

How Disruptive is Terrorism for Conflict Analysis? New Strategic and Economic Tools for Defense Policy

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1. Introduction

Following the 9/11 events the United States reacted to terrorism by a strong military operation against "Rogue States", designed as the origins of these attacks, and gave a huge boost to their defense expenditures. However one may wonder if such a reply suits the real threats of the post-post-Cold War. Public attention is now focused on terrorism, but it represents only one of the dangers on international security. Attacks against the US revealed the disruptive situation that actually has been emerging for at least a decade. Nowadays international relations are fundamentally characterized by an out-of-equilibrium situation.

Indeed many threats appear as asymmetrical, eventually overcoming many barriers to entry on which "classical" defense architectures are based. This is bound to transform the way defense is fulfilled. It is important to define the consequences of the current geopolitical context to grasp a way of understanding current and forthcoming threats, and define the means of preventing them. Analyzing military expenditures reveals however a paradox: while the world has changed, current defense policies tend to continue trends initiated during the Cold War. There is then a widening gap between political choices and defense needs. The post-9/11 period opens a real questioning of defense policy and the way public finance is managed.

Our paper aims at confronting the formulation of military doctrines to the optimality of budgetary orientations in regard to international threats. What kind of defense policy results or could result from the new geopolitical context? After analyzing the dominant reply to 9/11 attacks (part 2), we underline the importance of asymmetric threats (part 3). This rising dimension of defense implies a better understand in the grounds of defense through a game-theory approach (part 4). All these elements allow defining tomorrow's needs in weapons systems (part 5) and back a critical assessment of public policies in defense procurement (part 6). Eventually we conclude with some alternative proposal in order that military expenditures fit with security needs (part 7).

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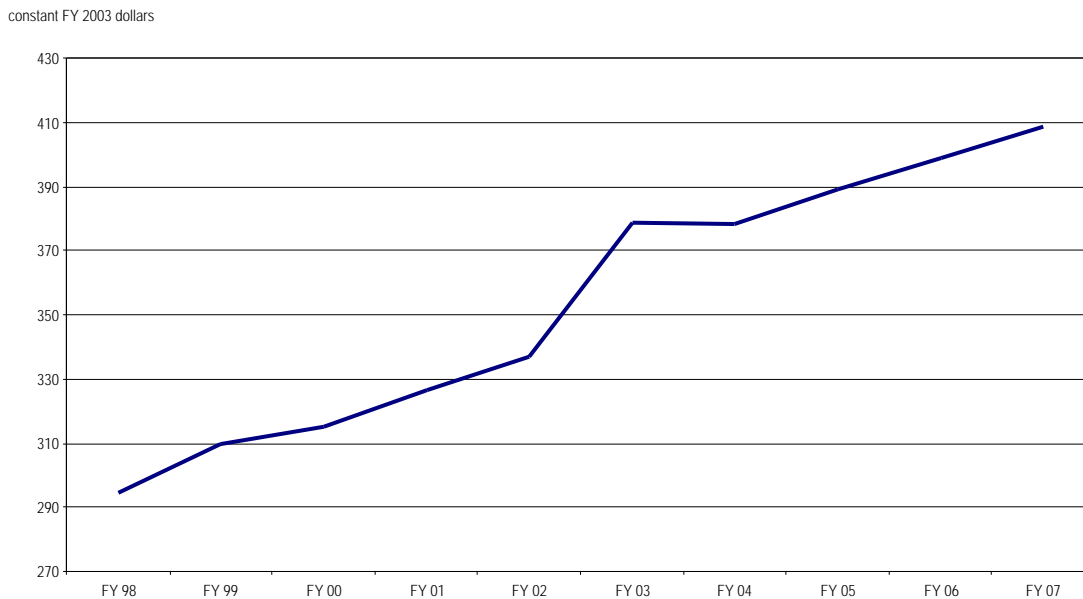
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2. Terrorism: The American Military Answer

Initiated last autumn by the Bush Jr. Administration, "war on terrorism" rises some questions. We may analyze both terms in this expression, because they have determined a dramatic evolution in defense policies since then. If we have a quick look over the period between 9/11 events and now, it appears that those attacks have been qualified almost immediately as terrorist and the US, followed by the United Nations and many countries, tries to find and punish culprit State(s) behind such cruel actions. The analytical framework that has been used refers to a well-known approach in international relations: pointing a group of States as the "axis of evil" induces a State-to-State issue based on military means, as the operations in Afghanistan demonstrated it. However, do terrorist attacks imply that we are in a warfare context? Do armed forces constitute the most suitable tool to manage a terrorist issue?

Indeed the US reply is fundamentally a military one. Such an analysis eventually helps to support a strong increase in military expenditures to resolve new security challenges. In fiscal year 2003 the American military budget may then be the highest since the end of Cold War while the US economy is bound to grow slowly in foreseeable years and federal budget surplus has almost disappeared. This kind of reply conducts to higher military burden¹, inducing some questions about the relevance of such a choice both in level of expenditures (as shown in the graph) and policy choices.

Figure 1: DoD Budget Authority



Source: Office of the Under Secretary of Defense, *National Defense Budget Estimates for FY 2003*, Washington, March 2002.

Beyond a pure budget approach one may wonder if the strategy chosen in autumn 2001 corresponds to the best possible answer. There are in fact two questions. Does the current issue fit the traditional framework of international relations? Can we qualify the emerging threats armed forces may face as "terrorist"?

¹ One may note that the Bush Jr. Administration urges other NATO-member States to follow its policy and increase their military budgets—amplifying the debate around the so-called "technology gap" between the US and its Allies due to huge differences in defense effort.

The UN Security Council clearly linked its support to the US² with Chapter VII of the UN Charter, which determines when and how a State can declare a "state of war." Such a choice backed the American position, which focused on identifying some States behind those events. President Bush Jr. remarked for instance the day after 9/11: "The deliberate and deadly attacks which were carried out [...] were more than acts of terror. They were acts of war."³ Then the UN Security Council as well as the General Assembly agreed with the US that it has a right to legitimate defense, setting the issue in the classical framework of international relations where States were the main and only actors. Operations in Afghanistan correspond with a State-to-State resolution of conflicts, since the Taliban regime was considered as the initiator (or, at least, the supporter) of those events.

Foreign policies and eventually conflict resolution are structured around a vision of international relations where conflicts are regulated through the international law. This framework results from a community of States based on shared values. However this perception postulates that such a community is composed of homogeneous actors—referring to the definition of a national State: one territory, one nation and one government. It appears that the IR game became more complicated since the end of the East-West conflict, especially since new actors raised or grew steadily. We can no longer understand international relations solely on a State-to-State interaction. Following 9/11 events François Heisbourg explained that "the principal trump of these non-governmental organizations [like Al-Qaïda] is they have neither territorial claims nor power. Conventional ripostes are then inefficient"⁴. Many security issues do no longer correspond to an interstate level, even though the "Rogue States" discourse⁵ forms an attempt to reintroduce this level in a new trend of international regulation.

Considering the current situation as a "war" helps to refer to the international law, but it also justifies the use of armed forces. However one may wonder if they are the more suitable forces to fight terrorism. The stalemate in the Israeli-Palestinian conflict shows how difficult it could be to fight some actors mixed with innocent civilians... Saint Germain (2001) remarks that terrorism is one form of asymmetric combats considered today as "non-military". One may add that it is crucial to include terrorist actions in the global strategy of adverse organizations, which realize such attacks to understand what terrorist actions mean. Indeed the military dimension of terrorism is not given *a priori*; it appears only when these actions contribute to a political *and* military project.

This indication allows us to exclude from the field of defense some actions, which have no other aim than the promotion of a political cause through a media visibility, following the example of operations from the Red Army Fraction in the 1970s. "Real terrorists don't want to kill a lot of people. Rather, they use limited, but indiscriminate, violence or hijacking to create noise or fear that draws attention to their cause and ultimately builds political or diplomatic pressure for a specific objective."⁶ Terrorism aims at generating spectacular destruction

² United Nations Security Council, *Resolution 1373 (2001)*, S/RES/1373 (2001), 28 September 2001.

³ Office of the Press Secretary, *Remarks by the President in Photo Opportunity with the National Security Team*, The White House, 12 September 2001, www.whitehouse.gov/news/releases/2001/09/print/20010912-4.html

⁴ Interview "Défense, A nouveaux périls nouvelle stratégie", *Le Nouvel Observateur*, n°1927, 11 October 2001, www.nouvelobs.com/dossier_1927/dossier3.html

⁵ See, for instance, Nicholas Berry, *The Self-Serving "Rogue State" Doctrine*, 16 June 2000, www.cdi.org; or Meghan O'Sullivan, *Replacing the Rogue Rhetoric*, *Brookings Review*, 18(4), Fall 2000, 38-40.

⁶ Thomas L. Friedman, "No Mere Terrorist", *The New York Times*, Opinion/Editorial, 24 March 2002, www.nytimes.com/2002/03/24/opinion/24FRIE.html

(particularly by many victims), mobilizing huge means against terrorist forces and creating a panic context. It seems clear that terrorists try to catch the people's attention and monopolize media interest to use them as amplifier for their ideas. The difficulty when confronting to terrorist threats comes from the fact such threats appear irrational and truly non-expectable. "Quite clearly, notes Dunlap (1998: 6), terrorism principally aims to affect its targets more *psychologically* than physically".

Then terrorists do not seek a military victory but a political one. In such a situation mobilizing domestic security forces (police, *gendarmerie*...) seems to be an adequate answer, without implying any interference from armed forces. On the opposite, some terrorist actions take part of a broader military project. In this case paramilitary actions (often called "terrorist" ones) go with purely military objectives and aim at truly defeating an enemy. Here the notion of *territoriality* is fundamental, and it is certainly what helps to make a quite clear distinction between military actions and political terrorism.

Terrorism interacts with the military field when there are territorial stakes (liberation from an external yoke, conquest of new territories). Military action, apparent or disguised, remains crucially linked to territorial issues, even though one may consider that the 19th-century notion of national State is vanishing... Nevertheless most recent conflicts—Bosnia Herzegovina, Kosovo, Chechnya, Palestine—have shown that territorial stakes are still the biggest issue. It is only when territorial issues are at stake that armed forces can be implicated in war against so-called terrorism. Otherwise this is not the true mission for which they are recruited and trained (but "terrorism" is often another name for political opposition: remember how colonial countries qualified liberation movements in Asia or Africa...).

Armed forces are neither conceived, nor organized for (domestic) security missions; their structuring and modes of functioning correspond to the defense of territories and populations who live there. As General MacArthur underlined in 1962 when speaking to Cadets at West Point: "Through all this welter of change, your mission remains fixed, determined, inviolable—it is to win our war".⁷ His appreciation remains relevant in today's context. "War on terrorism" is likely to be a wrong target for armed forces, since it is not really a war in a military point of view (even though there are military operations against the Taliban *government*) and including terrorism into defense missions may not suit their core missions.

In fact, armed forces must take part of an evolution in security issues, but from another point of view that results from 9/11 events. The real issue is to face asymmetric threats, in which some actions qualified as "terrorist" can be included. Asymmetric threats can be compared to terrorism, even though they are two completely different issues, because both contain a strong psychological element. This latter aims at compensating for material or other deficiencies. However those threats belong to the military field and ask for an adequate reply from armed forces, because they challenge the traditional architecture of national defense.

3. Emergence and Dominance of Asymmetric Threats

Analyzing the rise in defense expenditures since the late 1990s many observers wondered if a new arms race was engaged. Even though one can find some grounds for such an

⁷ Quoted by Rumsfeld (2002a).

interpretation a second look demonstrates that the new geopolitical context make impossible, or illusory, such a process—at least in the shape it had during the second half of the 20th century. Indeed there is no longer a superpower which tries, or is able, to challenge the United States as a global leader. The military power of this latter is unrivalled, and other major players in international relations—like the UK, Russia, France or China—lag far behind in terms of military forces, technology and defense expenditures. This situation determines at least how new threats can emerge.

Indeed a military competition in the classical sense can have sense only between adversaries that have similar resources; small players were considered as military dwarfs and major powers do not take them into consideration. Indeed, as soon as the—forces, technological and/or budgetary—gap widens, the weakest State cannot expect to challenge its rival by acquiring similar forces⁸. "The Gulf War was an object lesson to military planners around the globe, notes Dunlap (1998: 1), of the futility of attempting to confront the US symmetrically, that is, with forces and orthodox tactics." Who could jeopardize, for instance, the dominance of the seas by the US Navy? It is bound to be unwise by many ways...

The only possibility for a potential enemy is then not to try a direct conflagration, but identify the adversary's relative weaknesses and focus all the efforts against them to get a comparative advantage. "Effective asymmetric operations cause a disproportionate amount of damage to the target for the investment in resources, time, and money by the attacker," notes McKenzie (2000). This approach explicitly aims at creating an *out-of-equilibrium* situation that compensates a structural inferiority. Nevertheless it is important to distinguish *non-symmetric* threats and *asymmetric* ones.

Non-symmetric threats result from a gap in capabilities, but adversaries share the same perception of strategy and doctrines; the difference vests in resources they have or can afford. In a way seeking non-symmetries is fundamental to all warfare. What is truly interesting in the current situation is that some forces focus on main asymmetries and do not try to challenge their potential adversaries. Asymmetry corresponds to a conflict between forces that do not have the same logic and choose then diverging modes of action. Asymmetric strategy is an idea certainly as old as warfare itself, but an explicit mention in such terms was first formulated in the American military doctrine through the *Joint Warfare of the Armed Forces of the United States* published in January 1995. We can separate two kinds of asymmetry:

- *resources*, i.e. selecting military means—sometimes beyond the current definition of "weapons"—to overcome a quantitative or qualitative inferiority;
- *strategies*, allowing some military surprises by using weapons and human resources in non-conventional ways.

The collapse of the Soviet Union and its empire led international relations from a clearly identifiable threat to blurred and unpredictable threats, difficult to identify and analyze. Bédar (2001) remarks that the uncertainty about asymmetric enemies, their intentions and strategies implies the explosion of the strategic field in many scenarios. "The Cold War formula of the least-likely-is-most-dangerous is fast eroding, puts McKenzie (2000), and many unsavory scenarios can be imagined that are all reasonably likely to occur". At least the East-West

⁸ Remember Stalin's joke: "Vatican, how many divisions?"

conflict was comfortable, since the arms race occurred in a rational interaction within a shared political and military representation of the ways a conflict might occur. The current situation is then very more complex, because former rules have disappeared but they have not been replaced with new ones.

Many papers have been published yet about asymmetric conflicts, proposing various definitions and concepts (Metz and Johnson, 2001). These papers lead to a certain confusion; nevertheless the essential idea appears in these studies or articles: we are no longer in a equilibrated system. It is also important to be cautious with the American presentation of asymmetric threats, which emphasizes mainly on Rogue States. If these countries represent a real problem, it seems that they are not the only source of asymmetric threats. Limiting the analysis to them leads to a simplistic perception of what is at stakes. "Classical" military forces may select this kind of strategy too.

The rush into new equipment brought by information technology⁹ induces that very few countries are able to keep up with the US. Paradoxically the incredible advance of US armed forces invalidates in a way their procurement strategy, even though it was relevant during the Cold War (because of a similar strategy in the Soviet block), since no competitor is likely to follow the American high-tech choice and raises as a serious competitor... On the opposite such a strategy may compel other countries to develop alternative approaches disconnected from the American one (and the US Allies).

What is truly important is the fact that today asymmetry is *deliberately* exploited in a warfare context. Most examples of asymmetric victories in History rely on asymmetric strategy by default. For instance, a combined force of French and Indians defeated the British General Edward Braddock in 1775. Zulu tribes opposed a surprising resistance to a truly superior British army during the 1879 War. Lightly-equipped Finnish army wreaked havoc on armored and mechanized Soviet units in the 1939-1940 War, etc.¹⁰ However victory came because these soldiers fought in a way they knew, not because they analyzed the weaknesses of more conventional adversaries and identified tactics to overcome their own weaknesses. Today asymmetric victory results from a truly conscious strategy, not from (providential) luck.

For instance, the Israeli Navy bases its current strategy on innovative uses of current equipment rather than more sophisticated or additional systems. Vice-Admiral Yedidia Ya'ari justifies this choice: "We realized early on—after the [1967] Six Day War—that a small country like Israel with personnel constraints could not operate destroyers or frigates. We will never be able to adopt a conventional or symmetrical solution in terms of platforms, because it will always be overkill for us." The chosen strategy was then to concentrate all the efforts on surprise effects, based not only on selected armaments but also on specific tactics inducing a rethinking of soldiers' training, equipment utilization, etc.

Asymmetric strategy appears as the only possible solution for armed forces which do not have the means of challenge theirs adversaries by a quantitative (technology) or qualitative (soldiers, equipment) advantage. As Bédar (2001) puts it, "the use of a different rule creates vulnerability and destabilization of the adversary". Nevertheless this disruptive approach of

⁹ Information processing, real-time operations, "smart" precision-guided munitions, situational awareness, etc.

¹⁰ For more historical examples, see J. Guilmartin's paper "Technology and Asymmetries in modern Warfare" in Matthews (1998: 25-55).

warfare may look at conflict from a fundamentally different perspective is not only unknown to many in the West, and Americans especially, but appears totally counter-intuitive to them. As Dunlap (1998: 4) explains, "Americans persistently seem to assume that other peoples think basically the same as they do". For instance, a 1998 report from the National Defense University¹¹ defines asymmetry as "not fighting fair"! Unfortunately it is no longer true even if one may consider that it was the case during the Cold War.

4. Game Theory and Conflict Management

Social relations, business competition and military opposition have in common to confront conflicting interests allowing strategic behaviors by the actors involved. Game theory is one of the most emblematic and publicized example of the cross-fertilization of ideas, theories, and researchers between these different fields (Schmidt, 1991). The observation of concrete war situations and strategic dilemmas has guided the design of games' framework by economists. On the other hand, military officers have derived concepts from game theory to formalize their strategies and the principles of defense policies. While the parallel between war and economic competition raises many questions, we use it here to set the initial scene and as an analytic lens to specify radical changes experienced over the last decade. Games, rules, equilibrium are actually both central to the Cold War strategic landscape and Game theory. In this section, we will follow this approach to explore the two following issues. First can we describe these changes with the vocabulary and tools of game theory? Secondly what kind of avenues for strategic thinking does this opens as a result and what are the relevant tests for alternative competing new concepts or interpretations?

Equilibrium is the central common concept to the game-based economic analysis, strategic studies and defense policy research. But an equilibrium is fundamentally a solution to a game, which means: the existence of players, a scene (the game), rules, scales of gains/benefits from different decisions and behaviors. The current situation can be referred as an asymmetric context, and we may make a distinction between asymmetric and non-symmetric threats. We suggest using non-symmetric for the confrontation of forces and countries with different military capabilities, but sharing similar defense doctrines and strategic rationality. However there can be no balance or equilibrium given the huge gap in terms of military power and resources between parties involved (e.g. the 1983 Falklands war). Asymmetric then captures, more fundamentally, divergent rationale and rules of behavior. Therefore the modes of action and the evaluation of their gains/costs can drastically differ and cannot be calculated by the opposite power to define an optimal "rationale" decision.

For several historic and specific reasons, deterrence equilibrium also presented as the "balance of terror" established itself as the solution of the Cold War "game" (Castoriadis, 1981). For the military doctrine of the Soviet Union strategy was a science, follows regular "war laws" to be discovered and applied by officers at every level of armed forces. Among these laws, a particular importance was given to the "negation by negation" concept, meaning that every weapons system is to be countered by an opposite one specifically designed to do so (Paris, 2001). In the US the strategic doctrine emphasizes the role of geographic factors, and logically refers to the world picture of continental blocks balanced by oceans. Even if the 1960s and 1970s are usually described as an arms race, such a race was based on a persistent

¹¹ INSS, *Engaging Power for Peace: The 1998 Strategic Assessment*, NDU, Washington, 1998, chapter 11.

equilibrium of power and military capabilities. Small and temporary deviations led to a leapfrog effort to bridge the gap and find a new balance. Means could be different (quantitative superiority for the Soviet Union, technological dominance for the US) but goals were the same.

Ten years ago the Soviet Union gave up this race, abandoning the superpower competition with the United States. As a result, the global security and defense environment changed quickly and radically. This also implies a parallel crisis of analytic techniques that the military and political community has been employing. Game theory tools obviously top the list. Game equilibrium, players' rules, common norm are used in both military analysis and game theory. Even though the arms race concept rapidly became popular and publicized, the central point here is that there exists an overall balance between the two opposite powers. Each player reacts to small deviations in this balance, whether lead or backwardness, to leapfrog or establish a new lead.

Game theory can possibly suggest useful and relevant explanations of strategic settings only if a link can be made between the concept of solution and a strategic organization scheme that could further allow the use of game theory frame and results. From its origin (von Neumann, Morgenstern, 1944) interactions of game theory with strategic applications were central in the motivation and the references of scientists. What are then the alternative solution concepts that might replace the deterrence balance? The relevance of terrorism seems quite weak, at least (Dwyer, 2001)... Pointing to a *Revolution in Military Affairs* (RMA) rightly underlines the importance of current changes but gives little prospective indicative on likely future strategic outcomes. All this implies nevertheless to rethink the way armed forces understand their missions and they acquire defense systems.

5. Challenges in Weapons Procurement

Peace, or a close equivalent, is a difficult time for a nation's arms buyers, since there is no ready guide to what should be acquired. Such a difficulty is increased when uncertainty is high about potential threats and risks, as it is the case in post-post-Cold War era. Sapolsky (2001: 34) reminds us that is the main reason why the so-called Revolution in Military Affairs (RMA) appears so jumbled. A true revolution in military affairs is more than building new high-tech weapons; this process is also about new ways of thinking defense and of fighting. Then armed services do not only require improved systems¹², but also alternative ones *and* new doctrines to employ both new and old systems. As Secretary of Defense Donald Rumsfeld puts it, "our challenge in this new century is a difficult one: to defend our nation against the unknown, the uncertain, the unseen, and the unexpected" (Rumsfeld, 2002b: 23).

Such an uncertainty seems even more important because of asymmetric threats and the lack of a clearly identifiable enemy. Indeed defense planners cannot know precisely what kind of risks they have to prevent or fight, so that they must assure that forces can rapidly counter them by increasing their conceptual and organizational adaptability and flexibility. Such an evolution has strong implications at the procurement level, for acquired systems must be reoriented towards new missions, and new needs must be satisfied quickly. This implies a

¹² Moreover it could be sometimes unwise to try to improve existing systems, for they fit no longer with armed services' real needs... Rumsfeld (2002a) underlines that "all the high-tech weapons in the world won't transform our Armed Forces, unless we also transform the way we think, train, exercise and fight".

new conception of weapon systems definition. Moreover, while multipurpose systems are seldom as efficient as single-purpose ones, they may make the most sense because of the great uncertainty about foreseeable threats. Nonetheless single-purpose systems remain relevant when the strategic environment becomes clearer and a specific threats is identified. The procurement strategies might then be amended to integrate these new constraints, leaving more room to programs of a new kind.

In fact current armed forces are structured in battle systems prepared to face classical conflicts, where professional units try to acquire the means of tactical and strategic superiority tanks to training and equipment¹³. The East-West rivalry was completely based on such a philosophy, with doctrines aimed at guaranteeing a victory through a major conflagration: *the decisive battle*. Arms race resulted from the attempt to get technological and quantitative superiority, but both sides shared a similar vision of war. "Daughter of Second World War confrontations, notes La Maisonneuve (1997: 196), the Cold War favored the accumulation of armaments and a race to their modernization. Modern armed forces are those of quantity." Indeed, for at least a century, armament policies have been a quest for strategic equilibrium, characterized sometimes by great oscillations but always corrected quite rapidly. The concept of "terror balance" reflected clearly such a trend. However today's geopolitical situation is rather characterized by an *out-of-equilibrium* situation.

How can armed forces manage their procurement policy when the rules of war are changing, at least partially? Existing grounds of defense procurement seem to become obsolete, but no new one clearly emerges. Indeed it is possible to draw a list of asymmetric threats, and many analysts do so. For instance McKenzie (2000) identifies a typology of six potential asymmetric threats: nuclear, chemical, biological, information operations, operational concepts, and terrorism. However this kind of list is not necessarily useful here. It is more relevant to understand how armed forces can prepare themselves to emerging, unexpected threats rather than targeting only on those that have been identified. In a way military powers are still trapped in a "Maginot line" system, relevant during the Cold War but less and less efficient today. In fact, "as in judo, notes Saint Germain (2001), [our potential adversaries] are going to challenge us not with the same weapons but in targeting our weaknesses".

The American reply focuses mainly on technological innovations and weapons superiority. If such a strategy is necessary, is it enough? For instance the over-emphasis on technology in Western countries may induce to underestimate the many low-tech means and ways by which adversaries could asymmetrically respond to one country's technological supremacy. Such supremacy did not prevent the Netherlands' defeat in Indonesia, France's defeats in Indochina and Algeria, or more recently Russia's difficulties in Chechnya. Even the US cannot rely solely on its technological superiority, since it does not automatically guarantee victory on the battlefield (as the Vietnam War demonstrated). Actually it is not possible to find a technological *silver bullet* for each asymmetrical threat, although technology remains a crucial element in military battles, and an alternative approach might be found.

Interpreting the impacts 9/11 events Donald Rumsfeld used an eloquent image to describe the situation Western armed forces have to face: "It's like dealing burglars. You can't possibly

¹³ One may refer to William McNeill's *The Pursuit of Power: Technology, Armed Force, and Society since AD 1000* (University of Chicago, April 1985) for a thorough analysis of the rise of technology-based, modern warfare which reaches its apotheosis during the Cold War.

know who wants to break into your home, or when they might try it—but you do know how they might try it—and that you need good, solid deal bolt on your front door. You know that they might try breaking through a window—and that you need a good alarm system. You know it's better to stop them before they get in—and that you need a police force to patrol the neighborhood and keep the bad guys off the streets".¹⁴

Weapons acquisition takes place today at two levels: *non-symmetric* and *asymmetric*. Classical armament remains important in a large field of international relations. Even though no classical threat may rise in foreseeable years and the US dominance appears uncontested, it seems unwise to get rid of major weapon systems since they remain the basis of the military balance between States in the long run. The US has then developed a preemptive strategy to prevent potential rivals from investing in defense technology, expecting thus to create an entry barrier in main fields... Nevertheless this dimension is not sufficient because of asymmetric threats. It is also necessary to develop a new way of thinking to prevent and anticipate "flaws in the wall". Uncertainty concerning intentions of asymmetric actors and the possible evolution of threats implies a divide of the strategic field in numerous scenarios.

Then it appears more relevant to think in terms of capabilities and diminish the role played by enemy identification. This analysis led to crucial idea proposed in the *Quadrennial Defense Review 2001*: evolving from a threat-based strategy to a capabilities-based one (Rumsfeld, 2001). Such an approach focuses less on who might attack (or where) and more on how we might be threatened as well as what is need to deter and reply against aggressions or risks. Similar changes can be perceived in other countries. For instance, the French Defense National Agency has based its preparation of the forthcoming Five-Year Defense Acquisition Bill (2003-2008) on a catalogue of forty capabilities rather than its traditional systems-based proposal. The underlying idea is to develop an array of systems corresponding to an array of threats; this represents quite a dramatic transformation in the force/counter-force logic that has been dominating military doctrines for almost one and half century...

Preparing for the future in an uncertain world requires innovative visions as well as forces and capabilities that can adapt quickly to new challenges and unexpected circumstances. As Metz and Johnston (2001: 15) explain: "While iconoclasts and nonconformists should not rule the military, they should be valued, preserved and heard". However such an evolution does not appear as self-evident. It requires not only a complete revolution in the way military procurement takes place, but also and a great awareness on more and more diversified scientific knowledge and technology. The loop "identified threat/corresponding technology" appears necessary but not sufficient, and armed forces can no longer rely on pure defense technology. More than ever armed forces must prevent military "surprises". These latter were essentially localized in technological fields, but they nowadays emerge from various sources... implying to have a wider perception of the way technology scouting may occur.

In his keynote address at the 27th Annual AAAS Colloquium Science and Technology Policy on John Marburger, Director of the OSTP¹⁵, threw into relief that federal support of science must be directed first to sustain the own dynamics of science, and secondly to seize the greatest opportunities it is creating for discovery. This "science-based science policy"

¹⁴ Secretary of Defense Donald Rumsfeld, "21st Century" Transformation of the U.S. Armed Forces, National Defense University, Washington, 31 January 2002, www.defenselink.mil/speeches/2002/s20020131-secdef2.html

¹⁵ The Office of Science and Technology Policy (OSTP) depends on the Executive Office of the US President.

(Marburger, 2002) differs from issues-based policy in recognizing that discovery and the emergence of new technologies do not necessarily result from mandates in service to a particular issue¹⁶. While expressed in regard to the general S&T policy in the US, this analysis fits very well with the way defense R&D should be managed.

"Astonishingly, notes Hamilton (2002) for the US, Congress even diminished its capacity in science and technology, when in the mid-1990s it eliminated its office of Technology Assessment, which used to be a model of technology assessment for countries across the world." This trend of public disengagement make more complex decision-makers' work since politicians, servicemen and civil servant can no longer keep up with scientific and technological developments. The result of government's scientific deficiencies in many countries is a serious gap between the scientific and policy communities. Scientists find it hard to explain their needs and justify the importance of tomorrow's investments to policymakers, and policymakers find it difficult (most of time) to understand today's scientific issues. Then Ministries of defense may feel some difficulties in catching the more relevant technology and orientating procurement towards the adequate systems they need in forthcoming years.

The transformation of weapons procurement cannot be limited to the systems conception; it implies a complete redefinition of the relationship between armed forces and the *whole* industrial and technological base—both defense and commercial. Indeed it is crucial to avoid offering a guaranteed life to weapons production lines when technology and geopolitical context are changing rapidly. As underlines Sapolsky (2001: 42), "only approved design teams will have their aircraft prototyped, but anyone with a good smile and shined shoes (and maybe not even that) should have the opportunity to sell the military a new way to kill mobile missile launchers or discover the cave where Saddam presides." However it appears quite hard to make the dream come true!

6. Stalemates of Defense Spending and Production

The much-vaunted RMA can be criticized since it expects to take advantage of emerging technologies but preserve the existing systems. We are far from the description that Andrew Marshall, then Pentagon's Director of Net Assessment. A RMA occurs when "the application of new technologies into a significant number of military systems combines with innovative operational concepts and organizational adaptation in such a way that it fundamentally alters the character and conduct of a conflict"¹⁷. Beyond the expected organizational transformation that delays setting up, the new geopolitical requires an evolution in defense procurement to provide armed forces with the weapon systems they truly need.

As we have seen, the American *Quadrennial Defense Review Report 2001* aims at diffusing this new approach within the MoD; similar processes occur in France, the UK, and so one. However procurement choices lag behind the publicly promoted policy change. For instance, the MoD created the Office of Force Transformation (directed by Admiral

¹⁶ Hamilton (2002) added: "Science has its intrinsic needs and processes that have to be supported if the whole apparatus is to work effectively. If we ignore these needs, and direct funding according to the severity of social problems we would like science to address, we tend to enrich only one part of the machinery, and diminish our ability to address the critical problems." (What is especially true in a long-run perspective.)

¹⁷ Quoted by J. Blaker, "Understanding the Revolution in Military Affairs", *The Officer*, May 1997, p.23.

Cebrowski) to stimulate a new approach of defense issues: in the conception of weapon systems, but also in the culture that determines the manner procurement choices are realized...

Even though decision-makers promote a radical transformation, we can perceive a strong inertia in procurement practices. An historical parallel might be done with the beginning of the 20th century. At the turning of the century, naval power was hype following a trend initiated by the United Kingdom and the US. The *Dreadnought*-class battleships became emblematic of national power not only for the then leading powers, but also lesser powers. As the number of these ships grew, the dynamics of naval warfare evolved; they were supplanted by aircraft carriers and eventually few were ever employed. Old habits are hard to break...

Craig (1998) develops a strong critic about the inability of Western forces to get prepared against asymmetric threats. His assessment is especially based the Defense Science Board's report *DoD Responses to Transnational Threats* (October 1997), which sums up many critics against current policy in defense procurement. Indeed the MoD as well as many armed forces turn out to be ill prepared against current threats. The type of enemy that they are preparing to face is not the one that represents the greatest danger. Unfortunately we cannot choose the way battles will occur. The adversary imposes most of time the rules of game he wants to play—not the ones you would like to. Inertia is then quite strong in defense procurement. The current operations following the 9/11 events show, for instance, that the MoD lacks adequate assets.

More precisely armed forces seem to have too many weapon systems they do not necessarily need and too short of the ones they are dearly keen on. "But in spite of these shortages, underlines Rumsfeld (2002b: 28), the department postponed the needed investments, while continuing to fund what were, in retrospect, less valuable programs." How can we understand such a situation?

The relative stability in arms production results from armed services' wish to maintain production lines that are considered as crucial for the national security. Since they are responsible for the national security armed services may have an industrial and technological base at their disposal to reply at an emergency. Then some production units represent a strategic resource and have to be preserved. "The Defense Department would find it risky and even reckless, notes Kurth (1993: 308), to allow a large production line to wither and die for lack of a large production contract". This is the reason why armed forces have sometimes launched new productions when a major program ended to avoid closing a unique and essential capability, even though the systems do not provide path-breaking innovations or fill a crucial lack of equipment.

This "follow-on principle" (Kurth, 1972) has two main consequences: a relative stability of the main arms-producing firms, and a technological continuity—resulting from both firms' lobbying and armed services' conservatism. This explains why the military-industrial complex "has endured for several decades, in some cases dating back to the Second World War, despite the ebbs and flows, the booms and busts in defense spending" (Kurth, 1993: 307). Such a system constitutes a truly high barrier against technological disruptions and the introduction of new, alternatives defense systems... at least as long as the tension between available weapon systems and operational needs is not too strong.

In the US, except for a handful of location transfers and many changes in corporate logos, basically the same set of weapon system assembly lines that witnessed the collapse of the USSR are still in business—as in most of the main arms-producing countries. "The striking fact about the post-Cold War period mergers and acquisitions notwithstanding, is that essentially all the military aircraft, armor vehicle, and warship building line open at the end of the Cold War stayed open and productive," explains Sapolsky (2002: 35). Note that similar conclusions could be drawn in most European countries.

Some programs are running for years (since the life cycle of defense systems is about 20-30 years), but the main reason why they have been launched have sometimes disappeared. The *Leclerc* tank is still considered by the French Army as a major priority while it has been conceived to stop Soviet-designed tanks in Central Europe. Similarly the US Air Force seeks to replace the F-15 by the F-22 as its prime interceptor, but still require a credit line for a few F-15s each year—not necessarily because it needs them but to keep the F-15 line open.

Such a bias induces a tacit agreement with defense firms that promote the renewal of existing systems—relying on assets, technology and know-how they master. This strategy can be useful to maintain the defense industrial and technological base (DITB), but it has strong negative effects especially in an age of uncertainty and geopolitical evolution. Indeed the follow-on principle favors existing systems against new ones, which do not have the same backing from industrials, armed forces and decision-makers for economic, operational and political reasons respectively... Moreover such "follow-on" programs require huge credits and then reduce the available budget for other programs. Here the eviction effect might be strong (and often it is), especially when a less clear geopolitical context undermines the justifications of defense expenditures in budget debates¹⁸.

The Economist noted recently with a great sense of humor that "once a weapons program has its name inscribed on a commemorative coffee mug, it becomes impossible to kill. Given a constituency of enthusiastic generals, job-conscious legislators and contractors big and small, it becomes untouchable".¹⁹ Dick Cheney (then a Defense Secretary in the first Bush Administration) learned it as he tried unsuccessfully to kill the V-22 tilt-rotor aircraft, fiercely defended by the Marines. Here, as in many programs under threat, it appears that armed services know how to mobilize political and industrial support. Surprisingly their vision about the importance of in-progress programs coincides most of time with rather than contradicts contractors and politician interests...

This does not exclude any attempt to break the hold of the so-called military-industrial complex on procurement process. In the US, the Department of Defense has a powerful tool with the *Nunn-McCurdy Amendment* to stop cost growth in major weapons programs. Under his amendment introduced in 1982, any program whose total costs grow by more than 25 percents above original estimates must be terminated unless the Secretary of Defense certifies it as a critical system. Pete Aldridge, the pentagon's acquisition czar²⁰, made a big step in

¹⁸ About the difficulty in justifying the level of defense expenditures, it is interesting to analyze the statements that senior executives of the MoD made during the hearings of the US Senate during the 1990s. The discourse about "rogue states" was then weakly based—with an unclear description and recurring arguments—and appeared essentially as a substitute to the Soviet threat.

¹⁹ *The Economist*, "Crusaders belong to the past", 18 May 2002, p.48.

²⁰ Under-Secretary of Defense for Acquisition, Technology and Logistics.

December 2001 when he cancelled the Navy Wide Area missile defense program after it breached this rule.

Although Donald Rumsfeld announced a real assessment of systems concerned by the Nunn-McCurdy threshold and no more any automatic defense of them, it appears that Pete Aldridge allowed six of twelve programs to continue—reducing the credibility of Rumsfeld's determination in defense transformation. This concession to systems defenders constitutes a victory for the conservative-wing in the defense community in the US and beyond. "Democracies, comments Sapolsky (2001: 34), are motivated to buy weapons for what can be best expressed as combinations of survival panics and desire for pork [...] Without an acknowledged and believable enemy nearly all weapon purchases tend to look like the distribution of pork to most outside and even some inside observers."

In May 2002 Donald Rumsfeld has decided to kill the *Crusader*, a mobile artillery piece initiated in 1994 and to be deployed in 2008. This program is expected to cost \$11 billion (of which \$2 billion has been spent already). This battle will reveal if the announced "revolution in procurement" can survive to the attacks of lobby groups from armed forces, decision-makers and industrials. Already the House of Representatives has reintroduced some credits for the Crusader into the 2003 budget; and one may expect that the Senate will follow this strategy in forthcoming weeks—even though president Bush threatens to veto any bill giving budgetary support to this program.

Thanks to huge increases in fiscal year 2003, Donald Rumsfeld is able to please almost everybody. He can support the development of new systems that are going to transform defense while preserving old programs fiercely defended by vested interests... and *The Economist* to comment: "despite the president's vow to 'skip a generation' of weapons, Mr. Rumsfeld had lost his battle with the old guard". Although the American situation can be criticized without being critical, one may wonder if the European countries will be able to satisfy their armed forces' true needs while their defense expenditures do not increase as strongly as the American one. The long-run impacts of procurement inertia may undermine the ability of European armed forces to realize their missions.

7. Beyond the Budgetary Illusion: Alternative Approaches for Defense Policy

It is worth now sketching the argument developed in previous sections along the following four points:

- 9/11 events have given for the first time shape and content to the notion "unforeseeable threats" supposed to fill the space left by the collapse of Soviet Union. As a result, there is a growing pressure to consider terrorism as the new horizon for war, the definition of threats and enemies, and strategic analysis. However, beyond the confusion and concerns risen by such an approach, it eventually proves inefficient to characterize in a proper way the new strategic setting.
- To capture the radical change under way, the role of asymmetry proves quite helpful, if taken seriously—i.e. understood as a deliberately heterogeneous alternative avoiding direct confrontation to target the largest power's weaknesses, and not a simple disguised respectable name for Rogue States.

- This can be interpreted in the frame of game theory—which has an intricate relationship with military strategy since its origins—as not only differences in rules of behavior, but also more fundamentally the loss of a common norm. From then on, there is not automatic solution to the game (equilibrium). Therefore the challenge for defense policies is first to imagine the outline of new possible strategic solutions and contribute to their adoption and consolidation.
- In this perspective, it is likely that usual meaning and reality of war, weapons, armies will be deeply revised and altered. Logically, this should have serious direct consequences on the weapons procurement, defense budget and DITB. The gap can only widen between new answers and approaches resulting from asymmetric threats and the institutional, technological, and industrial legacy inherited from the program-based military-industrial complex (without any judgement about this expression).

Confronted with the above elements the American answer, which basically consists in a huge and sudden increase in the defense budget, should hardly be viewed as a model for other countries—in particular Europe. First macroeconomic constraints within the European Union prevent new deficits and focus on an budget equilibrium. Increasing military expenditures would force member States to cut proportionally other public spending, a option that seems very unlikely. Secondly any increase in defense budgets without a drastic restructuring of its content cannot efficiently address the problems we previously characterized. Given such a context this leaves only two possible solutions: either to improve the current system and its organization to increase efficiency and overcome identified failures; or to move towards an entirely different structure backed by a radically alternative defense policy.

The second option would require a dramatic upheaval of current defense procurement policies as well as DITB, requiring a strong political commitment. This might therefore seem utopian to many. Moreover the very definition of such an alternative approach would require in practice a long-term iterative process with the active implication of every player involved: government, services officers, armament firms, banks and financial institutions, researchers... Such a huge task obviously exceeds the scope of an academic paper. However, we believe that our previous methodological discussion allows us to derive some interesting conclusions on the overall rationale and guidelines for such an alternative approach. Our objective here is to kick off a renewed debate and provoke contradictory exchanges on possible solutions. We will then deliberately ignore practical difficulties, implementation problems, and political stakes—to strictly focus on logical consequences of our assessment on conceivable defense policy.

Both asymmetric threats and the lack of an established solution for the strategic game (indicating defense policy targets and weapons systems design) actually emphasize the crucial role of reactivity and flexibility in weapons procurement. Anticipation and evaluation of adversaries' expected initiative or answer cannot alone direct the definition and design of new military equipment. In recent years we noticed that US and European armed forces have increasingly used existing weapons (incrementally) modified according to the specific conflict's environment (technology, climate, geography...). In some cases they even engaged prototypes (like drones in Afghanistan) or made-to-measure equipment (e.g. electronic counter-measures pod for the French *Mirage* strikers in Bosnia). This trend is likely to expand

and may even become the norm in tomorrow's warfare landscape. If considered seriously this assumption has direct implications on defense R&D and industrial organization.

In this respect it seems wiser to give up an overwhelming bias towards technological superiority and the continuous sophistication in a small number of existing systems. Defense policies may give precedence to a greater technological diversity. Commanding a wide range of potential technologies will be the decisive asset to design and put into service within a very short timeframe the relevant equipment against new emerging threats. R&D effort would focus on the validation in the largest possible number of technical trajectories, from their scientific basis till feasibility (pre-development) tests. The goal is to reach the point where one can expect, if political order is given with a high priority in the use of resources, the development of a prototype in a 6-12 months delay. This would result in a shift of budget allocation to scientific upstream research (at the expense of programs' development spending), but also an emphasis on testing activities and facilities. This approach may finally open further opportunities and original forms of relationships with the civilian industrial and technological base, giving a new momentum to the notion of "duality" and associated policies.

At the same time defense industry would face an even greater challenge: moving from a program-based planned development and mass production frame to an "on demand" delivery of a small sets of prototypes or (highly) modular systems. Their core business would be to select the most efficient solution within the technological base (not only the defense one), and rapidly design a prototype that can be produced quickly and at an affordable price even on a small scale. A high specialization of weapons systems (at least subsystems), an expected short lifetime, and limited series are the central conditions for a successful development without a dramatic cost explosion. Besides a modular approach leads to a drastic upheaval in existing system design methods and tools. Traditionally a major defense system is conceived to support the complex integration of numerous functions on a single platform to get a multi-purpose weapons. In a modular architecture, the priority is to allow and facilitate in the most flexible way changes in (addition and removal) functions according to identified threats. Future weapons systems will then combine the necessary functions to cope with them, but only them.

Let us now briefly list some policy implications of this very preliminary exploration. First the nature of critical capabilities in DITB is radically affected. Priority shifts from capital intensive production lines and development units to basic research teams, testing facilities, and flexible prototyping plants (and production lines). This has multiple consequences: on defense firms' boundaries, their assets' definition and value, the efficient combination of civilian and defense activities, the national and European industrial policies...

Second, regarding the budgetary dimension, the planning of procurement spending over five years (as in the French Military Programming Law) loses its very rationale in an approach based on flexibility, technological diversity, prototyping and modular equipment. Only a limited number of retained long-term heavy weapons lies within this planning exercise, which scope, means and importance could then be vastly reduced.

Third the institutional framework devised for supervising the production of weapons through major programs cannot fit this new environment (and requirements) without new institutional reforms. However, contrary to the 1990s plans basically aimed at reducing costs and improving overall efficiency in DITB, the goal here will be to transform fundamentally

the mission of defense institutions: Ministry services, procurement agency, research centres... The revised role of each player might contribute to two new objectives on top of the agenda—first building and maintaining a diverse base of ready-to-use technological capabilities, and secondly facilitating and supporting a flexible industrial base for prototyping and modular systems production.

It will be interesting to see if the first reply to 9/11 events—a huge increase in the U.S. defense budget—is relevant or, more specifically, if these unexpected resources are allocated to the right needs. H.L. Mencken once wrote, "for every complex problem, there is a solution that is simple, neat, and wrong". We might hope that forthcoming decisions about defense procurement are going to invalidate that idea. One positive fact is that armed services' passion for new technology and advanced systems (which exists at the same time that a conservative approach of systems demand) is most of time frustrated by contractors' demands to keep older, more profitable armament in production. This situation could help to enlarge the window of opportunity for new, emerging technologies and systems in forthcoming years.

Actually the battle to transform the way arms procurement works might be truly tough. However this challenge is crucial to get value for money, especially in European countries which spend less than fifty percents of the U.S. defense budget. Moreover a better allocation into public budget can improve the image of defense in the public opinion and help to maintain or increase the public funding allocated to military issues. Indeed defense transformation cannot occur in one year, or even in a decade. This goal is an ongoing process, a revolution in minds.

8. Bibliography

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