various purposes, 16 had orbits less than 1,200 kilometers,⁵² well within the lethal range of the weapons mentioned above. Although Iraq’s capability to use its Scuds as satellite killers was then remote, because of limited range, poor guidance system and conventional warhead, future conflicts may not benefit from so many satellite capabilities. Again, this identifies a requirement for some defence mechanisms or systems.

Dilemma

The President of the United States, Bill Clinton, has deemed missile proliferation as one of the great threats to the security of the American people.⁵³ In fact, the threat of weapons of mass destruction described above causes serious problems for all the nations of the world, including the rogue states. It seems inconceivable that mankind has developed such devastating weapons for its protection. Einstein provided a warning: “The unleashed power of the atom has changed everything save our modes of thinking,

⁵¹ P. Anson and D. Cummings, “The First Space War: The Contribution of Satellites to the Gulf War”, RUSI Journal (Winter 1991), p 45.

⁵² Ibid, p 49.

⁵³ World Wide Web. Nicholas Burns, Unofficial Transcript, State Department, Noon Briefing, [<http://www.usis.it/wireless/wf970416/97041625.htm>], April 16, 1997, p 4.

and thus we drift toward unparalleled catastrophe.”⁵⁴ Now these weapons must be controlled, countered, deterred, neutralised, or eliminated. The proliferation of these weapons demonstrates once more that science and warfare are welded together.

The paper will now explore courses of action that may bring another element in the equation of science and warfare and may contribute to the pursuit of peace in the New World. There exists a dilemma for the former superpowers and other peaceful nations as to the potential courses of action to deal with the proliferation of ballistic missiles and weapons of mass destruction vis-à-vis the new multi-polar world. There are three courses of action available for coping with the current threat of nuclear, chemical, and nuclear ballistic missile capabilities and their proliferation. The following possible courses of action will be examined: elimination of ballistic missiles and weapons of mass destruction, deterrence, and anti-ballistic defence systems.

Elimination of Weapons of Mass Destruction

The Lateran Council outlawed the use of the crossbow in 1139 against the Christians but not against the heathens because such weapons caused unnecessary sufferings, at least on the Christians.⁵⁵ It is perhaps questionable that the superpowers and other well-developed and industrialised nations claim their acquired rights to nuclear and ballistic weapons for the sake of their national securities, whilst forbidding all other nations to contemplate the same securities through the same means. Since the nuclear

⁵⁴ World Wide Web. David Krieger, Ending the Nuclear Weapons Era, [<http://www.napf.org/EndNucWeap.html>], p 1.

⁵⁵ Martin L. Van Creveld, *Technology and War* (New York: The Free Press, 1989), p 255.

threat is paramount to the national security of all countries, the elimination of weapons as discussed below will concentrate on nuclear weapons and their delivery vehicles, as all of them will be most likely delivered with ballistic missiles. Similar arguments can be developed for the threats posed by ballistic missile proliferation, chemical warfare, and biological warfare. The nuclear arsenal is at the source of the problems.

In November 1995, the legal use or threat of nuclear weapons was discussed at the International Court of Justice in The Hague. The United Nations General Assembly and the World Health organisation initiated those debates.⁵⁶ The nuclear states argued that the matter was political, not legal and, therefore, that the Court should not issue an advisory opinion. However, the majority of countries presenting positions claimed that the use or threat of such weapons was illegal under the international laws. The debate resulted in the Court issuing an advisory opinion: “ ... that the threat or use of nuclear weapons was generally illegal under international law and that the nuclear weapons states were obligated to complete negotiations on nuclear disarmament. The Court was unable to reach a conclusion on whether or not the threat of use of nuclear weapons for self-defence would be legal in the extreme circumstance when the survival of the state was at stake.”⁵⁷

This Court opinion would set the stage for subsequent debates on nuclear weapons. In December 1995, the United Nations General Assembly issued a resolution

⁵⁶ World Wide Web. David Krieger, Ending the Nuclear Weapons Era, [<http://www.napf.org/EndNucWeap.html>], p 4.

⁵⁷ *Ibid*, p 4.

for the elimination of all nuclear weapons. It stated: “[nuclear weapons states were] to undertake step-by-step reductions of nuclear threat and a phased programme of progressive and balanced deep reductions of nuclear weapons, and to carry out effective nuclear disarmament measures with a view to the total elimination of these weapons within a time-bound framework.”⁵⁸

In April 1996, the Pelindaba treaty was signed yielding an African nuclear weapons free zone.⁵⁹ In August 1996, the Australian Canberra Commission⁶⁰ stated in its report: “The only complete defence is the elimination of nuclear weapons and assurance that they will never be produced again.”⁶¹ In September 1996, Australia continued their efforts toward the elimination of nuclear weapons and took the draft Comprehensive Test Ban Treaty⁶² to the United Nations General Assembly. Out of 185 countries, 153 adopted the treaty.⁶³ The five declared nuclear weapons states have already signed the treaty. However, to be enforced, the treaty must also be signed and ratified by all 44

⁵⁸ Ibid, p 5.

⁵⁹ Ibid, p 5.

⁶⁰ The Canberra Commission was established as a result of the Australians' anger over the French test

nations that have nuclear capabilities. India has no intention of signing the treaty until a commitment is made by all nuclear capable states to eliminate their arsenal.⁶⁴

All of the countries involve in nuclear disarmament must be commended for their efforts to annihilate the nuclear arsenals. Mikhail Gorbachev was most certainly the catalyst to all these debates, when in 1986, he called for the elimination of all nuclear weapons by the end of the century.⁶⁵ The end of the century is fast approaching, and although the world has made strides in the elimination of the nuclear arsenals (SALT I and SALT II), they still exist and the threat has not decreased significantly. The elimination efforts to rid the world of the threat posed by the nuclear weapons and ballistic missile proliferation must continue, so that perhaps, in the distant future, all weapons of mass destruction might have disappeared. However, in the mean time, other courses of action must be pursued for coping with the current threats of nuclear, chemical, and nuclear ballistic missile capabilities and their proliferation.

Deterrence

The gravity of the situation following the Soviet Union's first nuclear explosion in 1949 would require another revolution in military and strategic thinking; the concept of deterrence as a means to defence emerged. John English conceives deterrence as " ... an essentially modern phenomenon ..." while he refers to an enunciation of Bernard Brodie

⁶⁴ Ibid, p 5.

⁶⁵ Ibid, p 2.

where " ...modern deterrence is linked inextricably to the nuclear weapon".⁶⁶ However, as the two superpowers proceeded to achieve peaceful equilibrium through mutual deterrence, nuclear science evolved in other states, enabling them to develop their own nuclear capabilities. China, France, and the United Kingdom also had to develop their strategies around the concepts of nuclear deterrence.

Since the invention of the atomic weapon, deterrence has been very successful in forcing the two superpowers to refrain from using their weapons of mass destruction, effectively canceling each other out. This concept of mutual deterrence also supports the study of nuclear strategy that is defined by Freedman as being: "The study of nuclear strategy is therefore the nonuse of these weapons."⁶⁷ Since Hiroshima and Nagasaki, there has not been one nuclear weapon detonated against an adversary. As soon as the Soviets exploded their first device in 1949, the United States strategists recognised that conventional weapons would be paramount for the defence of Western interests and that the long-term goals of nuclear weapons were to deter their use by the enemy.⁶⁸ Furthermore, in 1952, the United Kingdom had already concluded: "that the best bet for the West in its confrontation with the East was to rely on nuclear deterrence."⁶⁹

⁶⁶ John A. English, *Marching Through Chaos*, (London: Praeger Publishers, 1996), p 119.

⁶⁷ Lawrence Freedman, "The First Two Generations of Nuclear Strategists", in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed by Peter Paret (Princeton: Princeton University Press, 1986), p 735.

⁶⁸ *Ibid*, p 738.

⁶⁹ *Ibid*, p 740.

Since the end of the Cold War, the bipolar world has become a multi-polar world. The treaties and regimes developed during the Cold War years are becoming more difficult to enforce as more nations acquire technologies related to weapons of mass destruction. The ABM treaty is still active but only between the two former superpowers. The threat emanating from the rogue states is more relevant with respect to the current concerns, as they may not respond to diplomacy or deterrence principles.

As all of the ballistic missiles fired until now have only made use of high explosive warheads, an argument exists that the perceived missile threat from rogue states is overstated. However, the intentions of the rogue states to utilise nuclear, chemical and biological warheads cannot be discounted. Within the next fifteen years, it is estimated that North Korea, Iran, and Syria will possess nuclear, chemical, and biological ballistic missiles that could be employed against coalition forces, neighbours, or surrounding countries; these three countries already have a limited ballistic missile capability.⁷⁰ Moreover, as discussed above, the Gulf War demonstrated that the threat and the use of ballistic missiles by Iraq against coalition troops and regional states could not be deterred. Israel was paralysed for six weeks because of the Scud campaign but they did not retaliate with their nuclear weapons. In the view that Israel could have unleashed their nuclear weapons against Iraq, deterrence again failed.⁷¹ In retrospect, it is not believed that the threat of ballistic missiles posed by rogue states is overstated.

⁷⁰ World Wide Web. Steven Fetter, "The Last Fifteen Minutes, Overview: Desirability and Feasibility of Ballistic Missile Defenses", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap1.htm>], p 4.

The United States and Russia have come to terms with the fact that the threat of ballistic missiles from rogue nations can not be deterred and that ballistic missile defence systems are becoming increasingly important. Recent modifications to the ABM treaty as related to ballistic missile defence will continue as the threat posed by the proliferation of weapons of mass destruction by rogue states keeps expanding. The United States and Japan would not be conducting expensive research for a ballistic defence system if they thought that deterrence could address the threat posed by North Korea. Since the Gulf War, Israel has also changed its views on deterrence and have been developing anti-tactical ballistic missile technology.⁷²

Furthermore, the United States would not have invested billions of dollars in the development of defence systems that could protect them from all ballistic missile threats if there was hope that deterrence had a chance of defeating the current threats. Canada also supports that position. In the 1999 Defence Planning Guidance, DND and the CF will: “ examine ABM-Treaty compliant ballistic missile defence options with the US. Focus on research and building on existing capabilities in communications and surveillance in order to advise Government on options in the context of North American and possible NATO-wide aerospace defence arrangements.”⁷³

⁷¹ World Wide Web. Gerald Steinberg, “The Political Economy of Science and technology in Israel: Mutual Interests and Common Perspectives”, [<http://faculty.biu.ac.il/steing/public/tech.htm>], 1994, p 13.

⁷² Ibid, p 8.

⁷³ World Wide Web. Department of National Defence, Canada, *Defence Planning Guidance 1999*, [http://131.137.255.5/vcds/dgsp/dpg/dpg99/chap3_e.asp], ch 3, p 3.

In formulating the Alliance's new strategic concept during a North Atlantic Council meeting in November 1991, NATO also recognised the importance of missile defence systems against the threat of ballistic missiles and weapons of mass destruction.⁷⁴ This was re-affirmed in December 1992 during a Defence Planning Committee (DPC) held in Brussels: "We [DPC] received an update by the United States on the status of discussions with the Russian Federation and other states about establishing a Global Protection System [GPS]. We agreed that the Alliance should continue to discuss the concept of a GPS, in the context of a strategy designed to prevent the proliferation of ballistic missiles."⁷⁵ Finally, Van Creveld also wrote the following on deterrence: "If a country's purpose is to be capable of fighting a war, the means for doing so have to be safeguarded against the worst the enemy can do. If the aim is to prevent war by deterrence, then too a force is required that is capable of surviving the worst that the enemy might do, and still inflicting 'unacceptable' damage."⁷⁶

Based on the foregoing, it would seem that deterrence, as a sole defensive mechanism, has been overcome by recent events and the change to a multi-polar world. As effective as deterrence may have been in the Cold War years, it can still prove to be successful but does not adequately and independently address the current threats posed by the rogue states. Consequently, another course of action must be pursued for coping with

⁷⁴ World Wide Web. NATO, "The Alliance New Strategic Concept", Brussels, [<http://www.nato.int/docu/comm/c911107a.htm>], November 1991, p 17.

⁷⁵ World Wide Web. NATO, "Final Communiqué", Brussels, [<http://www.nato.int/docu/comm/c921211a.htm>], December 1992, p 4.

⁷⁶ Martin L. Van Creveld, *Technology and War* (New York: The Free Press, 1989), p 256.

the current threats of nuclear, chemical, and nuclear ballistic missile capabilities and their proliferation.

Ballistic Missile Defence Systems

Having discussed that the elimination of ballistic missile weapons systems and deterrence are courses of action that must still be pursued but can not individually counter the threats posed by rogue states, it is now opportune to look at ballistic missile defence systems as a third course of action. The United Kingdom did not have an effective defensive system against the German V-2s. The technologies were not available to counter this new threat which could have resulted in the loss of many more lives had it been more accurate and more lethal. Today's ballistic missiles are very lethal and ways of countering their threats must be pursued. As science progressed in the fields of ballistic missiles, navigation and detection, so have the technologies related to defensive systems against weapons of mass destruction and satellite killers.

A question asked by Steven Fetter in an overview of the desirability and feasibility of ballistic missile defence remains unanswered: "... how can responsible leaders choose not to defend their country from attack if it is within their means and their ability to do so?"⁷⁷ John Keegan in a general discussion on the need for defence and fortification outlines that the cost of waging war has generally been less than fortifying. He summarises that in that perspective, "President Reagan's urge to realize a Strategic

⁷⁷ World Wide Web. Steven Fetter, "The Last Fifteen Minutes, Overview: Desirability and Feasibility of Ballistic Missile Defenses", Washington DC. [[<http://www.clw.org/pub/clw/coalition/chap1.htm>], May 1996, p 1.

Defence Initiative [SDI], and so protect his United States against the threat of wholesale ballistic missile attack, belongs not to some utopian dream of the future but to one of the deepest and oldest of all human responses to military danger.”⁷⁸ The argument that is made against spending billions of dollars for ballistic missile defence systems is based on a 1996 threat assessment. Recent developments in North Korea, India and Pakistan suggests that the threat posed by those states has changed for the worse and warrants the funding for and the development of ballistic missile defence systems.

The United States alone has spent over 99 billion US dollars in such defensive systems since 1962.⁷⁹ It seems that their investment was seen as crucial during the Gulf War when a decision was made to field the Patriot missile as a theatre missile defence system: "The larger point, however, is that, whatever tactical and operational difficulties resulted from the hunt for Scuds, the effort against the missiles, combined with the perceived success of the Patriot defending against them, achieved the strategic objective of keeping the Israelis out of the conflict.”⁸⁰

There is an argument against ballistic defence systems which is based on the fragility of the ABM treaty, still seen by the United States and Russia leaders as: “the cornerstone of nuclear arms control.”⁸¹ While the leaders of these two countries have

⁷⁸ John Keegan, *The Mask of Command*, (New York: Penguin Books USA Inc., 1987), p 7.

⁷⁹ World Wide Web. Joseph Cirincione and Frank von Hippel, "The Last Fifteen Minutes Ballistic Defense in Perspective", Washington DC. [[<http://www.clw.org/pub/clw/coalition/intro.htm>], May 1996, p 1.

⁸⁰ US, Department of the Air Force, Gulf War Air Power Survey, Vol II, (Washington, DC: Government Printing Office, 1993), p 180.

⁸¹ David E. Mosher, "The Grand Plans", *IEEE Spectrum*, September, 1997, p 32.

agreed in principle to the United States development of defence systems for targets slower than 5 kilometers per second and limited to 3,500 kilometer range, the United States is reaching for a defence system that would shield all 50 states.⁸² Hence, the latter defence system would be capable of intercepting weapons reaching 7 kilometers per second and having a range in excess than 3,500 kilometers. Such a defence apparatus would by default provide protection against all threats, including the Russian nuclear arsenal, thereby canceling all nuclear deterrence. The system would also breach the conditions of the ABM treaty.

While this may be perceived by some as unacceptable and inconceivable, Russia may not have much choice in the matter given its current economic crisis. Moreover, its nuclear arsenal is at risk, their detection systems no longer provide a round the clock warning, and their safety standards are questionable.⁸³ Yet, as discussed above, the threat of ballistic missiles hitting Russia is currently much greater than the threat of similar attacks against the United States. General Charles A. Horner's argument that the ABM treaty was developed in a bipolar world and has outlived his usefulness is apropos. His idea of sharing ballistic missile defence components or perhaps systems with Russia has merit and is worth investigating: "Why don't we [The United States] start the process by sharing warning, and as we build trust, then sharing defenses?"⁸⁴

⁸² Ibid, p 32.

⁸³ World Wide Web. US, "Russia's Nuclear Force Sinks With the Rubble, Economic Crisis Erodes Strategic Arsenal", The Washington Post, [<http://www.washingtonpost.com/wp-srv/Wpcap/1998-09/18/055r-091898-idx.html>], September 18, 1998, p 3.

⁸⁴ General Charles A. Horner, "New-Era Warfare", in *Battlefield of the Future*, ed by Barry R. Schneider and Lawrence E. Grinter, (Alabama: Air University Press, 1995), p 58.

This gesture would certainly negate the ABM treaty but would also discourage any rogue countries to develop weapons of mass destruction knowing in advance that missile defence systems are fully active, and that their efforts to influence conflicts through the threat or use of weapons of mass destruction would simply be futile. The developing technologies associated with ballistic missile defence systems are very promising; it is estimated that fully functional and effective in-theatre systems may be deployed as early as year 2000 while national missile defence systems currently have a target date of 2006.⁸⁵ Therefore, the development of ballistic missile defence systems would not only become a deterrent for the current threats of weapons of mass destruction but would also contribute to the non-proliferation of ballistic missiles.

An estimated funding envelope of 53 billion US dollars is being discussed related to the development and deployment of ballistic missile defence system for the 1997-2003 period.⁸⁶ Expensive as it might be, it provides the best course of action, hence coping with the current threats of nuclear, chemical, and nuclear ballistic missile capabilities and their proliferation.

⁸⁵ Technologies are currently available to develop ballistic missile defence systems for employment in a theatre of operations but also for national ballistic missile defence systems. Systems development concentrates on three phases of flight: launch, in-flight, and re-entry. David E. Mosher, "The Grand Plans", *IEEE Spectrum*, September, 1997, p 32-35.

⁸⁶ Ibid, p 32-35.

Conclusion

The evolution of technology throughout the ages has contributed to the development of technologies that were in all cases used to conduct warfare. The creation of the German V-2s combined with the unleashing of the atom has created a series of development toward ultimate weapons, but also devastating and unstoppable weapons. Although treaties, regimes, and resolutions have been successful in limiting the number of countries possessing weapons of mass destruction, they have not been successful at stopping the proliferation of these weapons to rogue states. The proliferation of nuclear, chemical, and biological missiles continues and the threat is therefore still increasing at an alarming rate.

There are three courses of action available to negate these threats. The most effective would be the total elimination of all weapons of mass destruction. Although there is a considerable concentration of effort toward achieving this goal, it only remains a possibility for future generations. However, the elimination of these weapons must be pursued in conjunction with the deterrence and the ballistic missile defence systems courses of action.

Deterrence proved to be very successful in a bipolar world. However, since the end of the Cold War and the emergence of a multi-polar world, there are serious doubts that deterrence alone could be the best course of action. Recent events of nuclear and missile testing are not re-assuring and would indicate that deterrence against the threat posed by rogue states, as a potential course of action, is being questioned by several

countries. Although it must also be pursued along with the elimination of weapons of mass destruction and the ballistic missile defence systems, it does not represent the best course of action.

Lastly, the development and fielding of ballistic missile defence systems represent the best course of action for the aligned states to counter the current threat posed by the proliferation and the use of ballistic missiles. Although such defensive systems are expensive, the technologies are available and the systems could be fielded before 2006. This course of action properly addresses the current threats posed by nuclear, chemical and biological weapons of mass destruction from the rogue states, including the threat of ballistic missiles used as satellite killers. Furthermore, this course of action will serve as a deterrent against the proliferation of ballistic missiles as they become totally ineffective against the ballistic missile defence systems.

Just as the shield was developed against the threat of the arrow, the ballistic missile defence system would aim at protecting against the threat of any ballistic missile, providing an effective shield against weapons of mass destruction. In other words, what ever goes up as a ballistic missile must also come down, but preferably be taken down.

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