BALLISTIC MISSILE DEFENCE: IMPLICATIONS FOR THE ALLIANCE

NATO Fellowship Report
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**The views expressed in this report are the author's, and do not reflect the official views of NATO*

or any of its member nations.

Executive Summary

Ballistic missile defence is not a new issue for the alliance. It first emerged in the mid-1960s in response to the American debate on anti-ballistic missile systems. This first debate peaked in the context of Secretary of Defence (SoD) McNamara's September, 18th, 1967 Sentinel announcement, waned with President Nixon's 1969 Safeguard announcement, and largely concluded with the 1972 signing of the ABM Treaty. The second occasion began with President's Reagan's March 23rd, 1983 television address, in which he enuciated what would become known as the Strategic Defense Inititaive (SDI). It peaked following SoD Weinberger's invitation to the allies to participate in SDI research at the March 26th, 1985 Nuclear Planning Group (NPG) meeting in Luxemborg. Allied response to the invitation varied from official acceptance to the invitation (eg. Germany, Great Britain, and Italy), acceptance limited to companies (Canada), to rejection (France, Denmark). While SDI remained an issue through 1988, as an alliance concern it largely fell off the agenda. Its successor, President Bush's Global Protection Against Limits Strikes (GPALS) also received little public attention from the alliance.

The current phase of this issue for NATO began publically in the fall of 1999 following a series of briefings from senior U.S. officials, including SoD Cohen, on the US National Missile Defence Programme (NMD). Since then, a range of strong public criticisms from the allies have been enunciated. The specific European concerns about NMD vary in degree and kind. Nonetheless, they share one significant concern; the potential impact of an NMD deployment decision on European domestic attitudes that could impact on current and future planned defence investments. While this has not been publically articulated by the allies, the geographic proximity of emerging ballistic missile capabilities from the South, possibly married to Weapons of Mass Destruction (WMD), means that Europe will be threatened much sooner than North America. Thus, an NMD deployment decision could place BMD directly on the public political agenda, especially if the allies signal their unreserved support for NMD. In so doing, public demands could emerge for the Europeans to accelerate their own BMD programmes, thus re-directing funds away from other more pressing defence investments in the context of the multi-faceted NATO Defence Capabilities Initiative (DCI), and/or increase their defence spending.

Many of the public criticisms, or concerns about NMD resonate from the past, with the exception of the core disagreement between the US and Europe on the nature and timing of the threat. These include, *inter alia*, concerns about strategic de-coupling - shared nuclear risk - and differential security, relations with Russia, the future of arms control, arms race implications, and the politics of consultation. At the same time, however, the public criticisms of NMD mask fairly robust BMD development programmes, inside and outside of NATO. Within NATO, this is centered on the Extended Integrated Air Defence (EIAD) initiative and the tri-national Medium Extended Air Defence Programme (MEAD). Outside of NATO there are range of national, binational, and tri-national European programmes largely focussed for the moment on naval based anti-tactical missile defence capabilities (ATMD).

From a distance, the NATO-European programmes provide a different picture from the outward public opposition to NMD as reported extensively in the press. Even though most of their programmes are concentrated in the lower tier or ATMD area, when examined in terms of ongoing US ATMD and theatre

missile defence (TMD) programmes relative to the nature of a foreseeable threat to Europe itself, it is evident that the building blocks are being set in place to create a strategic missile defence for Europe. Certainly, the alliance's immediate goal to obtain a missile defence capability for NATO non-Article V operations should not be ignored. However, this very capability in conjunction with geography and missile defence technology, linked by the NATO air defence modernization programme, will also provide a layered missile defence for all of Europe. In so doing, this capability will be limited to emerging ballistic missile and weapons of mass destruction (WMD) threats from the Middle East and southern littoral of the Mediterranean. It will not be capable, at least for the foreseeable future of confronting threats from the East or North.

The acquisition of this strategic defence for Europe, relative to US programmes, is essential for the future of the alliance. If for whatever political reasons this does not occur, then the gap between the US and Europe will widen greatly. Already increasingly problematic because of the growing military technological gap as a function of the size and scope of US defence investment when compared to the Europe as a whole under the umbrella concept of the Revolution in Military Affairs (RMA), it is essential that Europe through the alliance develop and deploy missile defences in manner inter-operable with US forces. In so doing, the trans-atlantic relationship through NATO will remain the core security relationship in the future for Europe itself, and for the West in terms of global security cooperation.

This report examines the implications of BMD for the alliance. Part I focusses directly upon the current issue of NMD for the alliance. It outlines the current state of the NMD programme, and argues that the prospects for a deployment decision this year are high, not least of all because it is cost free for the current Administration. Regardless, NMD deployment will take place sooner, rather than later, even if the decision is passed on to the next Administration. In evaluating the concerns enunciated by European decision-makers with regard to NMD, emphasis is placed upon the threat and strategic-de-coupling/security differentials. With regard to the former, the core concerns relate not to the emergence of a threat *per se*, but on its timing. By arguing that the threat is much further off, European elites are seeking to avoid a domestic debate in Europe. Concerns about de-coupling fail to recognize that deployed missile defences are vital to ensure that the US remains politically coupled to Europe through NATO. As regards security differentials, this has always been the case between Europe and the US, and within Europe itself, and NMD is not likely to significantly alter this reality. In fact, a deployed NMD system by supporting the political coupling of US to Europe reduces the security differential within Europe by reinforcing the longstanding US guarantee to all the allies.

Part II directly examines the conceptual *straightjacket* that informs the distinction between strategic and theatre defence. Drawing on its Cold War roots as embodied in the core arms control treaty, the 1972 ABM Treaty, it posits that the understanding of strategic defence serves to legitimize theatre defences. This has been codified most recently in the Demarcation Agreements. As a result, the strategic value of theatre defences for Europe, further legitimized by the emphasis on protecting expeditionary forces for out-of-area operations, has been lost sight of in the public debate. From this recognition, the various US and European missile defence development programmes are outlined. Although the European programmes largely reside

in the lower tier ATMD area, they provide the foundation for expanding into the upper tier TMD area, especially when linked to US development programmes. With the development time lines between US and European programmes somewhat synchronized, it strongly appears that Europe will acquire a limited strategic defence sometime around the end of this decade.

Part III concludes the study by examining the specific role of NATO in missile defence developments. In so doing, it outlines the evolution of NATO activity since the early 1990s, keyed by the impact of the Gulf War and US initiatives, identifies the various NATO organs involved in developing a missile defence concept for the alliance, and the current state of NATO's involvement. Three are central: the evolution of the US offer to share early warning (EW) data; the modernization of the air command and control system, which includes linkages to the naval environment and out-of-area force needs; and the core NATO Extended Integrated Air Defence (EIAD) programme. It argues that NATO's involvement is the key for ensuring trans-atlantic cooperation. Moreover, it will also serve to support the development of the European Security and Defence Identity (ESDI) as the European pillar within a strong alliance. Finally, the analysis also suggests that NATO's central role lays the foundation for future cooperation with Russia in the area of joint interests on missile defence, with the potential for greater political benefits in this regard.

Overall, BMD is not a threat to the future of the trans-atlantic relationship and the alliance. It is one of the essential components for the future of the alliance, the trans-atlantic relationship, and the evolution of ESDI within the alliance. The current public concerns about NMD from the European members of the alliance are largely directed towards their domestic audiences. The danger is that these public concerns could in the future rebound to undermine cooperation between US and Europe under the auspices of NATO. If this occurs, it is likely to signal the beginnings of the US and Europe drifting apart. Failure to move ahead in the area of missile defence will not be the cause of the drift. Rather, it is arguably the most important indicator of the future of the trans-atlantic relationship, and NATO.

Table of Contents

PART I

Europe, the US, and NMD

BMD has long been the almost exclusive purview of the Superpowers. In the context of NATO, the specific issue of TMD has been driven by the US. It has placed TMD on the alliance's agenda, and the US development process has largely dictated the pace and nature of the alliance's response in general, and the European members in particular. However, the issue for the alliance is not simply about TMD. It is also linked to the US NMD programme. Even though the US has separated NMD from TMD for development and management purposes, American policy views them as inherently linked as part of its wider national security strategy for the post-Cold War world.

In response to the increasing likelihood that US NMD will be deployed earlier, rather than later, a significant degree of European opposition to NMD has emerged. Beginning in late 1999 and carrying through to today, the major European members of the alliance have voiced opposition to early deployment on a variety of grounds. Like most political views from the European allies, this surface consensus conceals a range of different views about NMD. These range from significant opposition to NMD in general, opposition to early deployment, to basic concerns about the potential divisive nature of the NMD issue on alliance solidarity. In many ways, these concerns are not new. They reflect the political history of the trans-atlantic relationship since the formation of NATO in 1949. Moreover, the nature of opposition also reflects the issues raised by Europe surrounding the previous episodes of US missile defence: the ABM era of the 1960s, and the SDI era of the mid-1980s.

The purpose of this analysis is to examine the range of arguments put forward by the European allies in opposition to NMD. It demonstrates that many of these views misunderstand the political and strategic implications of NMD for the trans-atlantic relationship. In addition, opposition is a function of NMD timing relative to the various national and NATO missile defence development programmes. Early NMD deployment is feared to lead to a domestic European debate on missile defence for Europe. Such a debate could generate domestic pressure for greater European investment in missile defence in order to speed up

their own programmes. In so doing, more immediate pressing defence investment requirements under current and future constrained defence budgets could be significantly affected.

NMD and European Opposition/Concerns

In early July 2000, the third intercept test, and second integrated systems architecture test is scheduled.[1]

[1] Originally, there were to have been four intercept tests prior to the Deployment Readiness Review. The first test of only the interceptor was successful on October 2, 1999. The second intercept test, which included a test of the systems architecture by integrating early warning, the x-band guidance radar, and interceptor failed, although the system's integration component was seen as a success. The

Pending the results of this test, a decision will be made through the Pentagon's Deployment Readiness Review whether to recommend proceeding with deployment. Following this recommendation, tentatively scheduled for August, President Clinton will make a decision on deployment.[2] If the President decides to proceed, the initial step will be to choose formally the site for deployment, most likely Alaska, and select

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failure related to the cooling system for the on-board terminal infra-red guidance in the last 5 seconds. The third test, which is also a systems architecture test, has since been delayed from spring until early July. Background Briefing. National Missile Defense Conducts Intercept Test. News Release. Office of Assistant Secretary of Defense. Washington. January 18, 2000.

[2] The Pentagon has promised a 30 day data analysis turn around, which has been criticised as too short. Gopal Ratnam. "Colye Argues for Thorough Review of NMD Test Results" Defense News. May 1, 2000.

the contractor to build the x-band guidance radar infrastructure at Sheyma.[3]

[3] The alternative site at Grand Forks, the original ABM Safeguard location, has not been completely excluded, even though simulation and modelling undertaken at the Joint National Test Facility in Colorado Springs indicates that an Alaskan location provides the most effective coverage of all of the US, including Alaska and Hawaii; a coverage requirement mandated by Congress in the original 1991 National Missile Defence Act. Grand Forks will likely become the second site, assuming that a future decision is made to expand the system to two sites consisting of 100 interceptors each. It is possible, but not probable, that an agreement with Russia on revisions to the ABM Treaty would lead to

a Grand Forks decision. Grand Forks is the site of the US declared ABM location in the 1974 Protocol. As such, deployment in Alaska violates Article I of the Protocol. See "Protocol to the Treaty Between the United States and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems" reprinted in Matthew Bunn. Foundation for the Future: The ABM Treaty and National Security. Washington: The Arms Control Association. 1990. In addition, the Alaska interceptor site, in central Alaska, violates Article III of the original Treaty that mandates the guidance radar and interceptors be co-located.

Importantly, the decision to be taken this summer/fall is not necessarily a deployment one. According to the 2nd Welch Committee report in the fall of 1999, the decision should be understood as a deployment feasibility one; necessary to ensure that an operational capability can be in place by 2005.[4] The actual deployment decision would not take place until the completion of nine more intercept/integrated systems architecture tests in approximately 2003. In addition, if the decision is made to proceed, it has been argued that the US would not violate the ABM Treaty until the actual construction work on the x-band radar at

[4] A delay in beginning construction of the radar site would push the operational date further on because of the short construction season in Alaska. Thus, if no decision is made this summer/fall, the 2001 construction season would be lost. The second Welch Panel report recommended that if 2 of the intercept tests, including 1 systems integration, are successful, this would be sufficient to announce the site, and let the contract for the construction of the radar; arguably the radar would have value outside of NMD as well. L. Welch at.al. 2nd Report of the Panel on Reducing Risk in Ballistic Missile Defense Flight Test Programes. November, 1999.

Shemya begins, as distinct from the construction of the concrete platform and outer shell.[5] From these two perspectives, President Clinton can "fudge" the actual deployment decision and the ABM Treaty issue by saying yes, and at the same time pass both on to the next administration.

[5] Eric Schmitt and Steven Lee Meyers. "Clinton Lawyers Give a Go-Ahead to Missile Shield" New York Times. June 15, 2000.

The focus on the testing envelope provides a strong indication of the actual status of the deployment criteria enunciated by the Administration. Alongside the technological feasibility criterion, these are assessments of the threat, costs, and international security. All of the later three are moot points, regardless of allied, Russian, and Chinese opposition. With regard to the threat, the Rumsfeld Commission Report in light of the August 1998 North Korean three stage missile test, the January 20th, 1999 statement of SoD Cohen, and the latest National Intelligence Estimate indicate that this criterion has been met.[6] Deployment funds were authorized in the last budget, and will be increased in the new defence budget.[7] Finally, the international

[6] Rumsfeld Commission. Report of the Commission To Assess the Ballistic Missile Threat to the United States.104 Congress of the United States, July 15, 1998. The public version of the 1999 National Intelligence Estimate is Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015. September 9, 1999. For a recent critique, see Joseph Cirincione. Assessing the Assessment: the 1999 National Intelligence Estimate of theBallistic Missile Threat. Monterey Institute of International Studies. Monterey: Center for Nonproliferation Studies, 2000.

[7] The 2000 defence budget request included $10.5 billion for NMD through to 2010, which included deployment costs. The proposed 2001 budget calls for $2.2 billion in additional funding. As

security criterion, which includes arms control and allies, is largely irrelevant with President Clinton's signing into law of the 1999 legislation passed on a bipartisan basis in both the House and Senate. This legislation mandates the Administration to deploy once feasibility is demonstrated.[8]

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part of the debate on costs, a recent Congressional Budget Office (CBO) Report estimated the costs for the initial capability, labelled Expanded Capability 1, at approximately $30 billion, which includes one time costs and operating costs to 2015; $4 billion higher the Administrations estimate. CBO estimates that expansion of the system to Capability 2 would cost an additional $6 billion, and Capability 3 $13 billion. Congressional Budget Office. Budgetary and Technical Implications of the Administration's Plan for National Missile Defence. Washington: Government Printing Office. April, 2000.

[8] Over the past several months a range of arguments have emerged which doubt the feasibility of the system, and the legitimacy of the testing envelope. For example, see Richard Garwin. "The Wrong Plan" The Bulletin of the Atomic Scientists. March/April. 2000.

In other words, deployment appears inevitable, but not simply because of the current political situation in the US in light of the forthcoming Presidential elections. Interest in ballistic missile defence has been longstanding in the US. Despite the public profile of the ABM and SDI, and to a lesser extent the Bush Administration's GPALS proposal, US investment in missile defence can be traced back to the 1950s, if not immediately after the first German V-2 attacks on London in 1944. ABM had been based upon Air Force and Army research and development.[9] SDI drew upon a range of programmes, including the Anti-Satellite (ASAT) Homing Overlay Experiments.[10] GPALS was simply the downgraded deployment proposal from SDI.[11] The current manifestation, NMD, is simply the by-product of this longstanding investment process, and can be understood as simply part of the measure/counter-measure logic of arms development. What makes it inevitable today, however, is the changed geo-strategic circumstances brought about by the end of the Cold War, and the threat posed by the proliferation of ballistic missiles and WMD. It is this context which drives the US process. It also raises concerns about the implications of NMD for broader US security policy.

Several of the issues discussed above reflect elements of European concerns about NMD. On the surface, it appears that there is a consensus among the European allies in this regard. However as always has been in the case, there is significant variance among them. At one end of the spectrum, France appears most opposed to NMD, as evident, for example, in the October and December votes in the First Committee and General Assembly respectively of the United Nations on the ABM Treaty.[12] France was the only ally to

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[9] See P.B. Stares. The Militarization of Outer Space. Ithaca: Cornell University Press. 1985.

[10] For a recent overview, see Joan Johnson-Freese. The Viability of US Anti-Satellite (ASAT) Policy: Moving Toward Space Control. Occasional Paper 30. Colorado: Institute for National Security Studies.2000.

[11] See K. Scott McMahon. Pursuit of the Shield: The US Quest for Limited Ballistic Missile Defence. Lexington: University Press of America. 1997.

[12] The rest of the allies abstained, and the resolution calling for strict adherence to, and compliance with the ABM Treaty was adopted on a vote of 80 to 4, with 68 abstentions. General

support the resolution calling for strict adherence to the Treaty. The remaining allies abstained. At the other end of the spectrum, the United Kingdom appears the least opposed, and primarily concerned about the potential divisive nature of the issue on alliance solidarity. In between reside Germany and Italy, who for different reasons, also have concerns about NMD.

Assembly. Resolution 9675. December 1, 1999.

Of course, this is not the first time that missile defence has become a political issue for the Europeans. Several of the concerns identified below were enunciated during the ABM and SDI periods. Of these, de-coupling and alliance consultation were key. In the case of ABM, many of the direct issues were overshadowed by debate on flexible response and McNamara's own opposition, and died quickly following the Nixon decision to shift ABM from a thin city defence (Sentinel) to a point defence for US land-based ICBMs (Safeguard).[13] In this case, ABM by protecting US strategic forces served to promote strategic coupling. In conjunction with this decision, the signing in 1972 of the ABM Treaty largely eliminated any remaining European concerns.

Like ABM, SDI posed similar concerns for the Europeans, even though it was only an ambitious research programme. Many of these potential future concerns were mollified with Reagan's acceptance of the Thatcher four points from a December 1984 meeting: the US/West goal was not superiority, but maintaining a balance with the Soviet Union taking into account Soviet missile defence developments; SDI deployment as a result of Treaty obligations would be a matter of negotiation; the overall aim was to enhance deterrence; and East-West negotiations should seek security through reduced levels of offensive systems on both sides.[14] SDI did, however, raise one new additional concern for the allies; technological development. Most of the allies were deeply concerned that the massive US research effort would create an even greater technological gap between the US and Europe. This concern was not just in terms of military considerations, but also on the commercial side. The Europeans clearly believed that SDI research would have a significant spillover into the commercial world. Even though most did not believe that

[13] For example, in one of the classic books on NATO strategy during this period, little, if any significant, mention is made of the ABM issue. Jane Stromseth. The Origins of Flexible Response. New York: St.Martin's Press. 1988. McNamara was opposed on strategic stability/arms race grounds, but the Administration's hand was forced by Congress. Immediately following the Sentinel announcement, public opposition grew in light of the nuclear nature of the ABM system. See Gregory Herken. Counsels of War. New York: Oxford University Press. 1987, and K. Scott McMahon. Pursuit of the Shield: The US Quest for Limited Ballistic Missile Defense. New York: University Press of America. 1997.

[14] For the most recent detailed discussion of SDI see Francis Fitzgerald. Way Out There in the Blue: Reagan, SDI, and the End of the Cold War. New York: 2000.

accepting the US invitation to participate in SDI research would produce great economic benefits, it was this concern that lead most of the Europeans to participate.[15]

[15] France was the most prominent of the Europeans not to participate, but did use the issue to gain support for the Eureka research investment programme under the auspices of the European Community. For an overview of European perspectives in this period, see Stuart Croft. The Impact of Strategic Defences on European-American Relations in the 1990s. Adelphi Paper 238 London: International Institute for Strategic Studies. Spring. 1989.

The recent enunciated opposition or concerns about US missile defence emerged in the wake of a series of formal briefings begun last fall by key members of the administration at meetings of the alliance. SoD Cohen, Under-Secretaries of State Holum and Talbot, among others, provided formal NMD briefings to the North Atlantic Council.[16] It was in response to these briefings that public opposition appeared. On the surface, one could suggest that the Europeans were caught by surprise. However, this is unlikely, not least of all because European defence departments were well aware of the programme's nature and development. Rather, the formal briefings likely indicated to the Europeans, as well as Canada at the same time, that NMD would likely move ahead. In other words, the question of if NMD would be deployed shifted to the question of when as a function of the briefings.

[16] According to confidential sources, Talbot in particular was surprised by the level of concern and criticism expressed by the Europeans. The most recent American presentation was in Berlin by US Permanent Representative to the NAC, Ambassador Vershbow. Speech to the XVII International Workshop on Political-Military Decision-Making. Berlin. June 3, 2000. US Embassy Electronic Documents.

There are a several reasons for doubt among the Europeans. Like its predecessors, ABM, SDI, and GPALS, all of which had never reached deployment, one could reasonably expect that a similar fate would befall NMD.[17] The Clinton Administration had never been major supporters of NMD, and the programme known as 3+3 announced by the Administration in 1996, could easily be seen as a reluctant announcement; a function of Congressional demands rather than an actual commitment to it.[18] With reasonable doubts about the likelihood of deployment, it made sense for the Europeans to avoid any public discussion. However, the formal briefings made it clear that even the Clinton Administration would likely proceed, especially when the costs to the Administration of going ahead were minimal in that the actual deployment decision, as noted above, would be passed onto the next Administration.

At one level, public opposition from Europe appears much too late to influence the decision this summer or early fall. At another level, this opposition may be understood as a function of concerns about future plans for the system. While there is widespread bipartisan support for NMD in the US, there is also significant differences about the nature and future of the actual system. Many Republicans believe that NMD as a ground-based system is the wrong type for the defence of the US, and support a naval-based system.[19] Presidential hopeful George Bush has argued in favour of a much larger and more sophisticated system of national missile defence.[20] As such, European opposition to NMD, as well as Russia and China's, may be readily understood as opposition to future developments, rather than NMD in particular. In other words,

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[17] Safeguard at Grand Forks became operational in early 1975, but was cancelled and dismantled in the fall of 1975.

[18] The 3+3 programme provided three years of research and development, followed by three years to deploy, assuming that a decision to deploy was made. It was revised in January, 1999 by SoD Cohen to five years for deployment - hence the earliest operational deployment date of 2005 if a decision to proceed is made this year. Republican critics of 3+3 labelled it 3+infinity.

[19] See Heritage Foundation. Defending America: A Near and Long Term Plan to Deploy Missile Defences. Washington. 1995. More recently, the Pentagon is currently completing the first part of a study on the "Utility of Sea-Based Assets to National Missile Defence. Defense News. June 12, 2000.

[20] George W. Bush. "Missile Defense Now" Washington Times. May 25, 2000

NMD is a forerunner to a much larger, layered national missile defence capability a la GPALS and SDI.

Current concerns expressed by the Europeans in the councils of NATO and the public press serve to register a range of different concerns about the future with regard not just to missile defence, but to the trans-atlantic relationship and the ESDI as outlined in the updated Strategic Concept of the Washington Summit in April 1999.[21] Overall, the Europeans have identified six inter-related areas of concern: threat assessments, deterrence, de-coupling, Russia, arms control, and alliance consultation.[22]

[21] NATO. "The Alliance's Strategic Concept". The Reader's Guide to the NATO Summit in Washington. 1999.

[22]The following analysis is based on a wide range of confidential interviews conducted over the past two years. For a recent public viewpoint, see Karl A. Lamers (Rapporteur). NMD and Implications for the Alliance. Sub-committee on Transatlantic Relations. North Atlantic Assembly. April. 2000.

With regard to threat assessments, much of the differences relate to timing of the threat, not least of all because of the consensus in NATO about the threat posed by proliferation since 1991. For France, and Germany in particular, the threat posed by the proliferation of ballistic missiles and WMD is a distant one. Drawing a distinction between testing and an operational capability in light of the North Korean August 1998 test, there is little evidence to support the likelihood of potentially threatening states acquiring an actual operational capability in the time frame argued by the US. In addition, proliferation in the Middle East is being largely driven by regional concerns, rather than being directed against Europe itself. In contrast, the United Kingdom is closest to the US threat assessment on the proliferation of technical capabilities, but is not convinced necessarily that the political intention behind proliferation is directed in the short term against the West. Italy is also concerned about the threat, not least of all because it will come into range of medium range missiles from the South much earlier than most of its allies.[23] Finally, Turkey already faces a threat from missile deployments among its neighbours in the region.

Following on the threat, there are differences over the viability of deterrence as a strategy to deal with ballistic missile and WMD proliferation. Whereas some US analysts doubt the effectiveness of deterrence, the Europeans tend to believe that so-called "rogue states" are readily deterrable. Differences primarily exist between France, which posits that the threat of nuclear retaliation will deter the full range of WMD, and the United Kingdom, which limits its utility to nuclear weapons only. [24] Nonetheless, there is the belief that so-called "rogue states" can be detered and will act rationally not least of all because they would realize that

[23] Italy has already been a target. Libya launched an unsuccessful Scud attack against the US base on the Italian island of Lampuesa.

[24] For a general discussion on nuclear issues, see Bruno Tertrais. Nuclear Policies in Europe. Adelphi Paper #327. London: International Institute for Strategic Studies. 1999.

any attack would result at least in a conventional military response, if not devastating nuclear retaliation.

Perhaps key to European opposition is the longstanding concern about strategic de-coupling. An effective national missile defence would create a sanctuary in which the Europe alone would be vulnerable to emerging threats. This creates, according to many Europeans, differential levels of security. In many ways, the de-coupling argument is distinct from Cold War concerns, which related to European fears that the US and Soviet Union would be sanctuaries during a limited nuclear war in Europe. At the same time, this concern also reflects the longstanding idea of shared risk, which would be undermined by an effective US homeland missile defence. In this sense, NMD takes on more political meaning relative to cooperation within the alliance. Differential security could produce serious political fallout for the relationship.

Not surprisingly, future European relations with Russia also receive close attention. Especially for Germany, NMD deployment is a direct threat to improved relations with Russia. It is interesting that similar arguments did not weigh heavily with regard to NATO enlargement and the Kosovo campaign. Nonetheless, a deployed NMD which violates the ABM Treaty, in the absence of agreed revisions to the Treaty, is of direct concern.[25] Directly related is the fallout for future strategic arms reductions, which is transferred to concerns about the viability of the entire arms control and non-proliferation regime. Closely related as well is concerns about China's response, which some Europeans believe is the true purpose behind NMD.[26]The

[25] NMD capability-prime would also violate the Article I prohibition on national coverage, along with Article III as amended by Article I of the 1974 Protocol on the location of the site.

[26] For a general discussion of the impact on China and Russia, See Dana Wilkening. Ballistic Missile Defence and Strategic Stability. Adelphi Paper 334. London: International Institute of Strategic Studies. 2000.

Chinese threat to expand significantly their strategic forces if the US moves to deploy is seen as the end of prospects for engaging China in arms control negotiations.

What is unclear, however, is specific European desires with regard to ABM Treaty revision. It appears that most of the Europeans will be satisfied with a US-Russian agreement that ensures the future of the Treaty. At the same time, concerns about an expanded NMD in the future, especially if it were to include space-based interceptors, implies that there are limits to European acceptance to a revised Treaty. In other words, the Treaty is sacrosanct for Europe simply by its existence as a symbol of East-West cooperation, but any and all revisions agreed upon may not be. France as noted above, however, seems to oppose any revisions whatsoever, as evident in their vote in the UN First Committee and General Assembly. Underlying French opposition is also latent concerns about a possible US-Russian deal that undermines European/French security interests; one which potentially could lead to direct cooperation, and expanded missile defences for both parties which raise implications for French strategic forces.

Finally, NMD is also seen by some Europeans as another example of the problems of alliance consultation. As in the past, consultation to the US is seen as information provision. The US makes a decision reflecting its perceived security interests, and assumes that what is good for the US is also good for its allies. At best, European input becomes a *political football* for domestic US politics.

Assessing Concerns

While it is possible to examine critically each element of European opposition to, and concerns about NMD, two stand out in particular. The first concerns the focus on the threat, and relates directly to domestic European political concerns about the implications of accepting the US threat assessment. The second concerns the de-coupling and differential security arguments, because they are at the heart of the trans-atlantic security relationship, and relate to deterrence credibility. Certainly, one could question the theoretical logic and empirical evidence with regard to Russia and China, and their relationship to arms control and the non-proliferation regime. But, these are largely tangential to the key issue of the implications of missile defence for the alliance and the trans-atlantic relationship in the future. Consultation, as well, will likely remain an area of contention, but this is neither new, nor likely to change regardless of the ultimate outcome

of the NMD decision.

On the surface there appears to be a fundamental disagreement between Europe and the US on the threat, even in the case of Great Britain which is closest to sharing the US threat assessment. However, this is only a surface disagreement. Since the 1991 NATO Rome Summit, the alliance has agreed repeatedly that proliferation in general, and the proliferation of ballistic missiles and WMD in particular, poses one of the significant security challenges of the post-Cold War era. In response to this challenge, there is also agreement that the West's response should be multi-dimensional under the mutually supportive umbrellas of diplomacy and defence. This lead to the establishment of the Senior Political Group (diplomacy) and Senior Defence Group on proliferation. Most recently, the North Atlantic Council (NAC) established a WMD Centre this spring, although there was some disagreement on its specific size and function. Nonetheless, it is designed to coordinate the alliance's response to proliferation.

The disagreement on the threat is thus primarily one of timing. Whereas the US believes that the threat to Europe and the continental US will become operational sooner, rather than later, many of the Europeans believe the inverse. However, the earliest operational deployment of NMD in 2005 does not necessarily mean that 2005 is also the likeliest date of a new ICBM threat to North America from one of the *usual suspects*.[27] While possible, but unlikely, the NMD date may be better understood as an attempt to deploy as early possible ahead of an operational threat.

From this perspective, NMD is not simply a defence against proliferation. It is also a political non-proliferation initiative.[28] It is designed to support the diplomatic pillar of non-proliferation. A deployed

[27] The "usual suspects" are North Korea (#1), Iran, Iraq, and Libya. It is North Korea that is the primary concern of obtaining an operational capability by 2005. Importantly, North Korea apparently deployed the No Dong MRBM after only one successful test. Confidential sources.

[28] For a fuller discussion, see James Fergusson. "From Counter-Proliferation to Non-Proliferation: An Alternative Perspective on Ballistic Missile Defence" in Multilateral Approaches to Non-Proliferation. Andrew Latham ed. Toronto: Centre for International and Security Studies. 1996.

limited defence, regardless of its actual military effectiveness, holds the promise of affecting proliferation incentives. If proliferation is being driven by attempts to deter the threat of Western/US intervention, limited defence potentially eliminates the deterrence value of missiles as delivery systems for WMD. Certainly, it does not directly affect the WMD side of the equation, and could channel efforts elsewhere, such as into an greater emphasis on cruise missiles. But given the investment costs of ballistic missiles, limited defence raises significant questions about the utility of such investments.

The timing of the threat is thus partially misunderstood. The threat of short range (less than 500 miles) missiles already exists. In response, the US has already deployed, as has Germany and the Netherlands, the Patriot Advanced Capability-2 (PAC-2) point defence system for deployed military forces. Relative to potential non-Article V missions, there is a consensus about the importance of ATMD defences for expeditionary forces. Concerns are now directed to the medium to intermediate-range ballistic missile development programmes, of which the 1998 Iranian test is the most recent evidence of an emerging threat to NATO Europe.[29] Certainly, a single test does not make for an operational capability. Nor is it necessarily the case that Iran seeks a capability to threaten directly continental Europe or the US. Its missile programme may be only directed within the region itself. Moreover, current missile capabilities and programmes in the Middle East as a whole indicate largely a regional capability for the time being (Table 1).

However, the defence-diplomacy logic of NMD also holds here. Under any range of scenarios in which Western/US forces may intervene, ATMD defence is necessary, but not sufficient. Regional MRBMs married to nuclear weapons (given legitimate Western concerns about the Iranian nuclear development programme) provide Iran with the ability not only to strike at military debarkation and marshalling points for expeditionary forces, but also to threaten potential host nations. TMD capabilities become vital for defence specifically, but also defence politically to reassure host nations. At the same time, such defence

[29] Libya, in contrast to Iran and Iraq, could directly target most of southern Europe with a MRBM. Also, Saudi Arabia possesses the Chinese DF-3 IRBM with a range of between 2500 and 3000 km, that could potentially target Southern Europe if there was a dramatic regime change that ushered in an anti-Western government.

may alter the willingness of a state such as Iran to continue investments. The problem here is judging the time frame of the Iranian and other Middle East missile development programmes relative to ongoing US/European ATMD and TMD. Following this logic, *plugging* the tactical and theatre gap still leaves the long-range threat as an option. Thus, NMD serves to *plug* this gap. In so doing, a seamless missile defence web is created; similar in nature to the seamless deterrence web that informed alliance strategy during the Cold War, and reinforced the US guarantee to Europe.

Table 1

Middle East Ballistic Missiles[30]

Country	Type	Status	Fuel	Range (km.)	Payload (kg.)
Algeria	Scud-B	Operational	Liquid	280	985
Egypt	Scud-B	Operational	Liquid	280	985
	Scud-C	Development?	Liquid	450	985
	Badr-2000	Canceled	Solid	1,000	700
Iran	CSS-8	Operational	Liq/Solid	150	190
	Scud-B	Operational	Liquid	330	985
	Scud-C	Operational	Liquid	500	700
	Shahab-3	Operational?	Liquid	1,300	750
	Shahab-4	Development	Liquid	2,000	1,000
	Shahab-5	Development	Liquid	5,500	?
Iraq	Al-Samoud	Development	Liquid	150	300
	Scud-B	Destroyed	Liquid	330	985
	Al-Hussayn	Destroyed	Liquid	600	500
	Al-Abbas	Destroyed	Liquid	950	300

[30] Dean Wilkening. Ballistic-Missile Defence and Strategic Stability. Adelphi Paper 334. London: International Institute for Strategic Studies. 2000.

	Al-Tammuz	Destroyed	Liquid	2,000	750
Israel	Lance	Operational	Liquid	130	270
	Jericho-1	Operational	Solid	750	500
	Jericho-2	Operational	Solid	800	1,000
	Jericho-3	Operational	Solid	1,500	1,000
Libya	Scud-B	Operational	Liquid	280	985
	Al-Fatah	Development	Liquid	950	500
Saudi Arabia	DF-3	Operational	Liquid	2,650	2,150
Syria	SS-21	Operational	Solid	120	480
	Scud-B	Operational	Liquid	280	985
	Scud-C	Operational	Liquid	500	700
	DF-15	Operational?	Liquid	600	500
UAR	Scud-B	not operational	Liquid	280	985

This is a key element of the timing/threat disagreement. NMD is the final response layer to the step-wise development process of ballistic missiles (short to medium to intermediate to inter-continental). However, the final layer, NMD, will likely precede effective TMD capabilities, in which US systems are scheduled for operational deployment around 2007. Notwithstanding the ability of ATMD to deploy around cities for a limited, but not national or continental defence, Europe will be operationally threatened before the US from the Middle East, but the US will be defended, and Europe will not. If missile defence is understood as a non-proliferation initiative, the defence gap

at the medium/intermediate - TMD nexus is problematic, and not just for the non-proliferation logic of missile defence. It is politically problematic for the Europeans. It is this problem that underpins the timing of threat disagreement, and European opposition to NMD in general.

Accepting the US threat assessment means accepting that the medium/intermediate range ballistic missile (M/IRBM) threat to Europe from the south as looming in the immediate future, long before the likely deployment of TMD systems, which, depending upon type and deployment patterns, may be sufficient to

defend Europe. In so doing, acceptance also holds the potential for raising fears among European publics about a direct ballistic missile/WMD threat to Europe. It is difficult to measure the extent to which the European public holds negative images of certain Middle East regimes in terms of their rationality a la deterrence logic. Nonetheless, raising the spectre of a rapidly emerging threat also likely raises concerns among many European governments of a public demand for a response.

The current response, again directed publically at US NMD logic, is the viability and credibility of European nuclear forces. However outside of the limited air launched nuclear capabilities assigned to NATO, these forces are French and British. For the other Europeans which could be directly threatened, they would have to rely on either the French or British extending their deterrent forces, or US forces. The new question becomes whether the French, British, NATO (US weapons), and the US will obliterate some Middle East capital city in response to an attack against Berlin, Rome, Athens, or Ankara. Publically, it could potentially resurrect the nuclear debate itself within the alliance, especially relative to past public opposition to nuclear weapons as witnessed during the Euromissile/INF debate of the 1980s and the politics of the first-use debate leading up to the Washington Summit. Moreover, such a debate would take place in the context of an alternative to nuclear weapons that exists across the Atlantic - missile defence.

Finally, it is not simply the question of the credibility of a nuclear retaliatory threat in response to a threat to one of the non-nuclear members of the alliance. It is also the political ramifications for alliance solidarity in face of such a threat. As feared during the Cold War, threatening a non-nuclear member could serve to affect alliance consensus in terms of a conventional response. This would not likely affect the ability of the US and others to respond through an ad hoc coalition as in the Gulf War case. However, it would undermine the rationale and legitimacy of the alliance as a crisis management institution, and with it, raise questions especially in the US about the alliances viability and utility.

Overall, accepting the US threat assessment in combination with NMD deployment could readily produce public questioning as to why European governments are not working to defend their populations. In so doing, these demands could then raise pressures on these governments to dramatically alter defence

investment patterns. Thus, NMD spawns a domestic political debate in Europe, which all the governments appear to be seeking to avoid.

Avoiding such a debate, or at least delaying it until TMD systems, European and American, begin to come on line in the later years of this decade (see Part II), underlies European opposition to NMD. Public pressure for action would likely affect more pressing political-security goals relative to the ESDI pillar of the European Union (EU) and NATO, political-military restructuring programmes to promote an independent effective European military capability, and European/national procurement modernization and force restructuring programmes. On the specific defence investment side of the house, accepting US NMD could lead to demands for re-directing limited defence funds, and/or increased defence spending. Military elites in Europe are not interested in re-directing funds, for a variety of reasons outside the purview of this analysis, and political elites are not interested in increasing spending, or potentially undermining existing planned investment especially in terms of programmes which are as much about ESDI as they are about an effective military capability, such as in the case of the Future Large Aircraft programme.[31]

Using the threat disagreement between Europe and the US, in effect, exposes the European criticism of NMD as largely directed towards domestic audiences, rather than the US *per se.* The threat, proliferation, deterrence, strategic de-coupling, and security differentials are, in effect, for domestic consumption. In this sense, the Europeans in reality may not be opposed to NMD at all. Rather they may simply be opposed to the timing of NMD. Moreover, missile defence is essential for a range of European security interests in general, and for the future of the trans-atlantic link in particular.

The inter-related de-coupling and security differential concerns not only reflect this domestic issue, but also

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[31] **The FLA project is estimated to cost $22 billion to procure 291 aircraft by 2005. The participants are Belgium, France, Germany, Italy, Spain, Portugal, Turkey, and the United Kingdom that have signed the European Staff Requirement. Along with Airbus, Alenia (Italy), Tusas Aerospace Industries (Turkey) will be partners, with Gosselies (Belgium). See Douglas Barrie. "A400M Awaits $6 Billion Vote of Confidence."** ***Defense News.*** **June 14, 1999.**

relate to underlying concerns about US engagement and isolationism; a concern that NMD is the forerunner of Fortress America, increased US unilateralism, and the possible collapse of the trans-atlantic relationship. However, NMD is more properly understood as ensuring a US strategy of internationalism, and a missile defence for Europe is a vital component to limit the unilateralist impulse in the US.

Since the end of the Cold War, especially in terms of the collapse of the traditional *raison d'etre* for the trans-atlantic link, concerns, pronounced not least of all in the US itself, about a US withdrawal have been central to the importance of *re-inventing* the alliance. The Clinton Administration in annual successive documents has reiterated the strategy of engagement and leadership.[32] US global engagement and leadership is firmly grounded in a preference for multilateralism. That is, the US will remain engaged in defence of its interests, that includes its allies, and US leadership is essential for a collective allied response against threats to common interest and values. NMD is potentially an essential pillar of engagement and leadership, especially in relationship to the Cold War experience.

At the most basic level, no US President on political grounds alone will likely accept a situation in which US and allied forces in the field can be defended against ballistic missiles, but the US population cannot. NMD also provides a measure of assurance that the US public will be supportive of US engagement, especially with regard to conflicts not vital to US national security. In this sense, the political willingness of the US to intervene in support of friends and allies is enhanced. It is not simply the question of the presumed sensitivity of the US public to casualties in far away places, but ensuring that the US public itself does not feel threatened, even in the absence of a actual missile threat to North America from the *usual suspects.* In other words, NMD is not just about self-deterrence in which a limited, unsophisticated ICBM capability dissuades the US from acting. It is also about the broader political dynamic in the US vital to support a decision to come to the aid of friends and allies. In this context, it is important to remember that the NMD issue itself is the product of a domestic political debate. As such, NMD also serves an important domestic

[32] The White House. A National Security Strategy.... Washington: US Government Printing Office. Annual Publications 1993-1999.

political role for US engagement.

Of course, the US will remain engaged regardless of NMD in circumstances where vital US national security interests are affected. The core issue for allies, especially relative to non-Article V operations, is whether the US will act in concert in response to circumstances more vital to Europe than the US. Both share common interests *per se*, but these interests or situations may have distinctly different values and importance attached to them. Thus NMD, regardless of the threat, is an important political pillar to allied cooperation.

From another perspective related to engagement, NMD may also be understood as a means for the US to escape from the unsettling psychological condition produced by extended deterrence during the Cold War. Specifically, missile defence as partially understood during the Cold War was not as much about strategic and crisis stability concerns divorced from politics, but more from the political implications of the ostensible de-coupling of American strategic forces from Europe; the issue so salient on other grounds to the French under DeGaulle. Specifically, the US for a period of time attempted to balance a national strategic doctrine of assured destruction to promote MAD, with an alliance strategic concept of flexible response. Assured destruction was designed to re-assure the Europeans of the US commitment by strategic coupling, whereas flexible response also sought to re-assure the Europeans through de-coupling. In other words, flexible response raised the spectre of strategic de-coupling in order to ensure political coupling.

Interestingly, the issue of strategic coupling did not obtain politically during the 1950s when the US was relatively invulnerable. In fact, it was not an issue. The Europeans could rely upon the US threat of massive retaliation. During this same period, Europe was vulnerable to limited Soviet nuclear capabilities, such that differential levels of security between Europe and the US were arguably most pronounced. NMD understood as restoring US invulnerability against limited threats thus replicates the 1950s. The American political commitment, hence political coupling, is one of the positive by-products of NMD. In other words, the de-coupling of US strategic forces as a function of NMD relative to limited emerging missile and WMD threats reinforces political coupling across the Atlantic; the politics of the paradox of de-coupling to ensure

coupling.

In this sense, US TMD programmes relative to the idea or logic of spreading the US defence umbrella to Europe in the future, and to NATO/EU forces in out-of-area operations can be understood as attempting to de-couple US strategic forces in order to ensure the continued political coupling of the overall relationship. It is driven by two key conditions. First, assessments of the so-called rogue states, relative to their acquisition of long range ballistic missile delivery systems and WMD, impart credibility to their forces in the future; a variant of the *madman* thesis in which the most credible threat is the one issued by an irrational force. While public pronouncements focus on a high probability that these states will not, in fact cannot, be detered, the reality is that these states can easily deter.[33] They are perceived by many as not constrained by the moral or ethical dilemma of carrying out a threat which one does not want to. On the other side of the equation, the West/US can be readily detered; generally presented as the sensitivity of the Western public to high levels of casualities, but also supported by the traditional culturally derived belief system which divides governments from the people - for example the good Iraqi people, and the evil Hussein government. In effect, the prospect or fear is that the conditions will arise in which a US President might have to carry out the very action, which deterrence is designed to avoid: nuclear retaliation in the absence of any other viable option.

As these states are recognized to pose a general threat to Western/US security interests, which includes friends, allies, and clients, the very dilemma of extended deterrence (informal or tacit outside of Europe and formal via NATO in Europe during the Cold War) returns under new structural conditions. The escape for the US resides in shifting the grounds from extended deterrence to dissuade via threats of nuclear retaliation, to extended defence to dissuade through the ability to use conventional forces and missile defences. In so doing, the contentious *problematique* of the arcane debates on *crossing thresholds* and *dominating escalation chains* disappears. During the Cold War, there was no option other than retaliation to deterrence failure. Missile defence generally, and NMD in particular, provide another option; one more

[33] See Keith Payne. Deterrence in the Second Nuclear Age. Lexington. 1996.

acceptable psychologically for Western/US decision-makers. If the defence umbrella is extended through TMD, it also provides a similar option and enables the US to re-assure allies and friends even more.[34]

[34] The most recent speculative example of these arguments relates to US/Allied response to a Serbia with ballistic missiles. Eugene Fox and Stanley Orman. "Kosovo's Lesson in TMD". Defence News. August 9, 1999.

From this perspective, clouded by the expansive use of the concept of deterrence in the post-Cold War era, there are several implications for the alliance. At one level, NMD does entail the de-coupling of US strategic forces from Europe, but only with regard to emerging threats from proliferators.[35] As NMD is insufficient to deal with Russian strategic forces, even if the system is expanded in the future to two sites of 100 interceptors, US strategic forces remained coupled with regard to a Russian-based Article V threat, even though it is difficult to imagine the political conditions today and in the foreseeable future that would produce such a threat from Russia. With regard to proliferators, the strategic de-coupling implied by NMD is designed to ensure continued political coupling. That is, it promotes the likelihood that the US will continue its security commitment or guarantee to Europe without the dilemma created by extended deterrence.

In so doing, it then also has two additional implications. It reinforces the importance of ensuring that NATO remains a nuclear alliance, and grants in a way greater significance to NATO as a pseudo-independent nuclear agent. At the same time, it also inherently raises the significance of French and British independent strategic forces, and could drive the logic of their becoming the foundation of a truly independent European nuclear deterrent. In other words, the sense in which their forces and postures were inherently linked to US strategic forces, the way in which their respective finite and minimum deterrence postures made sense, are likely to be altered for Europe or the European pillar in response to strategic force decoupling. In other words, the nuclear equation is likely to become much more of concern for Europe; an equation which could be divorced from the US component.

The third implication falls out as a function of US leadership on the issue of missile defence; its dominance in placing, if not forcing, the issue on the political agenda. Despite the significant reluctance of the Europeans to confront missile defence, even though Europe will face a missile threat much sooner than the US, they face little or no choice but to respond. But in responding, they also must confront demands from the US for

[35] It has also been suggested, but not elaborated, that TMD would not likely have a direct impact on the US nuclear presence in Europe. David Yost. The US and Nuclear Deterrence in Europe. Adephi Paper 326. London: International Institute for Strategic Studies. 1999.

investment; the new manifestation of the old *burden-sharing* issue. In one way, Europe is faced with the dealing with the fact that *the US will defend them whether they like it or not*; the well-known Canadian dilemma. In the absence of European participation, investment, and acquisition of a missile defence capability, either a national-based *sharp-end* integrated into an alliance-based battle management/command and control (BM/C^2), or variants therein, the doctrinal and capability *end-state* of US TMD will determine how Europe is to be defended. Now this may not be problematic in a way for Europe; effective free-riding on a US TMD capability forward deployed (most likely the naval programmes), that supports the European nuclear posture. However, it also cedes to the US the ability to define the political-security response. Specifically, how Europe or the European pillar responds politically to events in its two core security regions will be effectively ceded to the Americans. Responses to the Middle East or Russia could increasingly be structured, if not determined, by the US. In effect, it is the spectre that deeply concerned many European, and especially the French, that their political-security future will be made by US policy towards, for example, Iran and Moscow. At the end of the day, it is also the possibility that the US will sacrifice Europe for the sake of other interests.

In other words, NMD is a vital element of the US commitment to Europe relative to emerging threats and cooperation in response to these threats, hence political coupling. European involvement and cooperation is vital to avoid the very fear of unilateralism and a US security *dictat*. Thus, both sides have a common interest in cooperative development of missile defences, even though the US by virtue of investment dollars is driving the agenda. Certainly, a security differential is likely to result to some degree, as simply a function of geography. However, it has always existed and exists today within Europe itself when one compares the north-west to the south-east members of the alliance. Cooperative missile defence which extends to a robust defence for all the members of the alliance against emerging threats provides a means to reduce, rather than exacerbate, the security differential in Europe. It appears that this is the very direction, in fact, that Europe and the US are proceeding in through the various programmes underway, and the future central role of the alliance.

PART II

Conceptualizing Missile Defence

Much of the analysis and discussion of BMD is somewhat confusing not least of all because of the legacy of the Cold War debates. This is most clear with regard to the way in which BMD systems are conceptualized as a function of the Cold War meaning of *strategic* weapons as enshrined in the ABM Treaty of 1972, amended by the 1974 Protocol, and reinforced by 1997 Demarcation Agreements. As a result of the Cold War, strategic weapons have been largely understood as nuclear weapons capable of striking at the national homelands of the United States and the Soviet Union, either launched from their respective national territories (i.e. ICBMs), or from alternative weapons platforms (i.e submarines or bombers). Europe, thus, was not conceived as a strategic entity; it was conceived as a theatre, albeit the most important for both the United States and the Soviet Union.

As a result of both the division in the US BMD programmes between NMD and TMD, and their demarcation relative to the ABM Treaty in 1997, not only has TMD largely disappeared from the political agenda, but both have also legitimized TMD programmes. They have ostensibly been removed from the missile debate relative to fears of instability and arms racing. In so doing, the potential effectiveness of TMD as a strategic defence for Europe has not been addressed. As these systems come on-line in the latter part of this decade and into the next, forward deployed US systems and independent European systems

currently under development will provide a nascent strategic defence for Europe. Such a defence, however, will be limited to strategic threats from the Middle East and South Mediterranean littoral states. The planned systems will not likely be effective against strategic missile threats from the East, whose trajectories would primarily cross the Arctic, notwithstanding the possibility of further developments.

This analysis examines the manner in which the remanents of the Cold War conceptual categories have masked thinking about missile defence for Europe in strategic terms. In so doing, it assesses the way in which strategic defence continues to be conceptualized relative to the legal framework of the ABM Treaty and the Demarcation Agreements. On the basis of this framework, the analysis demonstrates that TMD programmes will be able to provide a layered strategic defence for Europe. On this basis, the examination turns to outline the various US and European TMD development programmes currently underway.

Strategic Defence and Europe

The Cold War conceptualization of strategic is explicitly enshrined in the various strategic arms control agreements. Thus, strategic defence is the capability to defend the national territories of the United States and Russia today relative to the ABM Treaty. Article I, Paragraph 2 prohibits, according to the dominant interpretation, the deployment by either state-party of such a missile defence capability.[36] Accordingly, both state-parties are allowed to deploy a limited missile defence capability for defence of either its national capital, or an ICBM field as codified in the 1974 Protocol, based upon Article III of the 1972 Treaty. From this conceptualization, the Russian Galosh ABM system currently deployed around Moscow is not a strategic defence, and thus ABM acquires the meaning of a limited point defence capability.[37] As a limited

[36] "Each party undertakes not to deploy ABM systems for a defense of the territory of its country and not to provide a base for such a defense, and not to deploy ABM systems for defense of an individual region except as provided for in Article III of this Treaty." reprinted in Matthew Bunn, Foundation for the Future: The ABM Treaty and National Security. Washington: Arms Control Association. 1990. The dominant interpretation posits that the final phrase applies only to a region defence, not to the first clause.

[37] It was announced by Russia in June 1998 that the nuclear warheads had been replaced by conventional ones. Arms Control Reporter. Cambridge: Institute for Defense and Disarmament. 603.E-

point defence such a system possesses a fairly constricted defensive zone of coverage or footprint. It is not, however, limited by the differentiation between an exoatmospheric and endoatmospheric intercept point.[38] Rather given the technology of the initial ABM systems, and the restrictions on the number and location of sites as per Article III of the 1972 Treaty as amended by the 1974 Protocol, neither the Soviet or American system could provide coverage of its national territory.[39]

Even though the Treaty and Protocol did not ban ABM, they assigned ABM to a sub-strategic support role. In so doing by default, a strategic defence was equated with national coverage. In addition, the prohibition

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NMD. 1998

[38]The original Sentinel (never deployed) and Safeguard systems contained a exoatmospheric interceptor, the Sparton with a range of approximately 500 miles, and an endoatmospheric interceptor, Sprint, with a range of 25 miles.

[39] Article III limited each state-party to two sites consisting of 100 non-reloadable interceptors. Article I of the Protocol limited each to a single site, either around the national capital or an ICBM field with a specific distance between them.

on air, sea, mobile, and space-based ABM systems or their components, as per Article V, also limited allowable ABM to a fixed ground-based installation. These limitations, and hence the meaning of strategic, were subsequently reinforced with the signing of the First and Second Agreed Statements on demarcation on September 26, 1997.[40]

[40]Apparently, Russia ratified the Demarcation Agreements in April, 2000 in conjunction with START II and the Comprehensive Test Ban Treaty. The Clinton Administration has not submitted either the revised START II or Demarcation Agreements to Congress for advice and consent, and after the defeat of CTBT, is unlikely to do so. They will be passed on to the next Administration. See "First Agreed Statement Relating to the Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems of May 26, 1972" and the "Standing Consultative Commission Second Agreed Statement...." September 26, 1997. reprinted in The Arms Control Reporter. Cambridge: Institute for Defense and Disarmament. 603.D47 - 603.D.50. 1997.

The Demarcation Agreements were designed to resolve the issue of TMD systems. As critics pointed out, the ABM Treaty, Protocols, and the public record from the Standing Consultative Commission in Geneva, contained no reference to TMD. As such, they argued that the US was free to develop and deploy any and all TMD systems. However, others suggested that original American concerns about Soviet air defence systems which could be potentially developed into a missile defence capability, hence Article VI , the US Unilateral Statement of 1972, and the 1978 statement concerning testing in an ABM mode, made the issue problematic.[41] The ostensible issue spilled into Article V prohibitions. Basically, TMD systems, sea or mobile land-based under development, could potentially provide a capability to intercept ICBMs. Depending upon the number and location areas, they could also potentially provide a strategic defence or national coverage. In fact, there are some who continue to advocate a sea-based national missile defence system as opposed to the current plans for a land-based NMD system.

[41] The key, and thus root of Demarcation, was the phrase "strategic ballistic missiles", which were not defined. The Treaty and Agreed Statements are reprinted in Matthew Bunn, Foundation for the Future: The ABM Treaty and National Security. Washington: Arms Control Association. 1990.

The Demarcation Agreements thus attempted to resolve this issue, as both the United States and Russia had political and security interests to do so.[42] In so doing, two additional criteria for a strategic defence system emerged, and both concerned speed. The First Agreement delineated lower tier, endoatmospheric systems, ATMD, and the Second delineated upper tier, high endo and exoatmospheric systems, TMD.[43] ATMD systems were defined as interceptors capable of speeds of less than 3 km. per second. In addition, the Agreement specified that neither state-party would give such systems the capability to counter strategic missiles by restricting testing to ballistic missile targets whose speed and range does not exceed 5 km. per second, and 3,500 km. respectively. The Second Agreement restricted only the speed and range of target missiles to the same level as the First, and recognized that interceptor speed would exceed 3 km. per second. Nonetheless, both state-parties in the attached Joint Statement agreed to exchange information annually on any plans to test interceptors that exceeded 5.5 km. per second for land and air-based and 4.5 km. per second for naval-based systems, and the United States in a unilateral statement announced it had no plans to test TMD systems that exceeded these limits.[44]

In effect, the Demarcation Agreements buttressed the Cold War understanding of strategic defences, and

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[42] Apparently, the desire for an agreement on demarcation largely emanated from President Yeltsin and Russia. It was initially agreed to at the February, 1997 Helsinki Summit. Interestingly, the limits discussed above simply enshrine the development plans of both parties. Confidential Interview.

[43] THAAD is able to intercept missiles between 40 and 150 km. Its effectiveness relates to the trajectory of medium range through intermediate range ballistic missiles. THAAD is designed to deal with both, such that an intercept of missiles would take place at the upper reaches of the atmosphere, hence high altitude endo-atmospheric. It is also designed to intercept ballistic missiles with a range of 3,500 km., which would entail an exoatmospheric intercept. For discussion of these aspects, see George Lindsey. The Information Requirements for Aerospace Defence: The Limits Imposed by Geometry and Technology. Bailrigg Memorandum #27. Lancaster: Centre for Defence and International Security Studies. 1997

[44] The Agreements also included a Memorandum of Understanding binding Belarus, Kazakhstan, and Ukraine to the ABM Treaty. See Demarcation Agreements. September 26, 1997. Reprinted in Arms Control Reporter. Cambridge: Institute for Defense and Disarmament Studies. 1997. pp. 603.D.43 - 603.D.63. In addition, both Agreed Statements explicitly prohibit space-based interceptors.

implicitly, if not explicitly, legitimized TMD systems. In so doing, the issue of TMD, especially with regard to the current debate on US NMD and the ABM Treaty effectively dropped off the public agenda.[45] However, by conceptually, and hence politically, defining strategic with reference to the national territory of the US and Russia, and demarcating on the basis of speed, ATMD and TMD systems are not strategic. Four significant issues emerge.

[45] This is most evident in public statements from China. Approximately two years ago, TMD concerns with regard to Japan, Taiwan, and South Korea dominated. Since then, China has focussed exclusively on NMD.

First, a TMD system may be capable of intercepting a long-range ballistic missile, even with its speed disadvantage. That is, a TMD interceptor travelling at 4 to 5 km. per second could intercept an ICBM travelling between 7 and 8 km. per second. Although difficult because of the speed disadvantage and the restriction on testing against faster missiles, depending upon the angle of attack/intercept, it is, according to critics, theoretically possible.[46] Second, such systems could also be effective as a function of deployment location. This does not simply mean deploying mobile land-based on, and sea-based systems around, US national territory. It also concerns the forward deployment of mobile systems relative to ballistic missile launch points. Depending upon the distance between launch point, and deployed TMD, it may be possible to use TMD to intercept a ballistic missile in boost-phase when it is at its slowest and most vulnerable point.[47] Moreover, forward deployed TMD could also shoot at a missile bus/warhead overhead during its mid-course phase as it transits to a target thousands of km. away. For example, ICBMS launched from certain points in the Middle East will transit over the Mediterranean on their way to targets in North America. Of course, how effective a boost-phase and/or mid-course phase intercept attempt would be given speeds, the capability of the current planned systems, and time limitations for target identification, cueing, and tracking is difficult to estimate. Nonetheless, the earlier a target is intercepted during its flight time from launch to termination, the greater the amount of territory defended, or defensive footprint.

Third, the core of a strategic defence capability is a function of the identification and definition of strategic itself. From a territorial perspective, most nations are much smaller than either the U.S. and Russia, and in closer proximity to missiles. A limited TMD defensive footprint provided by a relatively small number of interceptor batteries may be sufficient to provide national coverage, relative to missile/interceptor speed. For example, Israel, currently deploying its Arrow system, along with existing PAC-2 batteries, will shortly possess an ability to cover its entire national territory. Moreover, ballistic missile threats to Israel are in the

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[46] See "THAAD and Navy Theater-Wide Violate Treaty" Arms Control Reporter. Cambridge: Institute for Defense and Disarmament Studies. March. 1997.

[47] Depending upon the range of the missile, boost-phase ranges from approximately 1 minute to no more than 5.

IRBM and below range. Even though Israel is not bound in anyway by the Demarcation Agreements, it would still fall under them. TMD systems are strategic for Israel.

Finally, the legacy of strategic arms control of the Cold War, that focussed upon technical characteristics to define and differentiate, misses the political element of strategic. At one level, a strategic target is a function of the value placed upon that target. National territory as a whole may be so valued, but it may also be the case that only the national capital or major cities have such assigned value. At another level, strategic value is a function of the political impact of offensive and defensive weapon systems on national calculations and decisions. The Gulf War is a useful example of the merging of both levels.

Relative to the crude capabilities of the Iraqi modified Scuds, a relevant example of first-generation missiles, counter-value (cities) targets pre-dominated. Tel Aviv in this case was the obvious strategic target, not the whole of Israel. Thus, the deployment of PAC-2 batteries for strategic effect could easily be made. As a result, the simple deployment of, and engagement by, PAC-2 batteries had strategic impact regardless of their actual effectiveness.[48] That is, the appearance of the ability to defend reduced internal political demands for Israel to intervene into the war; the strategic purpose of the attack itself. In other words, Israel possessed a strategic defence during the Gulf War, even though the actual ability of the system to defend was questionable.

The Gulf War case is illustrative of the need to re-conceptualize strategic defence in the post-Cold War era. Demarcation provides an arbitrary technical solution to a political problem. In terms of US-Russian relations, it does not technically resolve the *breakout* problem. Notwithstanding the technical limits on testings and the confidence-building measures with regard to deployment, the eventual deployment, and with it an underlying production capacity, of a range of TMD systems provides the basis for possibly augmenting

[48]The storm of controversy on Patriot successful intercepts was sparked by Theodore Postol. “”Lessons of the Gulf War Experience with Patriot”. International Security. Winter, 1991/92.

a strategic defence for both Russian and the US.[49] How quickly this could occur in response to a different security environment, and how effective they would be against a sophisticated offensive capability is difficult to predict. At the same time, both Russia and the US have a common interest in TMD capabilities against emerging ballistic missile threats. Russia has concerns with regard to its southern flank. The US has concerns with regard to providing defence for its expeditionary forces, forward-deployed forces, and allies.

In particular, the provision of a strategic defence for allies is vital in two ways. First, it is a means to ensure that US allies will participate in ad hoc coalitions. Second, it also serves to ensure that allies will host expeditionary forces. In both cases, strategic defence for others not only has direct military value with regard to intervention in defence of Western political interests, but it also signals potential regional adversaries that ballistic missiles married to WMD will have little, if any, political

Figure 1: Ranges from Libya and Iraq

[49] The Demarcation Agreement also stated that TMD "will not be deployed by the Parties for use against each other".

utility in deterring intervention either by a direct threat to the national territories/cities of the US and its European allies, or a threat to a regional host nation for their forces. In effect, it reinforces the ability of the US/Europe to deter regional/local aggression by signalling a credible threat to intervene. Finally, it also enables the US/Europe to avoid the political and moral problems long associated with extended deterrence as practiced by the US during the Cold War.

As noted above, demarcation has served the valuable political purpose of legitimizing TMD, if not removing it from the public political agenda. Yet, for Europe as a whole, TMD systems relative to the emerging ballistic missile/WMD threats on its southern flank provide a potential territorial defence. First of all, Europe is within range of medium to intermediate range ballistic missiles from the Middle East and southern

Mediterranean littoral, as demonstrated in Figure 1 that illustrates ranges distances from Libya and Iraq.[50] Even though a significant portion of Europe is beyond the M/IRBM range from Iraq, several key members of the alliance are not.

Most importantly, these ranges are within the testing ceiling of the Demarcation Agreements. Even though the European allies are not parties to the Agreements, nor the ABM Treaty, their public commitment to the Treaty potentially binds them to the limits as well. Moreover, their missile defence requirements can largely be met under these limits, and neither is cooperation with the US on TMD foreclosed, nor is the development and eventual forward deployment of US TMD systems. In particular, the Agreements provide the legal and political means to side step Article IX prohibitions.[51]

For Europe relative to the emerging threat from the south, ATMD and TMD provide a potentially effective layered approach to a strategic defence for Europe. Lower tier endoatmospheric point defence, land or sea-based, can prove useful for specific counter-value coverage, and as the final layer for an upper tier wide-area land or sea-based defence for exoatmospheric intercept, with possibly a additional boost-phase layer as well.[52] In effect, the latter by its nature is strategic. A boost-phase intercept can deal with the full

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[50] Map reprinted from Commission on Missile Defense. Defending America: A Plan to Meet the Urgent Missile Threat. Washington: Heritage Foundation. 1999.

[51] Article IX prohibits the state-parties from the transfer of an ABM system or its components to, and the deployment of an ABM system or its components on a third party's territory.

[52] In the context of the NMD debate, President Putin has proposed a cooperative boost-phase

range of ballistic missile threats from short to long range.

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strategic defence for Europe. See Michael Gordon. “Russian Officials Flesh out Alternative Antimissile Proposal” New York Times. June 14, 2000.

From a strategic, theatre, and tactical viewpoint, boost-phase is recognized as the most effective system. Missiles are extremely vulnerable during this phase. They are large single targets, lack effective counter-measures, and a successful intercept ensures that the warheads fall back onto the launching state. However, there are some difficulties that boost-phase confronts. First, it may require the ability to locate the launchers, which is problematic with the increasing reliance on mobile transporter launch erectors (TLEs).[53] Failing to locate launch points, thus, forces one to rely upon the rapid cueing of boost-phase systems from primarily space-based, but also possibly air-based, sensors. With boost-phases of between 1 to 5 minutes, depending upon the type of missile, the time available to identify a launch, cue the boost-phase intercept, and undertake an intercept is extremely short. Notwithstanding a *bolt-from-the-blue* scenario, the boost-phase intercept platform must also be within relatively close proximity of the missile launch. Air-based systems probably are most ideal within current technology development envelopes, but these systems are vulnerable to air-to-air and surface-to-air defences that must be suppressed.[54] Naval systems are to a degree less vulnerable, but are constrained by virtue of the proximity of the platform to the land-based launch point. A similar difficulty obtains for land-based systems.

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[53] See Tim Ripley. Scud Hunting: Counter-force Operations Against Theatre Ballistic Missiles. Bailrigg Memorandum 18. Lancaster: Centre for Defence and International Security Studies. 1996.

[54] Space-based systems, because of their dual missile and anti-satellite capability, significantly resolve the vulnerability problem of air-based systems. While research continues in the US, it is being funded at a very low level. According to US Space Command's Long Range Plan, such systems will not be available until 2020 at the earliest, notwithstanding the political issues underlying a decision to move to space. See USSPACECOM. Long Range Plan. Colorado Springs. 1998.

Conceptualizing boost-phase as the first layer of a strategic and multi-functional missile defence, TMD systems with an exoatmospheric capability provide a second layer. Although such systems are not effective against short-range missiles which do not leave the atmosphere, they are against medium and longer range ballistic missiles; the very type required to threaten Europe from launch points from the south. Such systems can potentially intercept missiles in the early mid-course phase, possibly before they are able to release decoys, assuming that such a capability is possible for the initial rudimentary missiles likely to deployed in the region in the foreseeable future.

In addition depending upon the location of the intercept platform, in this case naval in the Mediterranean, and the ballistic missile trajectory, an exoatmospheric system could potentially launch at any point during the mid-course phase providing multiple intercept opportunities and a shoot-look-shoot capability. With a sufficient number of naval platforms deployed along reasonably predictable trajectories from likely adversaries, the defensive footprint could provide full strategic coverage for Europe. The key is integrating and centralizing the process of early warning information vital to cue platform guidance radar. In the case of an IRBM attack against Europe, a 3,000 km missile has an estimated flight time of 16 minutes.[55] With a boost phase of approximately 3 minutes, less than 13 minutes are available for mid-course intercept.[56] This time frame, relative to the number and geographic deployment pattern of the naval platforms and distance from target trajectory determines intercept opportunities. A similar case also applies to land-based TMD systems in terms of trajectories that could transit over Asia Minor.

The final layer of defence is terminal or point defence, with a limited footprint as in the case of the Patriot ATMD batteries used during the Gulf War, as well as naval-based lower tier systems. While vulnerable to some counter-measures, but not decoys which burn up on re-entry, their deployment around key strategic

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[55] Duncan Lennox. "Threats and Their Development" Extended Air Defence & The Long-Range Missile Threat. Robin Ranger et.al. eds. Bailrigg Memorandum 30. Lancaster: Centre for Defence and International Security Studies. 1997.

[56] A portion of the flight time is the terminal phase when the warhead re-enters the atmosphere and descends directly to target.

counter-value targets serve to enhance the layered strategic defence.[57] As in the case of TMD, these could be naval lower tier systems deployed off-shore of key counter-value targets, and/or ground-based systems deployed in batteries around a land-locked counter-value target.

US-European TMD Development Programmes

One of the key problems in understanding the goal of European missile defence lies with the territorial and value elements of strategic defence. In one sense, Europe territorially is a sufficient land mass, albeit smaller than the US, to be roughly comparable to the understanding of strategic defence during the Cold War. However, the distances between launch points in the South and targets in Europe is much less than in the same case for the US. As such, demarcation limits on testing do not significantly constrain the use of TMD for strategic defence. Similarly, slower ATMD systems, depending upon their deployment number, location, and pattern can still serve in the European case as a final layer of a strategic defence. Problematic is that TMD and ATMD systems are also central for the protection of deployed forces in the field and local allies/clients in the case of intervention a la the Gulf. In other words, development programmes can be legitimized in support of forward deployed, out-of-area forces without any need to reference their potential utility for a Europan strategic defence. In fact, for most nations relative to likely missile threats, missile defences are multi-functional not only in the case of ballistic missiles, but also for the air-breathing threats of manned aircraft and cruise missiles.

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[57] Such measures may simply seek to alter the nature of descent from a ballistic path using the atmosphere. In addition, debris from the warhead's threat cloud can also confuse interceptor tracking to target.

In the case of ATMD and TMD systems, the US programmes remain the most prominent (Table 2). These consist of five major programmes: two ATMD, two TMD, and one boost-phase. The most well known is the Patriot system produced by Raytheon, that was operational during the Gulf War. Besides the US, the Patriot is also deployed by Germany and the Netherlands. The current operational system is the PAC-2, and uses a conventional proximity blast to intercept missiles during the terminal descent phase in the atmosphere. The follow-on PAC-3 system is currently in the test and evaluation phase. It uses a kinetic energy warhead to intercept missiles during the same phase as PAC-2. Over the past year, PAC-3 scored two successful hit-to-kill intercepts, and is earmarked for deployment in 2001. Both Germany and the Netherlands have indicated their intention to up-grade their Patriot systems with PAC-3 when it becomes available.

The second ATMD system is the US Navy's Area Wide. Similar to Patriot, it also provides a limited point defence. Earmarked for deployment on the existing Aegis Class Cruisers and Destroyers, it will consist of a improved SPY-1 radar system and the Standard II, Block IVA interceptor. As in the case of PAC-3, it also uses hit-to-kill intercept, and is also designed for air defence, including cruise

TABLE 2[58]

US Theatre Missile Defense Programme

System name	Prime contractors(s)	Type of warhead	Air defense role	Approx. radius of defended area, km	Number to be bought	Date of initial deployment	Acquisition cost
Lower-tier (point) defenses							
Patriot PAC-2 (Army)	Raytheon Co.	Blast fragment	Substantial	10-15	2247 missiles modified	1991	US $0.3 billion
Patriot PAC-3 (Army)	Raytheon/Loral Corp.	Hit-to-kill	Substantial	40-50	1200 missiles 54 fire units	1999	$6.2 billion

[58] Update to David Mosher. "The Grand Plans". IEEE Spectrum. September, 1997. For the most detailed account of US BMD as a whole remains BMDO. Report to Congress. 1997

Navy Area Defense (a.k.a. Navy Lower Tier)	Standard Missile Co. (=Raytheon/Hughes Aircraft Co.)	Blast fragment	Substantial	50-100	1500 missiles	2001+	$6.2 billion
Upper-tier (area) defenses							
Thaad (Army)	Lockheed Martin Missiles and Space Co. (Raytheon: radar)	Hit-to-kill	None	A few hundred	1233 missiles 77 launchers 11 radars	2007	$12.8 billion
Navy Theater Wide Defense (a.k.a. Navy Upper Tier)	Standard Missile vs. Lockheed Martin	Hit-to-kill	None	More than a few hundred	650 missiles on 22 Aegis cruisers	2007-10	$5 billion
Boost-phase defenses							
Airborne Laser (Air Force)	Boeing Defense and Space	Directed energy	None	Possibly huge	7 aircraft	2007	$6.1 billion

missiles. It is scheduled for deployment in 2004. Currently the US Navy is undertaking tests through its Linebacker programme of its capability to perform tracking and guidance, and also be inter-operable with space-based early warning systems, and ground-based systems as well.[59]

As both systems are primarily designed for defence of deployed military units, land and sea, with an additional capability to defend value targets such as bases, landing points, and allied cities, they are generally referred to as lower tier systems. To enhance their effectiveness, and expand the defensive footprint, the US is also developing two TMD systems: the US Army's Theatre High Altitude Area Defence

[59] Linebacker, also known as the User Operational Evaluation System, consists of two Aegis Cruisers, the USS Lake Erie and USS Port Royal. For details of all the Navy programmes, See Underway at Sea: Navy Theater Ballistic Missile Defence. US Navy. 2000.

(THAAD), and the US Navy's Theatre-Wide. Not only will both systems deploy interceptors with a velocity above the 3 km limit for lower tier, but they are also capable of both a exoatmospheric and a very high altitude endoatmospheric intercept. Both will deploy a kinetic-energy, hit-to-kill interceptor. By virtue of their speed and exoatmospheric capability, they are designed strictly against M/IRBMs, as short-range missiles apparently fly too low. Through an ability to attack medium to intermediate range missiles during their mid-course phase through to their initial terminal descent phase, the systems provide a much more expansive footprint. Moreover, when combined together, and with lower layer systems, they also provide for multiple intercept opportunities during the flight phases of the ballistic missiles. They are the Upper Tier, which represents an additional missile defence layer.

The THAAD system is the more prominent of the two, especially as a result of a string of six intercept failures. Since last year, the programme is back on track after two successful hit-to-kill intercept tests in a row. As a result, THAAD has gained greater support and financial backing, and its operational date, currently scheduled for 2007, may occur earlier.[60] In contrast, the Navy Theatre-Wide, also initially scheduled for deployment around 2007, may be pushed back several years due to funding constraints. Like Area-Wide, the system will be deployed on Aegis Class Cruisers and Destroyers with a further advanced Spy-1 radar, and another generation of the Standard Missile (SM-3).[61] Once deployed, these naval

[60] Gopal Ratnam. "Additional Funds sought to speed THAAD Design. "Defense News. March, 20, 2000.

[61] The SM-3 uses the Light Exo-Atmospheric Projectile (LEAP) for hit-to-kill.

platforms will organically possess a layered missile and air defence capability, which should be able to project a wide defence umbrella not only around naval task forces, but also onto land. Moreover, deployed in the Mediterranean, their exoatmospheric capability could also extend their footprint to cover targets deep inside Europe through an ability to strike a IRBMs flying overhead in space.

The final system is the Airborne Laser (ABL). Through the use of a chemical laser deployed on a Boeing-747, it is designed to shoot down missiles at a range of hundreds of km., and at the higher levels of the atmosphere above cloud cover. The first 747 has been delivered for modification, and the first test of the system is scheduled for 2003, with a deployment date of around 2007.[62] By focusing its high energy laser on the booster with a dwell time of a couple of seconds, it destroys the integrity of the booster, leading to structural failure, and its destruction by falling directly back to earth. As a boost-phase system, its footprint is unlimited. It does to have to contend with traditional air defences, such that it either cannot linger over an adversaries territory, requires the suppression of high altitude air defences, and/or combat air patrol to defend it.

While the US systems have garnered the most public attention, the major European nations are also engaged in a range of missile defence development programmes (Table 3). Of these, the United Kingdom is most prominent.[63] In January, 1997, the United Kingdom completed its Pre-Feasibility study on missile defence; a study lead by BAE industries.[64] It recommended that the technology for missile defence was not yet advanced enough for a British decision, and suggested a technology access approach. With the 1997

[62] Recently, the joint US-Israel Tactical High Energy Laser developed by TRW. successfully shot down a Katyusha rocket in a test at White Sands. James Glanz. "Laser built for Israel Shoots Down Missile in Successful Test" New York Times. June 8, 2000.

[63] Support in France for a greater missile defence effort also exists. It was argued in testimony to a French Senate Committee this year looking at French nuclear doctrine. A report is expected this fall. Michael Taverna. "Policy Makers Urge Debate on French Nuclear Doctrine". Aviation Week and Space Technology. March 20, 2000.

[64] The Pre-Feasibility Study apparently has not been released publically. One of the background studies that is public is Neville Brown. The Fundamental Issues Study within The British BMD Review. Oxford: Merton College. 1998.

Strategic Defence Review (SDR), the United Kingdom established the Technology Readiness and Risk Assessment Programme (TRRAP). One of the centrepieces of the British effort has been the MESAR radar capability, which can be traced back to the late 1980s. Since then, it has been the main avenue of British involvement with the US programmes, and further testing of the radar for missile defence is scheduled to begin in the near future at White Sands, New

Table 2[65]

European Naval Missile Defence Programmes

Country	Platform	N	Radar	Type	Missile
United Kingdom	Type 45 Destroyer	12	Sampson (MESAR)	Lower Tier	Aster 30
France	Horizon Frigate	4	EMPAR	Lower Tier	Aster 30
Italy	Horizon Frigate	6	EMPAR	Lower Tier	Aster 30
Germany	T124 Frigate	3	APAR	Lower Tier	SM-2
Netherlands	LCF Frigate	4	APAR	Lower Tier	SM-2
Spain	F-100 Frigate	4	SPY-1	Lower Tier	SM-2

Mexico.[66]

The MESAR E/F band radar is the core of the SAMPSON component of the Type-45 destroyer, earmarked for deployment in 2007.[67] This destroyer is the British replacement for the Type-42 anti-air

[65] All the missiles are proximity explosive. For further detail on naval systems, see Jeremy Stocker. Sea-Based Ballistic Missile Defence. Bailrigg Study 2. Lancaster: Centre for Defence and International Security Studies. 1999.

[66]"MESAR Radar System Ready for British Testing Programme" Defense News. February 28, 2000.

[67]Richard Scott. "Type 45 programme steams ahead" Jane's Defence Weekly. December 1, 1999.

destroyer and the Horizon frigate in the wake of Britain's withdrawal from the tri-national Horizon frigate project **in April, 1999. Originally, the programme was to consist of 22 frigates, of which the United Kingdom planned to purchase 12, Italy 6, and France 4. The decision to cancel the programme was in part a function of disagreements on design. Specifically, the United Kingdom was seeking a capability to provide a much wider area of air defence, including missile defence, whereas Italy and France sought a much narrower area of coverage. Italy and France are continuing with the development of their own frigate replacement, and plan to use the Italian EMPAR G band radar system.**

Although the Horizon platform programme collapsed, one element of the tri-national effort has continued; the Principal Anti-Air Missile System (PAAMS), and with it the creation of the EUROPAAMS consortuim consisting of Aerospatiale-Matra (France), Alenia (Italy), and BAE (UK).[68] At the core of PAAMS is the Aster 30 missile that is being designed for ATMD and anti-air defence. It is a lower tier weapon system, that uses a conventional proximity warhead to intercept tactical ballistic missiles, aircraft, and cruise missiles. The Aster is also part of the Franco-Italian Sol-air Moyenne-Portee/Terre (SAMP/T, Future-to-Air Family of Missiles) development programme that has been underway for over a decade. It is also the missile for the EUROSAM consortium for the next generation of air defences to replace the Hawk. There is also consideration of an extended range Aster, at times labelled the Aster 45, for possibly a TMD capability as

[68] PAAMS was signed in August of last year, and delivery is scheduled for 2005. JAC Lewis and Richard Scott. "Three-nation PAAMS deal is finally sealed" Jane's Defence Weekly. August 18, 1999.

well. This version, which could potentially use hit-to-kill technology, would be based upon the current Aster 30 missile frame.

In effect, the British, French, and Italian naval modernization programmes are preparing to develop and deploy radar systems and interceptors that can function against ballistic missile and air-breathing threats. At the same time, the German-Dutch-Spanish tri-national frigate programme is also pursuing some form of missile defence capability.[69] In contrast to the Germans and Dutch which are pursuing the APAR radar system for missile guidance, the Spanish have decided to acquire the US Aegis Spy-1 radar, although it is unclear whether the version will be the up-graded missile defence capable radar.[70] All three are currently negotiating a cooperative development agreement for the Standard Missile-2 IIIA for air defence, which could serve as the basis for the acquisition in the future of the SM-2,IVA and possibly the SM-3, and all three will possess the Mark-41 vertical launch capability [71]. In effect, all of these nations' naval modernization programmes entail a potential limited ATMD capability, likely upgradeable to a TMD capability depending on the technology development process, and of course issues concerning technology transfer. In addition, all are also likely to possess the Link-16 communication system that will ensure their inter-operability with US naval platforms.

There is, of course, a independent development logic to ensure that the new generation of air defence naval

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[69] The four Dutch Zeven Provincien command and air defence frigates are scheduled for deployment between 2001 and 2005. The upgrade to the SM-2, IVA is set for 2009. Martin Delaere. "Dutch Minister reaffirms stance on defence White Paper" Jane's Defence Weekly. December 8, 1999.

[70] The Active Phased Array Radar (APAR) is currently undergoing tests, and is scheduled for qualification tests on the first Dutch frigate in 2002. Richard Scot. "Multifunction radar arrives at RNLN test site" Jane's Defence Weekly. January 19, 2000. Norway is also looking at the APAR for its frigate programme. Douglas Barrie and Robert Holzer. "Norway to Decide Path on Frigate Programme" Defense News. December 6, 1999.

[71] Apparently, the Aster 30 can also be launched by the Mark-41 system. Robert Holzer. "Standard Missile Pact Could Shape Pattern for Naval Cooperation" Defense News. May 15, 2000.

platforms are as capable as possible with regard to new technology which leads to the natural acquisition of a limited missile defence capability. Moreover, the focus on a lower tier capability is consistent with the need to defend expeditionary forces, either in conjunction with the US or perhaps independently of the US for those missions related to the EU only since its absorption of the WEU. At the same time, these capabilities provide European technology opportunities, and their operational deployment are roughly temporally consistent with the time-line for the US lower tier systems. However, these lower tier systems would also serve as the basis for possibility expanding naval capabilities to take on a TMD role, and their potential deployment in the Mediterranean also give them a potential strategic defence role for Europe in this regard. They would, however, have a very limited role against potential launch points, trajectories, and distances from the East or North even if, or when upgraded to TMD.

Alongside the naval programmes, the most prominent of the European land-based missile defence development programmes is the NATO Medium Extended Air Defence (MEAD).[72] **The MEAD programme emerged in 1995 with the signing of a Statement of Intent by the four initial participants: France, Germany, Italy, and the United States. This cooperative programme was designed to field an operational, manoeuvrable, limited area point defence against the full range of air breathing threats, including cruise missiles, and short range ballistic missiles. The system itself provides defensive coverage for a radius of less than 10 kilometres and plans to use a kinetic energy hit-to-kill interceptor. The programme is divided into three phases, with the initial phase, project definition and valuation, recently completed. However, prior to the signing of the Memorandum of Understanding (MOU) for the first phase, France withdrew from the programme .**

The withdrawal of France resulted in a re-apportioning of work shares and development costs; currently distributed among Germany (25%), Italy (15%), and the US (60%). In so doing, the individual costs for the three participants increased overall, although total costs have declined with the removal of specific French requirements for the system. Current development costs for

[72] **MEAD is largely based upon the American Corp Surface-to-Air (SAM) project.**

MEAD are estimated at US$2 billion, with an estimated cost of US$40 billion for the purchase of 100 systems over fifteen years. With the completion of the initial phase, the consortium (collectively known as EuroMEADs) lead by Lockheed Martin, partnered with Daimler-Chrysler, and Alenia Marconi Systems, has been awarded the prime technology development contract, and the next phase is expected to be completed in 2003. Even though France withdrew, it does remain open to new participants, and there has been varying interest expressed by the Netherlands, and Turkey.[73]

[73] Turkey has recently expressed more interest in acquiring the Israeli Arrow TMD system, but this would require US consent. Burak Ege Bekdil. "Turks Launch New Initiative to Win Access to Arrow". Defense News. April 24, 2000.

Plagued by problems, including issues about whether the US Congress would fund MEAD, it is designed as a system to replace the Hawk, and possibly the Patriot.[74] In fact, the US has proposed the use of the Patriot missile for MEAD, and negotiations are underway to resolve the issues concerning technology transfer and access relative to the Patriot technology between Germany/Italy and the US.[75] Nonetheless, the French have suggested the Aster 30 for the programme. It remains to be seen whether MEAD will survive over the long term, or suffer the fate of many other collective NATO development and procurement projects.

Related to the MEAD technology dispute is the aforementioned Patriot PAC-3 upgrade for the German and Dutch.[76] The Dutch have expressed no concerns about technology transfer and access, and with hopefully the apparent German-US resolution of the issue with regard to MEAD, it appears that this will go ahead once the technology comes on-line. In addition, discussions between Germany, the Dutch, and the US on developing an inter-operable and integrated capability have moved forward.[77] Along with other allies, Joint Project Optic Windmill (JPOW) on missile defence, sponsored by the Dutch, has continued on an annual basis for the last five years. In addition, a loose NATO-based partnership to support command and control and battle management (C^2/BM) among Germany, the Netherlands, and the US has developed, which

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[74] **George Seffers, "A Political Roadblocks Await Troubled MEADS", Defense News. May, 31, 1999.**

[75] Gopal Ratnam. "Technology-Sharing Plan Beset by Skepticism" Defence News. May 15, 2000.

[76] Greece has also expressed an interest in acquiring PAC-3 to replace its Hawk SAM batteries.

[77] In addition, discussions are also underway on maritime TMD cooperation among the US, Germany, Italy, and the Netherlands. In October last year, the first meetings of the Maritime Ballistic Missile Defence Forum was held. Colin Clark and Robert Holzer "US, Allies Move on TMD Partnership Plan" Defense News. November 29, 1999.

will enable a potential single command structure for the national elements.[78] Both of these, and other joint exercises and experiments on missile defence cooperation and inter-operability primarily fall under the NATO rubric itself; the key actor for C^2/BM when the national systems begin to reach maturity and deployment.

[78] In 1996, discussions did occur between Germany and the US about developing a integrated Patriot brigade, but came to no fruition.

PART III

NATO as the Lynchpin

The European ATMD and TMD programmes are focussed upon the platforms and associated radar and interceptor components. The role for NATO that is emerging is to provide a centralized early warning, and C^2/BM for the national elements, which could include forward deployed US naval TMD assets as well those that are likely to be assigned to NATO commands. In so doing, the alliance through Supreme Headquarters Allied Powers Europe (SHAPE) will not be undertaking a new role *per se*. Rather, it is in many ways simply continuing its longstanding role from the Cold War of providing an integrated air defence capability for Europe. It is in this sense that the concept of extended air defence (EAD) has emerged to integrate traditional air defence with ballistic missile defence.

The logic of an integrated approach to air defence and in the future EAD followed from the defence requirements of Europe during the Cold War. It was one of the few areas of cooperation where the allies recognized that an effective air defence dictated a truly integrated approach. Even France after its withdrawl from the integrated military command structure in NATO in 1966 continued to participate in the air defence component. The result was the development of a series of radars, local and regional air control centres, and an overarching operational and tactical air command and control system (ACCS) for Europe as a whole.[79] It was supplemented with the acquisition of the NATO airborne warning and control system (AWACS), that was funded as a NATO Common Project.

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[79] This is somewhat misleading, as part of the motive for modernizing ACCS was the existence of other systems, such as in Great Britain and Germany, alongside what was known as the NATO Air Defence Ground Environment (NADGE).

The purpose of this discussion is to examine the steps underway in NATO with regard to a strategic missile defence for Europe against emerging threats from the South. In so doing, it examines the political guidance as found in the Washington Summit's Updated Strategic Concept, the ACCS modernization plan, and the current state of EAD thinking and planning. The path to acquiring such a capability for Europe within NATO will not be an even one. Nonetheless, its acquisition is not only vital to the future of NATO as the primary defence agency for Europe, but also vital for the future of the trans-atlantic relationship. In the new strategic world of missile defences of the next decade, NATO's role in a deployed, layered TMD will cement the continuing utility of a cooperative, trans-atlantic approach not only to European security, but global security issues as well. If for whatever political reasons this does not occur through NATO, then the divide between Europe and North America may become extremely wide, and with it the future of the alliance may be in doubt. In this sense, the failure to develop an extended integrated air defence (EIAD) capability within NATO will not cause the collapse of the alliance. Rather, it will be a core indicator of North America and Europe drifting apart.

NATO's Political Guidance for EIAD

Concerns about the proliferation of ballistic missiles and associated WMD have been clear within the councils of NATO since the end of the Cold War. The 1991 Rome Declaration identified "the proliferation of weapons of mass destruction and of their means of delivery" as a clear threat to international security.[80] Moreover, the proliferation of ballistic missiles and their threat to NATO territory, along with weapons of mass destruction, were clearly noted in NATO's New Strategic Concept. This was followed by a series of studies into theatre missile defence, and the establishment of the Senior Politico-Military Group on Proliferation (SGP) and the Senior Defence Group on Proliferation (SDG) at the Brussels Summit in 1994.[81] The former was to

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[80] **NATO. "Rome Declaration on Peace and Cooperation". NATO Review. December, 1991.**

[81] **For a detailed discussion of the evolution of NATO's missile defence response, see David Martin. "Towards an Alliance framework for extended air defence/theatre missile**

examine a political approach to proliferation, whereas the latter was to investigate military requirements either to dissuade proliferation or protect NATO territory and forces from attack.[1] In addition to these two groups, Supreme Headquarters Allied Powers Europe (SHAPE), the Defence Planning Committee (DPC), the NATO Air Defence Committee (NADC), and the Conference of National Armaments Directors (CNAD) began to examine missile defence requirements.

In particular, the CNAD responded to the American offer to share ballistic missile early warning data with its NATO allies, and established an ad hoc working group on extended air defence and theatre missile defence. Also, the NADC had already been tasked to work towards the development and implementation of the new air command and control system with modernized ground-based radars, and communication and a data management system. Finally, the threat of proliferation and the issue of ballistic missile defence were recently reiterated in the alliance's Strategic Concept released at the April Washington Summit.[2]

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defence" NATO Review. May, 1996.See also, Gregory Schulte. "Responding to Proliferation NATO's Role". NATO REVIEW. Vol.43. July 1995.

The updated Strategic Concept provides a relatively clear outline for missile defence developments. Not surprisingly, the references to missile defence reflect the much larger political-strategic debate within the alliance concerning out-of-area and core Article V defence requirements. With regard to the former mission, the Strategic Concept states: "The Alliance's defence posture against the risks and potential threats of the proliferation of NBC weapons and their means of delivery must continue to be improved, including through work on missile defences...capabilities for dealing with proliferation risks must be flexible, mobile, rapidly deployable, and sustainable...The aim in doing so will be to further reduce operational vulnerabilities of NATO forces while maintaining their flexibility and effectiveness despite the presence, threat, or use of NBC weapons"[82]

With regard to a strategic defence for Europe, it is stated that "...the Alliance's defence posture must have the capability to address appropriately and effectively the risks associated with the proliferation of NBC weapons and their means of delivery, which also pose a potential threat to the Allies populations, territory, and forces. A balance mix of forces, response capabilities and strengthened defences is needed".[83]

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[82] NATO. "The Alliance's Strategic Concept". The Reader's Guide to the NATO Summit in Washington. Washington. 1999. Paragraph 56. p. 58.

[83] Ibid, Paragraph 53 (h). p. 57.

Alongside the release of the updated Strategic Concept for the alliance, the Defence Capabilities Initiative (DCI) was established which is overseen by a High Level Steering Group.[84] Its purpose is to identify key defence capability requirements for the alliance for the complete range of possible missions, to facilitate inter-operability, especially with regard to concerns about the growing technology gap between US and European forces, and to avoid the unnecessary duplication of effort with respect to defence budgets. TMD is among the fifty eight elements of the DCI. Its priority ranking within these elements is unclear for several reasons. First of all, TMD technology remains in the developmental stage, with some temporal and capability variance between US and European missile and air defence programmes. Missile defence systems are scheduled for deployment at various points over the next decade, with US upper tier systems earmarked for sometime in the later part of the decade. Second, many of the core elements of a combined and joint TMD architecture, such as C^2 /BM and naval platforms, have multiple purposes, and would proceed even in the absence of missile defence developments. Finally, there is yet no final political consensus on TMD for Europe, which in part reflects the continuing political debate on Article V versus non-Article V priorities for the alliance.

The NATO Architecture

Light can be shed on the strategic (Article V) vs. operational (non-Article V) issue by looking at ongoing and proposed programmes. These indicate that NATO via SHAPE will be the central C^2/BM agent through the modernization of its ACCS for a range of national capabilities. The ongoing modernization of ACCS is by no means settled yet. On one hand, it is driven by the simple requirement to modernize the network of Air Control Centres, and Combined Air Operations Centres relative to existing and future air defence requirements, and also develop a mobile capability for forces deployed in out-of-area missions. This system has not been changed since the 1970s, even though the need for modernization has been known for a long time, especially in-terms of the NATO and national systems in operation. Closely related, ACCS

[84] "Defence Capabilities Initiative". Ibid. pp. 61-62

modernization is also designed to bring the new members' systems into the fold to complete an integrated air picture for Europe.

Central among the modernization components is the radar network surrounding Europe[85]. It is here that the issue of missile defence, or EAD comes into play, and it concerns the modernization of the radars to include potentially the ability to track theatre ballistic missiles. Accordingly, the first phase of this modernization is focused primarily on the radars along the southern periphery of the alliance, including Turkey; the very locations essential to deal with the emerging ballistic threat from the South. Essentially, this ability would serve to provide not only tracking, but also initial cueing for fire control radars (FCR) with deployed missile defence systems, either ground or sea-based.

Funding for the modernization of ACCS as a whole is from the common fund, or NATO Security Investment Programme. ACCS modernization is under the purview of the NATO Air Control Management Agency (NACMA), which reports to the NADC. The Level of Operations Capability-1 (LOC-1) programme, a 5 year programme signed in July of 1998, is designed to upgrade software, and tie existing radars into the system to include the 3 new members. The initial contract for the modernization programme was let last July to Air Command Systems International: a Paris-based consortium consisting of Thomson-CSF and Raytheon[86] The central focus is developing the software architecture and software computing systems vital to replace the out-dated system.

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[85]As a common funded programme, the allies disagree on the extent of radar requirements and modernization for all the sites in Europe. There appears to be agreement that the upper tier requirement is necessary for the southern periphery. Confidential Interviews.

[86] Luke Hill. "NATO's Plan for Air Defense Picks up Steam" Defense News. May 29, 2000.

It is unclear, however, whether the acquisition of LOC-1 will be sufficient for the complicated integration of missile defence systems, and C^2/BM at the operational/tactical level, along with air defence. LOC-2 has been identified as the follow-on modernization requirement for ACCS. However, LOC-2 has neither been funded, nor agreed upon by the alliance. Moreover, there are significant concerns about the escalating costs of LOC-1. Nonetheless, with LOC-1 scheduled for operational status sometime in the 2005-06 time frame, it is likely that the capability will be expanded over the process, potentially negating the requirement for a full-fledged LOC-2 programme.

Alongside this requirement is of course the overarching ability of ACCS to integrate into the full US C^3/BM system, which requires an ability to tie into the US Link-16 data system. In addition, ACCS cannot simply be a system for ground and air forces. With the development of naval platforms for EAD in US and Europe, the ACCS system must also be inter-operable with these systems to obtain a joint and multi-layered (lower and upper tier) missile defence. In other words, ACSS must be able to facilitate C^2/BM based upon a single integrated data picture of the battlespace for EAD. In so doing, it must ensure that naval assets are tied in, and the system is inter-operable with the US Navy's Cooperative Engagement Capability (CEC) which is designed for BM coordination among naval platforms.[87] As such, discussions are already underway to ensure that ACCS can interface with naval forces; what is known as the Maritime-ACCS Ship-to-Shore Tactical Interface Component (MASSTIC).

The ACCS element is only one part of an EIAD requirement for NATO with regard to either of its strategic and operational military missions. At the front end is the vitally important early warning requirements for the cueing of either/or both peripheral radars around the southern flank and FCR for forward deployed units in out-of-area operations and European defence. In 1994, the US as part of its counter-proliferation policy offered, and NATO accepted, to share early warning data from US space-based assets; currently the

[87] CEC recently underwent a successful firing test, and is set for production next year. Robert Holzer. "CEC Scores success in Target Intercept Test". Defense News. June 12, 2000.

Defense Support Programme (DSP), and in the future Space-Based Infrared High (SBIRS-H), as well as the ground-based Ballistic Missile Early Warning Network.[88]

With regard to out-of-area operations, during the Gulf War early warning information was transmitted from the Cheyenne Mountain Operations Centre (CMOC), North American Aerospace Defence Command (NORAD), to the Patriot batteries deployed in Israel and Saudi Arabia. Since then, the US has deployed the Joint Tactical Air-to-Ground Station (JTAGS) for forward deployed forces in the field. JTAGS provides direct access to the satellite data, thereby reducing the time between launch identification, attack assessment, and the cueing of FCR. This, combined with NORAD as a redundant back-up EW capability, provides an Attack Launch Early Report to Theatre Capability (ALERT). However, there is no indication

[88] SIBRS-High is the replacement for DSP, and will consist of at least four satellites in geo-synchronous orbit, and two in a high elliptical polar orbit. It is currently scheduled for operational deployment in 2004-05. Following on SBIRS-High is the SIBRS-Low constellation of approximately 28 satellites in low earth orbit. It will serve several functions, among which is cold tracking and target discrimination for missile defence. The development has not proceeded smoothly, and is now slated for deployment in 2008 at the earliest. BMEWS consists of radars deployed at Fylingdales (UK), Thule (Greenland) and Alaska. They are being upgraded as part of modernization and NMD.

yet that the US as part of its EW offer will provide JTAGS to the alliance. In the absence of such a capability, the NATO EW-ACCS system must be inter-operable with US only systems, including the ability to communicate with these systems to obtain information derived from JTAGS.

With regard to Europe as a whole, the US offer to provide EW data in 1994 lead to the esablishment of the Early Warning Inter-Agency Staff Group (EWISG) linked to the CNAD and the NADC. Currently, data from US Space Command (USSPACECOM) and NORAD are transmitted to the Joint Analysis Centre in the UK, then to the NATO Headquarters and finally the member nations.[89] The system, Phase One, became operational in June 1999, and a Phase Two offer is expected in 2001, although its details are unknown. Finally, the actual time elapsed in the process is, naturally, classified, but likely sufficient, at least theoretically, for a defence response against future longer range ballistic missile attacks at least. Once the process is integrated into the ACCS, the time line is likely to be shortened significantly.

[89] This is the data link. In addition, there are also several voice links.

Relative to missile defence, the current system is apparently incapable of processing data quick enough for a response to a missile attack. Accordingly, a NATO simulation test undertaken using using a five and half minute time span of a 600 mile SCUD in which a two minute warning was needed failed. The warning was acquired after the five and a half minute flight time. With the US apparently abandoning the old Linked Operations Command Europe (LOCE) shortly, its replacement is vital, even without ensuring that the new system has an effective missile defence capability.[90]

With the centralization of EW, and C^2/BM through the various elements related to ACCS as noted above, and its linkage to US systems for both missions, the final piece of the puzzle is EAD itself, as the modernized component of the former NATO Integrated Air Defence System (NATINADS). Work on the development of the concept of EAD has taken place in three areas. First under the direction of the CNAD, the AD-Hoc Working Group on Extended Air Defence/Theatre Missile Defence was established in 1993. In 1995, it completed its first report for NATO political authorities. The report identified four major categories for research and development examination; sensors, interceptors, C^3/BM, and Simulation. Eight nations took part in the various elements for investigation. In the summer of 1999, the CNAD approved the programme for a layered TMD feasibility study.[91] The Ad Hoc group transitioned into the Theatre Missile Defence Project Group (TMDPG), which now oversees the Feasibility Study being conducted by the NATO Consultation, Command, and Control Agency (NC3A) located in the Hague, as discussed below. In addition to this group, the National Industrial Advisory Group (NIAG) also began and recently completed its study on TMD.

Alongside the CNAD process, the NADC in 1993 also began to examine the integration of air defence and TMD, throughs its two sub-groups: the Panel on Air Defence Philosophy (PADP) and

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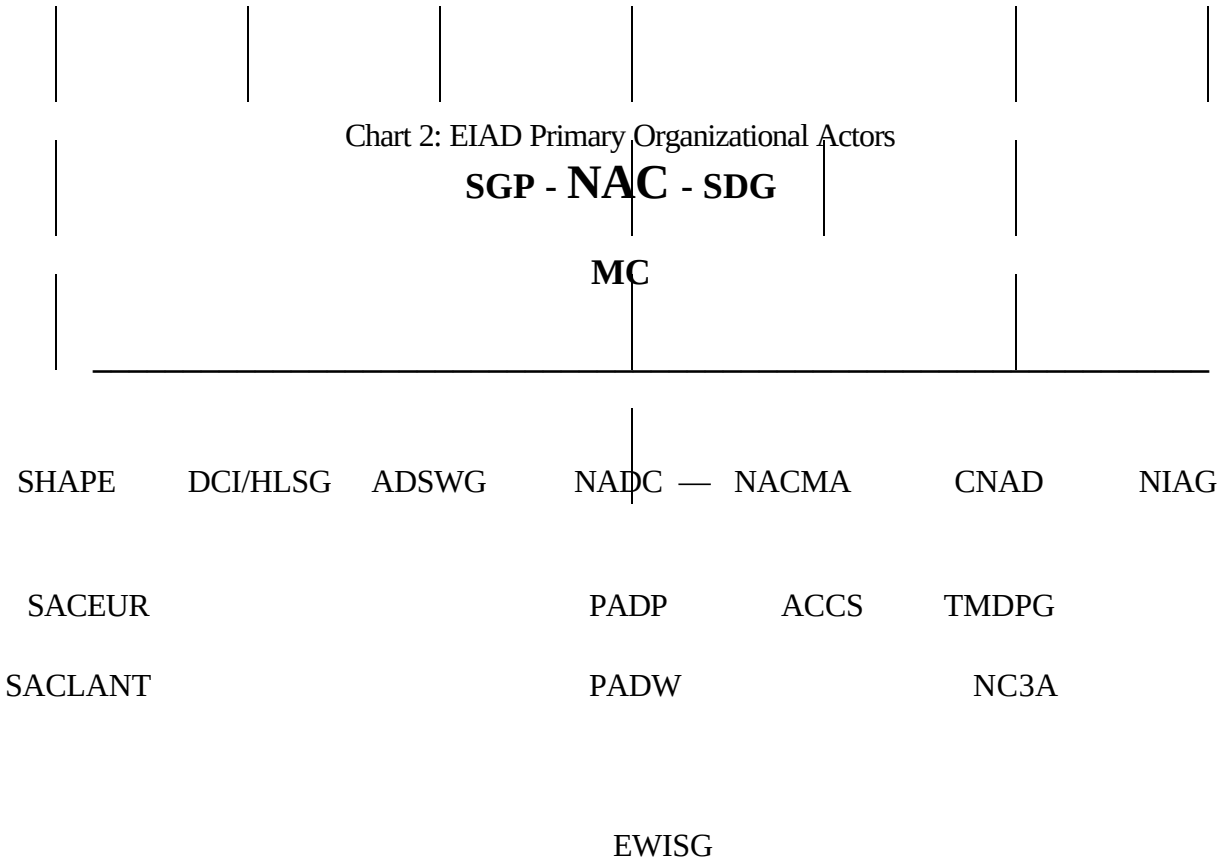
[90] LOCE should not be confused with the ACCS LOC-1. It is designed to operate above the operational and tactical level of ACCS.

[91] Luke Hill. "NATO Targets Theater Missile Defense Study" Defence News. September 27, 1999.

the Panel on Air Defence Weapons (PADW). Finally, SHAPE began examining the concept and requirements for EAD, along with the sub-commands Supreme Allied Command Europe (SACEUR) and Supreme Allied Command Altantic (SCALANT). The work combined into the identification of four pillars of EAD: Counter-force; Lower tier; Upper Tier; and Boost-Phase.

Chart 2: EIAD Primary Organizational Actors



Conventional Counter-Force (CCF) for EAD is considered to be an integral part of traditional counter-air operations. The primary focus of CCF for EAD is not, however, the TEL mission. As demonstrated in the Gulf, and in the context of the mobile missile systems under development, the ability to find TELS before and after launch is extremely difficult. Moreover, TELS are likely to be reasonably defended against air strikes. While the TEL mission is not likely to be ignored entirely, not least of all for political reasons, the CCF primary mission is the adversary's C^3 capabilities, production facilities, and logistical support capabilities.

Lower and upper tier systems provide two additional layers for EAD, relative to CCF. As discussed earlier, lower tier systems are designed primarily against short range tactical missiles, with an additional capability against manned and unmanned air-breathing threats, although they could also provide a limited point defence for counter-value targets. Upper tier systems are to be designed for longer range ballistic missiles with a capacity for a high altitude endo and/or exo-atmospheric intercept. The final pillar is a boost-phase capability, although the specific capability requirement is unspecified.[92] Of the four pillars, the first, CCF, is largely in-place, the second and third will likely come on-line over the next decade, and the last remains unclear. Overall, the goal is to have the first three EAD pillars in-place by around 2010. When linked to the EW, strategic C^3, ACCS, and MASSTIC, NATO will possess an EIAD capability against missile and air-breathing threats.

In support of this goal, SHAPE identified a requirement for TMD and triggered a capability package requirement forwarded to the Military Committee and the International Staff. This, in conjunction with the work of the other NATO groups involved, resulted in the approval by the North Atlantic Council (NAC) of a Stand Alone Project on February 8th. [93] The project was assigned to the NC3A as the host nation and entails two components. An industrial survey, which was completed this spring, was designed to notify and identify interested companies, and receive feedback on the forthcoming request for proposal (RFP) tender. The second part of the project is the core feasibility study for EAD, which will be awarded to two teams or consortia, with a decision on the successful two bids scheduled for next summer. It is likely that the winning consortuims will each consist of a US and European prime teamed together. Smaller defence firms from all the nations will likely be tied into each consortuim. The Thomson-Raytheon consortuim undertaking the ACCS programme would appear as a logical candidate for one bid. With the consolidation of the European missile industry, this component would appear as another likely candidate, possible teamed with

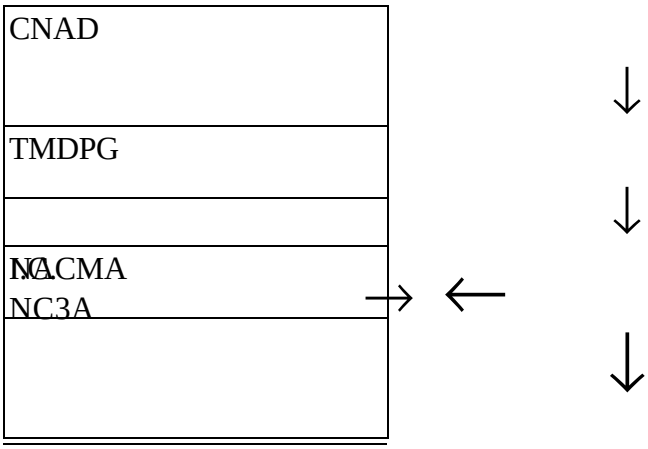
[92] There are three potential options; forward-deployed assets close to launch points (unlikely due to distances involved); the US Airborne Laser set for demonstration in 2003; and possibly a UAV system, which is currently being developed jointly by Israel and the US.

[93] "Allies Approve Studies for TMD Development" Defense News. February 21, 2000.

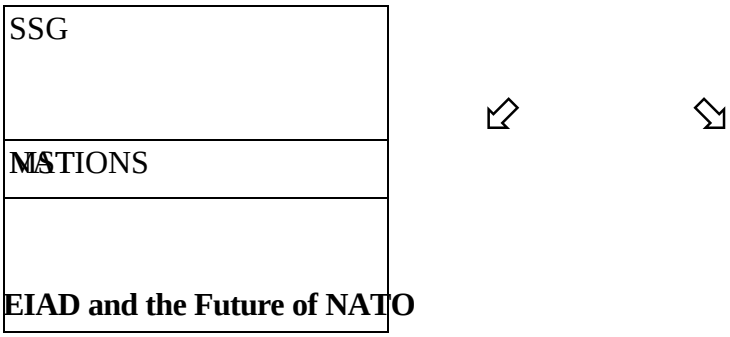
Boeing or Lockheed-Martin as the US prime.[94] The Feasibility Studies are earmarked for completion sometime

2003 and 2004.

Chart 2
EAD Feasibility Study
Organizational Structure



[94] The PAAMS consortuim of Aerospatiale-Matra, Alenia, and BAE, married to Lockheed and/or Boeing would appear as one option. Another could be the new European Aeronautic Defence and Space (EADS) Company which contains Aerospatiale-Matra, DASA and CASA. On the European missile consolidation, see Jordi Molas-Gallart. The European Missile Industry. Papers 1. Manchester: Centre for Research in International Security. 1999. On EADS, see Paul Beaver. "EADS Structures Itself for Different Futures" Janes Defence Weekly. December 15, 1999.



EIAD and the Future of NATO

In the wake of the Cold War, the alliance sought to modernize itself in response to the collapse of its original raison d'etre; collective defence against the threat posed by the Soviet Union. Through a series of political declarations, new concepts, such as the Combined Joint Task Force (CJTF), and actions - IFOR and SFOR in Bosnia and Kosvo - the alliance adapted to take on the role of crisis management and response. This functional adaption was not simply an institutional and generational response to a legitimacy crisis, nor in light of emerging new threats. It was and is also a response to concerns that one of pillars of cooperative security could unravel as a function of political forces on both sides of the Atlantic. In the US, this was fears that after years of entanglement in Europe, and elsewhere, the forces of isolationism would take hold, and the US would withdraw back into Fortress America. In Europe, these related to concerns about US withdrawal and European nationalists, among others, which would ignite the conditions for the re-nationalization of defence, with all that could portend for the future. [95]

While certainly elements of institutional legitimacy and a generation of elites on both sides of the Atlantic who had been socialized by the alliance cannot be entirely ignored, the political interests on both sides of the Atlantic are vital. The US had, and continues to have, little interest in a unilateralist approach to its security, shares fundamental values and interests with the Europeans, and possesses a strategic interest in a stable Europe. Conversely, the Europeans alongside values, interests, and the fears of re-nationalization, also seek to ensure a US role in Europe as one fundamental guarantee of its security, even though the immediate threats to its security are low for the time being. In one sense, both the US and Europe agreed that if the trans-atlantic relationship embodied in NATO collapsed, it might be difficult to re-construct in the

[95] The classic article is John Mearsheimer. "Back to the Future: Instability in Europe After the Cold War". International Security. Fall. 1990.

future if, or when it was needed.

The problems of the relationship are not new *per se*. Issues concerning consultation and more recently burden-sharing and technology transfer have a long history in NATO. Managing these issues has long been central to the alliance. At the same time, simple functional requirements for some degree of common military standards and inter-operability remains important for both sides of the Atlantic. Notwithstanding the low likelihood that NATO would undertake military missions on its own accord or with the blessing of the United Nations outside of continental Europe, commonality is vital for future missions that are ad hoc in nature. NATO may not go "out-of-area" but the US and many of its European allies may. The Gulf War demonstrated functionally the value of decades of military cooperation. In other words, it is not simply the political forces which underpin the value and importance of NATO. It is also the functional value of military cooperation.

In one way the greatest threat to NATO is that the military forces of the US and Europe will be unable to work together. The growing technological gap between the US and European militaries, as most deeply illustrated by concerns surrounding the Revolution in Military Affairs, are central to the DCI.[96] With the significant gap between US and European defence spending in general, and research & development/procurement in particular, the need to coordinate investment and avoid duplication is paramount.[97] Failure to do so would not necessarily mean that the US and Europe would not participate

[96] The most recent analysis, which unfortunately does not discuss the EIAD-missile defence element is James P. Thomas. The Military Challenges of Transatlantic Coalitions. Adelphi Paper 333. London: International Institute for Strategic Studies. 2000. See also, Elinor Sloan. "DCI: Responding to the US-led Revolution in Military Affairs". NATO Review. Spring/Summer. 2000.

[97] **For example, the American defence budget was $272 billion in 1997, and the combined defence budgets of all of NATO Europe was $184. In 1997 alone, the United States had committed roughly $14.5 billion to missile defence development projects over the next several years; an amount far beyond European ability. Even the cost of a single programme, such as the PAC-3 Patriot, estimated at $6.2 billion for the deployment of 1200 interceptors in 54 units, is problematic for any one of the single European military powers. David Mosher. "The Grand Plans". *IEEE Spectrum.* September, 1997.**

together in NATO out-of-area operations, or ad hoc coalitions enhanced by NATO military cooperation. There is a political logic for participation independent from the actual military ability to be inter-operable on the battlefield. In other words, *being there* may suffice.[98] However, there is also a political cost attached to simply *being there*. Input into the actual conduct of a military campaign is largely lost. As a result from a broader political perspective, it cedes wider political dominance to the US, and relegates the Europeans to the second tier.

It is this issue in many ways which underpins the ESDI initiative. There is an element of ESDI that directly relates to the wider integrationist agenda of a unified federal Europe. At the same time, it also relates in the context of the Washington Summit to conceptualizing ESDI as the European pillar of NATO in which greater political equality will result with the US. It is not necessarily the case that obtaining a truly integrated military capability for Europe, within the concept of *separable, but not separate* from NATO, is a forerunner of the replacement of NATO as the primary security institution for Europe. It is difficult to imagine the actual political conditions short of relatively benign peace support operations in which both the

[98] In the case of the Gulf War, the presence of troops from a wide-range of coalition members served a political value. Militarily, they were largely assigned to the second echelon, with the first echelon consisting of American and British forces. The French, due to their lack of heavy armour, were assigned to the far left flank. Only the Saudi's actually fought, but were supported by US forces greatly, and their military role was primarily a function of political considerations, rather than strict military ones.

US and Europe would not share similar interests and values. The importance of ESDI is, thus, political in nature, rather than truly military.

Nonetheless, the problem concerns which of the many military requirements for ESDI should receive attention and investment. It is here that the missile defence issue is important. At one level, the Europeans are unlikely to possess the resources and will to develop an independent early warning capability vital to effective missile defence. Despite French desires to develop such a capability, the interest of the other Europeans appears low. At the same time, if Europe does proceed to develop its own space-based Global Positioning System, currently known as Galileo, it will likely absorb a significant amount of investment dollars. Of course, if Galileo goes ahead, its funding will not likely come out of defence, even though the system would have significant defence application. Nonetheless, it would constrain the likelihood of further space initiatives, such as the development and deployment of a European EW capability.[99]

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[99] **France has been the most supportive of an independent military satellite system for Europe formerly under the WEU to be based upon the station at Torrejon, Spain. The current system is the Franco-Italian-Spanish Helios 1A reconnaissance satellite launched in 1995.**

Even with more robust European missile defence development programmes, European defence from missiles and air-breathing threats for the continent and deployed forces will have to rely upon access to US EW data. In so doing, the only institution available to coordinate and disseminate this vital data for peripheral radars and FCR is NATO. In this light, NATO's central role as the core security institution for Europe is not only cemented, but also enhanced. As air defence required a collective response during the Cold War, so EIAD requires a collective response. This collective response with its core trans-atlantic component also spills over into the other aspects of crisis management and collective defence. EIAD extends beyond traditional air defence to include the integration of naval forces. In so doing, it is one of the key elements of inter-operability through jointness. It also supports efforts to enhance combined operations. In effect, it is a key element that will be integrated into the CJTF plans in NATO. As such, it reinforces the reality of *separable, but not separate* relative to ESDI as the European pillar of NATO and the Atlantic pillar.

Work on the French Alerte ballistic missile early warning system has been recognized as vital for a European missile defence capability but remains stalled due to ongoing French re-structuring. For a relatively detailed discussion, see Shaun Gregory. "France and Military Satellite Systems: Implications for European Security." ***Research Paper #33*****. Athens: Research Institute for European Studies. 1997.**

As a core requirement for out-of-area operations, NATO or an ad hoc coalition based upon NATO membership and experience, the future battlespace of an integrated common joint picture, and interoperable forces requires the centralized C^2/BM that is being developed in NATO. This future of 2010 and beyond also reinforces the ideas behind the DCI. The future development of EW sharing from US assets represents a foundation for avoiding the duplication of efforts. Whether it will evolve into a more formal relationship in the sense of the Canada-US one in NORAD remains to be seen.[100] Yet a US-NATO Integrated Tactical Warning/Attack Assessment (ITWAA) beyond the current arrangements on EW would appear as the logical outcome. Both the US and the Europeans share a common interest in such an integrated approach. Such an outcome would thus serve to reinforce the role of NATO, and reduce underlying concerns that either or both the parties would drift apart.

Similarly in terms of missile defence platforms, NATO's key role in C^3/BM also provides opportunities to avoid duplication of effort. As the European programmes are concentrated for the time being in the lower tier, through the common picture or CEC, the requirement for Europe as a whole, or individual nations to develop multi-layered missile defence capabilities is reduced. It is unlikely as the US TMD systems come on-line that the Europeans will entirely eschew their own TMD capabilities in upgrading their naval platforms. Nonetheless, the overall requirements will be significantly less, than if Europe and/or the current European nations involved attempt to do it on their own. Moreover, the need for ground and naval missile

[100] For a discussion of the Canadian dimension and NORAD, see James Fergusson. Deja Vu: Canada, NORAD and Ballistic Missile Defence. Occasional Paper # 39. Winnipeg: Centre for Defence and Security Studies. 1999.

defence capabilities will be significantly less as a function of the cooperation through the alliance with the US. There is the possibility that NATO could acquire through its Security Investment Fund a missile defence capability similar to AWACS, although the likelihood is rather low.

Of course, the core role of NATO in facilitating combined and joint operations implies that two key issues will be resolved. The first concerns technology transfer questions between the US and European programmes. In this regard, NATO's EIAD programme may serve an important function facilitating the resolution of transfer issues. The key indicator here will likely be the outcome of the NATO-MEAD programme. Regardless, US willingness to transfer technology will be an important indicator, and NATO's role is important in this regard. One cannot expect that Europeans to be willing, on economic grounds alone, to accept rigid constraints on the way technology is handled. If the US is truly willing to share missile defence technology as repeatedly enunciated by successive Administrations, the future of the EIAD project may well be a core indicator over the near term.[101]

The development of NATO's role through EIAD, alongside greater technology transfer and related industrial cooperation between European and US firms, will enhance political cooperation. In fact, the Feasibility Study underway will likely serve to promote greater trans-atlantic industrial cooperation, and impact upon longstanding issues with regard to defence trade. One should not expect that EIAD will be a panacea for all the problems of cooperation. But, it will be an important indicator of the direction of the relationship as the Cold War fades evermore into memory.

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[101] The offer to share missile defence technology was reiterated again by President Clinton to its allies. Randall Mikkelsen. "US Set to Share its ABM Reserach" Washington Post. June 1, 2000.

The second issue, and perhaps the most central, will be the politics of missile defence itself. Technology transfer has a political dimension about cooperation and commitment. It is a signal of the continuing importance of the alliance and the trans-atlantic relationship. It is also an element of partially overcoming the hegemonic-consultation issue that has long affected the relationship; an issue that is much more germane in the post-Cold War security environment. However, publicly, the European allies are in a somewhat difficult position relative to their expressed concerns about NMD. To move too quickly down the TMD path is politically problematic. It is in this sense that the immature technology of missile defence, the focus on lower tier capabilities, and NATO's role keep the option open. Whether concerns about NMD will evolve into a political roadblock are difficult to predict, in the same sense as predicting the evolution of the missile and WMD threat to Europe itself. Nonetheless with regard to the politics of consultation has been the US posture on European and NATO missile defence developments. One can criticize the US for the lack of consultation. But at the same time, the US response to European concerns has not been to expose the Europeans publically at least to their own developments which hold out the promise of a strategic missile defence for Europe.

There is one final issue that concerns the implications of BMD for alliance: Russia. Most attention recently has been focussed on Russian opposition to US NMD and any revisions to the ABM Treaty. In so doing, Russia is playing on European concerns about strategic stability, the future of arms control, and arms racing. In addition, President Putin has recently offered some form of boost-phase defence for Europe apparently in return for Europe breaking with the US on the issue of NMD; the fear expressed by some Europeans that NMD will be divisive on the alliance if it proceeds. Combined, this policy position on the part of the Russia appears in some ways as a return to the classic Soviet policy objective to split the alliance. In other words, Russian opposition to NMD relative to the alliance portends a return to a Cold War style relationship between East and West.

As noted earlier, one can readily take issue with the theoretical logic and empirical evidence as it relates to Russia. For example, the Cold War is over, and the traditional understanding of stability is simply irrelevant

to the new security environment. NMD does not threaten the strategic forces of Russia. Russian strategic forces are declining, and regardless of NMD, it is in Russia's interest to negotiate further reductions via the START process. Finally, Russia is likely to accept some form of revisions to the Treaty, regardless of the rhetoric, simply because in the absence of revisions, and thus the collapse of the Treaty, there would be no constraints on US missile defence whatsoever. However, these types of arguments largely miss the point. Instead, emphasis should not be placed the divisive nature of NMD/BMD for relations with Russia relative to NATO, but rather on the possibilities of using BMD as a means to improve relations with Russia based on common interests ;ones that go beyond the common proliferation threat that Russia shares with the West to include greater cooperation in an evolved and expanded security architecture for Europe centered on NATO.

Current Russian opposition masks longstanding elements of cooperation on missile defence between Russia and the US, and the desire of Russia to cooperate with the alliance on missile defence as well. Russian-US cooperation dates back to President's Bush's GPALS proposal and the Yeltsin-Bush idea of a Global Warning System in 1991. Since then, there has been cooperation between the US and Russia on a variety of missile defence related experiments, as well as the presence of Russian officials at TMD tests in the US. More recently, there has evolved cooperation between the two on the Y2K issue, and shared early warning, with the latter especially important in light of the gaps in the Russian early warning system as a function of the collapse of the Soviet Union and economic difficulties in Russia.[102] In terms of NATO, it seems to be forgotten that one of the components of the 1997 Russia-NATO Charter was cooperation on missile defence.[103] Certainly, cooperation in this regard, as well as generally, has not gone well, not least

[102] A joint Russian-American statement on missile launches and early warning information sharing was signed in September, 1998. An earlier agreement to share early warning on TMD launches was signed in 1995. The US offered to extend and expand cooperation in October, 1999 if Russia agreed to re-negotiate the ABM Treaty. Arms Control Reporter. Cambridge: Institute for Defense and Disarmament. 603.B-11.1 1999

[103] Article III. Founding Act on Mutual Relations,Cooperation and Security between NATO and the Russian Federation. Paris, May 27, 1997.

of all due to the contentious political issues surrounding NATO enlargement and more recently Kosovo. Moreover, it is unclear whether the lack of engagement on missile defence between Russia and the alliance has been a function of Russian or NATO reluctance. Nonetheless, the recent Russian offer should not necessarily be understood in old Cold War terms, but perhaps as a subtle attempt to open a cooperative dialogue and future development cooperation in the area of a strategic defence for Europe against proliferation threats.

From this perspective, the opportunity may exist to move forward on missile defence cooperation. As NATO and the Europeans are dependent upon the provision of US early warning data, so is Russia to a degree. As the NATO C^2/BM role is vital in linking future US capabilities with European, so some consideration could be given in the future of NATO serving a similar role in linking these with Russian missile defence capabilities as they evolve. Even though the current economic difficulties in Russia limit its ability to invest greatly in missile defence, Russia did inherit the Soviet programmes, and could have technology to offer to the West to enhance missile defences. Working towards cooperation in development, as well as the potential economic benefits for Russia in this regard, could prove very useful in developing a more cooperative political relationship with Moscow.

In this sense, TMD developments on/ both sides of the Atlantic centralized in NATO may provide a valuable confidence building measure if extended towards Russia. Certainly, it will not be a panacea for all the issues confronting relations with Moscow. Nonetheless, it may provide a valuable political method for developing a cooperative relationship, and breaking down the barriers left over from the Cold War. Trans-atlantic TMD cooperation centered on NATO, as argued above, is a vital element in the future of NATO as the core security institution for Europe from one side of the Atlantic to Central Europe today. There is no reason that by taking up Russia's offer, not in confrontational terms relative to NMD, but in cooperative terms, that NATO's future will lead it to become the core cooperative security institution for all of Europe - from the Atlantic to the Urals.

This, of course, is well off into the future. But moving in this direction requires both East and West to move beyond the legacy of the Cold War. Much of the current public debate on NMD, especially as a function

of the mask over TMD in Europe, remains deeply embedded in Cold War rhetoric and logic. What is clear in the foreseeable future is a security environment of deployed missile defences; to some degree, these already exist. This future is not one in which nuclear deterrence will be replaced. Rather, it is one in which deterrence will be augmented by defence in both the East and West. Recognizing this future is essential to the possibility of using missile defence through the alliance as a mechanism for confidence building and a cooperative security relationship among Russia, Europe, and the US.

Acronyms and Abbreviations

ABL - Airborne Laser
ABM - Anti-Ballistic Missile
ACCS - (NATO) Air Command and Control System
ADSWG - Air Defence Senior Working Group
ALERT - Attack Launch Early Report to Theater
ATMD - Anit-Tactical Missile Defence
AWACS - Airborne Warning and Control System
BMD - Ballistic Missile Defence
BPI - Boost Phase Intercept
C^2/BM - Command and Control/Battle Management
CCF - Conventional Counter-Force
CEC - Cooperative Engagement Capability
CJTF - Combined Joint Task Force
CMOC - Cheyenne Mountain Operations Center
CNAD - Conference of National Armaments Directors
DCI - Defence Capabilities Initiative
DGP - Senior Defence Group on Proliferation
DSP - Defense Support Programme
EAD - Extended Air Defence
EIAD - Extended Integrated Air Defence
ESDI - European Security and Defence Initiative
EU - European Union
EW - Early Warning

EWISG - Early Warning Inter-Agency Staff Working Group

FCR - Fire Control Radar

GPALS - Global Protection Against Limited Strikes

HLSG - High Level Steering Group

IC - Infrastructure Committee

ICBMS - Intercontinental Ballistic Missile

IFOR - Intervention Force

IRBM - Intermediate Range Ballistic Missile

ITWAA - Integrated Tactical Warning/Attack Assessment

JPOW - Joint Project Optic Windmill

JTAGS - Joint Tactical Air to Ground Station

LOC - Level of Operational Capability

LOCE - Linked Operations Command Europe

MAD - Mutual Assured Destruction

MASSTIC - Maritime-ACCS Ship-to-Shore Tactical Interface Component

MC - Military Committee

MEAD - Medium Extended Air Defence

MRBM - Medium Range Ballistic Missile

MST - Modeling, Simulation Team

NAC - North Atlantic Council

NACMA - NATO Air Control Management Agency

NADC - NATO Air Defence Committee

NADGE - NATO Air Defence Ground Environment

NATINADS - NATO Integrated Air Defence System

NATINADS - NATO Integrated Air Defence System

NBC - Nuclear, Biological, and Chemical

NC3A - NATO Consultation, Command and Control Agency

NIAG - NATO Industrial Advisory Group

NMD - National Missile Defence

NORAD - North American Aerospace Defense Command

NSIP - NATO Security Investment Programme

PAAMS - Principal Anti-Air Missile System

PAC-2 - Patriot Advanced Capability-2

PAC-3 - Patriot Advanced Capability-3

PADP - Panel on Air Defence Philosophy

PADW - Panel on Air Defence Weapons

RFP - Request for Proposal

SACEUR - Supreme Allied Command Europe

SACLANT - Supreme Allied Commander Atlantic

SBIRS - Space-Based Infra-Red Sensors

SDG - Senior Defence Group on Proliferation

SDI - Strategic Defense Initiative

SDR - Strategic Defence Review

SFOR - Stabilization Force

SGP - Senior Political Group on Proliferation

SHAPE - Supreme Headquarters Allied Powers in Europe

SM-3 - Standard Missile-3

SM-IVA - Standard Missile-2 Block IVA

SoD - Secretary of Defense

SSG - Senior Support Group

THAAD - Theater High Altitude Area Defense

TLE - Transporter Launch Erector

TMD - Theatre Missile Defence

TMDPG - Theatre Missile Defence Project Group

TRRAP - Technology Readiness and Rish Assessment Programme

USSPACECOM - US Space Command

WEU - Western European Union

WMD - Weapons of Mass Destruction