Missile Defence for Australia: Vital Development or Strategic Snake Oil?

Background
The dream of a protective shield against intercontinental ballistic missiles (ICBM) entered the public arena in the 1980s when then President Ronald Reagan articulated the idea of a massive system to protect the USA from any type or number of ICBMs. The Strategic Defense Initiative (SDI)—more commonly referred to as STAR WARS—envisioned a vast system of ground and space based interceptors, lasers, and radars. As the system was developed, it was found to be technically impossible and was quietly put aside.

In more recent times there has been growing concern at the possibility that short (SRBM) or intermediate range ballistic missiles (IRBM) could be fired from ordinary-looking cargo vessels. This would make interception difficult because the hostile missile could be fired at less than maximum range and thus be able to use some of its fuel to alter its trajectory. This would make the task of interception almost certainly impossible.

This scenario could explain the urgency attached by all parties to the Proliferation Security Initiative (PSI) and the proposals for US, Australian and other coalition navies to intercept and inspect North Korean freighters on the high seas.

What is being considered?
The current program is known as the National Missile Defense or NMD Program—dubbed Son of STAR WARS. It seeks to provide an element of protection for the continental USA against limited numbers of incoming ICBMs.

As it stands today, the program is divided into three segments, each one aimed at a different stage of the incoming missile's flight.

The Boost Defense Segment is intended to destroy ICBMs in the initial seconds of flight while their rocket motors are still working. The preferred technology is the 'Air-Borne Laser' (ABL) which is a Boeing 747 aircraft armed with a very powerful chemical laser. This weapon has a limited range because of the requirement to be in direct line of sight to the missile launch.

The Mid-Course Defense Segment will use either ground-based or sea-based defensive missiles to destroy the hostile ballistic missile during the early ascent and middle part of its flight. This segment is difficult to implement because of the high velocity required by the interceptor and the need for the interceptor to be launched from a location near where the enemy ballistic missile is itself launched. Current focus is on the development of an interceptor missile (Standard SM-3) that can be launched from an Aegis type cruiser or destroyer that is able to hit ballistic missiles outside the atmosphere. However, size and speed constraints mean that the SM-3 can only engage short or medium range ballistic missiles.

The final element in the US program is the Terminal Defense Segment, which will destroy an incoming ballistic missile as it approaches its intended target. Existing approaches include the Patriot (PAC3) missile, the US-Israeli Arrow missile and a similar system (MEADS) currently under joint development between the US and Germany.

As outlined in recent ministerial comments, Australia is looking at systems able to provide protection to deployed troops, Navy ships or strategic assets. This suggests an interest in technologies such as the Aegis weapon system (as part of Project SEA4000) and the Patriot Missile system.

The Threat
Unlike the more generalised threat faced by Australia in the War on Terrorism, the threat from ballistic missiles appears to be low. While a number of countries are believed to have or be developing some sort of ballistic missile, only North Korea,
China, the USA or possibly India may possess missiles capable of reaching Australia. Of course, in an era of world-striding 'coalitions of the willing' there is a greater possibility that our forces may be deployed to areas within the reach of other countries' ballistic missiles.

A further concern is articulated in a recent comprehensive study of ballistic missile defence by the American Physical Society. This showed that if an SRBM or IRBM was fired from a converted freighter, a current generation SM-2 missile— as fitted to the Aegis-class cruisers and destroyers and a likely contender for Australia's Project SEA4000 Air Warfare Destroyer—would need to be launched from a ship no more than 40 kilometres away, and fired no later than ten seconds after the North Korean ballistic missile for the interceptor to have any chance of destroying its target. Overall, if the intercept did not take place within 45 seconds of the ballistic missile launch, it would be above the altitude where the interceptor could manoeuvre effectively. Such technological constraints put an emphasis on locating and shadowing any suspect North Korean vessel very closely.

### The Science

The problem of intercepting a missile possibly moving at some 6.5km/sec with another one moving at roughly the same speed is enormously complex. It all becomes almost impossible if the attacking missile deploys decoys or is fired at less than extreme range thus enabling its trajectory to dogleg unpredictably.

Over the past twenty years, numerous technological fixes have been attempted without any consistent success. More recently, some trials have succeeded but only in highly simplified scenarios, without decoys and without doglegs.

An example of the difficulties involved in mastering the technology of missile defence is the Patriot Missile System, which, despite being used in the 1991 and 2003 Gulf Wars has consistently failed to perform adequately. For example, in the 2003 war, it was responsible for three attacks on friendly aircraft, causing the death of one American and two British pilots. The Patriot missile batteries repeatedly ignored incoming Iraqi cruise missiles, including one of which landed outside Camp Commando in Kuwait, and another that landed in a Kuwaiti shopping centre.

### The Money

As stated above, Australia appears to be only interested in participating in the mid-course and terminal Phases of missile defence—which are by far the most technically difficult. Realistically, this restricts the alternatives to either the Patriot Missile (PAC3) for ground-based defence, or the Aegis Weapon System with SM-2 missiles for sea-based defence.

Patriot is a very expensive system, with earlier versions reportedly costing US$200 million per battery, and the PAC3 missiles costing upwards of US$2 million each. A requirement for the inclusion of sea-based ballistic missile defence would mean that the RAN's new Air Warfare Destroyer—would need to be equipped under Project SEA4000 with Aegis-equipped destroyers such as the US Navy's Arleigh Burke-class. The basic unit cost for such vessels is about US$945.9 million (A$1454.6 million).

### Asymmetric Responses

When faced with a concerted defence to an avenue of attack, an intelligent aggressor chooses a different way of attack. Thus, the Germans in WW2 when faced by France's Maginot Line simply attacked elsewhere. Similarly, an aggressor faced with the prospect of their scarce missiles being intercepted will choose alternative routes of delivering their WMD. This could be as simple as a 20ft shipping container, a tanker truck crossing an international border, or by using established criminal smuggling networks to bring the WMD material into the target country.

### Issues for Australia

- **Is Missile Defence a permanent solution to a temporary problem?**

  North Korea could well collapse before this system is introduced. No other country is likely to present a similar level of threat, potentially leaving the ADF with an expensive white elephant.

- **Is it a cost-effective way of using scarce Defence-dollars?**

While there is a case for the SEA4000 Air Warfare Destroyers to have a robust capability against conventional or cruise missiles, the oppressive cost of ballistic missile defence may be one best left to our senior alliance partner, in the same way we have sheltered under their expensive nuclear umbrella since the start of the Cold War.

**Given the expense, only very few strategic assets will be protected.**

How does Australia prioritise what assets should be protected? In a sense, any attempt to deem one city or facility to be more important than another, could be seen as a return to the WW2 Brisbane Line mentality.  

4. The Brisbane Line refers to a mythical WW2 decision that, should Australia be invaded by the Japanese, the defence would be conducted along a line stretching from Brisbane to Adelaide, leaving Northern Australia to look after itself. See [http://www.diggerhistory.info/pages-battles/ww2/brisbane_line.htm](http://www.diggerhistory.info/pages-battles/ww2/brisbane_line.htm)

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