OCCASIONAL PAPERS

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THE RMA
EUROPE CAN KEEP IN STEP

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SUMMARY

The transatlantic defence community drew divergent conclusions from NATO's *Operation Allied Force* in Kosovo. Many observers asserted that the operation showed the European allies to be irremediably behind the United States in applying decisive new forms of advanced technology warfare. Others viewed the Kosovo conflict as helping to demonstrate the illusory nature of the 'revolution in military affairs', or at least its irrelevance to military operations other than war (MOOTW) and asymmetric operations. Both of these views are misplaced.

The United States has begun a gradual transition from platform centric to network centric warfare, in which sensors, decision-makers and shooters are linked in unprecedented ways to achieve greatly increased operational effectiveness. The exact reach of this military transformation will depend on further technological development, especially in sensor systems, as well as on considerable experimentation to develop the operational concepts and organisational approaches that can best exploit new technologies. Nonetheless, RMA capabilities not only seem likely to be relevant to many forms of asymmetric operations and MOOTW as well as to major conflict, but may eventually become vital to the successful undertaking of most of these interventions.

European countries will consequently need to acquire RMA capabilities in order to undertake certain operations on their own and to make a substantial contribution to US-led operations, but they will not require anything approaching the variety and number of systems in the US military arsenal. Despite the impression left by the Kosovo campaign that Europe has not yet left the starting block with respect to the RMA, European countries are already starting to develop and acquire significant RMA related technological capabilities. Some of these capabilities will become operational in a relatively short time, and would have allowed a more substantial European contribution to the Kosovo campaign.

European countries are facing huge pressure on their defence budgets stemming from the need to carry out a two-fold military transformation aimed at developing both basic force projection and more advanced RMA capabilities. They will have to make choices regarding which RMA capabilities to emphasise, and determine how to reconcile the need to maintain coalition military effectiveness with the United States while not compromising longer-term possibilities for conducting autonomous operations. The ability of a European Security and Defence Policy to bring about tangible improvements to European defence capabilities will be vital to the success of this endeavour. Another important step will be to establish a transatlantic campaign of experimental programmes to explore new technologies, operational concepts, and organisational approaches that can enhance the effectiveness of Western-led coalition operations for peacekeeping, peace enforcement, and regional conflict. Although the primary onus is now on Europeans to deliver on their commitment to enhanced military capabilities, the United States must take more seriously its current political and perhaps future military need to have coalition partners for most missions that it will plausibly undertake.

In both European capitals and in Washington there is substantial recognition that a 'business as usual' approach to will not succeed in dealing with the multiple challenges to coalition military effectiveness. Yet, on both sides of the Atlantic it will take much effort and political will to overcome entrenched ways of doing things. While despair over an unbridgeable transatlantic RMA gap is certainly unwarranted, misplaced confidence would be even more so.

THE RMA - EUROPE CAN KEEP IN STEP

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Since the latter half of the 1990's, considerable discussion has been taking place within the transatlantic defence community regarding the technology gap between US and European military capabilities. While the United States has always led its allies in deploying new defence technologies, concerns have emerged that this gap could grow to such an extent that US and European armed forces will find it increasingly difficult to operate effectively together as the 21st century progresses. At the heart of these concerns lies the conviction that the United States is well on the road to exploiting new technology for the purpose of implementing revolutionary changes in the way it conducts warfare, while the European countries lack the strategic vision as well as the resources to do likewise. The gaps in operational capabilities that *Operation Allied Force* in Kosovo highlighted between US and European militaries have further fuelled this apprehension.

Many observers indeed assert that these technological and capabilities gaps will inevitably continue to grow, despite new initiatives within both NATO and the European Union (EU) to close them.[1]

On the other hand, some European defence experts have questioned the feasibility of a 'revolution in military affairs' (RMA), and even if feasible, whether the RMA is relevant to dealing with the likely security threats of the future. Divergent interpretations have emerged regarding the lessons of *Operation Allied Force* for the RMA. Some have argued that the operation helped demonstrate the RMA's reality because precision air and missile strikes proved decisive, while others asserted that the NATO bombing campaign confirmed the illusory nature of the RMA or at least its irrelevance to military operations other than major war.

This paper takes the view that the United States can plausibly achieve a major transformation in the way in which it conducts military operations through the synergistic application of new information, sensor, and weapons technologies. Whether this transformation is revolutionary or not constitutes a semantic issue of secondary importance compared to its reality. Moreover, this US military transformation may well be applicable to many future mission scenarios and not just to major war. The lessons of Kosovo for the RMA are, in fact, quite inconclusive.

Nonetheless, advocates of rapid movement towards this new future have not prevailed within the US Department of Defence (DoD), and US adoption of the weapon systems, organizational structures, and operational concepts needed to bring about an RMA is likely to remain a gradual, evolutionary process. Given this situation, neither the major European militaries nor Europe's defence industrial base appear in a hopeless position to pursue those elements of the RMA most critical to meeting core European military objectives, and thus 'to keep in step' with the United States.

Simple statements that show the huge disparities between US and European military capabilities provide impressive illustration of US global military dominance.[2] However, these

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[1] Read, for example, Brooks Tigner, 'Europe's Military Capabilities Will Fall Further Behind US in Next Decade, Say Experts', *Defense News*, 21 February 2000, p. 4.

[2] European NATO members when aggregated are in second place behind the US in the Royal United Services Institute's 'index of martial potency', but significantly lower in score. See Michael Codner, 'The RUSI Index of Martial Potency', in The Royal United Services Institute for Defence Studies, *The International Security Review 2000* (London: The Royal United Services Institute for Defence Studies, 1999), pp. 305-318).

statements are essentially meaningless in terms of the real military issues facing Europe. Europeans must possess the military capabilities needed to achieve two objectives:

- undertaking certain operations on their own, or with limited US support; and
- making a substantial contribution to US-led operations in which they choose to participate.

In order to achieve these objectives, Europe will not require anything approaching the variety and number of systems in the US military arsenal. After all, the United States is a global military power with a far broader range of operational requirements than its European allies.

In the Kosovo air campaign, transatlantic capability gaps clearly had a substantial operational impact, severely limiting Europe's contribution. European capitals in addition to London and Paris must take difficult political decisions involving a wider restructuring of armed forces for power projection missions as well as the refocusing of acquisition priorities on the most critical RMA related technologies. The achievement of tangible progress in current efforts to develop a European Security and Defence Policy (ESDP) will constitute a vital step in attenuating the operational impact of the transatlantic gap in military capabilities, and in keeping Europe 'in step' with the US in its progression towards the RMA.

I. The United States and the RMA

The RMA etiquette can most simply refer to the use of information technology in order to achieve radically greater levels of military efficiency. In this perspective, significant and repeatable increases in destructive power and in the tempo of operations without any quantitative or qualitative increases in weapons and platforms could be seen as an RMA. Information would become a new dimension of warfare, equal in importance to manoeuvre and attrition, rather than simply an enabler or multiplier of the more traditional elements of military force.

At its most far-reaching, the RMA vision anticipates that intelligence, surveillance, and reconnaissance (ISR) systems will make the battlefield transparent, providing the United States with 'dominant battlespace knowledge'. Digitised command, control, communications, and computer (C^4) capabilities, also known as battle management systems, will enable real-time processing and transmission of enormous quantities of data. Precision strike systems will bring highly accurate, stand-off destructive power against adversary targets. Distributed sensor and precision strike systems, linked by C^4 assets into a 'system of systems', will be able to detect, target, and immediately destroy adversary forces and other assets.

If achievable, this level of technology performance could enable fundamental changes in military organization and concepts of operations. Warfare would no longer be platform-centric, but would shift to network centric forms in which massed firepower replaces massed forces.[3] Current military structures would disappear, replaced by forms of military organization that are less hierarchical and more interconnected. In its most far-reaching forms, the RMA vision holds that the battlefield could become virtually emptied of soldiers. Any units remaining on the ground would be small and dispersed, primarily assuming a scouting function.[4]

US motivations for pursuing this RMA vision merit consideration in order to assess their relevance to Europe. European discussions of the RMA often point to it as a mobilizing theme for sustaining a high level of US defence spending, as a response to the US obsession with incurring 'zero casualties' in military operations, or as a means of maintaining US politico-military domination over Europe.[5] Although all of these points have come up in American debate over the RMA and contain elements of truth, none of them are at the heart of what is driving the RMA movement in the United States.

The RMA debate began in the United States without any reference to the European allies, and *Joint Vision 2010*, the US military's conceptual template for beginning to exploit the RMA, scarcely refers to coalition military operations. While some American writing on the RMA has suggested that an American 'information umbrella' could replace the Cold War's nuclear umbrella as an instrument of US politico-military influence in NATO, Western Europe is likely to retain a significant degree of military dependence upon the United States for at least the next fifteen years, regardless of whether Washington pursues the RMA. Nor is the RMA primarily about casualty avoidance, although limiting casualties is clearly a hoped for benefit. Lastly, the

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[3] Network centric warfare can be defined as 'an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision-makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization'. David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority* (Washington DC: DoD C4ISR Cooperative Research Program, 1999), p. 2.

[4] Michael G. Vickers, *Warfare in 2020: A Primer* (Washington DC: Center for Strategic and Budgetary Assessments, October 1996), 16 pp.

[5] See, for example, Yves Boyer, 'This way to the Revolution', *RUSI Journal*, April 1999, pp. 1-3.

RMA could not serve to sustain defence spending if it had no arguable relationship to a major US security concern.

With no peer competitor visible for the next 20 years, the main impetus for US pursuit of the RMA comes from the concern that US forces will have to confront regional powers possessing 'hybrid militaries', combining industrial era capabilities with certain 21st century ones. These regional powers could succeed in denying US forces, as currently organized, access to the theatre of operations, or defeat them before they are fully deployed, in particular through the use of nuclear, biological, and chemical (NBC) weapons. US military planning now assumes that CBW use will be a characteristic of future conflict. Moreover, future regional adversaries are unlikely to allow US and allied intervention forces six months to deploy into the theatre, as Saddam Hussein did in 1990-91.

The indictment of some critics of US defence policy that the RMA concept largely involves fighting the Gulf War all over again is only partly true. While the US RMA discussion has heavily focussed on regional conflict, the assumptions for such conflict have become far more severe than the conditions that prevailed in the Gulf War. In the viewpoint of US RMA advocates, it will be necessary in the future to possess a force that is light and mobile enough to deploy very rapidly into the regional theatre of operations; that can operate in smaller, more dispersed units in order to avoid presenting easy targets to NBC weapons attack; but that can still bring to bear highly destructive firepower against the adversary.

The United States military has been proceeding at a measured pace in its exploration of RMA type transformations, looking at advanced technology deployment over the near to medium term more as a means of making existing force posture more efficient rather than as an instrument radically to restructure those forces. This measured pace has occurred for two reasons.

One is the conservatism of many military officers, who find it difficult to move away from tactical aircraft towards unmanned aerial vehicles (UAV's), and from aircraft carriers towards arsenal ships.[6] The second stems from the fear that a rapid military transformation strategy would be too disruptive and might leave the United States without adequate capabilities for meeting near-term security threats. Each of the US military services needs to replace existing equipment during the coming decade. Even the US defence budget has not been large enough both to provide for the 'recapitalisation' of the current force structure, and to carry out an accelerated military transformation strategy. Secretary of Defence William Cohen has consistently stressed that the US needs to maintain the right balance between assuring its ability to respond to near-term threats and preparing its military forces for the future. In this view, an overemphasis on the latter could leave the United States unable effectively to do the former.[7] Consequently, the United States has been pursuing a strategy of maintaining existing force structure and readiness levels while inserting new technologies at a moderate rate.

This strategy has been the object of significant criticism. Existing force structure is based upon the requirement that the US military be able to fight two, simultaneous major regional conflicts, which many observers view as a highly unlikely scenario and as unhealthily slowing US military transformation.[8] The US Army received substantial criticism in the aftermath of

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[6] 'Twas famous victory, but...', *The Economist*, 18 December 1999, pp. 43-44. The arsenal ship can carry as many as 500 vertically launched missiles, manned by a crew of only 50 compared with 5,000 for a large carrier.

[7] Remarks as delivered by Secretary of Defense William S. Cohen, Fletcher Conference on Strategic Responsiveness, 2 November 1999, www.defenselink.mil/speeches/1999/s19991102-secdef.html.

[8] See, for example, *Seeking a National Strategy: A Concert for Preserving Security and Promoting Freedom* (Washington DC: U.S. Commission on National Security/21st Century, April 15, 2000), pp. 14-15.

NATO's Kosovo campaign for having forces that were either too heavy and thus lacking in sufficient mobility, or too light to provide adequate firepower. The army is now trying to step up its interim transformation into a medium weight force, but it is not until the 'Army After Next', projected for the horizon of 2025, that the US expects to have ground forces able to 'put decisive combat power in theatre in a matter of hours'.[9] Moreover, the strategy is also underfunded. Most analyses of the US defence budget conclude that in order fully to maintain the force posture set out in the 1997 Quadrennial Defence Review (QDR), the Pentagon would need to spend an additional $25-50 billion per year over the next two decades beyond the funding likely to be available. Thus, even if the Pentagon were to modify the two major theatre war requirement, only limited additional funding might be available for accelerated military transformation.

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[9] General Dennis J. Reimer, 'The Army After Next: Revolutionary Transformation', *Strategic Review*, Spring 1999, pp. 41-44.

II. RMA uncertainties

A number of significant uncertainties confront the RMA vision across the spectrum of military operations. These uncertainties concern above all asymmetric operations and military operations other than war (MOOTW), but are not absent from major theatre conflict. Although JV 2010 stipulates that the combination of advanced technologies and its four key operational concepts of dominant manoeuvre, precision engagement, full dimensional protection, and focussed logistics, will enable US forces to dominate the entire spectrum of military operations, RMA concepts have admittedly not yet looked in any meaningful way at asymmetric operations and MOOTW.

Many Europeans view RMA operational concepts, until now heavily focussed on the needs of high intensity conflict, as representing a vision of warfare that is unlikely to apply to the real world to any meaningful extent. Rather than attempt futile conventional military operations in the face of Western superiority, adversaries will increasingly resort to a variety of asymmetric operations, including terrorist attacks against civilians and civil society, guerrilla warfare, and urban combat. [10] NATO's air campaign in Kosovo seemingly reinforced this critique of the RMA, as Western air power was unable to impede the Serbian campaign of ethnic cleansing. Serb forces in Kosovo were able to disperse and conceal themselves in forested areas and among the civilian population. Attack aircraft flying at high altitude often could not distinguish between military and civilian vehicles, or decoys from real targets.

Air power enthusiasts have stressed that the political limitations placed on the scope and intensity of the air war meant that the NATO air campaign started at a very modest level, escalated slowly, and was never able to apply decisive force against Serbia. Yet, these political limitations have arguably become an inescapable reality of Western military intervention short of at least major theatre war. Although US officials would have struck a wider range of strategic targets in Serbia than most of their European counterparts were ready to countenance, US-European differences in sensitivity to collateral damage are a matter of degree rather than of antithesis. US as well as European leaders face substantial constraints from domestic and international opinion concerning the inflicting of collateral damage, as illustrated by the United States' December 1998 strikes against Iraq. Washington limited their intensity in order to avoid causing large numbers of Iraqi civilian casualties, and their duration so as not to bomb Iraq during the Muslim holy month of Ramadan. Nor is it clear that even a greatly intensified campaign of air and missile attacks against Serbian strategic targets would have brought about an earlier Serbian capitulation. Serbia's eventual submission appeared due to a number of critical factors in addition to strategic air and missile strikes, including Russia's joining in the push for a peace settlement that basically met NATO objectives, increasing activity on the part of the Kosovo Liberation Army (KLA), and the mounting threat of a NATO ground offensive.

The debate over the lessons of Kosovo for the RMA typically misses two crucial points. First, the RMA does not mean the absence of any ground forces. As previously discussed, even the most far-reaching vision of the RMA's long-term impact still include small, dispersed ground units that play at least a scouting role. NATO ground operations would have greatly increased the effectiveness of the air and missile campaign against Serb forces in Kosovo by compelling those forces to mass and by providing better target identification. Precision artillery and rocket fire from Western ground forces could also have proven highly effective against small Serb artillery

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[10] Analysis expressed in Thérèse Delpech, *La guerre parfaite* (Paris: Flammarion, 1998), pp. 43-82; and Lawrence Freedman, *The Revolution in Strategic Affairs*, Adelphi Paper 318 (Oxford: Oxford University Press for the International Institute for Strategic Studies, April 1998), pp. 73-78.

and armoured units able to avoid air and missile strikes by firing and moving rapidly. During *Operation Deliberate Force* in Bosnia in August and September 1995, British and French artillery of the European Rapid Reaction Force (RRF) was better suited than air-launched precision munitions for taking on the mission of silencing Serb artillery that threatened Sarajevo. RRF artillery was linked to a system of target acquisition radars that observed the trajectory of Serb artillery fire and enabled an immediate RRF riposte.[11]

The impact of offensive operations that the KLA began conducting after the first two months of the air campaign illustrates the critical role of ground forces in underpinning the effectiveness of stand-off air and missile power. KLA activity compelled the Serbs to mass their forces, thus presenting an easier set of targets for NATO air and missile assets. Considerable controversy remains over the extent of armour and artillery losses that NATO inflicted on Serb forces in Kosovo. Nonetheless, it seems likely that what losses were inflicted very largely took place during the last three weeks of the war when KLA attacks resulted in the massing of Serb forces.[12] If lightly armed, poorly trained KLA troops had this impact, the effectiveness of a highly mobile, lethal ground force, with real-time C^3 links to long-range precision air and missile capabilities should be orders of magnitude greater. If the following type of ground capability had been available for immediate deployment into Kosovo at the outset of the NATO operation, one could imagine an entirely different outcome to the Serbian ethnic cleansing campaign:

> Ground units will now be able to nest on almost any piece of ground and still command their surroundings. The enemy will no longer be able to predict when and where American forces will land in their midst... A highly mobile and sophisticated ground manoeuvre force capable of operating in small units scattered across the countryside will deny the enemy refuge and source of sustenance. Our superior ability to see the battlefield with unparalleled clarity coupled with our ability to occupy or control key points will take away his ability to assemble his scattered forces without risking piecemeal destruction by fire. A soldier's eyes on every target will ensure that the right and most vital targets are hit.[13]

While current Western ground forces could also certainly have stopped Serbian ethnic cleansing, they were too heavy to deploy rapidly enough, and would have been more vulnerable to Serb attack as well as taken longer to achieve operational objectives than the type of future force described above.

The second point often missing from discussion of Kosovo's lessons for the RMA is that even the US military only had elements of RMA capability during the campaign rather than a full panoply. Most importantly, US forces did not have a real-time targeting and battle damage assessment capability. A few weeks into *Operation Allied Force* a US intelligence official stated that 'three to four hours is the best we can do' in terms of the time lag between identifying targets and delivering weapons.[14] ISR assets were insufficient to operational needs in terms of both numbers and capabilities. The coming decades may see the deployment of more advanced

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[11] Sylvaine Pasquier, 'Le découpage en filigrane', *L'Express*, 14 September 1998, pp. 18-20.

[12] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo*, working draft of 29 September 1999, www.csis.org., pp. 148-151, 175.

[13] This characterisation of future US Army capabilities is from Major General Robert H. Scales, Jr., 'A Sword with Two Edges: Maneuver in 21st Century Warfare', *Strategic Review*, Spring 1999, p. 51.

[14] Quoted in Bryan Bender, 'Allies still lack real-time targeting', *Janes Defence Weekly*, 7 April 1999, p. 4.

technological capabilities that should prove highly useful for asymmetric operations as well as for high intensity conventional conflict. The achievement of real-time C^3 links is virtually certain. The United States is working on more advanced sensor technologies that can penetrate foliage and camouflage as well as better identify moving targets, although these are admittedly very challenging tasks.[15] Reliable long-range identification of mobile targets that are intermingled with civilian vehicles and decoys will require a very advanced sensor and logic package. Weapons tailored to urban combat could also come into being.[16] The US Army will attempt to develop a Future Combat System that is light enough for fast deployment and rapid manoeuvre while having the ability to detect, target, and destroy adversary assets without being detected itself.[17] The outcome of these and other technology development efforts will play a major role in determining the RMA's ultimate reach.

In addition to concerns over its utility for asymmetric warfare, another common critique of the RMA questions its relevance to MOOTW, which have become the most common type of contingency in which Western armed forces are involved. In MOOTW, the key objective is generally to deter and control violence rather than to apply decisive force in order to inflict defeat upon an identifiable adversary. However, peace enforcement operations comport a substantial risk of fighting between the outside intervention force and one or more of the belligerent parties, and situations can potentially deteriorate into full-scale combat. Both US and European military experts view the military capabilities required for peace enforcement operations as differing only in proportion but not in kind from those needed for regional conflict.[18] Even in peacekeeping operations, which imply the consent of the belligerent parties for the intervention, uncertainties may exist regarding the degree and permanence of that consent. Thus, except for interventions that take place in an extremely benign environment, a peacekeeping force should have the credibility to deter any resort to violence by possessing the mobility and firepower to undertake combat operations if necessary.

Moreover, the future environment for MOOTW may also become more dangerous, as sub-national groups in possession of advanced weaponry, increasingly challenge state authority.[19] Even peacekeeping forces that are theoretically operating in a 'permissive environment' could come under greater threat of attack in the future. In this respect, the Australian-led intervention in East Timor could be a harbinger of things to come. A main battle tank parading around currently constitutes a significant factor of both reassurance and intimidation in a MOOTW, but it will not play this role if, for example, sub-state actors contesting a peace accord can easily destroy the tank with advanced convention weaponry. Highly capable C^4ISR systems could provide a decisive advantage in monitoring compliance with

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[15] David A. Fulghum, 'Darpa Tackles Kosovo Problems', *Aviation Week & Space Technology*, August 2, 1999, pp. 55-56.

[16] These might include low-speed, extremely agile fibre-optic missiles, and mini-robots to provide forward reconnaissance. See Paul Mann, 'Urban War Requires New Technologies', *Aviation Week & Space Technology*, 5 July 1999, pp. 55-56.

[17] George I. Seffers, 'U.S. Army, DARPA to Explore Technology's Edge', *Defence News*, 27 March 2000.

[18] See Report of a French-German-UK-U.S. Working Group, *Coalition Military Operations: The Way Ahead through Cooperability* (Arlington, VA: U.S.-CREST, 2000), pp. 13-23. The working group consisted primarily of European MoD and US DoD civilian and military officials, although the report does not necessarily represent official views.

[19] A vision of the future might consist, for example, of picturing Somali 'technicals' with SA-18's and laser-guided mortar shells in addition to AK-47s. Read Zalmay Khalilzad, David Shlapak, with Ann Flanagan, 'Overview of the Future Security Environment', in Zalmay Khalilzad and Ian O. Lesser (ed.), *Sources of Conflict in the 21st Century* (Santa Monica: RAND, 1998), pp. 7-42.

a peace agreement as well as in acquiring targets in order to impose a cessation of hostilities.[20] Extremely agile forces that can immediately react to real-time intelligence information on a developing confrontation between belligerents or on some other violation of the peace agreement could perhaps bring about some reduction in the size of vulnerable ground deployments. Finally, NATO's air operations over Bosnia and Kosovo have demonstrated that sensitivity over causing civilian casualties in any military operation short of all out war makes precision strike capabilities a *sine quo non* for conducting these types of interventions.

Unlike the case of asymmetric operations and MOOTW, there is wide acceptance of the proposition that RMA technologies, military organisation, and doctrine have the potential to confer considerable advantage in large-scale conflict. Countries that transform their militaries in this way should be well-positioned to thwart traditional territorial aggression, which requires the massing of sizeable invasion forces. Yet, while the relevance of the RMA for MOOTW and asymmetric operations may be underappreciated, its ability to provide easy dominance in high-intensity conflict may suffer from over exaggeration.

First, the degree that C^4ISR systems can reduce the 'fog of war' is not clear. As the United States develops new means of observing adversary forces, those forces may develop ways to become more difficult to find. Even when confronted with a deployed ground presence that attempts to compel it to mass its forces, a clever adversary may in the future exploit cellular technologies and the internet in order to allow its forces to remain divided into small, dispersed units until opportunities present themselves for massing rapidly to achieve local superiority.[21] Warfare in jungles and forested mountains will provide adversary forces many opportunities to exploit cover and camouflage unless there are breakthroughs in developing sensors that can penetrate heavy foliage. It is consequently difficult to predict who will win the competition between 'finders' and 'hiders'.

Second, the increasing flow of information from ISR systems is already beginning to overwhelm commanders, staffs, and intelligence organizations. Data processing and sorting will need to become sophisticated enough to filter through to units and soldiers only the information that is needed, thereby avoiding 'information overload'. Third, the C^4ISR network could be vulnerable to decoy and sabotage if the adversary is able to break into it. Dependency on the network will leave the military blind if it ceases to function properly either through adversary efforts or technical failure. Lastly, information is not knowledge, and the interpretation of received information will remain a question of human judgement with all its potential fallacies.

In conclusion, RMA capabilities may not confer as decisive an advantage in at least some scenarios of major theatre conflict as is often portrayed. On the other hand, they may also be more relevant to many forms of asymmetric operations and MOOTW than some observers appear to anticipate. RMA capabilities hardly seem likely to offer a panacea to the challenges presented by any level of military operations, but they may eventually become vital to the successful undertaking of many or most types of interventions if the environment in which these interventions take place becomes increasingly difficult. The RMA is neither an illusion nor a panacea, but in between these two extremes there is uncertainty as to exactly what capabilities it can deliver, and for what range of contingencies. Given the technical issues discussed earlier, the precise extent to which the exploitation of new technologies will result in radical organisational

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[20] The previously cited four power working group observed that network centric doctrine may eventually have an impact on peace operations by linking force elements in ways that are not currently possible. See Report of a French-German-UK-U.S. Working Group, *Coalition Military Operations*, pp. 67-68.

[21] Read Maj. Gen. Robert H. Scales, Jr. USA, 'Adaptive Enemies: Dealing with the Strategic Threat after 2010', *Strategic Review*, vol. 27, no. 1, Winter 1999, pp. 5-14.

and doctrinal changes remains unclear. Network centric warfare is only an emerging concept of operations that will require considerable experimentation to develop and refine. The broad utility of RMA technologies across the spectrum of military operations is much less in question than that of emerging operational concepts, which have to date centred very largely around high-intensity conflict. There is no reason to think that operational concepts and doctrine to exploit new technologies for MOOTW will also not emerge.

Most military contingencies will undoubtedly continue to require varying levels of ground presence, but that presence should be lighter, more mobile, more lethal, and less vulnerable than one based upon current force structures. Given the capabilities that Western armed forces may well require in the future in order effectively to undertake both MOOTW and regional military interventions, the question of whether Europe should pursue the RMA consequently concerns more the extent of RMA type capabilities to be acquired than the overall direction to take.

III. European implementation of the RMA

Political, technical, and budgetary considerations will all be important in determining Europe's evolving approach to RMA related concepts and systems. The extent to which the European allies, especially the major powers, want to have the ability to provide significant military support to the United States in a mid-to-high intensity conflict in the Mediterranean/Persian Gulf area will constitute an important determinant in the future of the level of RMA type capabilities that they attempt to acquire. Engaging in major regional war now constitutes the most extreme case along the threat spectrum for Western militaries, and will occur rarely. Nonetheless, it constitutes a plausible danger when considering a defence planning horizon of fifteen years. The possibility of intervening alongside the United States in the Greater Middle East has been an important element in British and French defence planning, but other European countries have not treated this contingency as a tangible determinant of their force posture. If NATO's European members were to exclude the scenario from their defence planning, a serious weakening of the United States' military engagement in NATO would likely occur.

US-European interoperability requirements in regional wars will be more demanding than for MOOTW or small-scale conflicts. There will be a need for wider sensor-to-shooter connectivity between US and European forces, with even battlespace wide connectivity desirable in a major regional conflict. Problems stemming from differing doctrine would be more severe in the case of regional conflict than for MOOTW. Thus, participation in regional conflict alongside the United States will require a heavier level of European technology investment, and more intense efforts to harmonize organisational and doctrinal approaches.[22]

Europeans do not generally hold an integrated conception of the RMA in the way that has become common in the United States, and there is little vocal advocacy in Europe in favour of reorienting defence policy specifically for the purpose of exploiting the RMA. Moreover, European military inadequacies during the Kosovo campaign gave a strong impression that Europe had not yet left the starting block with respect to the RMA. Many or most European powers had no or only limited capabilities for carrying out secure, advanced communications; for acquiring, integrating and exploiting intelligence data in real time; for conducting stand-off precision strikes, especially at night or under inclement weather conditions; for suppressing and penetrating enemy air defences, and for conducting battle damage assessment. Poor weather conditions during the early stages of the campaign thus curtailed sorties by European aircraft, although by the end of the war European air forces had flown almost as many strike-attack sorties as their US counterparts. Still, US aircraft conducted 71% of overall support sorties, over 90% of advanced intelligence and reconnaissance missions, over 90% of electronic warfare missions that used dedicated aircraft, fired over 85% of the precision guided weapons used, and over 95% of the cruise missiles.[23]

Nonetheless, European countries, led by the UK and France, are developing and acquiring significant RMA related technological capabilities. As the 1998 UK Strategic Defence Review stated, exploiting the synergistic combination of long-range precision strike capabilities with networks of advanced sensors and data processors 'will lead to significant improvements in

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[22] For a discussion of the difficulties that RMA and pre-RMA forces could have in operating together, see David C. Gompert, Richard L. Kugler, and Martin C. Libicki, *Mind the Gap: Promoting a Transatlantic Revolution in Military Affairs* (Washington DC: National Defense University Press, 1999), pp. 33-36.

[23] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo*, working draft of 29 September 1999, www.csis.org., pp. 33-39.

military capabilities'.[24] France's 'model army 2015' project also entails the incorporation of many RMA technologies. One German view of the RMA notes:

> 'No doubt, wars and militaries in the 21st century will be dramatically different from those of today. New services, structures and organizational forms will establish themselves. Units will become smaller, faster, and more manoeuvrable. They will be modular and multi functional. Independent operations by individual services will become a rarity, if they occur at all. Hierarchies will grow flatter; the number of components existing and networked on one level will increase.'[25]

Many Americans would not describe the RMA in any different terms. There is indeed broad transatlantic agreement concerning the utility across virtually the full spectrum of military operations of more advanced ISR and precision strike capabilities, linked by digitised C^4 systems. As Lawrence Freedman writes: 'It is hard to imagine any conflict in which Western forces are involved in which commanders will not want to acquire and exploit the best information, target their forces with precision, and keep casualties to a minimum'. Freedman recommends that 'capabilities with the widest possible application, such as precision strike and C^4I capabilities', constitute priority areas for European defence investment.[26]

Precision strike weapons already constitute a major priority for UK and French defence acquisition. The French have developed the Apache family of air-launched cruise missiles, and are planning to procure 500 Scalp-EG missiles with a range of over 250 kilometres coupled with one metre accuracy, as well as varying numbers of other Apache derivatives. The missile has all-weather capability through GPS guidance. European missile firm Matra BAe Dynamics is developing new versions of the Storm Shadow/Scalp EG cruise missile.[27] The United Kingdom announced in late 1995 that it would purchase 65 conventionally armed Tomahawk land attack cruise missiles from the United States, to be deployed on nuclear powered attack submarines. The UK MoD awarded as well a major, £600 million contract in the summer of 1996 for the acquisition of 900 Storm Shadow missiles, the British version of the Scalp. In late 1999, Italy also decided to acquire Storm Shadow cruise missiles.[28] Germany is developing a highly capable air-launched cruise missile, the Taurus, but has not yet made an acquisition decision.

However, of the different cruise missile systems that European countries are in the process of acquiring, only the British Tomahawks had begun to arrive in time for use during *Operation Allied Force*.[29] France's 'lessons learned' document on the Kosovo campaign stated, 'French participation in the air raids was reduced by the absence of equipment whose arrival with the forces is expected in a very short time'.[30] The UK, Germany, and Italy all have some

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[24] Directorate of Defence Policy, UK Ministry of Defence, 'Supporting Essay Three: The Impact of Technology', in *The Strategic Defence Review: Supporting Essays* (London: The Stationery Office, 1998), p. 3-2.

[25] Holger H. Mey, 'The Revolution in Military Affairs: A German Perspective', *Comparative Strategy*, July-September 1998, pp. 317-318.

[26] Freedman, *The Revolution in Strategic Affairs*, p. 75.

[27] Matra BAe Dynamics is examining the development of sea- and ground-launched derivatives of the Storm Shadow/Scalp-EG. See John D. Morrocco, 'Storm Shadow/Scalp Derivatives Studied', *Aviation Week & Space Technology*, June 28, 1999, p. 46.

[28] Jacques Isnard, 'L'Italie choisit de commander un missile de croisière européen', *Le Monde*, 21 October 1999.

[29] Storm Shadow will enter service in the UK in 2002, and the Scalp-EG in France in 2003.

[30] French Ministry of Defence, *Les enseignements du Kosovo*, November 1999, internet version, http://www.defense.gouv.fr/actualites/dossier/d36/capacites6.htm, p. 2.

technological or operational capabilities for the suppression of enemy air defence (SEAD).[31] During the Kosovo campaign, Germany flew 394 Tornado sorties for the suppression of Serbian air defences, firing 244 high speed anti-radiation missiles (HARM).[32]

In the area of ISR capabilities, the larger European countries have already deployed or are developing and acquiring a range of systems. France, Germany, and the UK have substantial technological capabilities in the area of reconnaissance drones and observation missiles, while the UK, France and Italy have national airborne ground surveillance programs. French and German CL-289 UAV's flew close to 200 reconnaissance missions over Serbia, and the British Phoenix UAV also saw limited action before the air campaign ended.[33] France is deploying the Hélios series of optical observation satellites, and interest exists in the development of new optical and radar observation satellites. European powers are likely to field in the future all weather observation capabilities through the development of medium altitude reconnaissance drones, as well as potentially over the longer-term a radar observation satellite.

European countries have several satellite communications systems, including the UK Skynet 4, French Syracuse Italian Sicral, and the Spanish Hispasat. The British are planning to deploy a successor Skynet 5 system, while the Franco-German Bimilsatcom programme will provide global communications coverage, with the first satellite scheduled for launch around 2005.[34] While some European countries lacked secure communications, British and French satellite and tactical communications systems played a significant C^3 role for those two powers during the Kosovo operation.

All of the major European powers are now investing in digitised C^4 systems. The UK plans to have fully implemented a formation-level battlefield management system (FBMS), which supports units from brigade size and above, by 2007. France has successfully deployed a FBMS in Bosnia since 1995, and is developing the FELIN soldier system programme that will integrate future infantrymen within a digital BMS allowing real-time information exchanges.[35] Although digitisation programmes are causing added financial strain on tight European defence budgets and are encountering delays in some cases, the use of commercial-off-the-shelf technologies (COTS) should help make them affordable. The Dutch Army's new Integrated Staff Information System (ISIS) is based on COTS and constitutes one of the most advanced C^2 systems deployed by a NATO military. The German defence ministry's information technology director has stated that commercial products can satisfy as much as 95% of the information technology requirements of the German armed forces.[36] Over the next 10-15 years, European capabilities for real-time transmission of data and images should consequently come on-line.

A straightforward transatlantic 'technology gap' is therefore not the most significant problem that may emerge from US pursuit of the RMA. The United States is far in the lead with respect to the development and deployment of RMA related military systems, and in both qualitative and/or quantitative terms many US systems dwarf their current or forthcoming European counterparts. Nonetheless, there is meaningful movement in the same direction in Europe, albeit less comprehensively and with a significant time lag in most cases.

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[31] *Ibid.*, p. 3.

[32] Cordesman, *The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo*, p. 34.

[33] *Ibid.*, p. 209.

[34] Alasdair McLean, 'European Exploitation of Space: when rather than if', *RUSI Journal*, October 1999, pp. 47-50.

[35] See Julien Mathonnière and Rupert Pengelley, 'Channel Hopping: French and UK Battlefield Digitisation', *Jane's Defence Weekly*, 12 May 1999, pp. 25-28.

[36] Read Luke Hill, 'Germans to Adopt Civil Info Technology', *Defence News*, 21 June 1999.

Moreover, the European RMA type programmes referred to herein are almost all based on European technology, in some instances bolstered by transatlantic cooperation. Only UK acquisition of Tomahawk cruise missiles represented an outright "off-the-shelf" purchase from the United States. European defence companies are thus technologically capable of meeting most of the requirements of European militaries for RMA type weapons systems. There are only limited RMA technology areas where Europeans do not possess significant capability, with stealth being an important example.

Rather than a pure technology gap, the primary problem that Europeans are facing concerns the large demands being placed on very limited defence resources. In addition to the previously noted concerns over its relevance to MOOTW and asymmetric operations, perhaps the most important European reservations concerning the RMA relate to its cost and potential level of technological risk.[37] The demands on European defence budgets stem firstly from the continuing need of most European countries to pursue or in many cases even to start transforming their militaries from a Cold War posture focussed on territorial defence to one that provides a substantial ability to conduct force projection operations, and secondly from the large cost that a full suite of RMA capabilities would entail. The European countries are thus trying to play catch up on two fronts simultaneously.

NATO's Defence Capabilities Initiative (DCI) is designed to help address European shortcomings in both force projection and RMA capabilities. The DCI arose from a November 1998 conference in Norfolk on 'Transforming NATO to Meet the Challenges of the 21st Century', with its formal launching taking place at the Alliance's fiftieth anniversary summit. The goal of the initiative was to identify shortfalls in key areas of military capability, and to provide a new mechanism for addressing those shortfalls. The DCI identified five areas of capability shortfalls: deployability and mobility, sustainability and logistics, effective engagement, survivability of forces and infrastructure, and NATO C^2I systems. In each area of capability shortfall NATO countries reached agreement on 'decision sheets' that identified both near- and long-term projects. Fifty-eight specific capabilities initiatives have emerged from the DCI framework.

However, no government regards the decision sheets as entailing firm commitments to specific armament projects. The large number of projects identified are beyond the budgetary reach of European countries, and thus require the setting of priorities. For most European countries, the acquisition of basic force projection assets, notably strategic transport and logistics support, will take precedence over that of most RMA capabilities, with the exception of C^3 systems.[38] Moreover, transforming from a conscript based to an all professional military is an expensive but essential undertaking for the development of significant force projection capabilities. French cuts in defence acquisition spending over the past few years have stemmed directly from the cost of achieving this transformation. Italy and Spain are now beginning the professionalisation process. Consequently, for most European countries the budgetary resources will not be available for starting a large number of new programs designed to acquire RMA capabilities.

These capabilities will not come cheaply. According to one rough assessment, the acquisition of a significant but still incomplete suite of RMA related capabilities would total

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[37] Michael Codner, 'Some European Concerns about Joint Vision 2010', *RUSI Journal*, April 2000, pp. 73-78.

[38] See Luke Hill, 'Nato's Defense Capabilities Initiative Gathers Speed', *Defense News*, 18 October 1999, p. 74.

approximately \$15-16 billion.[39] This total includes advanced C^4 systems to equip three modern army divisions and three air wings, a dozen ground stations for the integration and dissemination of data, a fleet of 50 UAV's, 1,000 cruise missile, 5,000 short-range precision munitions, 500 advanced air-to-air missiles, a squadron of partially stealthy aircraft, and several batteries of theatre missile defence (TMD) systems. The stealth aircraft and TMD batteries are particularly expensive, comprising some \$4.5-6.5 billion of the overall amount. At current levels of European defence spending, only the UK and France could even begin to contemplate such a suite of capabilities, and in practice not even those two are likely to find it affordable.

European governments consequently need to make choices regarding which RMA capabilities to emphasise. One approach might be to focus above all on C^4 and precision strike systems, with less emphasis on sensors at least for an interim period. An audit of European military capabilities that Western European Union (WEU) conducted in late 1999 seems implicitly to take this approach. The audit noted that it is 'advisable to dispose of a consolidated, high-performance, strategic and tactical communications system for the rapid exchange of classified documents' and that Europe should enhance as well its 'capacity to conduct electronic operations.' The audit also observed that Europe needs to develop the 'capability to conduct integrated air defence and operations using precision-guided munitions'.[40] Although the DCI also identified a 'need for more - and more capable - reconnaissance and surveillance systems',[41] the WEU audit was basically silent on this issue.[42]

Several arguments exist for European militaries to focus on C^4 and precision strike. The great US preponderance in precision-strike munitions delivered during the Kosovo war was probably the most salient disparity between US and European military capabilities that came out of the air campaign. The very high level of reliance on US systems for attack operations during a Western coalition intervention will not be politically sustainable in Washington, and European countries would be also be severely handicapped in undertaking an intervention without direct US participation if they do not possess adequate long-range, precision strike assets.

The vast increases in the ability to process and communicate information provide the core enabling capability for the RMA, and interoperable C^3 systems will be increasingly vital for carrying out effective coalition military operations. Interoperable C^3 systems are essential in order to have pooled sensor data, a common operational picture,[43] and synchronised planning and execution among coalition partners. Interoperability requirements are more stringent and complex today than they were during the Cold War, when efforts were focussed on hardware rather than software. Significant impediments exist to C^3 interoperability, but achieving this goal should be an ultimately solvable task:

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[39] Michael O'Hanlon, 'Military Innovation and Allied Operations', *National Security Studies Quarterly*, Spring 1999, pp. 78-80. This rough estimate does not include development costs.

[40] WEU Council of Ministers, *Audit of Assets and Capabilities for European Crisis Management Operations: Recommendations for Strengthening European Capabilities for Crisis Management Operations*, Luxembourg, 23 November 1999.

[41] Frank Boland, 'NATO's Defence Capabilities Initiative - Preparing for Future Challenges', *NATO Review*, Winter 1999, pp. 26-28.

[42] The audit did call for 'improved WEU Satellite Centre access to commercial - and, above all, military - high resolution satellite imagery' in order to strengthen collective strategic intelligence capabilities.

[43] A common operational picture means that military commanders have or share the same understanding of the operational situation, enabling better communication and mutually supporting actions. See Alberts, Garstka, and Stein, *Network Centric Warfare*, pp. 121-145.

The market place creation of *de facto* technical standards to support the commercial sector, the continued pressures of globalisation, the lower costs of basic capabilities, and the progress in collaborative environments and artificial intelligence applications (including translation) will make it easier for organisations to exchange information and to collaborate if there is a will to do so.[44]

NATO and individual allied defence ministries have undertaken various initiatives to help promote C^3 interoperability. NATO is developing a C^3 Interoperability Management Plan, with a vision that foresees a NATO-wide integrated 'system of systems'.[45] The British, French, and German MoD's have maintained liaison officers in the Pentagon to ensure that planned command and control systems are compatible with the US Global Command and Control System, a worldwide network that allows American military commanders to share voice, data, and imagery with their allied counterparts. The US DoD has launched an Advanced Concept Technology Demonstration encompassing eight allied nations that is aimed at deployment of interoperable C^3.

As progress is made in US-European C^3 interoperability, European militaries should become increasingly able to have real-time access to battlespace information generated by US ISR systems. In order to save money, European countries could potentially become tempted to rely to a very large extent on US assets for ISR needs, especially if the US achieves breakthroughs in new sensor technologies. The US government would probably find it more politically acceptable to provide ISR support to a European led operation than, for example, precision strike weapons. On the other hand, implementation of RMA concepts of operations and organisational approaches will require access to a very high level of battlespace information. Transforming European forces along RMA lines could consequently further increase Europe's current operational dependence on the United States, unless European militaries also acquire sufficient ISR capabilities. Suggestions to construct a NATO C^4ISR network to which all allies would have 'fair access' only partially address this issue.[46]

Simply accepting the existence of very divergent operational concepts, doctrine and organisational approaches on the two sides of the Atlantic would not be a suitable response to this potential European dilemma over how much investment to make in ISR systems. The successful bridging of US-European differences in concepts of operation, doctrine, and organisation, encapsulated by the term 'cooperability', will be critical to successful Western coalition exploitation of the RMA. The concept of cooperability attempts to underline the critical importance not only of technical interoperability, which allows the exchange of data, but also of the ability of coalition partners to 'create a shared understanding of the situation, collaborate on the development and selection of courses of action, communicate these to all forces or units, and allow forces to work together effectively'.[47] Divergent operational concepts, doctrine, and organisational structures can stem from: differences in the rates at which militaries acquire and assimilate new technologies; differing force structures, cultures, and military experiences; and

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[44] For more on both impediments to and opportunities for better technical interoperability, read Report of a French-German-UK-U.S. Working Group, *Coalition Military Operations*, pp. 47-52.

[45] *Ibid.*, pp. 35-39.

[46] For such suggestions, see Gompert, Kugler, and Libicki, *Mind the Gap*, pp. 55-64.

[47] A US-European working group of defence officials and research institute experts coined the term cooperability. See Report of a French-German-UK-U.S. Working Group, *Coalition Military Operations*, pp. 29-30.

differences in national policy and strategy. Gaps in these areas even more than in technology could strain the effectiveness of transatlantic coalition operations.[48]

European countries are thus facing an impressive spectrum of challenges in the military sphere. These challenges include: the acquisition of greater force projection capabilities; the development and acquisition of those RMA capabilities that will be critical for making a balanced contribution to US-led operations as well as for undertaking missions in which the United States is not a full participant; and coevolving operational concepts, doctrine, and organisational approaches together with the United States in such as way that enables effective transatlantic coalition operations but still leaves Europe with the possibility of undertaking some missions on its own. Successfully meeting these challenges will first and foremost depend on the European response to them, but US policy also has a critical role to play.

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[48] *Ibid*., pp. 29-75.

IV. The way forward

A critical step forward for the United States and European countries to take together consists of establishing a campaign of experimental programmes to explore new technologies, operational concepts, and organisational approaches that can enhance the effectiveness of Western-led coalition operations for peacekeeping, peace enforcement, and regional conflict. The campaign would include simulations, war games, and exercises. A cooperative process among the participating countries should define the goals and individual experiments of the campaign, rather than having the United States simply invite allies to take part in US designed experiments. National differences in concepts of operation, doctrine, training, and organisation would arise naturally during the campaign, and the participating countries would have to deal with them.[49]

NATO has already launched a program of concept development and experimentation.[50] In order to make faster and more meaningful progress than is possible at sixteen, alongside NATO-wide experimentation there is also an important role to play for closer collaboration among the most militarily capable NATO powers on building interoperability and cooperability. The results achieved within the smaller group of countries can then serve as a basis for promoting NATO-wide change. As NATO countries move ahead in undertaking military transformation at varying paces and with inevitable differences in national approaches, this type of multinational exploratory experimentation can constitute an essential element in fostering transatlantic interoperability and cooperability. It should also help clarify for European countries the issue of how to reconcile the need to maintain coalition effectiveness with the United States while not compromising longer-term possibilities for conducting autonomous operations.

There is no need, and indeed no possibility, for the European allies to acquire a force posture that replicates the United States', in either quantitative or qualitative terms. Europeans arguably do not need militaries that are exclusively made up of high technology capabilities. Some mix of high and lower technology forces may be sufficient both for carrying out missions on their own and making a substantial contribution to US-led operations. A critical task will be to determine the exact composition of that mix. European militaries can simply rely on the United States to provide the most advanced technological capabilities, which will largely be needed in the more challenging missions that European countries are likely to undertake only with US participation. Relatively low cost UAV's could potentially provide the key means of meeting most of Europe's ISR requirements.

Greater European willingness than is likely to be shown by the United States to deploy ground forces for European crisis management operations can help mitigate the military impact of lacking certain advanced capabilities, albeit at the cost of higher casualties. During the Kosovo campaign, greater NATO willingness to risk losses would have resulted in more extensive use of less technologically advanced European air assets by allowing aircraft to attack at lower altitudes. Low and medium altitude attacks would also have been more effective against Serb forces in Kosovo, although again, more losses of NATO aircraft and pilots certainly would have occurred.

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[49] *Ibid*., pp. 43-45, 77-81.

[50] Read Harold W. Gehman, 'Transforming NATO Defense Capabilities', *Joint Forces Quarterly*, Spring 1999, pp. 47-51.

Nonetheless, unless there is a more serious, focussed effort to develop a military posture based around force projection and RMA type capabilities that extends beyond the UK and France, the European powers will fail to achieve both their key objectives of being able to undertake autonomous crisis management interventions in Europe and of contributing significantly to US led operations. For three reasons, ESDP's ability to bring about tangible improvements to European defence capabilities will be critical.

First, ESDP has the potential to enable or to accelerate the taking of difficult political decisions, above all through EU adoption of defence convergence or capability criteria. For example, when the Italian government decided in September 1999 to end conscription and professionalise its armed forces, the defence minister stated, 'the total professionalisation of the military instrument is for Italy an important step towards ensuring its role in the new Europe, and enabling it to carry sufficient weight in the European defence and security identity'.[51] Current German defence reviews are not likely to lead directly to the abolition of conscription, but they will result in a significant increase the share of professional soldiers within the *Bundeswehr*.[52]

The table below illustrates the critical importance of downsizing and professionalising the armed forces in order to free up greater budgetary resources for acquisition. The United States, with a 1.4 million strong military (1998 figure), is able to spend a much higher percentage of its defence budget on R&D and procurement than most EU members, who collectively have some 1.8 million citizens under arms. Only the fully professionalised British armed forces are at the same level as the US military in terms of percentage of defence spending devoted to R&D and procurement, actually surpassing their North American ally by 36.6% to 32.6%. France is not far behind, and should be able to increase that percentage once its military professionalisation process is complete, but remaining European countries fall well short of the US-UK standard. Since UK and French defence budgets constitute close to half of the NATO Europe total, the latter's percentage of defence spending devoted to R&D plus procurement reaches 26.7%. Defence restructuring on the part of Germany and Italy in particular would bring this figure close to the US level.

1999 Defence Spending (1997 US$million)

	Defence Budget	R&D	Equipment	% budget devoted to R&D plus equipment
France	28,353	3,148	5,242	29.6
Germany	23,790	1,262	3,715	20.9
Italy	15,609	298	1,905	14.1
Netherlands	6,797	64	1,380	21.2
Spain	5,464	170	744	16.7
United Kingdom	33,254	3,909	8,263	36.6
NATO Europe[1]	135,213	8,946	27,152	26.7
United States	252,379	35,324	47,052	32.6

[1]Does not include the Czech Republic, Hungary and Poland
Source: *The Military Balance 1999/2000* (Oxford: Oxford University Press, 1999), p. 37.

The EU's setting of defence convergence or capability criteria could play a key role in arresting declines in defence spending as well as in redirecting spending towards the most

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[51] Quoted in M. Bôle-Richard, 'L'Italie met fin au service militaire obligatoire', *Le Monde*, 5-6 September 1999.

[52] Brigadier General Ernst Lutz, 'Germany's Strategic Choices', *RUSI Journal*, April 2000, pp. 79-80.

important areas. Such criteria could include broad ones that specified an approximate percentage of defence spending that must be devoted to acquisition, or specific quantitative measures for capabilities such as numbers of strike aircraft capable of night time delivery of precision-guided weapons. Germany's announcement in fall1999 that it would reduce defence spending by approximately DM18.6bn over the following four years did not auger well for ESDP's ability to bolster defence spending, but the process is still at an early phase. As European countries directly confront the operational capability requirements for building a projected 60,000 strong intervention force, defence ministries should acquire increased leverage in fighting internal budgetary battles.

Achieving greater synergies in European defence R&D and procurement constitutes the second way in which ESDP's ability to enhance European defence capabilities is critical. France's lessons learned of Kosovo assessment notes that 'France could exhaust itself in attempting to attain an inaccessible level [of defence technology research], or will be forced to abandon entire research areas, if it does not coordinate its investments with its European partners'. Thirdly, significant progress in ESDP could greatly facilitate wider European task-sharing. Given the constraints on European defence spending, greater task-sharing between nations could play a vital role in helping to acquire the requisite level of military capabilities.[53] TMD provides one example of the potential benefits of task sharing. The UK seems likely to opt out of the TMD area by forgoing the acquisition of any modern extended air defence system. The Netherlands, on the other hand, is developing a significant niche capability in this area, including through the purchase of US Patriot PAC-3 missiles. As the Netherlands does not have large expeditionary forces, Dutch TMD units could potentially provide coverage for British military assets engaged in a force projection operation.

The cautious US approach to military transformation places a lower degree of stress on transatlantic coalition warfighting than would be the case if aggressive US efforts to implement an RMA were underway. It gives the allies more time to follow the US lead in key technology areas, and to examine together issues related to operational concepts, doctrine, and organisation. Nonetheless, the ultimate success of ESDP in bringing about substantial improvement in European military capabilities is far from certain, and will in any case take considerable time.[54] Scepticism is rife in Washington regarding ESDP's ability to enhance European defence capabilities, and European failure to carry through on the impetus provided by the UK-French Saint-Malo declaration and the war in Kosovo will prove fatal for ESDP's credibility across the Atlantic.

While Europeans must now deliver on their commitment to enhanced military capabilities, the United States must take more seriously its current political and perhaps future military need to have coalition partners for most military missions that it will plausibly undertake. DoD has started to pay more attention to the question of how to ensure that US and allied forces achieve greater interoperability and cooperability, but there are considerable obstacles in Washington to making key changes in US policies that could greatly benefit the goal of enhancing coalition effectiveness.

The need for the United States to adapt Cold War intelligence and technology exchange practices arguably constitutes one of the most critical issues for resolution. The US defence

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[53] The WEU audit of capabilities makes prominent mention of greater task-sharing as a means of improving European operational capabilities.

[54] Following the announced German defence budget cuts and a seeming swing of the ESDP debate towards institutional issues, François Heisbourg questioned whether ESDP initiatives would once again turn into empty rhetoric. Read 'Défense européenne: encore un faux départ?', *Le Monde*, 6 October 1999.

acquisition system has been notoriously unresponsive to the requirements of interallied armament collaboration.[55] Transatlantic armament cooperation should, in principle, have a major role to play in assisting European participation in the RMA, by stretching European defence resources for RMA related technology development, by enabling more efficient achievement of US-European interoperability, and by helping to create a more competitive environment in defence acquisition as European industrial consolidation continues. DoD has recognised the impediments that current US export control and technology transfer policy place in the way of deeper transatlantic armament cooperation, has conducted internal reviews of the issue,[56] and has instigated an interagency examination in Washington of potential reforms to US policy. This effort is now starting to bear fruit, although the implementation of far-reaching reform is likely to be a drawn out process.[57] A *quid pro quo* for enhanced European efforts to acquire force projection and RMA capabilities should include substantial reform of US export control and technology transfer policy in order to facilitate greater transatlantic armament collaboration. In fact, perceptions in Washington of a serious European effort to improve defence capabilities could well help over time to unlock the door to more radical US policy reforms.

In both European capitals and in Washington there is substantial recognition that a "business as usual" approach to coalition military effectiveness will not succeed in dealing with the challenges of new missions, an evolving threat environment, the different rates at which national armed forces are acquiring and assimilating new technologies, and distinct national cultural approaches in how militaries adapt concepts of operation, doctrine, and organisation in order to leverage new technologies. Yet, on both sides of the Atlantic it will take much effort and political will to overcome entrenched ways of doing things. While despair over an unbridgeable transatlantic RMA gap is certainly unwarranted, misplaced confidence would be even more so.

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[55] See, Robert P. Grant, 'Transatlantic Armament Relations Under Strain', *Survival*, Spring 1997, pp. 111-137.

[56] Read, for example, *Final Report of the Defence Science Task Force on Globalization and Security* (Washington DC: Office of the Under Secretary of Defence for Acquisition and Technology, December 1999), 137 pp.

[57] Colin Clark, 'U.S. Agencies Reach Consensus on Exports', *Defence News*, 15 May 2000.