

Implications of the US withdrawal from the Nuclear Anti Ballistic Missile Treaty

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Abstract

In 2001 the United States announced their intention to withdraw from the bilateral Anti-Ballistic Missile Treaty thus allowing the U.S. to pursue the development of sophisticated anti-ballistic missile system. The U.S. rationale for withdrawal was so that it could defend itself and its allies from a limited ballistic missile attack by rouge nations and non state actors. The U.S. withdrawal however continues to have wider implications on the other nuclear states as well as those aspiring to acquire nuclear weapons; this paper therefore sets out to investigate the implication of the U.S. withdrawal from the Anti-Ballistic Missile Treaty on the other nuclear nations.

Introduction

In 2001 the United States gave notice to Russia of its intention to withdraw from the Anti-ballistic Missile Treaty. This bilateral treaty had stood for nearly 30 years and constrained the scale and architecture of each nation's Anti-Ballistic Missile system by preventing both nations from being immune from a retaliatory ballistic missile attack. The ABM limitations set out in the treaty were at the time seen as a capstone in curbing the unrestrained race to develop and deploy strategic ballistic missiles designed for nuclear weapons delivery. The US withdrawal from the ABM treaty was the first time in modern history that the US had renounced an international agreement. So why did the US withdraw?

At the time the US and Soviet Union signed the treaty, Cold War politics polarized the East and West. Moreover, those countries that held nuclear weapons were responsible states and so whilst the proliferation of nuclear weapons was a

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concern nuclear weapon proliferation was not being demonstrated in reality. The Cold War is over. The threat of a major conflict between superpowers seems improbable for now. However, the proliferation of nuclear weapons and ballistic delivery systems is a current reality and achievable for some of the world's poorer nations. An added factor, many will assert,² is that Islamic radicalization is filling the power vacuum left by the breakdown of the communist ideology, and this is adding to the tension within and between nations. So today we live in world where the threat of conflict involving the exchange of 1,000s of nuclear weapons delivering 100s of megatons of damage across the globe has been replaced by the threat of a nuclear engagement involving 10s of nuclear warheads, and the world has also seen some nations trying to utilize their nuclear ambitions as bargaining tools to extract political concessions from other states.

In light of these developments, George W. Bush gave a speech in 2001 in which he outlined that a new concept of deterrence is required that does not rely solely upon the threat of nuclear retaliation, but would also include the utilization of Anti-Ballistic Missile systems for the defense of an nation against a limited ballistic missile attack.³ The constraints of the 1972 ABM treaty, however, prevented the US from developing an optimized ABM system able to defend the whole country and in order to do so, the US withdrew from the Treaty.

A nationwide defensive system, once developed and proven, may protect the US and its allies from a limited ballistic missile strike. However, it also has the potential for destabilizing the deterrence strategies employed by the other nuclear nations, some of whom are allied to the US. This paper will explore the implications that the US withdrawal from the treaty will have upon the other nations who currently have or aspire to obtain weapons of mass destruction.

Background

Throughout the 1950s and 1960s, both the US and Soviet Union were engaged in a nuclear arms race which was being contested on two fronts: the first front focused upon improvements to the quality and quantity of offensive nuclear weapons, their survivability and their delivery system; the second front developed of defensive

² The Economics of Radicalisation, Anatol Lievin, Paper from the First International Conference on Radicalisation and Political Violence.

³ President George W. Bush "Speech on deterrence and missile defence delivered at the National Defense University" May 2001.

systems designed to counter a ballistic missile threat. In the 1960s and 1970s both nations were developing anti-ballistic missile systems which were based upon similar architectures. They employed exo-atmospheric interceptors containing a high yield nuclear warhead (up to 5MT) designed to kill offensive warheads with an x-ray burst. These were backed up by endo-atmospheric interceptors carrying a much smaller (approximately 3 kT) warhead designed to stop those warheads that evaded exo-atmospheric interception.

The cost benefit argument for constructing an ABM system, at first, seemed simple to make. The expenditure associated with offensive missiles that need to travel thousands of kilometers must be greater than the costs associated with defensive missiles required to travel only a few hundred kilometers. Simplistically, this statement can be expressed as the **cost-exchange ratio** where the cost of getting one additional warhead through the defensive system is divided by the cost to the defender for stopping the warhead. For example, if both the offence and defense have similar financial capacities and the cost of one more warhead is 5 times greater than the cost to the defender, then the advantage remains with the defensive system:

$$\text{Ratio} = \frac{\text{Offence}}{\text{Defence}} = \frac{5}{1}$$

In the 1950s and early 1960s, offensive ballistic missiles carried a single nuclear warhead and the cost-exchange ratio benefited the defensive nation, especially when the defensive system was not required to undertake any discrimination of the ballistic missile threat, and the interceptors carried nuclear warheads which were not required to be too accurate to defeat an offensive warhead.

In the late 1960s, Robert McNamara recognized that one nation's deployment of an ABM system would provoke an adversarial response with an increase in offensive ballistic missiles to restore the perception of the nuclear deterrence. To counter the Soviet ABM threat and rebalance the cost-exchange ratio, the US began a study to improve the Polaris missile system. This included hardening of the warheads as well as introducing decoys which reset the cost-exchange, making it more beneficial to the offence. This concept referred to as Polaris A-3A, was trialled between 1966 through 1968, but it never entered service. The US soon realized that with the development of the Poseidon missile, which could carry up to 14 Multiple Independent Re-entry Vehicles (MIRV) W68 nuclear warheads, they could swamp the Soviet ABM defensive system with nuclear warheads.

In 1967, US President Lyndon B. Johnson and US Secretary of Defense McNamara discussed with the Soviet Premier the relationship between strategic offensive and defensive forces and proposed strict limitations on strategic ABM systems. Although this proposal was initially rejected by the Soviets, the ABM treaty which posed strict limitations on the architecture and scale of each nations ABM capability was signed by both parties in 1972.

Anti Ballistic Missile Treaty

By signing the treaty, both the US and Soviet Union agreed to limit the scale and capability of their ABM systems. The salient points of the limitations were:

- Two deployment areas⁴
 - Restricted so they cannot provide a nationwide defense
- Each site must have no more than 100 launchers
 - Each launcher must have no more than 1 interceptor
- Minimal improvements to ABM technology
 - No development, test or deployment of ABM launchers capable of launching more than one interceptor
 - No modification of launchers to allow a capability for them to be rapidly reloaded
 - Interceptors must not contain more than one independently guided warhead
- Prevention of SAM and Radar systems, designed for an anti-aircraft capability, to be improved for use against Ballistic Missiles
- Early warning radars could only be sighted within territorial boundaries, orientated outwards and unable to contribute to the ABM battle
- Development of sea, air, space based or land mobile ABM Systems was prohibited

In this way, the ABM treaty significantly constricted each nation's ability to defend itself from a high intensity ballistic missile engagement. It constrained them so much that the US questioned the value of its own Safeguards ABM system and deactivated it soon after it became operational.

⁴ Subsequently reduced to one deployment area.

For an ABM system to be truly effective against multiple MIRVs, it needs to increase its ability to track, discriminate and intercept, and this cannot be achieved if it is constrained by the limitations set out above. Consequently, the US withdrew to enable legal development of the more capable systems fielded today.

Consequences of withdrawal

US and Russian Federation

Despite improvement and proliferation of ABM systems around the world, these systems are currently incapable of adequately countering the ballistic missile capabilities of the US and the Russian Federation. While these nations maintain hundreds of ballistic missiles and thousands on nuclear payloads, their offensive advantage is unlikely to be matched or overtaken by ABM defensive systems any time soon. Both the US and Russia, are engaged in negotiations aimed at reducing their strategic stockpiles, but unless the nuclear warhead cuts are unprecedented, then the ABM systems are unlikely to be a significant threat in the near term. The USAF with their shrinking de-MIRVed ICBM force is likely to be the first of the US strategic assets to become impotent. However, as the Minuteman III represents a single element in US nuclear force planning, this issue can be managed by simply targeting threat nation assets which remain undefended.

Despite the ongoing discussions between the two nations, the Russians remain deeply suspicious of the US plans to develop and deploy ABM systems and has threatened to target those nations which would site some of the US missile system architectural elements. Russia has a strong case. The ground based interceptors, which were destined for Eastern Europe, would be used to kill ballistic missiles launched from countries like Iran. The Russian concern is that these systems could be used to counter Russian missiles. In addition, they could set a precedence for sighting even more sophisticated ballistic missile interceptor systems in the future.

The Russians recognize the strategic advantages offered by ABM systems which in extremis could become a battle winning asset in a world where the nuclear arsenals of the super powers are measured in tens rather than hundreds of ballistic missile delivery systems. This is especially true if the ABM systems are not

constrained to the territorial boundaries of one's own nation. For now, Russian nuclear forces are not under threat. However, the cost of maintaining such a large nuclear stockpile has a significant impact upon the Russian economy which the Russians would like to see reduced. Russia is keenly aware that effective ABM systems stand in the way of significant arms reductions.

India and Pakistan

These two nations have a long tradition of rivalry and mistrust which has intensified as a result of the Mumbai terror attacks. This antipathy is unlikely to subside in the foreseeable future and, depending upon the outcome of the conflict in Afghanistan, the world could see Pakistan emerge as a highly radicalized Islamic nation that could increase regional tensions even further.

Pakistan, as reported in the Bulletin of the Atomic Scientists, is enhancing its nuclear weapon capability and is deploying new nuclear-capable missiles. It is estimated that the nation has between 70-90 nuclear weapons. Pakistan is also building new reactors which are set to triple its plutonium production, suggesting that it is moving its nuclear forces towards next generation two stage nuclear weapons which are lighter and could be delivered further by aircraft and/or ballistic missiles. Pakistan has three types of ballistic missile in service, all of which are thought capable of delivering nuclear warheads up to approximately 1,000km. Additionally, Pakistan has also claimed that they are developing the Shaheen-2, which is capable of delivering a 1,000kg payload over 2000km.

India states that it maintains a minimum deterrence posture which will be "commensurate with the size and geostrategic position of India in the world".⁵ It is currently estimated that the Indian nuclear arsenal is sized similarly to that of Pakistan. India has ambitions to procure a nuclear triad. However, currently its nuclear weapons deterrence is only deployable by aircraft and land based missiles (although the latter suffer from reliability issues). To complete its triad, India is developing land based ballistic missiles which will have a range approximating 3,000km and will have its first ballistic missile submarine⁶ by 2012. India also has an active ABM program and has successfully conducted both endo- and exo-

⁵ "India will continue to strive towards achieving minimum deterrence – Antony" Indian Press Information Bureau.

⁶ Often referred to as Ship Submersible Ballistic Missile (SSBN)

atmospheric interception of ballistic missiles. It is claimed that these systems will work in tandem, much like the Russian system and will have a hit probability of 99.8%.

Both India and Pakistan operate dual purpose delivery platforms capable of deploying nuclear or conventional warheads. This result in an ambiguous operational status of these systems⁷ and has potential to cause tension in the region. This tension will only deepen in the event of a high intensity conventional conflict between the two states, especially if these dual purpose delivery platforms are used. It would appear that India, with its ABM system would have a distinct advantage over Pakistan, especially when Pakistan has limited ballistic missile capability and no realistic ABM defense. A conflict between the nations could lead the Indian planners to believe that they may win a nuclear war with Pakistan. Pakistan, for their part, fully understands this imbalance and is reported to be attempting to procure ABM systems from China.

In summary, both countries are continuing to counterbalance each-others offensive nuclear capability by building more missiles, nuclear warheads, and by obtaining ABM systems to help counter the other nations nuclear threat. These countries were not signatories to the 1972 ABM treaty and it cannot therefore be claimed that the US withdrawal has led to the arms race from their perspective. However, the ABM technology being developed by the US, Russia, and China will contribute to this arms race. The tension between India and Pakistan is driving the Ballistic Missile/ABM race and is not solely due to proliferation of ABM technology.

China

Of the five original nuclear weapon states China is the only one currently actively increasing its nuclear arsenal; in addition China also has the most active ballistic missile program in the world. Along with these developments it is also claimed that China is actively developing systems able to counter ABM defensive systems.⁸

China has a nuclear stockpile which is similar in size to that of the United Kingdom and France. However, with its modernization program, it is currently

⁷ i.e. potential adversaries would not be sure if the system is deployed with nuclear weapons or not.

⁸ Department of Defense, Annual Report to Congress, Military Power of the Peoples Republic of China 2008.

unclear what form and scale the Chinese nuclear deterrent will take in the future. Today the Chinese are able to deploy nuclear weapons from land based ballistic missile systems and aircraft, but while the Chinese currently have a single SSBN, it is thought that it is operational. China is reportedly building a fleet of SSBNs and will commence an operating posture similar to that of the UK and France once these boats are operational.

It is reported that the majority of China's land based ballistic missiles are pointed towards the US and that these missiles carry a single warhead but also carry decoys and penetration aids to counter the US ballistic missile defense. Moreover, it is thought that the Chinese have begun the development of Multiple Independent Re-entry Vehicles for some of their ballistic missiles.^{9 10 11 12}

China, like India, has the potential for becoming a future superpower to rival or even surpass the US. It would appear that China is responding to the US ABM threat and is examining ways of overcoming the US ABM systems by deploying decoys or MIRVs. This application of technology to neutralize the US ABM system would also give the Chinese solution space for overcoming ABM systems deployed in the future by other nations.

Other Threat Nations

North Korea has made clear its intentions for developing nuclear forces as well as Ballistic Missile systems. There is no public information available that North Korea has moved past the experimental nuclear device into a viable nuclear weapon which is deliverable by either aircraft or ballistic missile. Most worrying for the region, however, is the North Korean ballistic missiles which are capable of reaching the capital of its southern neighbor as well as Japan. These missiles, it is believed, also have the ability to deliver chemical and biological payloads.¹³ North Korea's ballistic missile programs are impressive despite it being a third world country

⁹ Department of Defense, Annual Report to Congress, Military Power of the Peoples Republic of China 2008.

¹⁰ Bulletin of Atomic Scientists, Chinese Nuclear Forces 2008, Robert S. Norris & Hans M. Kristensen.

¹¹ National Air & Space Intelligence Centre, Ballistic & Cruise Missile Threat, NASIC-1031-0988-06, March 2006, p.20.

¹² Jane's Information Group, Strategic Weapons Systems Issue 47, 2007, 12, 20,33.

¹³ Statement of General Thomas Schwartz, Commander in Chief UN Command/Combined Forces Command & Commander, United States Forces Korea before the 107th Congress Senate Armed Services Committee.

subject to international export controls. In-fact, North Korea is frequently cited as being willing to sell technology and expertise to anyone willing to pay.¹⁴

From the evidence that is publically available, there is no indication that the US withdrawal from the ABM treaty has had an effect upon North Korea. In fact, the opposite appears to be true and that North Korea was one of the concerns which drove the US to withdraw from the treaty and seek alternative methods of deterrence. East Asian countries that are allied to the US continue to be interested in procurement of ABM systems to counter the North Korean threat. Specifically, Japan and the US have engaged in joint development of the Patriot Advanced Capability 3 (PAC-3) as well as procuring US developed sea based assets.

France and the United Kingdom

Both nations have similar sized nuclear stockpiles which rely upon a sea-based minimum deterrence posture (although France does have a small nuclear cruise missile capability). Unlike the US and Russia, the UK and France do not have sufficient assets to remain unconcerned by future ABM system proliferation. Both nations routinely have one platform at sea and can only deliver a limited number of warheads onto a target. The UK deterrence mission has traditionally been based upon a Moscow scenario with its ABM defensive system. This Moscow criteria has set the scale and architecture of the UK deterrence mission ever since the UK became a nuclear power. Therefore, the US withdrawal from the ABM treaty has had a significant effect upon these nations because they can no longer reliably predict the deterrent forces they may need in the future. Effectively the US has taken away the Anglo-French crystal ball, and now each face an uncertain future regarding what their respective deterrence should look like.

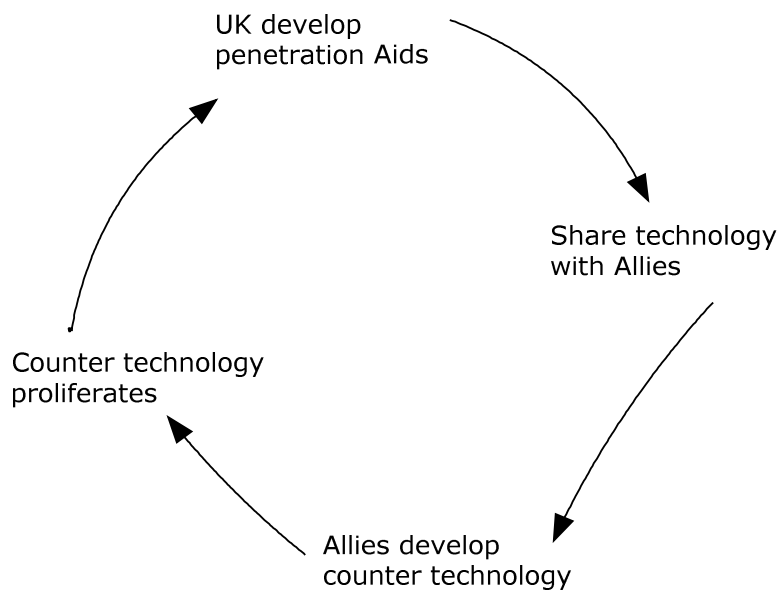
Currently, with ABM systems in their embryonic form, the deterrence mission of the French and UK are likely to succeed. However, with the ABM treaty gone, the Russians could make modest improvements to their ABM systems making the UK deterrence mission impotent. Additionally, as ABM systems improve and achieve better kill probabilities, both nations with their limited deterrence posture, will be in danger of becoming ineffective. This could occur as soon as the next

¹⁴ Remarks of Director of the Central Intelligence Committee, Leon E. Panetta at the Pacific Council on International Policy, May 2009.

decade. It is currently inconceivable that the UK or France would build additional nuclear warheads, delivery vehicles or platforms to counter future ABM capabilities.

Therefore, if the UK and France are to succeed in their deterrence missions, they may need to follow the Chinese lead and employ decoys and penetration aids with their ballistic missiles. Undertaking such a modification from a UK perspective is more easily said than done. This is because the UK and US share the D5 missile used to deliver the warheads to the target and any modification could have significant financial implications for the UK and perhaps could lead to another program like Chevaline.

Additionally, if the UK were to develop penetration aids for use with this system, they would expose an interesting causal loop as described: UK develops novel penetration aids which it will share with the US community; the US ABM community, to become more effective, will develop ways of discriminating against the penetration aids; the US ABM capability will proliferate making the UK solution impotent; the UK will develop more sophisticated solutions.



The loop diagram, while being very simplistic, shows a trend that describes a potential technology race between the ballistic missile offence verses the ABM defense.

From the European perspective, the resultant cost-exchange ratio is likely to be hard to accept politically or economically (consider the arguments around the Chevaline program¹⁵). In the pursuit of a world without nuclear weapons, the small European stockpiles provide the US with a window into the future as it reduces its own stockpile. Perhaps the US already recognizes the advantage provided by novel penetration aids and will be willing to engage in a joint development. The alternatives for the UK are currently limited. The UK could consider reducing its definition of deterrence or even consider abandoning its deterrence altogether in its current form¹⁶ and seek other forms of deterrence. Another option that the UK and France might want to consider would be the combination of their deterrence capabilities thus providing a European Union deterrence capability (how this would work would be a complete study in itself).

Conclusions

The US withdrawal from the ABM treaty has had some effects, most notably upon those countries which truly maintain a minimum deterrence posture. These countries can no longer use the ABM treaty as a model for defining ABM system architectures which they need to overcome. For these countries, their deterrence posture is currently stable, but as ABM systems improve, they will enter a state of uncertainty. These countries will need to expedite planning the future architecture and posture of their deterrence.

There is an asymmetric arms race being conducted, most notably by China, India and Pakistan, who are racing to produce more nuclear weapons and ABM systems. China is also reportedly developing decoy systems to overcome ABM systems. In summary, those countries not constrained by the ABM treaty were already developing ABM systems. so the US withdrawal has simply accelerated the technological developments. In fact, it is the belief of the author that both the US and Soviet Union/Russia were, by proxy, developing ABM systems which would have breached the ABM treaty. The fact that the US withdrew first was a measure that they were more technically advanced than Russia at the time they withdrew.

¹⁵ Chevaline when it entered service was behind schedule and significantly over budget; but despite its project failings it still remained the cheapest option to the UK. It would have been significantly cheaper than procuring more Resolution class submarines and associated missiles, warheads, support systems and infrastructure required to deliver the equivalent effect.

¹⁶ Moving to alternative payload delivery vehicles is unlikely to return any cost benefits to the UK.

Finally, perhaps the signatories of the Nuclear Non-Proliferation Treaty should consider bringing ballistic missile technology under the umbrella of the NPT to reduce the effects of this technology race. It may also be worthwhile, as part of future strategic nuclear arms limitations, to consider decoys and penetration aids as part of the strategic stockpile. This would make offensive systems truly transparent. However, as some countries are exceedingly opaque about their strategic systems, it is unlikely that this would work and the technology race would continue.