The future of allied air power

The United States Air Force

Brad W. Gladman
Canadian Forces Aerospace Warfare Centre
DRDC - Centre for Operational Research and Analysis

Defence Research and Development Canada

Scientific Report
DRDC-RDDC-2014-R82
October 2014

Abstract

This Scientific Report is the first in a series of reports for the Commanding Officer of the Canadian Forces Aerospace Warfare Centre. Their purpose is to inform discussions of capability and concept development within both the Royal Canadian Air Force (RCAF) and the Canadian Armed Forces (CAF), as well as providing an important input into Canadian policy development. The methodology adopted begins with an analysis of the policy and supporting strategy framework of, in this case, the United States (US) to develop an understanding of the direction being given to its military on the areas of the world and threats against which it is to prepare. On the basis of this understanding of the key tenets of US strategic thinking it is possible to identify those concepts and capabilities being developed to prepare the US Air Force (USAF) to meet those threats. The findings of this analysis are that the new Air/Sea Battle concept is a main pillar of US strategic thinking, and one with capability development implications for the RCAF and CAF in general. At the same time, the USAF is seeking to find cost-effective means to project effective air power into low- to mid-intensity conflicts such as the ongoing mission in Syria. When completed, this larger analytical effort could serve a range of functions within the Department of National Defence and the CAF, from focusing RCAF capability and concept development through to informing joint force and policy development.

Significance to defence and security

This Scientific Report is the first in a larger analytical effort that when completed will have a significant impact on the policy development community, and will help to provide a focus to RCAF and CAF concept and force development. Through the development of a more comprehensive understanding of the orientation, threat perception, and capability and concept development efforts of Canada's key allies this analytical effort will identify areas that RCAF and CAF concept and force development communities need to explore to ensure the CAF maintains its position as a trusted and capable ally. Moreover, the general analytical approach developed in this report, of creating and using an understanding of 'future warfare' as the main methodology for force development across the services, is recommended for wider use.

Résumé

Le présent rapport scientifique est le premier d'une série de rapports à l'intention du commandant du Centre de guerre aérospatiale des Forces canadiennes. Leur but est de guider les discussions sur le développement de capacités et de concepts au sein de l'Aviation royale canadienne (ARC) et des Forces armées canadiennes (FAC) ainsi que de présenter des renseignements importants pour le développement de la politique canadienne. La méthodologie adoptée a d'abord consisté à procéder dans le présent cas à une analyse de la politique et du cadre de la stratégie d'appui des États-Unis en vue d'acquérir une compréhension de l'orientation que ce pays donne à ses forces armées quant aux régions de la planète et aux menaces contre lesquelles elles doivent se préparer. En fonction de cette compréhension des principes clés de la pensée stratégique américaine, il est possible de cerner les concepts et les capacités développés en vue de préparer la Force aérienne américaine (USAF) à faire face à ces menaces. Cette analyse permet de conclure que le nouveau concept de combat aéroterrestre est un pilier principal de la pensée stratégique américaine et qu'il a des répercussions sur l'ARC et les FAC en général pour ce qui est du développement des capacités. Parallèlement, l'USAF cherche à trouver des moyens économiques de projeter efficacement sa puissance aérienne dans le cadre de conflits dont l'intensité est de faible à moyenne, comme la mission actuelle en Syrie. Une fois mené à terme, ce grand projet d'analyse pourrait être utile dans le cadre d'un large éventail de fonctions au sein du ministère de la Défense nationale et des FAC, qu'il s'agisse d'orienter le développement des capacités et des concepts de l'ARC, de guider le développement des forces interarmées ou d'éclairer l'élaboration des politiques.

Importance pour la défense et la sécurité

Le présent rapport scientifique est le premier à être établi dans le cadre d'un grand projet d'analyse qui, une fois mené à terme, aura une incidence importante sur la communauté chargée d'élaborer les politiques et aidera à orienter le développement des forces et des concepts de l'ARC et des FAC. En acquérant une compréhension exhaustive de l'orientation, de la perception des menaces et des efforts de développement de capacités et de concepts des alliés clés du Canada, ce projet d'analyse permettra de cerner les domaines que les communautés responsables du développement des concepts et des forces de l'ARC et des FAC doivent explorer pour que les FAC conservent leur statut d'allié digne de confiance et compétent. De plus, il est recommandé d'utiliser à plus grande échelle la démarche analytique générale mise au point pour le présent rapport et ayant consisté à acquérir et à utiliser une compréhension de la « guerre de l'avenir » comme principale méthodologie de développement des forces dans les trois armées.

Table of contents

List of figures

1 Introduction

The formulation of coherent and enduring defence policy, and concomitant supporting strategy, for a country the size of Canada with its interests in many regions around the world is no simple matter. It is a task further complicated in times of fiscal austerity and declining defence budgets, and by a dynamic security environment where calls for a military response can come with little warning. Ensuring the Canadian Armed Forces (CAF) has the right set of capabilities to meet domestic defence requirements, to make meaningful contributions to deployed coalition or national operations in support of Canadian interests, and to have those capabilities available at high readiness and with the right force posture can seem a daunting task. Fiscal austerity and dynamic security environments are nothing new to the CAF and the Department of National Defence. But at such times clear and pragmatic strategic thinking is all the more necessary to create a defence policy that is sufficiently clear in its articulation of expectations and levels of ambition to guide capability investment and concept development to build a suitable military.

As with many of its key allies, Canada has long built its defence policy upon assessments of the strategic threat environment in the context of the nation's geostrategic imperatives. Indeed, any rational defence policy formulation would be wise to do so to avoid immediate irrelevance. Thus, Canadian defence White Papers and policy statements invariably include assessments of the key threats or defence trends of concern to the Government of Canada.[1] Typically these policy statements combine recent operational successes and policy triumphs with descriptions of the expected challenges about which the government of the day is concerned. The start point normally is a framework for Canadian defence which provides a hierarchical description of the three enduring roles for the Canadian Armed Forces (CAF). As expected, the top priority always is the defence of Canada and its approaches. A close second, indeed often stated as almost on an equal footing with the defence of Canada, is the cooperation with the US in continental defence. A third priority, recently more directly linked with continental and domestic defence, is the contribution to deployed operations tied to Canadian interests and international security in general.[2] These three broad priorities can accurately be referred to as Canada's geostrategic defence imperatives, and thus transcend political ideology or individual proclivities. Yet these three broad defence roles often are not delineated sufficiently to allow for coherent strategic-level planning. Some of the largely missing elements are sufficient granularity to the three defence roles, including the government's level of ambition and commitment of resources, and in that context a means to orient the CAF's force generation, force integration, and force development efforts to prepare effective military capabilities. This is perfectly understandable, given the uncertainty in which defence strategic planning must operate – both politically and because of the

[1] For examples of this trend, see Government of Canada, *White Paper on Defence* (Ottawa: Queen's Printer, 1964), 6-16; Government of Canada, *Defence in the 70s: White Paper on Defence* (Ottawa: Queen's Printer, 1971), 1, 3-13; Government of Canada, *Challenge and Commitment. A Defence Policy for Canada* (Ottawa: Minister of Supply and Services Canada, 1987), 4-16; Government of Canada, *A Role of Pride and Influence in the World: Defence* (Ottawa: Her Majesty the Queen in Right of Canada, 2005), 6; Government of Canada, *Canada First Defence Strategy* (Ottawa: 2008), 6.

[2] Government of Canada, *White Paper on Defence* (Ottawa: Queen's Printer, 1964), 13-15; Government of Canada, *Defence in the 70s: White Paper on Defence*, 17, 25, 32, 39; Government of Canada, *A Role of Pride and Influence in the World: Defence*, 16, 21, 24; Government of Canada, *Canada First Defence Strategy*, 7-9.

nature of the strategic environment. What would assist those efforts is a better understanding of the direction Canada's key allies are taking in terms of threat perception and capability investment and concept development through which to combat those threats. Thus, while it may be banal to point out the importance of getting defence procurement and concept development decisions right, doing so requires the correct focus and a consciousness of the Canadian defence reality.

The primary purpose of this paper is to assist in focusing the Canadian Forces Aerospace Warfare Centre's (CFAWC) concept development and experimentation efforts through an analysis of, in this case, the direction the US Air Force (USAF) seems to be taking in terms of major capability investment and concept development over the next ten or so years. While this will not be an exhaustive list of all the USAF's capability development efforts, and will not deal with current capabilities that may be modified or adapted to meet operational requirements, it will highlight the current driving forces behind US strategic thinking, and will focus on the main areas of USAF capability investment and concept development. The selection of the USAF in isolation is intentional to keep the paper a manageable size, but it is acknowledged that subsequent papers dealing with United States Naval and US Army aviation will be needed to provide the kind of comprehensive understanding of US capability and concept development direction of value to the Royal Canadian Air Force (RCAF) and CFAWC.

That said, since the USAF will remain the principal coalition partner and, through the North American Aerospace Defence Command (NORAD), a partner in continental aerospace defence its selection as the starting point for this analytical effort is logical. Yet even a comprehensive understanding of the US capability and concept development is insufficient for the purpose of setting the context around Royal Canadian Air Force (RCAF) concept and capability development, since the fiscal realities brought about by the recent economic down-turn suggest the US may return to its more traditional role of limited military engagement in areas with threats to critical or key US interests. Canada may find itself in an expeditionary coalition operation without the US as the lead nation. Thus, other papers centring on other key allies will follow this one to provide a more comprehensive picture useful for RCAF capability and concept development, and which taken together could assist in the development of a 'future air warfare' input into CAF joint force development.

This more comprehensive awareness of the directions Canada's allies are taking also could serve as an important input into policy formulation discussions, which form the first crucial step in the preparation of a lucid national response to the threats facing the nation and its interests.

The analytical framework adopted for this and subsequent reports in this series will start with an understanding of the policy and grand strategy framework of the country in question. Each nation's geostrategic imperatives, views of the world and perceived threats, and policy goals are different, and even close allies often have conflicting interests and differing policy goals. How nations conceive of the threats faced in the context of their unique geostrategic imperatives, and then formulate policy goals and supporting strategies is an important element in determining their orientation in terms of how resources will be applied, and military capabilities and concepts developed. While it is true that many variables outside of national security and defence policies and strategies, such as the defence industrial base, technology developments, and politics do exert an influence on strategic planning, the importance of national security and policy goals and the strategies that support them cannot be understated. It is this direction and guidance, if clear,

relevant, and consistent, that identifies the threats against which planning will occur, focuses attention on areas of the world and countries of interest, and specifies the nation's level of ambition. This, in turn, makes much easier the development of supporting strategies to commit resources, and the identification of capability gaps and concepts in need of development to meet clearly stated goals. In short, the existence of clear policy goals focuses defence planning efforts. That said, as Field Marshal Helmuth von Moltke the Elder once said "no plan survives contact with the enemy", and the unexpected actions of an adversary or other factors that complicate the plan often have unintended consequences.[3] Thus, the formulation of clear policy goals and strategies is no guarantee of success, but it is important to note that success is made far more likely with such a clear policy and strategy framework. With the understanding of this framework, the reports will analyse the capability investment and concept development of the nation's air force, and draw out the implications of this for the Canadian context, and the RCAF in particular.

[3] Correlli Barnett, *The Swordbearers: Studies in Supreme Command in the First World War* (London: Eyre and Spottiswoode, 1963), 35.

2 The need for strategy

There is an important difference between the terms 'policy' and 'strategy' that is often overlooked. Many nations tend to conflate policies and strategies into products which are neither, but instead are elements of both. In somewhat simplistic terms for the defence establishment, the defence policy sets the target that consists of, hopefully, clear statements of what a government expects its military to be able to accomplish in a given timeframe, the threats against which it is to prepare, and its level of ambition in terms of capabilities, capacities and the ability to sustain operations. From there, a defence strategy can be developed which would articulate a roadmap by which resources would be committed to develop the means to attain the policy goals. Without both the clear target of a defence policy, which itself supports a national security policy, and the defence strategies, which include a national military strategy and supporting service and joint strategies, defence planning becomes all the more and unnecessarily complicated. Again, it should be noted that even in the context of clear policy and creative strategy there is no guarantee of success. There are numerous factors, such as the defence industrial base, technology developments, and politics that do exert an influence on strategic planning with or without clear direction, but its presence does mitigate those problems as much as possible and provides some focus always needed but particularly when defence budgets are tight. The conflation of these very different things – policy and strategy – unnecessarily complicates coherent defence planning.

In practice, however, the relationship between policy and strategy is more intricate than is typically acknowledged. In most Western nations, where the democratic tradition is sufficiently well-established to make the civilian control of the military crystal clear, there is a need to get past that focus. The notion of the military overthrowing civilian rule should be reserved for nations where this is not an absurdity, and instead the focus should be on developing a structure and processes for clear dialogue between civilian and military leadership to harmonise their effects. While in general it is safe to say that strategy follows from policy, advice from the military should follow structured organisational pathways to the civilian leadership in order to formulate attainable policy goals and expectations to meet anticipated threats. At the same time, the development of military strategies for peace-time force development and managed readiness, and during war-time operations, must be made with an understanding of government policy. The nature and changing character of warfare has a reciprocal effect on policy goals, at times forcing a shift in those goals to meet an evolving situation. Thus, while flowing from policy the formulation of coherent strategy is not as subordinate in practice as the purist might desire. The two remain symbiotic to a degree, and thus a clear national security architecture is needed by which advice and expertise can flow unfettered even with the vagaries of personality.

Recently, some prominent scholars have argued that the "United States has long suffered from a serious strategy deficit" stemming from, *inter alia*, a failure to understand the nature of strategy and how difficult, and yet essential, its formulation is to a reasoned national response to threats faced.[4] The debate about the evolution of the term 'strategy' is, of course, somewhat beyond the scope of this paper. Suffice it to say that the meaning of the term 'strategy' has changed from

[4] Colin S. Gray, "The Airpower Advantage in Future Warfare: The Need for Strategy," *Airpower Research Institute Papers Research Paper 2007-2* (Maxwell AFB Alabama: Airpower Research Institute, 2007), *vii* and 14. This sentiment is echoed by Hew Strachan in his forthcoming book *The Direction of War: Contemporary Strategy in Historical Perspective* (New York: Cambridge University Press, 2014).

what Baron Antoine-Henri de Jomini referred to in *The Art of War* as "the art of making war upon the map."[5] This definition lasted until the First World War and became the *raison d'etre* of the general staffs during the nineteenth century. It was something done by generals in a theatre of operations that involved manoeuvre and envelopment. It was in the boundaries with policy where problems were found. Many believed, as Moltke the elder told Bismarck in the Franco-Prussian war, that when war began the political leadership should remain silent until the victory was delivered.[6] Such a stark, and typically Prussian, statement was echoed across Europe, but even Moltke realised that "strategy works uniquely in the direction indicated by policy" even if "at the same time it protects its complete independence to choose its means of action."[7]

As historian Hew Strachan has pointed out, lately the word 'strategy' has been used with such imprecision that its meaning has been significantly weakened if not lost altogether. He argues it "has acquired a universality which has robbed it of its meaning, and left it only with banalities."[8] While this may overstate the case somewhat, it certainly is true that 'strategy' has been conflated with policy in recent times, and has lost some of its unique characteristics. For example, it is common to see governments developing strategies for the formulation of policy, rather than the traditionally accepted relationship where a clear and relevant policy allows for the development of a strategy to attain policy goals. For example, the UK Foreign and Commonwealth Office recently developed a strategy "for policy, public service delivery and organisational priorities."[9] In this case, policy goals no longer served as the target for the development of a strategy to attain those goals, but rather the strategy resulted in policy. Furthermore, strategy has far too frequently been used to describe a desired end-state, further confusing ways, means, and ends. In a speech to the International Institute for Strategic Studies, former President Bush argued that tyranny should be opposed by democratic states. To this end, the US would pursue "a different course, a forward strategy of freedom in the Middle East."[10] While a strategy can be developed to attain the admittedly nebulous policy goal of freedom in the Middle East, it would be a condition or desired end-state towards which the strategy is aimed, and not a strategy itself. Clear political decision-making leading to relevant policy upon which coherent strategy can be based has been the crucial element in the success or failure of military operations. According to Strachan, in

> the ideal model of civil-military relations, the democratic head of state sets out his or her policy, and armed forces coordinate the means to enable its achievement. The reality is that this process – a process called strategy – is iterative, a dialogue where ends also reflect means, and where the result – also called strategy – is a compromise between the ends of policy and the military means available to implement it.[11]

---

[5] Baron Antoine-Henri de Jomini, *The Art of War* (Philadelphia: J. B. Lippincott & Co., 1862), 69.
[6] Gerhard Ritter, *The Sword and the Scepter: The Problem of Militarism in Germany*, 4 volumes (London: Allen Lane, 1969-1973), vol.1, 187-260. Also see Hew Strachan, "The Lost Meaning of Strategy," *Survival,* Vol. 47 No. 3 (October 2005), 37.
[7] Hew Strachan, "The Lost Meaning of Strategy", 37.
[8] *Ibid.*, 34.
[9] *Ibid.,* 33.
[10] International Institute for Strategic Studies, "19 November 2003 – President Bush Delivers IISS Address," 19 November 2003, http://www.iiss.org/conferences/recent-keyaddresses/president-bush-delivers-iiss-address (accessed 21 February 2013).
[11] Hew Strachan, "The Lost Meaning of Strategy", 52.

If the alleged US 'strategy deficit' is true, it is a failing common to Western governments and militaries, stemming in part from the whims of politics and a desire to maintain flexibility in response. It also derives from a lack of precision in the use of terms and in the methodologies adopted to come to terms with the post-911 threat environment. The tendency to conflate terms like strategy and policy, war and warfare, and strategic planning and strategy development further muddies the waters and encumbers efforts to overcome this strategy deficit. More precision in the definition and use of these and other terms will assist in the formulation of clear policy goals, appropriate strategies for their attainment, and in the setting of military requirements for capability development.

As a specific example of the perceived US strategic deficit, it has been suggested that the

> 1998, 2000, 2002 and 2006 editions of the national security strategy of the United States all appear to be little more than lists of eminently desirable goals with hardly a hint as to how they might be achieved under existing resource constraints and in the face of active opposition from American adversaries.[12]

This seems to stem from a misapprehension of the difference between a policy goal or desired end-state, and the plan to apply resources to attain that end. The same can be said of the 2010 US National Security Strategy, which continues the pattern of listing the desired goals without much attention to the specifics of how they are to be achieved. A note of caution in this judgement is prudent, however, since the author only has access to the public version of these documents and it is possible that the specifics are contained in a classified National Security Presidential Directive. This would be in keeping with the long history of classifying one's strategy at the highest level "for the excellent reason that it is generally unwise to reveal one's strategy in all its particulars to the other side."[13] For example, both Truman's NSC 68 and Eisenhower's New Look strategy NSC 162/2 were classified Top Secret for this obvious reason. Yet it is unlikely that the virtual laundry list of goals and aims in the 2010 US National Security Strategy are central to US interests, or are in any way attainable. Included in the list are the eminently desirable goals of meeting the basic needs of the world's population, supporting the rights of women and girls, and drawing strength from diversity.[14] In any case, these are goals or desired end-states and not a strategy. At any rate, in practical terms it is difficult to connect these lofty goals with specific actions, and it certainly is debatable whether these goals are attainable using the levers of power available to the US President. Recent experience in Iraq and Afghanistan have highlighted the difficulty of even the world's most powerful nation to enact substantial societal change within a foreign state, and an argument could be made that although values underwrite thinking about national security policy and goals, a nations interests must be the driving force.

Other scholars recently have echoed this sentiment, calling for the return to the centrality of vital national interests in defining policy goals. One convincing argument calls for focus, vigilance, and relevance to "be the watchwords guiding future foreign and economic policy decisions."[15] Asserting, as past policy statements have done, values over interests "risks being of little value to

---

[12] Andrew F. Krepinevich and Barry Watts, "Regaining Strategic Competence", *Strategy for the Long Haul* (Washington: Center for Strategic and Budgetary Assessments, 2009), 11.
[13] *Ibid.,* 13.
[14] *The National Security Strategy of the United States* (Washington DC: The White House, May 2010), 37-39.
[15] See D.H. Burney, W.A. Dymond and J.L. Granatstein, "Linkage: Foreign Policy, Interests and Prosperity" (Calgary: Canadian Defence and Foreign Affairs Institute, 2008), 4.

anyone, and most notably to a nation's own interests."[16] Values are important, but "a nation's core values likely would be adequately captured in any clear articulation of its national interests."[17] While values "inform the choices we make, the alliances we forge, and the actions we take in global affairs…they are not ends in themselves nor principles that override determination of what our interests are and how they can be best served."[18] In either case, the ability to conduct military operations in support of national interests is constrained by the degree to which policy direction is forthcoming. The lack of policy direction also hampers, force planning, force posture and readiness, and force development efforts. The latter includes the difficulties in identifying capabilities to be acquired or developed and also those capabilities which can be divested, without clear policy goals. Even worse, the preparation of such plans based on guessed, inferred, or speculated estimation of the government's level of ambition can be undone by a more austere policy based on fiscal realities or differing expectations.

Ideally, national security strategy development should not take place without a clear policy statement describing the government's desired end-state in sufficient detail, and tied to the nation's critical interests. The subordinate components, including foreign and defence policy and concomitant strategies, must be tied to this higher direction of what the government expects and its level of ambition in those matters. Rational force development requires a dynamic civil-military interaction that includes a structured dialogue to push needed information to policy makers, and to have the government essentially put boundaries around which force development discussions can occur. As Sir Lawrence Freedman has said, "Strategy constitutes the creative element in any exercise of power. It involves the search for the optimum relationship between political ends and the means available for obtaining them."[19] The consequences of being directed by dysfunctional national policy and strategy development processes can be quite serious.[20] Yet the business of formulating national strategies is not easy, and mixing of ends, ways and means common.[21]

While certainly evident in the present, the problem of creating a clear policy end-state and strategic vision has eluded political leadership in the past, so it would be unfair to castigate modern leaders too much for their conflation of policy and strategy. Yet without a policy goal towards which both civilian and military action can be directed, the results often are disastrous. In 1914, for example, none of the Great Powers understood clearly the desired strategic outcome for the war in which they found themselves, or what that outcome would demand of them. The continual references to the conflict being completed and bringing the boys back home by Christmas illustrates the misunderstanding of the military realities faced. The conflict quickly became so expensive and appalling that continuing the struggle, and risking much more, seemed the only option. The political price of admitting that the enormous financial costs and the enormous casualties suffered even in 1914 had been a mistake would have been so grim that any

---

[16] *Ibid.*
[17] Brad Gladman and Peter Archambault, "A Role for Effects-Based Planning in a National Security Framework", *Journal of Military and Strategic Studies* Vol 13 No 2, (Winter 2011), 21.
[18] D.H. Burney, W.A. Dymond and J.L. Granatstein, "Linkage: Foreign Policy, Interests and Prosperity" (Calgary: Canadian Defence and Foreign Affairs Institute, 2008), 4.
[19] Lawrence Freedman, "Strategic Coercion," in Freedman, ed., *Strategic Coercion: Concepts and Cases* (Oxford: Oxford University Press, 1998), 14.
[20] Brad Gladman, *Continental Air Defence: Threat Perception and Response* (Ottawa: DRDC CORA TM 2012-257, November 2012).
[21] Andrew F. Krepenevich and Barry D. Watts, "Regaining Strategic Competence", *Strategy For The Long Haul Papers* (Washington: Center for Strategic and Budgetary Assessments, 2009), especially 5-14 and 33-44.

alternative was preferable. In this case, as often happens, this belief contrasted with the opinion of senior military officers. For example, Chief of the Imperial General Staff and German War Minister, General Erich von Falkenhayn, argued in late 1914 that Germany could not win the war and it would be better to make peace sooner, under more favourable terms. German Chancellor Theobold von Bethmann Hollweg, however, either could not or would not accept this interpretation and "informed Falkenhayn that he was prepared to fight to the bitter end, no matter how long it might take."[22] Thus, as has always been the case, the clear articulation of sound and attainable political goals is the essential first step to the formulation of effective national and military strategies. As the Germans discovered in both World Wars, effective performance at the tactical will be hard pressed to overcome the negative impact of unclear policy goals coupled with a flawed national strategy. Indeed, it is the only way to marry political 'ends' with resources by military and other partners – the 'ways' and 'means'. Supporting national security and military strategies are (hopefully) a map or the 'ways' the government and its instruments of power will be used to attain those ends. Those ends may or may not involve the use of military power, and the determination of what is and is not a military problem is complicated by the concomitant lack of a reasonably authoritative theory of 'war' and 'warfare' that can accommodate related theories of air, land, and maritime warfare.[23] Thus, any theory of war and warfare, and the resulting discussions of military capability requirements, cannot be divorced from those national policy and grand strategic goals, or indeed the fiscal realities, or it would lose any relevance.

[22] Holger Herwig, *The First World War, Germany and Austria Hungary, 1914-1918* (London: Arnold Publishers, 1997), 116-117.

[23] For some modern treatments of the role of civil-military relations in the development of strategy see Eliot A. Cohen, *Supreme Command: Soldiers, Statesmen, and Leadership in War* (New York: The Free Press, 2002); Edward N. Luttwak, *Strategy: The Logic of War and Peace*, revised ed. (Cambridge, MA: The Belknap Press of Harvard University Press, 2001); Harry R. Yarger, *Strategic Theory for the 21st Century: The Little Book on Big Strategy* (Carlisle, PA: Strategic Studies Institute, US Army War College, February 2006); Colin Gray, *Irregular Enemies and the Essence of Strategy: Can the American Way of War Adapt?* (Carlisle, PA: Strategic Studies Institute, US Army War College, March 2006), 31-32; Colin Gray, *Fighting Talk: Forty Maxims on War, Peace, and Strategy* (Westport, CT: Praeger Security International, 2007).

3 Sequestration and US strategic military planning

Before turning to the guidance to the US military in the form of US National Security and National Military Strategies, a bit of background is needed regarding the deadlock between the Obama administration and the Republican Party controlled Congress over an appropriate means by which to deal with the alarmingly high US debt and budget deficit. This polarization of views has resulted in some draconian measures being applied to the US budget that have thrown some chaos into US military strategic planning, capability investment, and concept development.

In the context of the 2008 economic down-turn, the US has finally reached the point that many Western nations reached decades ago, where dramatic defence spending reductions have been forced by economic reality. That said, the measures put in place by US lawmakers have been particularly harsh, and have affected the ability of the US services to invest in future capabilities. Thus, a brief outline of this situation is needed to understand the difficulties being faced by the USAF as it attempts to develop the capabilities needed to meet anticipated threats.

On 1 March 2013, the US Department of Defense budget was reduced immediately by $37 billion in the first wave of a series of planned cutbacks triggered by the Budget Control Act (BCA) and the failure of the special 'super committee' to reach an agreement on deficit reduction.[24] The automatic cuts were intentionally severe, reducing budgets across the board without consideration to where the axe would fall, excepting pay for US servicemen and women. The result of sequester, which "was not a policy designed to be implemented", was a degree of disarray in the US armed services.[25] It introduced

> senseless chaos into the management of more than 2,500 defense investment programs, waste into defense spending at the very time we need to be careful with the taxpayer's dollar, inefficiency into the defense industry that supports us, and causes lasting disruptions even if it only extends for one year.[26]

Yet on 1 March 2013 it happened nonetheless. The result has been confusion and a definite need to overcome the previously discussed 'strategy deficit' by crafting policy goals and considered strategies to deal with austerity while protecting US interests. Instead, some have argued, the President and Secretary of Defense have wasted the two years between the signing of the BCA and when its measures were implemented; time that could have been spent developing policy goals and a follow-on national and military strategies in line with the fiscal realities, and to match forces and development efforts to the attainment of those goals. Since the sequestration took place, those missed opportunities have been compounded by failing to develop a defence budget consistent with the cap imposed by the BCA. In its place, the Defense Department initially requested a budget that exceeded the BCA cap by $52 billion for the 2014 fiscal year, setting the stage for automatic cuts on the amount above BCA caps if no deal on deficit ceiling was

[24] Deputy Secretary of Defense Ashton B. Carter and Vice Chairman of the Joint Chiefs of Staff James A. Winnefeld Jr., "Prepared Testimony, House Armed Services Committee" (Washington DC, 1 August 2013), 3.
[25] *Ibid.,* 6.
[26] *Ibid.,* 1.

reached.[27] It was only after the Bipartisan Budget Act of 2013 (BBA), signed into law by President Obama on 10 December 2013, that the sequestration caps were raised for the 2014 and 2015 fiscal years in exchange for an extension of the caps into 2022 and 2023.[28] Consistent with the revised budget ceilings agreed to in the BBA, US defence funding was reduced "by $31 billion compared with the President's Budget request, and the FY 2015 President's Budget requested $45 billion less than was planned in the FY 2014 budget."[29]

Despite the desire to return to times of plenty, it is clear that lower US defence budgets are here to stay. The massive US deficit and debt make spending cuts essential, and the BCA has already been passed. It likely is more politically palatable to maintain it and avoid the political costs of reducing other entitlement spending such as Medicare or Social Security. Aside from the period immediately after the Second World War, when the US economy was performing extraordinarily well, the US debt is larger as a share of the economy than it has ever been.[30] It is at such times when the rational move is to overcome the 'strategy deficit' by crafting pragmatic policy goals and supporting national security and national military strategies that are affordable, and to restructure the US military to attain those goals. While some effort has been taken in this regard through the *Strategic Choices Management Review* ordered by Secretary of Defense Chuck Hagel, it is difficult to impossible to focus defence planning without clear policy goals.[31] As of the time this paper was written that grand strategic target has not appeared in the form of clear policy direction or an updated *National Security Strategy*. Moreover, the *2012 Defense Strategic Guidance* scarcely mentions budget reductions, and gives no useful guidance, aside from vague references to reducing the costs of doing business, on the Obama administration's level of ambition given the fiscal realities.[32] Again, a note of caution is warranted, since it is possible that those details are provided in the classified versions of this and other guidance documents.

The defence budget saga shows no signs of abating. In June 2014, for example, Defense Secretary Chuck Hagel argued that the US Congress was acting irresponsibly and making it more difficult for the US military to transition from thirteen years of war and to meet the world's new challenges.[33] In a speech a day after the House Armed Services Committee "unveiled its markup of the $521 billion defense bill for fiscal year 2015, Hagel charged that Congressional actions are

---

[27] Marcus Weisgerber, "DoD Looking at Sequestration Impact to 2014 Budget" *Defense News,* 5 June 2013, http://www.defensenews.com/article/20130605/DEFREG02/306050027/, (accessed 26 November 2013)

[28] Summary of the Bipartisan Budget Act of 2013, 10 December 2013, http://budget.house.gov/uploadedfiles/bba2013summary.pdf, (accessed 25 June 2014).

[29] *Estimated Impacts of Sequestration-Level Funding* (Washington: United States Department of Defense, April 2014), 1-1, http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2015/Sequestration_Impacts.pdf, (accessed 25 June 2014).

[30] US Government Accountability Office, "Financial Audit: U.S. Government's Fiscal Years 2013 and 2012 Consolidated Financial Statements", 27 February 2014, 13, http://www.gao.gov/assets/670/661234.pdf, (accessed 25 June 2014)

[31] Secretary of Defense Chuck Hagel, "Statement on Strategic Choices and Management Review", (Washington DC: Office of the Secretary of Defense, 31 July 2013), http://www.defense.gov/speeches/speech.aspx?speechid=1798, (accessed 27 November 2013).

[32] *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington DC: The White House, 3 January 2012), 7.

[33] Sandra I. Erwin, "Hagel: Congress Needs to Get Real About the Defense Budget", *National Defense* vol. 98, Issue 727 (June 2014).

preventing the military from investing in its future and adjusting to fiscal reality.[34] In particular, the 2015 bill "puts the kibosh on Pentagon proposals to curb the growth of military pay and benefits. It also bans the Defense Department from mothballing aging aircraft such as the A-10 attack plane and the U-2 spy plane. The bill also impedes the retirement of an aircraft carrier and opposes base closures."[35] The other side of that coin will force the Pentagon to offset these planned cuts through cuts in other areas of the defence budget, which includes capability investment and the degree to which it can develop and experiment with new concepts.

From a policy perspective, and with this discussion of the strategy deficit in mind, the US position is somewhat unclear, leading to diverse interpretations on how to attain the somewhat unclear goals articulated in the various strategies. This has become all the more acute in the context of the new fiscal reality imposed by the Budget Control Act's sequestration of defence funding. That reality shows no signs of changing in the foreseeable future, and thus the US (like most of its allies) should seize the opportunity to develop national security policies and follow-on strategies that it actually can afford, those which will reshape the US military to meet its national interests. That said, and while the road from US policy to strategy to capability investment is not as clear as the purist would like, it is possible to draw out the threats against which the US government is directing supporting departments and agencies to prepare.

[34] *Ibid.*
[35] *Ibid.*

4 US threat perception: Geostrategic imperatives

Each nation faces a set of imperatives it must achieve, often determined by geography, relative power, and national ambition. Those imperatives often serve to crystallize a nation's perception of the threats to its critical interests. While geostrategic imperatives are seldom stated outright by a nation's leadership, they do serve as intuitive guiding principles that most political leaders follow, regardless of their ideological proclivities.[36] This is not to say that all actions or decisions are determined by these imperatives, only that geography and the 'neighbourhood' in which a nation finds itself can affect profoundly the courses of action available. For this reason, while some statesmen have the ability to shape foreign policy, that capacity often is constrained. The President of the United States is habitually characterized as the most powerful individual on the planet. While this is no doubt true, even the President's ability to act in international affairs is shaped strongly by these imperatives.

Most of the geostrategic imperatives of the US have been satisfied, but given the geography of the United States and its 'neighbourhood', this is hardly surprising. The first and most important of these imperatives was the securing of its place in the continent, something accomplished by the end of the 19th century. Rising from its coastal colonial roots made US leaders acutely aware of their vulnerability to British sea power. Moving inland was a natural way to attain some strategic depth and reduce this vulnerability by developing domestic markets not dependant on the sea. The discovery of the greater Mississippi river basin and the world's most productive stretch of contiguous agricultural land combined well with the low costs of moving goods along the river. This has made the development of capital a much easier prospect than for its neighbours on the continent, or indeed for any nation on earth. The increasing economic power of the US led to a growth of population and developed its strength to a point that, by the end of the 19th century, saw the practical elimination of all land-based threats in the continent.

The second major imperative of controlling the world's oceans and in particular the ocean (and later the air) approaches to North America has taken somewhat longer. It was only after the end of the Second World War that the strength of the US Navy and Air Force has allowed the free flow of goods by sea to foreign markets. The resulting domestic prosperity and US economic power has seen it take its place at the helm of the world's economy. It might even be argued that the world economy is as much dependant on the presence and strength of the US Navy and Air Force as on any other institution. Any regional or global challenge to this predominance certainly will draw the attention of the United States.

The final imperative of the US is to prevent the rise of any potential challenger to its position in the world. That often unspoken imperative is difficult to attain and yet something towards which the US will continue to strive. As Zbigniew Brzezinski (former National Security Advisor to President Jimmy Carter) put it, "the three grand imperatives of imperial geostrategy are to prevent collusion and maintain security dependence among the vassals, to keep tributaries pliant and protected, and to keep the barbarians from coming together."[37] While it is not suggested that the

[36] For a discussion of geopolitics see Nicholas J. Spykman, *The Geography of the Peace* (New York: Harcourt, Brace & World, Inc., 1944), 7.
[37] Zbigniew Brzezinski, *The Grand Chessboard: American Primacy and Its Geostrategic Imperatives* (New York: Basic Books, 1997), 40.

US has imperial designs, the last maxim in particular does apply. In seeking to maintain its unrivalled position of prominence, the US must maintain a balance of power in regions containing potential challengers, using regional allies to check their rise, and prevent the formation of blocks whose power might rival its own. In so doing a series of levers of US power must be used, hopefully in a coordinated way towards a clear policy goal. US military strength and relevant capabilities to deal with adversaries' strategies – recently, the most notable of which has been anti-access/area denial strategies – must underwrite and give strength to diplomatic and other efforts to gain and maintain allies in contested regions. Ideally, the diplomatic efforts must be coordinated in the context of an overriding vision for US foreign policy, one that makes clear how efforts in each area of interest combine towards the goal.

Indeed, some scholars have argued that the lack of an overriding vision for the Obama Administration's approach to foreign policy has been its major weakness, one betraying both a lack of ambition and an ignorance of history.[38] To past successful presidents, having a clearly articulated overriding vision has served to give foreign policy a sense of mission. Ronald Reagan, who had the existential Soviet threat to counter, had a very clear foreign policy conception and message which unified all the constituent parts of the US foreign policy machine with a clear message and narrative. Whether one believed in it or not, having a clear vision for US foreign policy knitted together the efforts in each of the world's very different regions. Without such a vision, and in the context of a war-weary and economically weakened US public, why the various regions in which blood and treasure are being expended matter to homeland security and US economic strength has been very difficult to explain. During his first term in office, President Obama said his focus would be to end the costly wars in Iraq and Afghanistan, to avoid future wars, and to kill terrorists where possible. None of these goals, or so opponents of President Obama would say, give the same sense of mission as Ronald Reagan's 'defeat of Communism' or Woodrow Wilson's ultimately failed attempt to spread democracy. Without the grand unifying conception, it is much more difficult to connect the actions (military and diplomatic) in each region towards a desired goal. The result is likely to be a great deal of important but diffuse action, the total of which is not greater than the sum of its parts. Moreover, adversaries and allies both seem to have viewed the lack of a clear foreign policy vision as "a period of drift and vulnerability in American foreign policy", enabling them to act as they wish in pursuit of their regional ambitions.[39] Those adversaries have not been deterred by a clear foreign and defence policy vision backed by the threat of action, and that in itself has emboldened them to act without fear of serious US reaction.

Other scholars counter that argument by saying that "Obama is neither an out-of-his-depth naïf nor a reactive realist. He has been trying to shape a new liberal global order with the United States still in the lead but sharing more responsibilities and burdens with others where possible or

[38] For a contrary view, see Victor Davis Hanson, "Obama's Ironic Foreign Policy" *Victor Davis Hanson Private Papers* (16 December 2013), http://victorhanson.com/wordpress/?p=6838#more-6838, (accessed 14 February 2014). Hanson argues that the retreat of the US from the global stage is intentional and generally supported by the US public.

[39] Walter Russell Mead, "Grand Strategy: The End of History Ends" *The American Interest* (December 2013), http://www.the-american-interest.com/wrm/2013/12/02/2013-the-end-of-history-ends-2/, (accessed 7 January 2014).

necessary."[40] In so doing he would be attempting to restore a traditional pattern of US foreign policy as it did in the First and Second World Wars, of allowing events to play out to a point where critical US interests are threatened and only then to employ US military power. Up to that point, other levers of US power certainly would be used as needed, but allies would be relied upon to carry the burden. This approach will function only if allies are willing and able to do so, which given the economic state of most traditional European allies has proven elusive.[41] If this return to what could be described as a more traditional US approach to foreign policy is what President Obama is seeking, it is difficult to explain why he seems to have a great deal of difficulty in putting all the pieces together to sell it to a US public fed up with foreign engagement. It is almost as though his administration is caught in the paradox of a desire to act in the world on idealist principles with the day-to-day demands on a President to act as a realist.

What the recent fighting in Syria, Iraq, and Ukraine has demonstrated, however, is that the degree with which the US can avoid involving itself in the world is limited given its position and global interests. To put it another way, the US cannot avoid interacting with the world, as one way or another the world will interact with the US. This is not to say that involvement in the world has to be military, or that the military option is the only or best option. But avoiding war requires the sophisticated use of other levers of power and different methods, while still having the credibility of a capable military and the willingness to use it. In this regard, the example of President Dwight Eisenhower is somewhat instructive. The former general avoided involvement in a major war during his two terms in office. His decisive action using other elements of US power at key times like the 1956 Suez Crisis, and his reputation as a general willing and able to use the powerful US military, prevented escalation of crises where a miscalculation may have led to a major war. Not all successful US Presidents have been retired generals; but it is essential that each President understand US geostrategic imperatives and tie that understanding to a clearly articulated vision in policy and strategy documents that knit together all the local and regional interests into a coherent whole that can focus the efforts of subordinate organizations towards their attainment. Moreover, successful Presidents (and political leadership in general) must understand the nature of the various levers of power of their office, including when and where to threaten the use of force as well as when and where to use it. In so doing, the timely advice from experts made available through structured and formalized organizational pathways as part of the national security architecture is needed to provide leadership with the information upon which to make the best decision to advance national and allied interests.

The purpose of this brief discussion of US geostrategic imperatives is not predictive, but merely to serve as a contextual backdrop for discussions of the current threat environment from the US perspective and to help explain why the US acts as it does.

4.1 Perceived threats and political direction

From the previous discussion, it is clear that one of the main geostrategic imperative the US generally follows is to prevent the rise of a potential challenger, and if one arises to contain and

[40] Martin S. Indyk, Kenneth G. Lieberthal, and Michael E. O'Hanlon, "Scoring Obama's Foreign Policy" *Foreign Affairs*, Vol.91 Issue 3 (May/June 2012). Also see Martin S. Indyk, Kenneth G. Lieberthal, and Michael E. O'Hanlon, *Bending History: Barack Obama's Foreign Policy* (Washington D.C.: Brookings Institution Press, 2012).
[41] Colin Dueck, "The Accommodator: Obama's Foreign Policy", *Policy Review* Issue 169 (Oct/Nov 2011), 22.

limit its options in order to maintain a balance of power in key regions.[42] Many countries have followed this general approach to foreign policy, including the British at the height of their global power.[43] In no way is this an attempt to draw a parallel between British Imperial designs from the 15th to the early 20th centuries with the foreign policy of the US, but simply to emphasise that it is common for great powers to attempt to prevent the rise of, or contain and limit the options of, potential challengers or those who might threaten their interests.

The regions from which modern challengers to US power could rise and the means by which that rise is afforded have varied from the Cold War ideological confrontation with the Soviet Union. The more recent manifestations of potential challengers include the potential rise of an Islamist caliphate in a region of the world holding a strategic resource, and the more recent rise of a regionally aggressive and expansionist China. The means used to contain and limit those adversaries will differ with the specific threat, and there are a great many areas of the world requiring US focus. Yet despite demands for US attention around the world, its bandwidth and ability to focus sufficient resources on multiple areas of interest is limited, as is its ability and present interest in prolonged and costly military campaigns. As Michael Mazarr of the US National War College has written, "A Great Power's strategic reservoir of attention is not infinite".[44] Too much focus on one area causes other areas to be neglected to some degree, allowing regional powers to shape the dynamics in their part of the world. The Middle East still holds US attention, for obvious reasons, but the US focus on that region over the last dozen years has permitted the resurgence of the Russians in their own near abroad. Despite a commitment to the 'Pacific rebalance' (initially called the Pacific pivot), the continued focus on the Middle East caused by the Afghanistan conflict, the Syrian conflict, and the recent unrest in Iraq have proved a continuing distraction for the US. Recent missed meetings with potential key allies in the Pacific likely have sent a clear message about the Obama administrations priorities and its degree of commitment to the 'Pacific rebalance'.[45] Indeed, as stated earlier, the lack of an overriding vision for US foreign policy and the lack of clear policy goals leading to grand and military strategies has been a major problem for the US.

---

[42] Arthur Moore, "The Asia Pivot: Old Policy, New Name" *Geopolitical Monitor* (9 February 2014), http://www.geopoliticalmonitor.com/the-asia-pivot-old-policy-new-name-4920/, (accessed 11 February 2014).

[43] David French, *The British Way In Warfare 1688-2000* (London: Unwin Hyman, 1990), 1. Also see Gerald Nicholson, *Marlborough and the War of the Spanish Succession* (Ottawa: Queen's University, 1955), Winston S. Churchill, *Marlborough: His Life and Times* (London: George G Harrap & Co, 1934), and J. F. Bosher, "The Franco-Catholic Danger, 1660-1715," *History* Vol. 79 Issue 255 (February 1994).

[44] Michael Mazarr, "The Rise and Fall of the Failed-State Paradigm" *Foreign Affairs* (January/February 2014), http://www.foreignaffairs.com/articles/140347/michael-j-mazarr/the-rise-and-fall-of-the-failed-state-paradigm, (accessed 18 December 2013).

[45] Victor Davis Hanson has argued that the Pacific Pivot is "is mostly a linguistic artifact, not a muscular reality", see "The World's New Outlaws: With America's presence in the world receding, regional hegemons flex their muscles" *National Review Online* 3 December 2013 http://www.nationalreview.com/article/365292/worlds-new-outlaws-victor-davis-hanson#; also see David S. McDonough, "Obama's Pacific Pivot in US Grand Strategy: A Canadian Perspective" *Asian Security*, Vol.9 Issue 3, 165-184; "Blowback in the Pacific: The US military's 'Pacific Pivot' is raising tensions with China and prompting local resistance" *The Nation*, 21 January 2013; "Visits by Panetta, Obama to Asia Pacific to punctuate U.S. 'Asia-Pacific pivot'" *East-Asia Intel Reports,* 14 November 2012; "Obama's Absence Leaves China as Dominant Force at Asia-Pacific Economic Cooperation Summit" *New York Times,* 7 October 2013; Charlie Campbell, "At APEC, Obama's Replacement Flies U.S. Flag as Best He Can" *Time*, 7 October 2013; Rodolfo C. Severino, "The United States in the East Asia Summit" *Regional Outlook 2011/2012 Southeast*, 10-13.

The policy/strategy direction from the White House in the form of the US National Security Strategy (NSS) has identified weapons of mass destruction and their proliferation as the "gravest danger to the American people and global security".[46] This sentiment is echoed in the US National Military Strategy (NMS), which identifies the "intersection between states, state-sponsored, and non-state adversaries" as being the "most dangerous in the area of W[eapon] of M[ass] D[estruction] proliferation and nuclear terrorism."[47] The NMS goes on to say that the "prospect of multiple nuclear armed regimes in the Middle East with nascent security and command and control mechanisms amplifies the threat of conflict, and significantly increases the probability of miscalculation or the loss of control of a nuclear weapon to non-state actors".[48] For these reasons, the NSS directs the pursuit of "a comprehensive non-proliferation and nuclear security agenda, grounded in the rights and responsibilities of nations." Moreover, it seeks to "strengthen the Nuclear Non-Proliferation Treaty (NPT) as the foundation of non-proliferation, while working through the NPT to hold nations like Iran and North Korea accountable for their failure to meet international obligations."[49]

Included with the danger from the proliferation of weapons of mass destruction are other things identified as threats, such as climate change and pandemic disease, but which are conditions or trends instead of threats. As one defence analyst has written, these lists of threats "fail to answer the question that ought to be the starting point for any threat assessment: who is threatening whom, and why?"[*emphasis in original*].[50] Moreover, if "security environment analysis is decoupled from the discipline imposed by the requirement to relate threats to the national security state, it becomes more difficult for decision-makers to differentiate between threats, risks, trends and challenges."[51] In the case of weapons of mass destruction, the weapons themselves are not the threat, but rather the extremists who undoubtedly are attempting to acquire them and "may not be deterred from using them", or the states like Iran and North Korea who are seeking to develop them in moves that will upend regional balances of power.[52] The motivations of each group are profoundly different, and so too must be the means to counter them.

4.2 The anti-access/area denial challenge

In the absence of clear direction from an updated NSS, the US military has drawn out in its NMS, from the roll of eminently desirable goals, challenges, and trends listed in the NSS, a series of national military objectives which are to counter violent extremism, deter and defeat aggression, strengthen international and regional security, and shape the future force.[53] More specific in its

[46] *The National Security Strategy of the United States* (Washington DC: The White House, 2010), 8, 17 and 23.
[47] *The National Military Strategy of the United States of America* (Washington DC: The Office of the Secretary of Defense, 2011), 3.
[48] *Ibid.*
[49] *The National Security Strategy of the United States* (Washington DC: The White House, 2010), 4.
[50] Peter Archambault, "Context is Everything: The Air India Bombing, 9/11 and the Limits of Analogy" *Commission of Inquiry into the Investigation of the Bombing of Air India Flight 182, Research Studies Volume 1: Threat Assessment and RCMP/CSIS Co-Operation,* (Ottawa: Public Works and Government Services, 2010), 87.
[51] *Ibid.*
[52] *The National Security Strategy of the United States* (Washington DC: The White House, 2010), 17; *The National Military Strategy of the United States of America* (Washington DC: The Office of the Secretary of Defense, 2011), 3.
[53] *Ibid.,* 4.

guidance, although without identifying the nation or nations in question, the NSS does identify a military requirement to "prepare for increasingly sophisticated adversaries, deterring and defeating aggression in anti-access environments".[54] While no specific adversary is identified, it is clear that in the context of the pacific rebalance that the potential for confrontation with China is high on the list.

China's recent activity in the Pacific basin is a source of concern particularly for the countries in the region, but also for the United States and many of its allies. Yet that potential for conflict must be balanced against the internal problems China is facing with a slowing economy and attempts to develop a more sustainable economic model. Indeed, some authors argue that "China is acting in both the East China Sea and the South China Sea from, in some respects, a weak position", and that its actions are "mainly bluster and puff" aimed mainly at a domestic audience.[55] While the strength of the Chinese navy and coast guard is greater than any of its local competitors, China simply cannot at the moment contend with a coalition that includes the United States. The result is a series of confrontations "that serve domestically in China to keep the nationalistic spirit at a high volume in order to reinforce the sense of rising Chinese power – something particularly necessary for the leadership during a time of slowing economic growth."[56] It demonstrates strength to the domestic audience by standing up to the United States without directly provoking a confrontation it cannot yet win. That said, US military planners are not afforded the luxury of hoping potential enemies will either remain so, or will decline in power. Indeed, it has often been in decline when Great Powers have proven the most dangerous.

China also is pursuing an anti-access and area denial strategy to complicate US freedom of movement and make it clear that US support might not be as close as local allies might hope. In the context of a Chinese regime under pressure at home because its economic miracle is not what it once was, with all the associated and probably unavoidable social and political turmoil from reduced employment and a reduction in exports, stoking nationalism makes some sense. Yet that sort of brinksmanship can carry unintended consequences, including the potential for a mistake that leads to a general war. As will be shown, growing Chinese military strength has forced the US to plan for the unthinkable war with China, even if the chance of that war happening appears remote at this stage.

Since the end of the Cold War, US defence policy has focused on maintaining the ability to wage two major wars simultaneously, with a focus on defending key allies against aggressive moves by adversaries. For example, the large US contingent in South Korea has focused on checking any such move by North Korea, and if necessary to conduct counter-invasions to change offending regimes.[57] Technology that has provided the US with a near monopoly on precision-guided munitions enabled those concepts, but recently that technological monopoly has begun to erode. The Chinese, in a strategy referred to as 'counter-intervention'[58], are seeking means to attack the US military's traditional way of projecting power through fixed air bases, logistical hubs, and

[54] *The National Security Strategy of the United States*, 14.
[55] Robert Kaplan, "Why Is China Really Provoking Its Neighbors?", http://www.realclearworld.com/articles/2014/02/13/why_is_china_really_provoking_its_neighbors-full.html, (accessed 2 July 2014).
[56] *Ibid.*
[57] Andrew Krepinevich, "Strategy in a Time of Austerity" *Foreign Affairs*, Vol. 91, Issue 6, (Nov/Dec 2012).
[58] Benjamin Shreer, *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia* (Canberra: Australian Strategic Policy Institute, April 2013), 8.

major ports, and its key advantages (and potential vulnerabilities) of cyber and space capabilities. Moreover, these same technologies are being adapted to target US Navy carrier battle groups, a standard US method of securing access and ensuring peace in the global commons. As well, developments in anti-satellite missiles and lasers, supplemented with cyber-attacks on US systems, seeks to degrade the ability of US forces to act freely within the Asia-Pacific region.[59] The purpose is not to confront the US directly, but combine Eastern strategic thought with Western technology into a potent counter-intervention operational method.

The US, in turn, is seeking to counter these strategies and, as the 2012 Defense Strategic Guidance points out, to ensure America's ability to operate effectively in anti-access and area-denial (A2/AD) environments.[60] Early in 2012, the Department of Defense promulgated its Joint Operational Access Concept (JOAC) which describes, in broad terms, the Chairman of the Joint Chiefs of Staff's "vision for how joint forces will operate in response to emerging antiaccess [sic] and area-denial security challenges."[61] To that end, the specific military problem identified is for the US "to be able to project military force into an operational area and sustain it in the face of armed opposition by increasingly capable enemies when U.S. overseas defense posture is changing and space and cyberspace are becoming increasingly important and contested domains."[62] Supporting the JOAC are two concepts being pursued concurrently, the Air-Sea Battle concept (ASB) and the Joint Concept for Entry Operations (JCEO).[63]

Another nation pursuing an A2/AD strategy is Iran, albeit far more modestly than China. Its recent focus on the development or acquisition of anti-ship cruise missiles, mines, and submarines and their potential use with small boat 'swarming' attacks on US warships in the Strait of Hormuz seeks to make entry into the Persian Gulf to ensure the flow of oil far more costly.[64] In so doing, the confidence of US regional allies will be reduced, increasing Iranian regional power. Added to this is the potential development of Iranian nuclear weapons. In both cases, traditional US policy would include the possibility of a counter-invasion aimed at regime change. As Andrew Krepinevich has argued, "if the prospect of conducting a regime-change operation against a country the size of Iran is daunting, in the case of China, it is pure moonshine."[65] Thus, a more nuanced national security policy, and corresponding military response, is required for both the Pacific 'rebalance', the continual draw and focus on the Middle East, and to maintain a deterrent value against more traditional adversaries.

---

[59] Andrew Krepinevich, "Strategy in a Time of Austerity".
[60] *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington D.C.: Department of Defense, January 2012), 4-5.
[61] *Joint Operational Access Concept* (Washington D.C.: Department of Defense, 17 January 2012), foreword.
[62] *Ibid.,* ii.
[63] "Air-Sea Battle: Service Collaboration to Address Anti-Access & Area Denial Challenges" (Washington D.C.: Air-Sea Battle Office, May 2013), 8.
[64] Anthony Cordesman, "U.S. Strategy and Added Sanctions on Iran: The Role of the Administration and Congress in a "Good Cop, Bad Cop" Approach" (Washington D.C.: Center for Strategic & International Studies, 6 February 2014), http://csis.org/publication/us-strategy-and-added-sanctions-iran-role-administration-and-congress-good-cop-bad-cop-a, (accessed 6 February 2014).
[65] Andrew Krepinevich, "Strategy in a Time of Austerity".

4.3 The deterrent value of conventional 'Heavy' forces

At the end of the Cold War many assumed that conventional warfare between developed states was a thing of the past.[66] At the time, the belief was that military operations would consist largely as peacekeeping, disaster relief, and operations other than war. In a similar way, since the Iraq and Afghanistan conflict and the advent of terms such as the 'long-war', many began speaking as though not only was inter-state war obsolete but counter-terrorism and counter-insurgency would be the main way in which future operations would occur. This surprisingly radical idea, that wars between nations which had been a fairly constant condition in Europe for centuries, would now be rare or non-existent took root very quickly. In the place of these wars would be low- to mid-intensity conflict with non-state actors and insurgent groups. While it is true that the dynastic succession struggles and wars between nations in Europe had been common, from the Thirty Years' War of the 17th century, the Napoleonic Wars of the 19th century, and the two World Wars of the 20th century, it also has seen its share of wars involving what are now called non-state actors. To argue that the past was characterized by symmetric wars and the future by asymmetric is historically illiterate.[67] The consequences of such arguments could have an impact on the deterrent value of US heavy conventional forces, since such forces would be unsuitable for counter-insurgency and counter-terrorism operations.

The reasons for this argument are many, but in this context it is sufficient to say that until recently no nation on earth was capable of challenging the US pre-eminence. With that said, it is clear that some nations over time will increase their power and may form alliances and coalitions with which to challenge the US. As well, those characterizing recent operations as the pattern for most future ones likely are, for the most part, speaking honestly. Defence planners and senior military officers often are preoccupied with the current war they are fighting, and justifiably so. That they believe these wars will be the permanent or long-term task should surprise no one. To assume that the war they have just fought or are now fighting at the culmination of their careers is not the permanent model makes their sacrifice seem unimportant. While it certainly is true that most operations other than war, including peacekeeping and counter-insurgency operations, are more common than inter-state wars, it does not mean they should be the focus of future force development for the simple reason that they are generally not about critical interests. For example, had Britain lost the Malayan Emergency (1948-1960), while it would have been a blow to national pride and perhaps hastened the unravelling of the Empire already underway, that result would have paled by comparison to the prospect of losing the Napoleonic Wars or the Second World War. The point here

[66] For examples of this literature see John Mueller, *Retreat from Doomsday. The Obsolescence of Major War* (New York: Basic Books, 1989), 240-242; Francis Fukuyama, "The End of History?" *The National Interest*, Summer 1989, http://ps321.community.uaf.edu/files/2012/10/Fukuyama-End-of-history-article.pdf, (accessed 3 September 2014); Francis Fukuyama, *The End of History and the Last Man* (New York: Free Press, 1992); John Keegan, *A History of Warfare* (New York: Alfred A. Knopf, Inc., 1993), 378–385; Niall Ferguson, *The Cash Nexus. Money and Power in the Modern World, 1700–2000* (New York: Basic Books, 2001), 395–425; Samuel P. Huntington, "The Clash of Civilizations?" *Foreign Affairs* 71 (Summer 1993), 22–49; Samuel Huntington, *The Clash of Civilizations and the Remaking of the World Order* (New York: Simon and Schuster, 1996), and perhaps the most concise criticism, Joseph Nye, "What New World Order?" *Foreign Affairs* Vol. 71 No.2, (Spring 1993), 83–96.

[67] Robert Grossman-Vermaas, "Future Perfect: Effects-based Operations, Complexity and the Human Environment" (Ottawa: DOR (Joint) Research Note 2004/01, 2004), 4, and Philip Farrell, "Control Theory Perspective of Effects-Based Thinking and Operations: Modelling "Operations" as a Feedback Control System" (Ottawa: DRDC Ottawa Technical Report TR 2007-168, 2007), 1-2.

is that any claim that a style of warfare has ended should be viewed skeptically by military and political leaders and defence planners. There are states, as the recent unrest in the Ukraine has shown, interested in flexing their conventional (and potentially nuclear) muscles perhaps not to challenge the US and its allies directly, but instead for regional dominance.[68] Such adversaries are unlikely to be deterred from regional aggression by a US military structured for counter-insurgency or counter-terrorism. The challenge is to find a capability mix that meets a broad range of challenges effectively, putting the right capabilities towards the right operating environment to avoid an expensive over-match.

4.4 The enduring focus on the Middle East

Since the 9/11 attacks against the US, a great deal of focus and State Department and Presidential attention have been focused on the Middle East and the worldwide rise of violent Islamist radicalism of various types and affiliations. These include al-Qaeda and its associates and the Islamic State (IS), both of which have the interference with US interests and the longer-term strategic threat of the rise of an Islamist (and anti-Western) caliphate in a region holding a vital strategic resource. Iran, of course, has long been a regional concern of the US from the Carter administration forward, although as a state sponsor of terrorism and a regional problem rather than a challenger to the US position in the world. While the US counter-terrorism campaign against al Qaeda has decimated its core and leadership, and the de-centralized model forced by that campaign has largely removed the strategic threat for the time being, the terrorists realize this is to be a long war and that time may be on their side. For these reasons the US interest in regional stability and defeating Islamist radicalism will remain a focus of its foreign and military policy. Indeed, the most recent US National Security Strategy includes a stated goal to "disrupt, dismantle and defeat al-Qa'ida and its affiliates", a sentiment echoed in the National Military Strategy.[69]

Again, from a somewhat unclear national security policy perspective, these represent the main threats and areas of concern of the US government. While a country with global interests will face constant challenges, it has identified through its National Security and National Military Strategies the parameters within which supporting forces will plan and develop capabilities and concepts to meet those goals.

[68] Bill Gertz, "Russian Strategic Bombers Near Canada Practice Cruise Missile Strikes on US: Nuclear launch rehearsal conducted in North Atlantic", *The Washington Free Beacon*, 8 September 2014, http://freebeacon.com/national-security/russian-strategic-bombers-near-canada-practice-cruise-missile-strikes-on-us/, (accessed 9 September 2014); Agence France-Presse, "Russia Announces Plans To Upgrade Nuclear, Air Defense Forces", *Defense News,* 10 September 2014, http://www.defensenews.com/article/20140910/DEFREG01/309100040/Russia-Announces-Plans-Upgrade-Nuclear-Air-Defense-Forces, (accessed 11 September 2014).

[69] *The National Security Strategy of the United States* (Washington DC: The White House, 2010), 19-22; *The National Military Strategy of the United States of America* (Washington DC: The Office of the Secretary of Defense, 2011), 5.

5 USAF response

In the context of the so-called US strategic deficit, or at the very least where US policy seems to lack consistency, attainability, and a clear rationale, attempting to define supporting defence policy goals and a corresponding strategy becomes all the more problematical. It becomes difficult to identify those capabilities essential to delivering unclear government objectives, those which may need augmentation, and those which can be divested. This becomes even more critical in times of fiscal austerity, although one could argue it is always essential.[70] Without a clear policy target, military service parochialism can trump pragmatic thought. So too do the vagaries of politics and the pursuit of political agendas, the costs of which can be considerable.

The newly minted USAF strategy *America's Air Force: A Call to the Future* outlines the course charted into the future. It seeks to steer towards the somewhat unfocused national security policy goals, provide broad guidance to focus discussion of capabilities to meet current challenges and "*ensure a credible and affordable force"* [emphasis in original] for the future.[71] It begins by outlining the purpose of the USAF – to provide "*responsive and effective Global Vigilance – Global Reach – Global Power"* through its five core missions – *air and space superiority; intelligence, surveillance, and reconnaissance; rapid global mobility; global strike;* and *command and control"* [emphasis in original].[72] As with many of the US strategy documents, and mindful of the previous caveat about the specific details of the strategy being shielded from public view, this strategy is more a vision and a target than a strategy. A future vision certainly has to be included in policy statements and strategies to attain them, but a series of vectors to guide experimentation and research – a laudable aim to be sure – is not itself a strategy, which are typically defined as the allocation of resources towards a desired end.[73] Indeed, the forthcoming *Strategic Master Plan* "which will enumerate priorities, objectives, and goals associated with this strategy" really constitutes 'the strategy'.[74]

In addition to strategic guidance documents, the US armed forces are subject to the requirements of US law. Title 10 of the United States Code, which are "a consolidation and codification by subject matter of the general and permanent laws of the United States", dictates a series of responsibilities in law for the US armed forces.[75] Subtitle D of Title 10 outlines the responsibilities of the United States Air Force (USAF), which are:

1. preserving the peace and security, and providing for the defense, of the United States, the Commonwealths and possessions, and any areas occupied by the United States;

---

[70] Bernard Brodie, *Strategy in the Missile Age* (Santa Monica, CA: RAND, January 15, 1959), 359-361.
[71] *America's Air Force: A Call to the Future* (Washington DC: Department of the Air Force, 2014), 4.
[72] *Ibid.,* 6. The author has contacted the United States Air Force Academy DFMI, or Department of Military and Strategic Studies, to see if any further information on US concept development and capability investment was available through defence channels. The material cited is considered the most authoritative on these matters.
[73] James S. Corum and Wray R. Johnson, *Airpower in Small Wars: Fighting Insurgents and Terrorists* (Lawrence Kansas: University Press of Kansas, 2003), 426.
[74] *America's Air Force: A Call to the Future,* 20.
[75] Office of the Law Revision Counsel, *United States Code* http://uscode.house.gov/browse/prelim@title10&edition=prelim, (accessed 9 January 2014).

2. supporting the national policies;

3. implementing the national objectives; and

4. overcoming any nations responsible for aggressive acts that imperil the peace and security of the United States.[76]

There are numerous sub-sections of Title 10 subtitle D which outline the size and composition of the USAF, and give some direction regarding aircraft types and other functions. While the US Code does serve as a funding guarantor for the directives in the title, it may be somewhat restrictive regarding force development and legacy platforms. For example, in October 2011 the US Title 10 code was amended to direct the Secretary of the Air Force to "maintain a total aircraft inventory of strategic airlift aircraft of not less than 301 aircraft". The code further directed that the Secretary may not retire more than six B-1 aircraft and must maintain "not less than 36 B-1 aircraft as combat-coded aircraft."[77] Further Congressional legislation has prevented the USAF Secretary and Chief of the Air Force Staff from mothballing the A-10 close air support aircraft in favour of preferred spending elsewhere. The reality of political interference in defence planning and procurement faces all nations on earth, but must be considered when looking at the direction sought by senior military leadership for future force development, and those factors that alter that direction.

5.1 Countering anti-access/area-denial strategies

In the latest strategic direction to come from the White House and Department of Defense, the 2012 Defense Strategic Guidance, it is again argued that the

> United States military will 'rebalance' toward the Asia-Pacific region…Our relationships with Asian allies and key partners are critical to the future stability and growth of the region…The United States is also investing in a long-term strategic partnership with India to support its ability to serve as a regional economic anchor and provider of security in the broader Indian Ocean region…Furthermore, we will maintain peace on the Korean Peninsula by effectively working with allies and other regional states to deter and defend against provocation from North Korea, which is actively pursuing a nuclear weapons program...the growth of China's military power must be accompanied by greater clarity of its strategic intentions in order to avoid causing friction in the region."[78]

Taking its cues from the strategic guidance, the *Joint Operational Access Concept* (JOAC) notes that "Increasingly capable future enemies will see the adoption of an anti-access/area-denial strategy against the United States as a favorable course of action for them. The ability to ensure operational access in the future is being challenged–and may well be the most difficult

[76] *United States Code Title 10, Subtitle D – Air Force, chapter 807 section 8062* http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title10-section8062&num=0&edition=prelim, (accessed 9 January 2014).
[77] *Ibid.*
[78] *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, 2.

operational challenge U.S. forces will face over the coming decades."[79] It further identifies the military problem as being the challenge in projecting military force into a disputed area and to sustain it "in the face of armed opposition by increasingly capable enemies when U.S. overseas defense posture is changing and space and cyberspace are becoming increasingly important and contested domains."[80] Most literature focuses attention on two key adversaries, China and Iran, while admitting that A2/AD strategies are or may be adopted by other potential opponents. Each of these countries is modifying this general strategy to meet its own particular regional requirements, with capability implications for the US military and USAF in particular.

Of course, US defence officials insist that the Air-Sea Battle concept is not aimed specifically at China, as the Iranian nuclear program and its pursuit of missile and other technologies have at least in part the goal of keeping the US out of the Persian Gulf or limiting its freedom of action in a time of war. But in the context of US geostrategic imperatives and vow to rebalance to the Asia-Pacific region, China is the obvious target envisaged by the concept. It is clear that no other country has the ability and the resolve to pose a formidable A2/AD challenge, which the Chinese call a 'counter-intervention' strategy, to the US in the region.[81] As Geoffrey Till of the International Institute for Strategic Studies argues, despite

> frequent protestations to the contrary, Air–Sea battle ideas are inevitably associated with rather traditional political assumptions which explicitly identify China … as a putative adversary that needs to be 'offset' in order to preserve a 'stable military balance' in the Western Pacific and more generally.[82]

In either case, the ASB concept is entirely suitable to counter China's growing A2/AD strategy to keep US and allied forces out of the Asia-Pacific region or severely limit their freedom of action. The US, in turn, is seeking to counter these strategies and ensure America's ability to operate effectively in A2/AD environments.[83] As indicated earlier, the JOAC is supported by two concepts being pursued concurrently, the ASB concept and the Joint Concept for Entry Operations (JCEO). Taken together, these form the core of American strategic thought and planning, with capability and supporting concept implications for the USAF and its allies.[84]

As Benjamin Shreer of the Australian Strategic Policy Institute writes, the "biggest questions about AirSea Battle are strategic".[85] While the initiative strengthens American deterrence, it "is optimised for high-intensity conventional war between China and the US and its allies" which applies only in

---

[79] *Joint Operational Access Concept* (Washington D.C.: Department of Defense, 17 January 2012), ii.
[80] *Ibid.*
[81] Benjamin Shreer, *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia* (Canberra: Australian Strategic Policy Institute, April 2013), 8.
[82] Geoffrey Till, "Asia's Naval Expansion: An Arms Race in the Making?" *Adelphi Series* (London: International Institute for Strategic Studies, 2012), 83-84; also see Benjamin Shreer, *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia*, 10.
[83] *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington D.C.: Department of Defense, January 2012), 4-5.
[84] "Air-Sea Battle: Service Collaboration to Address Anti-Access & Area Denial Challenges" (Washington D.C.: Air-Sea Battle Office, May 2013), 8.
[85] Benjamin Shreer, *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia*, 6.

that extreme case.[86] It is thus not "a catch all' solution to America's conventional deterrence dilemma in the Western Pacific", and without a clearly articulated grand strategic framework addressing China's military rise it "isn't clear how AirSea Battle fits".[87] Yet the high-intensity version of Air-Sea Battle is but one method by which the US might engage China in a conflict. It certainly would not impetuously charge across the Pacific into a Chinese missile shield. Instead, and exploiting its regional allies and existing military presence, could well use a version of the 'Off-Shore Control' approach some authors have called for.[88] In either case, an understanding of the mind-set, approach being adopted, and specific capabilities to be faced will assist in the development of an effective concept, and eventually an Air-Sea Battle Doctrine and the capabilities required for its successful execution.

5.2 Shashoujian

The Chinese, in a strategy some have called *shashoujian* or 'the assassin's mace' referring to concealable ancient Chinese hand maces that could be used without warning, are seeking the potential to attack the US military's traditional way of projecting power through fixed air bases, logistical hubs, and major ports by incorporating precision guidance into its cruise and ballistic missiles to strike directly at these key targets. Moreover, these same technologies are being adapted to target US Navy carrier battle groups, a long relied-upon method of securing access and ensuring peace in the global commons. As well, developments in anti-satellite missiles and lasers, supplemented with cyber-attacks on US systems, would seek to degrade the ability of US forces to act freely within the Asia-Pacific region.[89] The purpose is not to confront the US directly, but combine Eastern strategic thought with Western technology into a potent counter-intervention operational method.

Scholars have argued that Chinese military and political leadership is influenced profoundly by its history and traditions.[90] As Jason Bruzdzinski has written, "Ancient Chinese history, as well as more recent experiences and observations, are guiding internal P[eople's] L[iberation] A[rmy] debates about strategy, methods, and the development of new weapons and military equipment" in the hope of improving rapidly the People's Liberation Army's (PLA) warfighting methods and capabilities using *shashoujian* weapon systems.[91] The ultimate purpose of these efforts is to employ the classic Chinese stratagem of overcoming the superior with the inferior. The strategy behind *shashoujian* is a modern application of an ancient Chinese concept designed and used specifically against an adversary with superior technology and weaponry. It aims to find and exploit adversary weaknesses using weapons that can be used quickly and, ideally, secretly to change the course of a war.[92] Whether these efforts will succeed is, or should be, the subject of debate, but since these theories are driving political and military leadership along a course that

[86] *Ibid.*
[87] *Ibid.*
[88] T. X. Hammes, "Offshore Control: A Proposed Strategy for an Unlikely Conflict", *Strategic Forum* No. 278 (June 2012).
[89] Andrew Krepinevich, "Strategy in a Time of Austerity".
[90] Jason E. Bruzdzinski, "Demystifying Shashoujian: China's "Assassin's Mace" Concept" in *Civil-Military Change in China: Elites, Institutes, and Ideas After the 16th Party Congress*, ed. Andrew Scobell and Larry Wortzel (Carlisle PA: Strategic Studies Institute, 2004), 348.
[91] *Ibid.,* 350.
[92] Larry R. Moore, "China's Antisatellite Program: Blocking the Assassin's Mace" *Asian Perspective* Vol. 38 Issue 1 (2014), 170.

could lead to the order of "a *shashoujian* equipped PLA into what would be a disastrous conflict with the United States is, indeed, very troubling".[93] While some authors have suggested the Chinese probably will not be able to pull things together to offer a serious challenge to the United States in the short-term, those predications always carry a heavy caveat.[94] As an example of what can be done, Larry Wortzel points to the success of China's M-9 and M-11 missile programs, and its sea and air launched cruise missile systems.[95] Whether one accepts the notion of *shashoujian* as a central feature of Chinese military thinking or merely as an idiom ultimately is of less importance than the assessment of the emerging trends in Chinese military development.[96] The possibility "of China presenting a military operational concept that takes the United States by surprise" using *shashoujian* weapons systems and infrastructure to enable that concept, and "a strategic or tactical context in which the successful use of this operational concept is decisive" should be the focus of US leadership, planners, and their key allies.[97]

In the context of fiscal austerity and declining defence budgets, some within the USN and USAF may see this as an opportunity to press for their own service force development at the expense of the US Army. A similar tactic was attempted in the debates on US force development following the initial part of operation 'Enduring Freedom'.[98] Some influential analysts studying the early stages of the conflict in Afghanistan, featuring the use of Special Operations Forces (SOF) and precision weapons, argued that this represented the future for American and Allied operations, and that it should serve as a template for US force structure planning.[99] In what has been called the 'New Model' or 'Afghan Model", small teams of SOF illuminate targets that are then attacked

---

[93] Jason E. Bruzdzinski, "Demystifying Shashoujian: China's "Assassin's Mace" Concept", 352.
[94] Larry M. Wortzel, *China's Military Potential* (Carlisle PA: Strategic Studies Institute, 1998), 20-22.
[95] *Ibid.,* 22.
[96] Not all authors accept the notion of *Shashoujian* or the "Assassin's Mace" as a central feature of Chinese strategic thinking. See Mark Gabrielson, "Shashoujian: A Strategic Revelation or Simply an Idiom?", http://www.chinausfocus.com/culture-history/shashoujian-a-strategic-revelation-or-simply-an-idiom/, (accessed 15 July 2014).
[97] Jason E. Bruzdzinski, "Demystifying Shashoujian: China's "Assassin's Mace" Concept", 353.
[98] Historian Frederick Kagan and Tom Hone, the Assistant Director in the Office of Force Transformation, have engaged in a debate over the direction of US military transformation in the context of the lessons learned from both Iraq and Afghanistan. For examples of this exchange, see Frederick W. Kagan, "A Dangerous Transformation," *The Wall Street Journal,* 12 November 2003. Available at: http://www.opinionjournal.com/extra/?id=110004289; and the response to Kagan by Tom Hone, "Understanding Transformation," *Transformation Trends,* 16 January 2004. While this debate is illustrative, one should refer to Williamson Murray and Robert H. Scales, Jr., *The Iraq War. A Military History* (Cambridge, Mass: Harvard University Press, 2003), Stephen Biddle, *Afghanistan and the Future of Warfare: Implications for Army and Defence Policy,* Strategic Studies Institute (SSI) Report (November 2002), and Anthony H. Cordesman, *The Iraq War. Strategy, Tactics, and Military Lessons.* Center of Strategic and International Studies (CSIS) Significant Issues Series (September 2003 for a more detailed discussion of the emerging lessons of the Afghanistan and Iraq wars.
[99] For examples of this argument see Thom Shanker, "Conduct of War is Redefined by Success of Special Forces," *The New York Times,* 21 January 2002; Joseph Fitchett, "Swift Success for High-Tech Arms," *International Herald Tribune,* 7 December 2001; Paul Watson and Richard T. Cooper, "Blended Tactics Paved Way for Sudden Collapse," *Los Angeles Times,* 15 November 2001; Vernon Loeb, "An Unlikely Super-Warrior Emerges in Afghan War, *Washington Post,* 19 May 2002; Rajiv Chandrasekaran and John Pomfret, "Aided by U.S., Pashtun Militias Move Closer to Kandahar," *Washington Post,* 27 November 2001; Ann Tyson, "US is prevailing with its most finely tuned war," *The Christian Science Monitor,* 21 November 2001; Michael Gordon, "'New' U.S. War: Commandos, Airstrikes and Allies on the Ground," *New York Times,* 29 December 2001.

using precision weapons.[100] The argument's attraction is that the lethality of SOF-guided precision weapons enabled a small number of US forces to defeat its opponent without having to move large numbers of troops into theatre in the traditional fashion.

The conclusions that emerge from a more thorough study of the Afghanistan campaign are somewhat different than either the proponents and the detractors of the 'Afghan Model' contend. Historian Stephen Biddle offers a more tempered interpretation of the importance of the campaign. He argues that the "…Afghan campaign does indeed offer important clues to the future of warfare, but not the ones most people think – because the war itself was not fought the way most people think."[101] Biddle continues, saying that "will be unrepresentative of the emerging challenges the American military will face in years to come", but the conflict offers important lessons about the future. Possibly the most important of these lessons "is that warfare's future may have more in common with its past than many in the current debate would have us believe."[102] One can merely hope that Pentagon officials take note of this reality as they seek to define the future US military. Yet the ASB concept will entice defence planners along specific lines.

Those seeking to employ A2/AD strategies, using *shashoujian* weapon systems and methods or not, will try to find and target enemy technological and operational weaknesses. The US faces two main issues in deploying capabilities in response to Chinese A2/AD doctrine. First are the long distances between the US and the Asia-Pacific region, requiring secure lines of communications. Second, maritime and air operations will predominate in most foreseeable scenarios, but hopefully some care will be taken to maintain the deterrent value of both sizeable and capable US land forces. In any event, targeting the main means by which the US typically projects power into distant regions, and its reliance on technology, networked operations, and secure communications will be central to success. In particular, Andrew Krepinevich writes, *shashoujian* strategies are

> designed to delay the assembly of US power-projection forces (to include their battle networks) to keep them beyond effective range of Chinese territory, or to defeat them once they come within range. These methods might include attacks on logistics, transportation, and support forces; attacks on land, sea, and ports; and attacks on air bases. In addition *shashoujian* forces can be expected to engage in attacks to disrupt and/or destroy us battle networks, to include cyber-attacks [sic] and the use of [anti-satellite] ASAT weapons. They might also include coercive measures designed to dissuade US allies from granting US forces operational access to their bases.[103]

---

[100] Stephen Biddle, "Afghanistan and the Future of Warfare" *Foreign Affairs*, Volume 82 No2, 31, and Stephen Biddle, "Special Forces and the Future of Warfare: Will SOF Predominate in 2020?", *Strategic Studies Institute, US Army War College,* 24 May 2004, 4.

[101] Stephen Biddle, "Afghanistan and the Future of Warfare: Implications for Army and Defense Policy*"* *Strategic Studies Institute* (November 2002), 57–58.

[102] Stephen Biddle, "Afghanistan and the Future of Warfare," *Foreign Affairs*, Volume 82 No2, 44.

[103] Andrew F. Krepinevich, *Why AirSea Battle?* (Washington D.C.: Center for Strategic and Budgetary Assessments, 2010), 15. Also see Roger Cliff, Mark Burles, Michael S. Chase, Derek Eaton, and Kevin L. Pollpeter, *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States* (Santa Monica: RAND Corporation MG524, 2007).

The Chinese approach to overcoming technological challenges with speed and effect is quite impressive. In 2001, the Director of the Defense Intelligence Agency, Vice-Admiral Thomas Wilson, testified before Congress that Chinese anti-satellite capabilities might be faced by US forces in 2015. Yet, by early 2007 PLA ground-based missiles had destroyed an inoperative Chinese weather satellite.[104] The inevitable international condemnation from the test has forced the Chinese to (at least publicly) divert their efforts into developing anti-ballistic missile (ABM) capabilities, about which the US cannot complain. The technologies involved in ABM defence are virtually the same detection, tracking, and kill vehicles as are needed in an anti-satellite system. It is thus widely believed that the ABM developments are a thin veil for the ASAT program, especially since a modified version of the weapon used in the 2007 ASAT test was used in the 2010 ABM test.[105]

In addition to the kinetic kill aspect of Chinese ASAT technologies, US and allied forces likely will have to confront cyber-attacks on their satellite communications and technologies. This will serve the dual purpose of deterrence and an effective means of striking at Western technological superiority and alliance cohesion. As Colonel Yuan Zelu of the People's Liberation Army has said, "The goal of a space shock-and-awe strike is to deter the enemy, not to provoke the enemy into combat…This will shake the structure of the opponent's operational system of organization and will create a huge psychological impact on the opponent's policymakers."[106] This 'shock-and-awe' would take the form of kinetic attacks against the constellation of US satellites, something which would undoubtedly bring international condemnation as did its 2007 ASAT test, combined with "neutralizing the uplinks and downlinks of space-based systems through diverse forms of cyberattack [sic]".[107] It would be both effective and low-cost, providing a degree of anonymity at least initially. The ability of the Chinese to disrupt or destroy critical elements of US military networks should not be underestimated. The majority of US precision weapons are dependent on Global Positioning System (GPS) satellite information for their targeting, and some "US unmanned aerial vehicles, such as the Predators, are incapable of operating in the absence of satellite data links to their remote controllers."[108] Moreover, the "US military's Time-Phased Force and Deployment Data (TPFDD), essential to deploying forces in a timely and efficient manner, is highly dependent upon myriad data links bringing together information from a range of sources."[109]

In the event of a conflict over Taiwan or some other East Asian contingency, Chinese planners believe that the US military would act as it has in previous campaigns – starting operations with a missile and air campaign while it builds up its forces and networks in theatre.[110] The Chinese likely would counter this campaign with cyber and kinetic strikes at all stages and at varying distances from and within the theatre using the weapons systems developed and under

---

[104] *Ibid.* Also see Phillip C. Saunders and Charles D. Lutes, "China's ASAT Test: Motivations and Implications" *Joint Forces Quarterly* Issue 46 3rd Quarter, 2007, 39-45, http://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-46.pdf, (accessed 21 July 2014).
[105] Zachary Keck, "China Conducts Third Anti-Missile Test", *The Diplomat,* 24 July 2014, http://thediplomat.com/2014/07/china-conducts-third-anti-missile-test/, (accessed 6 August 2014).
[106] Larry R. Moore, "China's Antisatellite Program: Blocking the Assassin's Mace" *Asian Perspective* Vol. 38 Issue 1 (2014), 163.
[107] *Ibid.,* 168.
[108] Andrew F. Krepinevich, *Why AirSea Battle?*, 16.
[109] *Ibid.*
[110] *Ibid.*

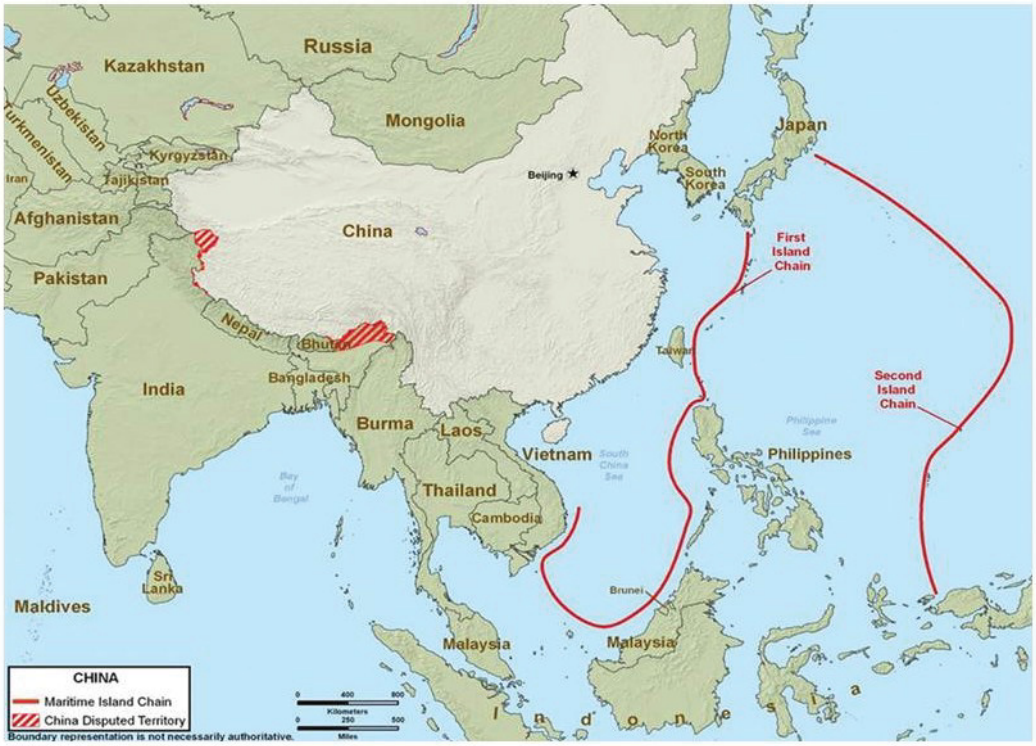
development in the figure below. As argued above, it also would attempt to degrade the satellite systems upon which US command and control, targeting, and employment and sustainment are based through cyber and kinetic kill means. Its short and medium-range ballistic missiles, carrying conventional and potentially nuclear weapons, could threaten forward operating bases at Guam and other locations as far distant as the so-called 'second island chain' (see Figure 1). Moreover, those technologies, in the form of anti-ship ballistic missiles now believed to be reaching initial operational capability (IOC), pose a serious threat to key US surface combatants, most notably its aircraft carriers which are central to US power projection.[111] The so-called "carrier-killer" or DF-21D is of particular interest to US Navy planners, as it is "designed to hit ships at ranges beyond the unrefueled range of a carrier strike group".[112] The addition of a "special submunition warhead for the missile with clusters of non-explosive flechette penetrators designed to damage a carrier by kinetic impact, and a high-power microwave warhead designed to disable naval radars with electromagnetic pulses…[would] allow the [People's Republic of China] PRC to "mission-kill" [render inoperable] a carrier."[113] Combined with maritime surveillance systems designed to detect and target US warships at extended ranges, and maritime patrol aircraft and a rapidly improving fleet of diesel-electric and nuclear powered submarines to 'shadow' and possibly engage US carrier battle groups at distance or inside the theatre, the tools with which the PLA will threaten US surface combatants are becoming very real.[114]

[111] See Harry Kazianis, "Behind the China Missile Hype", *The Diplomat* (January 20, 2012), http://thediplomat.com/2012/01/behind-the-china-missile-hype/, (accessed 21 July 2014). Michael S. Chase, Andrew S. Erickson, and Christopher Yeaw, "Chines Theater and Strategic Missile Force Modernization and its Implications for the United States," *The Journal of Strategic Studies,* (February 2009), 67-114.

[112] Stew Magnuson, "Navy Program at Center of Drone Survivability Debate", *National Defense* (September 2014), http://www.nationaldefensemagazine.org/archive/2014/September/Pages/NavyProgramatCenterofDroneSurvivabilityDebate.aspx, (accessed 2 October 2014).

[113] Andrew F. Krepinevich, *Why AirSea Battle?*, 19. Also see See Robert Hewson, "Dragon's Teeth – Chinese Missiles Raise Their Game," *Jane's Navy International*, February 2007, 22.

[114] Andrew F. Krepinevich, *Why AirSea Battle?*, 19.



Source: Department of Defense, Office of the Secretary of Defense, Annual Report to Congress on the Military Power of the People's Republic of China, 2009, 18.

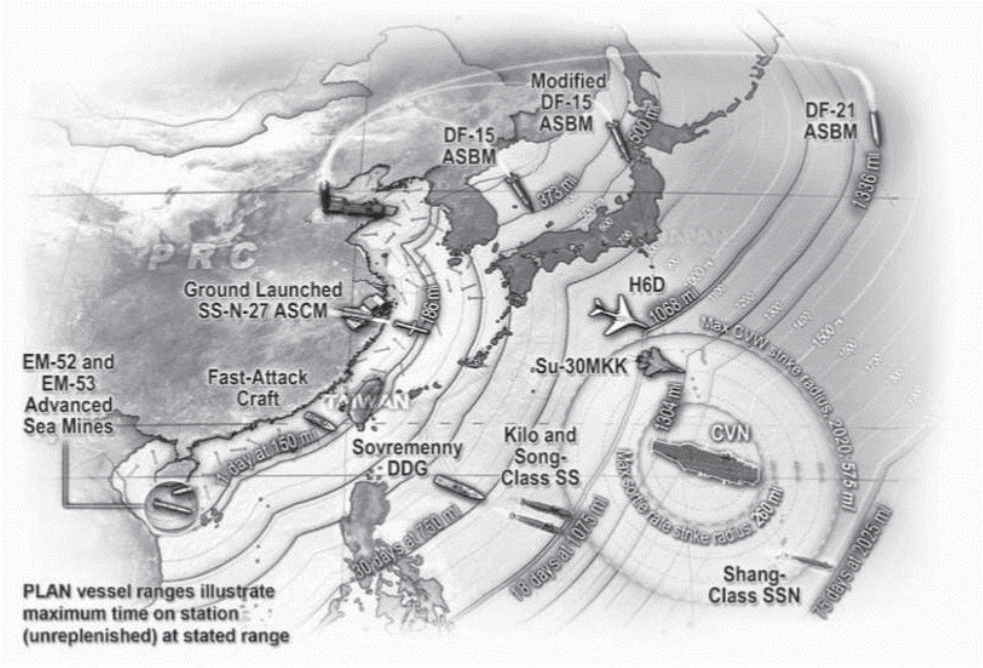
Figure 1: *China and the two island chains.*

The layered nature of Chinese A2/AD defences includes long-range bombers such as the H-6K, a substantially modified copy of the Soviet Tupolev Tu-16, with an extended combat radius and armed with sea-skimming anti-ship missiles and anti-radiation missiles designed to target systems like the US Navy's SPY-1, E-2 Hawkeye, and Airborne Warning and Control System (AWACS).[115] Escorting, and potentially supplementing the maritime strike capability of the H-6K, are the fourth generation fighters like the Sukhoi Su-30MKK2, which have an unrefueled combat radius of roughly 860 nautical miles. The combination of the H-6K and Su-30MKK2 "raises the specter of combined fighter and bomber attacks against US aircraft carriers – a threat not encountered since World War II."[116] These advanced aircraft soon will be complemented by the addition of fighters with fifth-generation capabilities. In particular, the January 2011 test flight of the J-20, China's next-generation fighter, illustrates China's intent to produce its own fighter with "stealth attributes, advanced avionics, and supercruise-capable engines over the next several years."[117] With its own AWACS, aerial refueling tankers, Intelligence, Surveillance, and Reconnaissance (ISR) and maritime surveillance aircraft, and close to five hundred modern,

[115] *Ibid.,* 21.
[116] *Ibid.* Richard Fisher, Jr., "Growing Asymmetries in the China-Japan Naval Balance," *International Assessment and Strategy Center,* November 22, 2005, http://www.strategycenter.net/research/pubID.83/pub_detail.asp, (accessed 21 July 2014).
[117] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs," (Washington D.C.: The Douglas and Sarah Allison Center for Foreign Policy Stuides Special Report No. 122, 12 October 2012), 7.

fourth-generation fighters and attack aircraft, and in time the addition of fifth-generation fighters, the People's Liberation Army Air Force (PLAAF) "will be able to contest US forces for control of the air in the Western Pacific and to strike targets at ranges beyond 850 nm."[118]

While not specifically *shashoujian* weapons, the ability of the Chinese air force to defend its own airspace and to prevent the US air forces from accessing Taiwanese airspace is considerable and growing. Its combination of interceptor aircraft and surface to air missiles (SAM) coordinated with missile and special operations attacks on regional airfields "hopes to effectively eliminate US air power as a major factor in any regional conflict."[119] Upgraded Russian SAM systems, such as the S-300 PMU1 and PMU2, with ranges exceeding 200 kilometres give a sharp edge to the impressive radar coverage, especially along the Taiwan Strait.[120] This concentrated and seemingly capable network will be difficult for even USAF fifth-generation fighters to contend with, and the efforts to harden SAM sites and to link all elements of this system together with "dedicated fiber-optic command and control networks that are unconnected to outside networks" will be difficult to penetrate or affect.[121]



Source: Andrew F. Krepinevich, Why AirSea Battle? (Washington D.C.: Center for Strategic and Budgetary Assessments, 2010), 24.

Figure 2: *Emerging Chinese anti-access/area-denial capabilities.*

[118] Andrew F. Krepinevich, *Why AirSea Battle?*, 21. Also see Carlo Kopp and Peter A. Goon, "Inquiry into Australian Defence Force Regional Air Superiority," *Air Power Australia*, (February 2006), 55-56.
[119] *Ibid.,* 23.
[120] Roger Cliff, *et. al., Entering the Dragon's Lair: Chinese Anti-Access Strategies and Their Implications for the United States,* footnote on page 85.
[121] Andrew F. Krepinevich, *Why AirSea Battle?*, 24.

5.3 Iranian anti-access/area-denial capabilities

Iranian geography gives it a unique position in that it sits at the bottleneck of the Strait of Hormuz in the Persian Gulf, the strait being little more than 24 miles wide at its western end.[122] Through it travels a large percentage of a strategic commodity, Middle East oil. Thus, the region will remain an area of US interest and focus, as will the pursuit of the US geostrategic imperative of preventing the rise of a regional power armed with nuclear weapons. While negotiations to end the Iranian nuclear weapons development program are proceeding, and while it seems the Iranians have good reason to trade away this program in exchange for an acknowledgement of its *de facto* regional influence, these trends are by no means deterministic and it is possible that a conflict may erupt between Iran and its regional adversaries, involving the United States and its allies. If that unfortunate event takes place, the US and its allies would encounter a foe with an A2/AD system not as formidable as China's, but one that could pose significant challenges to projecting military force and ensuring the free flow of world oil.

The length of Iran's coastline is scattered with Iranian naval and air bases, and its Islamic Revolutionary Guard Corps Navy (IRGCN) "has constructed outposts on several islands close to the strait, including Abu Musa, Larak, and Sirri. The Islamic Revolutionary Guard Corps (IRGC) has also built an extensive network of tunnels and underground missile bunkers on these islands, creating what it calls 'static warships.'"[123] The Iranian intent would be to raise the cost of entering and maintaining a military presence in the Persian Gulf, something accomplished using anti-ship mines to slow and disrupt the movement of naval forces through the tight Strait of Hormuz. Slowing naval vessels as they deal with mines further reduces the attack warning time, and makes them more vulnerable to

> the array of Iranian strike forces, which include torpedoes, anti-ship cruise missiles, and swarming craft, some of which may be used for suicide attacks. Were that not enough, Iran's growing arsenal of ballistic missiles may pose a threat to US forward bases in the region in a manner similar to, although far less formidable than, the PLA's missile forces. Over time, of course, there is also the prospect of Iranian nuclear weapons becoming part of the military balance equation.[124]

The combination of the narrow waters of the Strait of Hormuz, fast attack speedboats driven by committed IRGCN crews, and torpedoes and anti-ship missiles poses a source of concern for allied navies operating in the Persian Gulf. The difficulty of detecting these small craft in rough seas magnifies their potential to strike with very limited warning. Included in its arsenal are a small number of *Tondar* fast attack vessels with "a displacement of some 200 tons and a top speed of 35 knots".[125] The limited range of their target acquisition sensors renders them of limited use unless they can close rapidly and launch their C-802 anti-ship cruise missiles before drawing "disproportionate fire".[126] Given the Iranian leadership's belief in the Iranian martyrdom culture,

[122] Fariborz Haghshenass, "Iran's Asymmetric Naval Warfare" (Washington D.C.: The Washington Institute for Near East Policy, Policy Focus 87, September 2008), 2.
[123] Andrew F. Krepinevich, *Why AirSea Battle?*, 28.
[124] *Ibid.*
[125] Fariborz Haghshenass, "Iran's Asymmetric Naval Warfare", 13.
[126] *Ibid.*

this may well be the intent of these and other small boats.[127] Their ultimate effectiveness remains in question given the US focus on methods with which to deal with them.[128]

Another area of concern is the Iranian regular navy's, which differs from the IRGCN, three Soviet-era Kilo 877EKM purchased from Russia.[129] These submarines are known to have deployed "in the eastern mouth of the Strait of Hormuz, the Gulf of Oman, and the Arabian Sea."[130] Complementing the Kilos, the Iranian navy and IRGCN operate smaller littoral submarines (Ghadir and Nahang-1 class).[131] While the raucous Persian Gulf waters make submarine detection more difficult, the narrowness of the Strait of Hormuz works against the natural abilities of the Kilos which are of more utility in the open ocean. If employed outside the Persian Gulf, these submarines would potentially pose a threat to warships entering and exiting the Gulf, and could be used to lay mines to establish the perimeter of Iran's A2/AD defences.[132] The recent expansion of Iranian torpedo capability, including the TT-4, 53-65KE, and TEST-71 wake-homing torpedoes with ranges up to twenty kilometres, is another means by which shipping would be threatened. Of more concern is the claim that Iran has

> designed a torpedo for targeting submarines and surface vessels in the Strait of Hormuz; it is reportedly in service with both the IRGCN and IRIN [Islamic Republic of Iran Navy]. Also purportedly in service is the Hoot superaviation high-speed missile torpedo (reportedly based on the Russian Shkval), with a speed of 223 miles per hour…Iranian possession and mastery of such a system could be a potential game-changer in the Gulf, although Iran's claim remains unverified, and the safety, reliability, and capabilities of the original Russian system on which it is based remain a matter of contention.[133]

Iran also has a range of anti-ship cruise missiles which vary in capability. While the open-source data varies in estimating the numbers involved, conservative estimates are that Iran has several hundred anti-ship cruise missiles and dozens of batteries.[134] The quality of these missiles, and thus their usefulness in A2/AD strategy, varies greatly. Most of their missiles are from China or are based on Chinese designs. These include the C-802 Saccade turbojet powered and older and shorter-ranged C-801 Sardine rocket propelled sea-skimming missiles which can be launched from aircraft, surface vessels, or trucks – the latter of which are more mobile and more difficult to find and destroy. As well, the Iranians possess several hundred of the older Chinese-made CSS-N-2 Silkworm and CSS-N-3 Seersucker cruise missiles massed around Bandar Abbas,

---

[127] *Ibid.,* 11-12.
[128] Kevin Baron, "The U.S. Navy's new and improved Anti-Iranian small boat defenses", *Foreign Policy* (21 September 2014), http://e-ring.foreignpolicy.com/posts/2012/09/21/the_us_navy_s_new_and_improved_anti_iranian_small_boat_defenses, (accessed 22 July 2014).
[129] Fariborz Haghshenass, "Iran's Asymmetric Naval Warfare", 13.
[130] *Ibid.*
[131] *Ibid.*
[132] Andrew F. Krepinevich, *Why AirSea Battle?*, 32.
[133] Fariborz Haghshenass, "Iran's Asymmetric Naval Warfare", 14-15.
[134] Shlomo Brom and Yiftah Shapir, *The Middle East Military Balance, 2001-2002* (Cambridge Mass.: Massachusetts Institute of Technology Press, 2002), 160. Also see Caitlin Talmage, "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz" *International Security,* Vol. 33, No.1 (Summer 2008), 82-117.

directly across from the Strait of Hormuz.[135] Iran also is said to have a shorter-range anti-ship cruise missile for use on its fast attack boats.[136]

Another form of missile attack which at the moment "is more potential than real" comes from its ballistic missiles.[137] The potential, nightmare scenario is for an Iranian nuclear weapon to be delivered by a ballistic missile. Iran has yet to develop a nuclear weapon, and it has many incentives to trade this card for an acknowledgement of Iranian regional power and an easing of economic sanctions, and its ballistic missiles are not accurate enough "to make saturation attacks by conventionally armed warheads effective against forward [US and allied] bases."[138] Yet the potential is there and cannot be discounted. The Iranian ballistic missiles come from Soviet technology that has made its way to Iran from Chinese and North Korean sources. The Shahab-1, for example, is the export version of the Soviet Scud-B, while the much more accurate Shahab-2 is a derivative of the Soviet Scud-C.[139] The Shahab 3 Medium Range Ballistic Missile (MRBM) is based on the North Korean No Dong missile and has a range of around 600-1000 miles[140], while the Shahab-4 is a longer-range version at some 1,200 and 1,700 miles.[141] Its future development plans include the Ghadr-110, a solid-fuel missile similar to the Chinese M-9, the Ashura MRBM, and longer-range solid-fuel versions of the Shahab missile with ranges out to 3,000 miles.[142]

Unlike the sophisticated Chinese air defence system, the Iranian air defence network mixes the old with the newer, although the effect of the economic sanctions in place on the system's readiness is uncertain. Some of the older systems like the Shahab Taqeb, US-built HAWK dating back to the Shah, and the Soviet SA-2, SA-5, and SA-6 systems may well be inoperable.[143] Of more concern are the newer generation of Russian systems including the Tor-M1 and the possible fielding of two different versions of the S-300 system, the sale of which to Iran was first promised in 2007 but the delivery was later postponed.[144] Recently, Iran displayed what it calls the "Bavar 373" equivalent of the S-300, allegedly developed in Iran as its version of the S-300 system.[145] Whether the Russians finally delivered the promised S-300 missiles, whether Iran

---

[135] Caitlin Talmage, "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz", 101.
[136] *Ibid.* Also see Anthony H. Cordesman and Martin Kleiber, *Iran's Military Forces and Warfighting Capabilities: The Threat in the Northern Gulf* (Washington, D.C.: Center for Strategic and International Studies Press, 2007), 117-118.
[137] Andrew F. Krepinevich, *Why AirSea Battle?*, 34.
[138] *Ibid.*
[139] *Ibid.* Also see Anthony H. Cordesman and Adam C. Seitz, *Iranian Weapons of Mass Destruction: The Birth of a Regional Nuclear Arms Race?* (Washington DC: Center for Strategic and International Studies Press, 2009), 108.
[140] National Air and Space Intelligence Center, "Ballistic & Cruise Missile Threat", (Wright-Patterson AFB, OH: NASIC, 2009), 15, http://www.afisr.af.mil/shared/media/document/AFD-130710-054.pdf, (accessed 22 July 2014).
[141] Steven A. Hildreth, "Iran's Ballistic Missile Programs: An Overview," *Congressional Research Service* (February 4, 2009), 3.
[142] Andrew F. Krepinevich, *Why AirSea Battle?*, 35.
[143] *Ibid.,* 32.
[144] "Russia Completes Air Defense System Deliveries to Iran–Ivanov," *RIA Novosti*, January 16, 2007, http://en.ria.ru/russia/20070116/59156706.html, (accessed 22 July 2014).
[145] Dalit Halevy and Ari Yashar, "Iran Displays Its New S-300 Equivalent Missile," *Arutz Sheva*, 25 April 2014, http://www.israelnationalnews.com/News/News.aspx/179917, (accessed 23 July 2014).

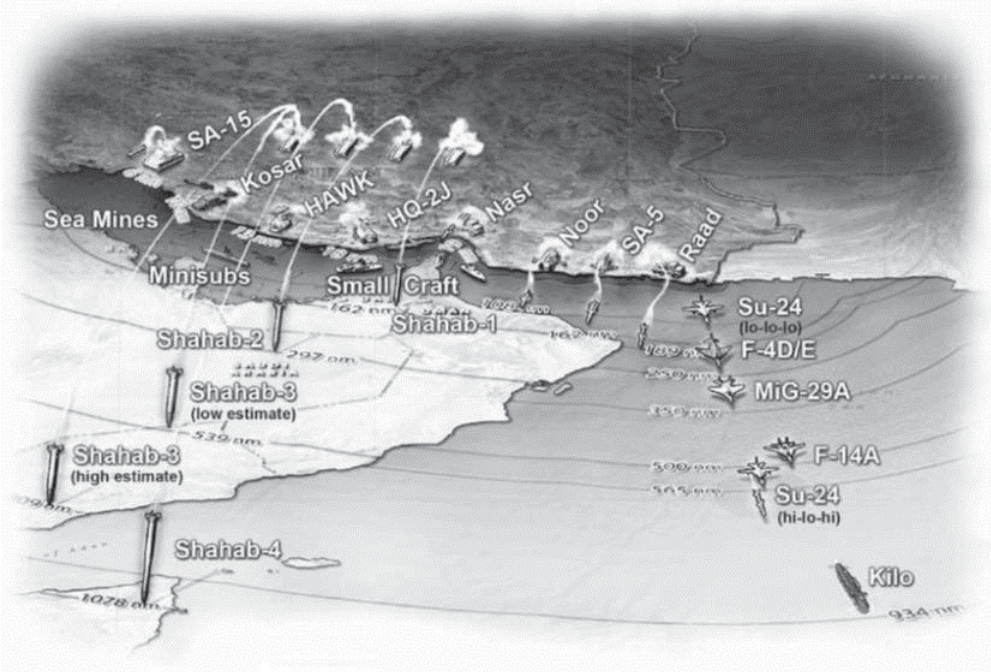
acquired them through another country, or whether this display was all show and no substance is not clear, but such a missile system would complicate any attempt to penetrate Iranian airspace.[146]

Even with such systems, Iran's air defences are insufficient to provide coverage for the whole country, and must be focused on providing limited air defence for its key population centres, military bases, and oil and nuclear facilities. Moreover, its radar system lacks comprehensive low-altitude coverage. It also lacks

> command-and-control assets, advanced sensors, and electronic counter-counter measure (ECCM) capabilities to field a highly capable integrated air defense against fourth- and fifth-generation aircraft and air-breathing missiles. Moreover, Iran lacks the ability to link together its hodge-podge of air defense systems whose origins range from China and Russia to the United States.[147]

Despite the technological challenges it faces to the development of a sophisticated A2/AD strategy, those conditions may be overcome in time and the possibility exists that Iran will become the predominant military power in the region. While the US is seeking to end Iran's nuclear ambitions, and it is possible this will succeed, Iran's interest might not align with those of the US and its allies. Although, standard regional rhetoric aside, it now seems that Iran is interested in creating a military that will enable it to coerce its regional rivals and prevent easy access to the region even by major powers instead of preparing for a real war, "the latter cannot be discounted, no matter how illogical it may seem to Western political leaders. Sadly, the history of the last century offers many examples of countries that plunged themselves into self-destructive wars."[148]

[146] "Belarus denies sales of S-300 air defence systems to Iran". *RIA Novosti*. 4 August 2010, http://en.ria.ru/military_news/20100804/160070974.html, (accessed 23 July 2014).
[147] Andrew F. Krepinevich, *Why AirSea Battle?*, 33.
[148] *Ibid.,* 36.



Source: Andrew F. Krepinevich, Why AirSea Battle? (Washington D.C.: Center for Strategic and Budgetary Assessments, 2010), 36.

Figure 3: *Emerging Iranian anti-access/area-denial capabilities.*

The classified versions of the US JOAC and subordinate JCEO and ASB likely include an understanding of these matters, and hopefully plans to counter them. Indeed, as will be shown one sees evidence that they have in the capability investment being planned. In any event, the US is unlikely to operate as the enemy expects – unlikely to charge across the Pacific into a Chinese missile shield, or directly into the Strait of Hormuz without appropriate consideration of enemy military capabilities. While the specifics of the JOAC, JCEO, and ASB are classified, indications are that the US Navy and USAF are seeking to identify technical weaknesses in the Chinese and Iranian A2/AD strategy and doctrine.[149]

The Air-Sea Strategy Office is managing the development of ASB plans, hoping to outmatch sophisticated A2/AD capabilities through the development of platforms that can penetrate enemy defences with stealth technology or conduct strikes beyond the range of enemy defences. Those defences include advanced diesel-electric and nuclear powered submarines and anti-ship ballistic missiles designed to limit the freedom of action or destroy any US vessel in range. In the longer-term, the reliance on bases and logistical hubs may be reduced through the development of the next-generation bomber capable of conducting the Prompt Global Strike mission, supplemented by long-range cruise missiles and other stand-off weapons enabled by improvements to air and space-borne ISR assets. But those capabilities will take years to develop, and in the meantime the US military must rely on extant capabilities and strong and strategically located regional allies. The most obvious of these are Australia, Japan, and South Korea. While

[149] These two countries are the current sources of concern regarding A2/AD strategies. While other nations may seek similar approaches in future, and those will have to be addressed individually, Iran and China likely are the current planning considerations for the USAF.

all are increasingly concerned about Chinese military developments and aggressive moves, not all of their interests are identical to those of the US. Moreover, as in Australia's case, even long-time and strong allies wish to avoid provoking a regional power with China's strength, less its attention be turned to them.[150] This is further complicated by the hesitant way in which US foreign policy has committed to the 'Pacific rebalance', undoubtedly leaving some allies (or potential allies) to doubt Washington's sincerity.[151]

5.4 Capability implications from the strategic environment

Any investment in new capability carries with it considerable risk, something made more acute at times of fiscal austerity. The politically charged US procurement system is always a minefield, but one that has seen the development of some remarkable military advances. The fifth-generation F-22 and the B-2 stealth bomber are but two examples in a wide field. The high costs of new capabilities is something shared by all the US services, but this is particularly so with the USAF because of its commitment to very expensive weapon systems and advanced technology. So, even when the USAF procurement system is working effectively it is expensive and often a target for those seeking quick and easy budget reductions. Some recent and very negative incidents have further complicated the ability of the USAF to procure the platforms that deliver needed capability. Indeed, for a time the USAF lost control of its acquisition authority over some major capability investment plans through incidents that have caused some to question the professionalism of senior USAF leadership. The most alarming of these, and one suggesting the sense of pride and mission once a hallmark of the US Strategic Air Command (SAC) had eroded, was the 2007 revelation that a USAF B-52 bomber flew over the length of the United States carrying six nuclear armed cruise missiles. The shock of such a lapse resulted in the unprecedented firing of both the USAF Chief of Staff, General Michael 'Buzz' Moseley, and Secretary of the Air Force Michael W. Wynne.[152] A more recent case where thirty-four nuclear missile launch officers were accused of cheating on a proficiency exam brought more unwanted

[150] Benjamin Shreer, *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia*, 31.

[151] Victor Davis Hanson has argued that the Pacific Pivot is "is mostly a linguistic artifact, not a muscular reality", see "The World's New Outlaws: With America's presence in the world receding, regional hegemons flex their muscles" *National Review Online* 3 December 2013 http://www.nationalreview.com/article/365292/worlds-new-outlaws-victor-davis-hanson#; also see David S. McDonough, "Obama's Pacific Pivot in US Grand Strategy: A Canadian Perspective" *Asian Security*, Vol.9 Issue 3, 165-184; "Blowback in the Pacific: The US military's 'Pacific Pivot' is raising tensions with China and prompting local resistance" *The Nation*, 21 January 2013; "Visits by Panetta, Obama to Asia Pacific to punctuate U.S. 'Asia-Pacific pivot'" *East-Asia Intel Reports,* 14 November 2012; "Obama's Absence Leaves China as Dominant Force at Asia-Pacific Economic Cooperation Summit" *New York Times,* 7 October 2013; Charlie Campbell, "At APEC, Obama's Replacement Flies U.S. Flag as Best He Can" *Time*, 7 October 2013; Rodolfo C. Severino, "The United States in the East Asia Summit" *Regional Outlook 2011/2012 Southeast*, 10-13.

[152] Bill Van Auken, "Why was a nuclear-armed bomber allowed to fly over the US?" *Global Research,* 7 September 2007, http://www.globalresearch.ca/why-was-a-nuclear-armed-bomber-allowed-to-fly-over-the-us/6723, (accessed 25 July 2014); Ann Scott Tyson and Josh White, "Top Two Air Force Officials Ousted," *The Washington Post*, 6 June 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/06/05/AR2008060501908.html, (accessed 25 July 2014).

attention to the service.[153] Even more damaging to the Air Force reputation was the so-called 'Druyun affair', when in October 2004 former Principal Deputy Undersecretary of the Air Force for Acquisition, Darleen Druyun, was sentenced to sixteen months in jail for corruption.[154] The charges stemmed from a contract with Boeing to initially lease 100 KC-767 tankers to replace the oldest of its Boeing 707 (military designation KC-135) tanker aircraft. The costs to lease these aircraft were far in excess of their purchase cost, a fact that did not go unnoticed, nor did Druyun's lucrative $250,000 a year job at Boeing the followed immediately her leaving the USAF in 2003.[155] The fallout of this scandal has left "the senior uniform leaders at the Air Force…in a situation where if the culture is not corrupt, then the oversight is incompetent."[156] Echoing these sentiments was Senator John McCain, who said that the lease deal "appears to be a case of either a systemic failure in procurement oversight, willful blindness or rank corruption. Either way, full accountability among Air Force leadership is in order."[157] Following this, the Department of Defense assumed direct oversight of USAF acquisition programs for a time, and it has only been in the past few years that the USAF has re-established some degree of control over its acquisition programs.[158] Incidents that result in a delay in procurement of obsolescent aircraft, or ones not suited to emerging operational challenges, uses increasingly more of a USAF budget already under pressure from sequestration.

5.5 Next generation aerial refueling tanker

Few would doubt the importance of the aerial refueling capability of the USAF and its importance to the speed and reach of US air power.[159] As former United States Air Force Chief of Staff General Norton Schwartz once said, "Without tankers, we're not global".[160] The ability to refuel bombers, fighters, transport aircraft deploying and sustaining ground forces, and ISR assets enables the rapid reach of not only American air power but also ground power. At a recent

[153] Jon Harper, "34 nuclear launch officers involved in Air Force cheating scandal," *Stars and Stripes*, 15 January 2014, http://www.stripes.com/news/us/34-nuclear-launch-officers-involved-in-air-force-cheating-scandal-1.262223, (accessed 25 July 2014).
[154] Nikos Passas, "Corruption in the Procurement Process/Outsourcing Government Functions: Issues, Case Studies, Implications", (Boston: Northeastern University, 2007), 7.
[155] Leslie Wayne, "Air Force at Unease in the Capital", *The New York Times*, 16 December 2004, http://www.nytimes.com/2004/12/16/business/16tanker.html?_r=1&, accessed 25 July 2014.
[156] *Ibid.*
[157] Rowan Scarborough, "Pentagon Likely to drop weapons buyer nominee," *The Washington Times*, 1 June 2005.
[158] Gail Putrich, "Pentagon pulls space decisions from USAF, NRO," *Defense News*, July 8, 2008, http://www.vnfawing.com/forum/viewtopic.php?t=1908&start=210&sid=ad831a136e9e5e (accessed 31 July 2014); Ann Roosevelt, "LAS Cancellation Could Lead Back to DoD Oversight of USAF Programs," *Defense Daily,* Vol. 253, Issue 8 (3 December 2012); Marina Malenic, "USAF Chief Wants Space Acquisition Authority To 'Migrate Back' To The Service", *Defense Daily* Vol. 241, Issue 33 (24 February 2009).
[159] See Jay Wertz, "Filling Stations in the Sky", *Aviation History* Vol. 19, Issue 5 (May 2009); Rebecca Grant, "Playing With Fire," *Air Force Magazine* Vol. 92, Issue 7 (July 2009); Reina J. Pennington, "Tankers: Never loved until they're needed", *Air & Space* (October/November 1997); Rebecca Grant, "9 Secrets of the Tanker War," *IRIS Independent Research* (September 2010), http://www.irisresearch.com/library/resources/documents/9SecretsoftheTankerWar.pdf, (accessed 28 July 2014).
[160] Rebecca Grant, "9 Secrets of the Tanker War, 2.

conference on Operation Unified Protector, the North Atlantic Treaty Organization (NATO) operation in Libya, former Supreme Allied Commander Europe (SACEUR) US Admiral James Stavridis pointed to the importance of tankers to the projection US and NATO air power, and that their development and increased fielding should be a priority for NATO nations.[161] From a USAF perspective, and that of the US Navy which relies heavily on USAF tankers to refuel their own aircraft, the need is equally great. According to evidence assembled for the US Congress in 2010, "Aerial refueling capability is a critical component of the U.S. military's ability to project power overseas and to operate military aircraft in theater with maximum effectiveness."[162] This is why so much effort has been devoted to replacing the "Eisenhower-era" fleet of KC-135 aerial refueling tankers in what the USAF and its U.S. Transportation Command state "is their highest recapitalization priority."[163]

In a future A2/AD conflict against an adversary keen on preventing US military power from operating from bases in the theatre, the value of aerial refueling becomes all the more apparent. In particular, against a scenario involving China the long distances across the Pacific and heavily defended airspace around China and the Strait of Taiwan will demand extremely long reach and the heavy use of tankers. Indeed, the fuel requirements and need for a tanker with long range, a degree of stealth, and ability to loiter on station are considerable. Based on experience from Operation Allied Force in 1999, "a typical bomber mission from long distance may take four refuelings [sic] of nearly 100,000 lbs. of fuel each."[164]

While mired in controversy and delays, which some argue are normal in a procurement project of this magnitude, the USAF and Boeing have finalised the design of the KC-46A Pegasus. This first contract, KC-X, is to be followed by KC-Y and KC-Z contracts designed to replace the remaining half of the some 400 USAF's KC-135 and its 59 KC-10 Extender platforms.[165] The USAF expects to take delivery of 18 combat-ready tankers by 2017, the first of 179 tankers stipulated in the 4.9 billion dollar contract.[166]

Overcoming what many see as a major weakness in current USAF planning, the next generation of aerial refueling tankers will extend the strategic reach of the USAF's fleet of short-range multi-role fighters, expanding the number of potential bases from which they can operate. The same is true,

---

[161] The author was in the audience at the June 2012 Learning from Air Operations in Libya conference at the US Naval War College Rhode Island, where Adm Stavridis repeatedly identified a lack of tankers as a major deficit in the NATO force structure. The presence of Canadian Polaris and Hercules tankers also was noted as being of particular value to the success of the operation.

[162] Jeremiah Gertler, "Air Force KC-X Tanker Aircraft Program: Background and Issues for Congress," (Washington DC: *Congressional Research Service,* 2010), 2.

[163] *Ibid.,* 1; Statement of General Duncan J. McNabb, USAF, Commander, United States Transportation Command, Before the House Armed Services Air & Land Forces and Seapower & Expeditionary Forces Subcommittees [Hearing] On the State of the Command, 25 February 2009, 6-7.

[164] Rebecca Grant, "9 Secrets of the Tanker War," 7.

[165] Gareth Jennings, "USAF announces initial basing plans for KC-46A tanker", *HIS Jane's Defence Weekly*, 24 April 2014, http://www.janes.com/article/36998/usaf-announces-initial-basing-plans-for-kc-46a-tanker, (accessed 28 July 2014).

[166] "US Air Force, Boeing Finalize KC-46A Tanker Aircraft Design", *Boeing News Release* (nd), http://boeing.mediaroom.com/US-Air-Force-Boeing-Finalize-KC-46A-Tanker-Aircraft-Design (accessed 28 July 2014); Aaron Mehta, "Boeing Takes $272 Million KC-46 Hit", *Defense News,* 25 July 2014, http://www.defensenews.com/article/20140725/DEFREG02/307250028/Boeing-Takes-272-Million-KC-46-Hit, (accessed 28 July 2014).

to a lesser degree, for long-range bombers. The reach obtained by refueling such aircraft may enable them to hold targets at risk deep in enemy territory, assuming they can penetrate defended airspace without suffering prohibitive losses. Thus, the next generation tanker is of critical importance to the USAF's strategic reach and effect.

5.6 Next-Generation Strike – Bomber (NGS-B)

At the centre of the USAF contribution to Air-Sea battle is the next-generation long-range bomber. It is one of the main means, which is part of a family of systems, with which to overcome Chinese growing A2/AD capabilities. It also offers a considerable deterrent value against more traditional military threats because of its range, capabilities, and ability to carry conventional and nuclear weapons. This project, like the next-generation tanker, has suffered from considerable delay. Its need was first identified in the 1990s, but it was not viewed as an urgent need. In 1999, the USAF established 2037 as the date by which the new bomber should attain initial operating capability.[167] The security environment of the early 21st century has forced a reconsideration of the relevance of the next-generation bomber, and in 2006 the Quadrennial Defense Review called for the development of "a new land-based, penetrating long-range strike capability to be fielded by 2018 while modernizing the current bomber force."[168] Somewhat vague as to whether this called for a next-generation bomber or just a modernization of current platforms, this ambiguous direction was continued in the 2010 Quadrennial Defense Review, which called for a family of systems and for the Air Force to review "options for fielding survivable, long-range surveillance and strike aircraft as part of a comprehensive, phased plan to modernize the bomber force."[169] This imprecise and unclear direction was finally overcome in the 2012 Defense Strategic Guidance, which directed the development of "a new stealth bomber" as part of a family of systems which, operating through the Joint Operational Access and the Air-Sea Battle concepts, will target developing anti-access and area denial strategies.[170]

The importance of the next-generation strike bomber to JOAC and ASB is difficult to over-state. While developing a family of systems "to provide the joint commander with a range of options to hold at risk fixed and mobile targets over great distances and in contested environment" makes a great deal of sense, the flexibility of the NGS-B is unparalleled.[171] When compared with the alternatives across the desired attributes of persistence, time-sensitive, multi-target, command and control, standoff, penetrating, and non-kinetic, only the NGS-B was assessed as 'green' in all categories.[172] It is thus the most capable and flexible platform in the family of long-range strike systems.

Despite the long delay in getting this project moving, the NGS-B is now, as the Secretary of the US Air Force recently noted, one of "the top three priorities for modernization" – the other two

[167] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs," 13.
[168] *Quadrennial Defense Review Report*, (Washington DC: US Department of Defense, 6 February 2006), 46.
[169] *Quadrennial Defense Review Report*, (Washington DC: US Department of Defense, February 2010), 33.
[170] *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington D.C.: Department of Defense, January 2012), 5.
[171] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs," 14.
[172] Robert P. Haffa, Jr. and Michael W. Isherwood, "Long-range Conventional Strike: A Joint Family of Systems", *Joint Forces Quarterly* Issue 60, 1st quarter (2011), 107.

being the F-35 Lightning II and the KC-46 Pegasus tanker.[173] According to the Assistant Air Force Secretary for Acquisition, William LaPlante, in June 2014 the program had moved into the competitive phase with the USAF being days away from releasing the final request for proposals.[174] The current plan is designed around a fixed set of requirements with "relatively mature technologies…[that] won't have everything on it that we want or will want", and an open architecture with "places on the wings that allow us to customize sensors and weapons with future capabilities."[175] The exact number to be built remains the source of debate, but the initial contract will be for some 80 to 100 aircraft at $550 million each.[176]

Given the NGS-B and its family of systems is designed to counter A2/AD environments, it is safe to assume the winning bid will feature enhanced low-observability, resistant to electromagnetic pulse, carry a variety of weapon systems from nuclear weapons to advanced precision guided munitions, and be capable of extremely long-range operations.[177] The initial delivery of the NGS-B likely will be in the mid-2020s and the first block will be manned, although the USAF will explore whether to make subsequent blocks "optionally-manned".[178] The ability to contemplate this stems from the advancements in Unmanned Aerial Vehicle (UAV) technology. Of critical importance to this capability are the subdomains of system autonomy, which "can be further divided into autonomous flight management and mission management."[179] The former simply means that a unmanned aerial system can perform core missions "such as sensor employment, from start to finish without human intervention", while mission management technology "will enable a small number of human operators to control large numbers of UAVs in different roles and configurations."[180] The second subdomain allows for autonomous air refueling, extending the endurance in defended airspace necessary to locate and destroy moving and transportable targets. While there is always a human in the loop, technological advances have expanded the range of missions UAVs can perform without the need for direct human control. How much of that is desired or necessary remains a subject for much debate. In the near-term, the NGS-B will be a manned platform, and the centrepiece to the ASB concept, its range, stealth, and payload making it arguably the most important capability for both ASB and conventional deterrence scenarios.

5.7 Space systems

With the advent of Chinese anti-satellite tests, and obvious development of ASAT capabilities, the US and its allies need to focus attention on their dependence on space-based systems for communication, satellite communications, ISR, precision strike, and other such key elements of their way in warfare. The crippling of the GPS satellite network, to be fair this is something much

[173] Rich Lamance, "SecAF outlines top priorities during 'State of AF' address", *Air Force News Service,* 24 February 2014, http://www.af.mil/News/ArticleDisplay/tabid/223/Article/473409/secaf-outlines-top-priorities-during-state-of-af-address.aspx, (accessed 29 July 2014).
[174] Aaron Mehta, "RFP For US Bomber Coming Soon, USAF's Top Buyer Says", *Defense News*, 13 June 2014, http://www.defensenews.com/article/20140613/DEFREG02/306130027/RFP-US-Bomber-Coming-Soon-USAF-s-Top-Buyer-Says, (accessed 29 July 2014).
[175] *Ibid.*
[176] *Ibid.*
[177] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs," 14.
[178] Aaron Mehta, "RFP For US Bomber Coming Soon, USAF's Top Buyer Says".
[179] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs," 14.
[180] *Ibid.*

easier said than done, would have a dramatic effect on the speed, precision and effect of US military power. In 1993, the average age of the Air Force's satellites was at an acceptable fifty percent of the designed life. A decade later, the bulk of those satellites exceeded their design life, and this trend has continued. Over half of the GPS satellites in the constellation, for example, have exceeded their design life.[181]

Key USAF advisors are calling for efforts to "reverse the atrophy in the US space design and industrial base, and its associated manpower base."[182] In addition, there is a need to attend to the approaching "deficit in the joint force's ability to transmit critical information to deployed forces in opposed-network environments via long-haul, high bandwidth protected satellite communications (SATCOM)".[183] The Chinese destruction of its weather satellite brings a new focus to the need to protect the now more vulnerable US constellation of military satellites, including those in geo-stationary orbit. Complementing such efforts will be methods of restoring space capabilities successfully targeted by adversaries. Two programs "stand out as prime candidates for further development. The first are Radiation Belt Remediation (RBR) technologies to eliminate or reduce the lethality of pumped radiation belts following a high altitude nuclear detonation that could diminish the life of unhardened [Low Earth Orbit] LEO satellites."[184] The second program would be a series of light, low-cost, easily launched tactical satellites to replenish those destroyed. "Air Force Space Command's Operationally Responsive Space (ORS) program explores cost-effective, rapid replenishment tactical satellites along with commercial backup options to provide quick turn-around satellite replacement during a major conflict."[185]

The other potential vulnerability of space systems is through cyber-attack. As stated above, in any conflict with the United States the Chinese may opt initially for a cyber-attack to neutralize "the uplinks and downlinks of space-based systems".[186] Such an attack would be low-cost and would provide a degree of anonymity, at least initially. The disruption or destruction of critical elements of US military networks could have a significant effect, one only overcome by effective commanders practicing the operational art while the networks are being reconstituted.[187] The majority of US precision weapons are dependent on GPS satellite information for their targeting, and some "US unmanned aerial vehicles, such as the Predators, are incapable of operating in the absence of satellite data links to their remote controllers."[188] Any interference with these systems, an area certain to be targeted by sophisticated enemies, could have a dramatic effect. Moreover, the US military's TPFDD discussed earlier, which is essential to deploying forces in a timely and

[181] "GPS.Gov Space Segment", http://www.gps.gov/systems/gps/space/, (accessed 1 August 2014).
[182] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul* (Washington DC: Centre for Strategic and Budgetary Assessments, 2009), 76.
[183] *Ibid.*
[184] *Ibid*, 80.
[185] *Ibid.*
[186] Larry R. Moore, "China's Antisatellite Program: Blocking the Assassin's Mace", 168.
[187] In other words, this is the art of the general that Carl von Clausewitz described in *On War,* where the effective commander's *coup d'oeil* is "his ability to see things simply, to identify the whole business of war completely with himself that is the essence of good generalship. Only if the mind works in this comprehensive fashion can it achieve the freedom it needs to dominate events and not be dominated by them." Carl von Clausewitz, *On War*
[188] Andrew F. Krepinevich, *Why AirSea Battle?*, 16.

efficient manner, depends "upon myriad data links bringing together information from a range of sources."[189]

Another complicating factor related to space systems that comes at the expense of other USAF programs is the so-called 'space tax', which is the cost of providing other service and agencies with free services from air force systems. For example, providing protected satellite communications to others using Air Force systems comes with a significant cost that currently is not leveraged against the services and agencies for which the service is provided. Given that both high- and low-end adversaries have the ability to jam unprotected communications; those costs are likely to grow. In the absence of adequate oversight by the Office of the Secretary of Defense (OSD) forces the USAF to provide these services at the expense of its own space and air programs. By developing a system to value and charge for this service "would return the requirements process to a more market-based incentive structure rather than the current system that treats extravagant joint programs as must-do's and Air Force core missions as leftovers."[190] Indeed, the same could be said for USAF aerial refueling, upon which the other services depend, as well as the combat air patrol demands made on its UAV fleet.[191]

Whether these difficulties are overcome or not is less important than ensuring their protection. Quite simply, the critical role of space-based assets to the persistence, speed, and accuracy of aerospace operations make them a vital resource central to ASB and conventional deterrence. Thus, they are certain to be a key target for any serious adversary.

5.8 Intelligence, surveillance, and reconnaissance

Technological advances have blurred the edges of the once separate bomber, fighter, airlift, tanker, and ISR force structures. Bombers and fighters have become very useful and important sensors, and some ISR platforms can now carry very effective weapons. Moreover, both tactical and strategic airlift assets and aerial refueling tankers have been configured for an ISR role and to serve as communication nodes.[192] The need for persistent aerial surveillance, something always desired by commanders anxious to keep pace with enemy movements and to track mobile targets, has been reinforced in the conflicts of the post-Cold War era. Bringing the sensors available to modern fighters and bombers together with those of UAVs that have enhanced persistence and the ability to operate in denied areas, and to combine all this with other land and naval systems to produce a comprehensive picture upon which reasoned decisions can be made is, and should be, the main goal of the USAF ISR program. Doing so will require overcoming the weak institutional support that has plagued the USAF ISR program. For example, until 1974 the USAF ISR acquisition was handled by the intelligence community, something that led to the establishment of the unfortunate Defense Airborne Reconnaissance Office (DARO).[193] The formation of DARO saw all of the services lose their UAV acquisition autonomy from 1993-1998 to an organization

[189] *Ibid.*
[190] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 81.
[191] *Ibid.*
[192] This is the so-called 'smart tanker' concept that is being extended to the next generation tanker. See Sandra I. Erwin, "Air Force Takes Steps Toward 'Smart' Tanker" *National Defense* June 2003, http://www.nationaldefensemagazine.org/archive/2003/June/Pages/Air_Force_Takes3840.aspx, (accessed 2 October 2014).
[193] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul,* 72.

that "radically altered the environment for innovation with UAVs" until its collapse only five years after it was formed.[194] Attaining the required degree of sensor integration across the services will also require development programs for the next generation of low-observable follow-on systems suitable for deployment against the full range of anticipated operations – from high-end A2/AD environments to relatively low-end or irregular conflicts. This USAF trend away from non-stealthy UAVs and an assumption of 'permissive' environments similar to those encountered in Iraq and Afghanistan is noteworthy, and towards, as Secretary of the USAF recently said, "unmanned aerial aircraft that can operate in contested environments."[195]

To accomplish this, many authors have for quite some time called for a tiered fleet tailored to meet the range of anticipated missions.[196] Indeed, as early as 1993 the US Joint Requirements Oversight Committee (JROC) endorsed the "three-tier approach to acquiring an "endurance capability"."[197] The first tier would consist of a fleet of somewhere in the neighbourhood of one hundred moderately low-observable follow-on aircraft to the Reaper class.[198] These medium-altitude (15,000-40,000 feet) and medium-endurance UAV would operate in medium-threat environments, be capable of a range of missions, including full-motion video surveillance to direct action, and would be particularly appropriate for clandestine missions associated with the global war on terror as well as areas where they may encounter more sophisticated anti-aircraft systems.[199]

The next tier involves a replacement for the Global Hawk UAV with a platform capable of aerial refueling that is very stealthy and able to operate for very long periods at altitudes over 60,000 feet in denied areas to satisfy both in-theatre and national surveillance requirements.[200] Indeed, the stated joint requirement for a UAV with many of these characteristics has been in place since January 1990, when the JROC approved a Mission Need Statement for a "Long Endurance Reconnaissance, Surveillance, and Target Acquisition (RSTA) Capability" able to operate in "defended and denied areas over extended periods of time".[201] Yet despite having several systems like the Lockheed Martin DarkStar program reach the advanced prototype stage, this requirement has not been satisfied in its entirety as a USAF capability. Some authors have argued that with the "personal intervention of senior Air Force leaders" this caliber of stealthy UAV could be fielded by 2015 in support of USAF operations "by using updates to an existing, partly-tested design." The arguments against its development, mostly that the USAF would face relatively benign air defences in future conflicts, has been proven false and the need for this capability has been

[194] Thomas P. Erhard, "Air Force UAVs: The Secret History" (Arlington VA: The Mitchell Institute for Airpower Studies, 2010), 46-48.
[195] Aaron Mehta, "Ready for Retirement, Can Predator Find New Home?", *Defense News*, 13 May 2014, http://www.defensenews.com/article/20140513/DEFREG/305120020/Ready-Retirement-Can-Predator-Find-New-Home-, (accessed 20 October 2014).
[196] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 72; also see Geoffrey Sommer, Giles K. Smith, John L. Birkler, and James R. Chiesa, *The Global hawk Unmanned Aerial Vehicle Acquisition Process: A Summary of Phase 1 Experience* (Santa Monica, CA: RAND Corporation, 1997), 12-13.
[197] Geoffrey Sommer *et. al*, T*he Global Hawk Unmanned Aerial Vehicle Acquisition Process*, 12-13.
[198] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 73.
[199] *Ibid.*, 73-74.
[200] Geoffrey Sommer *et. al*, *The Global Hawk Unmanned Aerial Vehicle Acquisition Process*, 12.
[201] *Ibid.*

repeatedly demonstrated in recent wars.[202] It must be said, however, that there has been development of advanced stealthy ISR UAVs in the form of the Lockheed Martin RQ-170 and recent testing of the RQ-180 for use by the Central Intelligence Agency (CIA), and these platforms likely would be made available for any potential A2/AD scenario.[203] Indeed, in 2011an RQ-170 Sentinel was reportedly lost during a CIA mission over Iran, and other reports have them operating in support of the Abbottabad raid against Osama Bin Laden. But these platforms do not meet the full requirements stated by the JROC.

An interesting suggestion by the special assistant to the USAF Chief of Staff is for the final tier to be an unmanned ISR version of the next-generation strike bomber. This type of UAV would possess a considerable strike capability, and would possess the latest stealth technologies. Whether this option will be explored seriously remains to be seen, but the requirement for work "to find designs for an advanced version of a Tier III stealthy global UAV with endurance measured in weeks or months without the need for refuelling" is being recommended.[204] The combination of extended range, and thus strategic reach, persistence over the target, and low-observability would be necessary for effective operations in heavily defended airspace. When combined with other manned ISR platforms, supplemented with the systems on bombers, fighters and other aircraft, a truly global UAV "would be a major step forward in strategic warning, high-caliber manhunting [sic], and communications relay" with considerable utility to the high-end challenges posed by adversaries using A2/AD strategies.[205]

5.9 Stand-off weapon systems

As outlined in the latest USAF strategy, the air force seeks to "*increase emphasis on stand-off capabilities while maintaining stand-in resilience"*.[206] To that end, the USAF is investing in a series of GPS and laser-guided precision weapons for stand-in resilience, and also developing the next-generation of stand-off weapons like the Lockheed Martin AGM-158 Joint Air-to-Surface

[202] Eric J. Labs, *Options for Enhancing the Department of Defense's Unmanned Aerial Vehicle Programs* (Washington DC: Congressional Budget Office, 1998), 63.
[203] Elisha Maldonado, "Iran Denies U.S. Request for Drone Return, Demands Apology", *International Business Times* (13 December 2011), http://www.ibtimes.com/iran-denies-us-request-drone-return-demands-apology-382694, (accessed 2 October 2014); Scott Shane and David E. Sanger, "Drone Crash in Iran Reveals Secret U.S. Surveillance Effort", *New York Times* (7 December 2011), http://www.nytimes.com/2011/12/08/world/middleeast/drone-crash-in-iran-reveals-secret-us-surveillance-bid.html?_r=0, (accessed 2 October 2014); John Reed, "RQ-170 Stealth Drone Used in Bin Laden Raid", *Defencetech* (18 May 2011), http://defensetech.org/2011/05/18/rq-170-sentinel-stealth-drone-used-in-bin-laden-raid/, (accessed 2 October 2014).
[204] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 75.
[205] *Ibid.* When combined with possible upgrades to the Joint Surveillance Target Attack Radar (JSTAR) system, which include variants of the P-8A and business jet platforms with the required sensors, which would carry the battle management command and control system, would be a positive step forward in this kind of integration. See Stephen Trimble, "USAF reveals plan to replace JSTARS with business jets by 2022, *Flight Global,* 27 January 2014, http://www.flightglobal.com/news/articles/usaf-reveals-plan-to-replace-jstars-with-business-jets-by-395241/, (accessed 14 August 2014).
[206] *America's Air Force: A Call to the Future*, 16.

Stand-off Missile (JASSM) with extended ranges of up to 600 nautical miles.[207] The advantages of this missile system, compared with the Boeing Stand-off Land Attack Missile – Expanded Response (SLAM-ER) is both range and that it offers a degree of stealth to prevent interception. The Boeing air-to-surface SLAM-ER has a much shorter range, but "offers the important logistic advantage of being based on the HARPOON anti-ship missile" in service with the US Navy.[208] The JASSM is an all-weather missile using both inertial navigation and global positioning "to locate its intended target and then an infrared seeker for pinpoint terminal accuracy, just before impact."[209]

With the emphasis on the ability to find, fix, and attach targets at long range outside the range of enemy defences in A2/AD environments, some key advisors have suggested that "the Air Force should pursue new low-observable conventional and nuclear missile programs with ranges from 1,500 up to 3,000 nautical miles", and that it also should alter its current twenty-to-one ratio of investment in short to long range strike weapons.[210] These weapons may not necessarily be carried on board the aircraft that acquires the target. Recently, "the US tested an F-22 retargeting a Tomahawk cruise missile that was launched from a submarine", blurring the distinction between aircraft conducting other missions and simultaneously identifying targets that are attacked with other assets.[211] The development of hypersonic missiles, the science of flying in excess of five times the speed of sound, adds a new and lethal aspect to this kind of integrated attack. Hypersonic missiles may provide a marriage of surgical precision with rapidity of action, enabling forward deployed F-35s, F-22s, and longer-range assets like the NGS-Bs and UAVs to guide these weapons precisely to a range of targets, or launch them directly. Moreover, in the context of an A2/AD scenario, hypersonic missiles offer the prospect of striking targets deep in enemy territory without putting valuable aircraft at risk. The idea that one platform's sensors (in the past limited to the pilot's eyes) can lead other aircraft to desired targets with speed and power is by no means new, and although the speed and precision certainly have changed, the reliance on effective command and control has not.[212]

5.10 Command and control

From the description of the Chinese weapon systems under development it is clear that the PLA in particular "is pursuing modernization on a scale unprecedented in its history and is rapidly closing the gap with Western air forces across a broad spectrum of capabilities including aircraft,

[207] Directory of U.S. Military Rockets and Missiles AGM-158, http://www.designation-systems.net/dusrm/m-158.html, (accessed 6 August 2014).
[208] "Australia to Procure Stand-Off Missiles", *Military Technology* Vol.28, Issue 9, (September 2004), 79.
[209] Georg Mader, "Powered Punch: Developments in Air-to-Ground Missiles and Air-Launched Cruise Missiles", *Military Technology* Vol.34 Issue 2, (2010), 29.
[210] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 69; Jan Van Tol, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept* (Washington DC: Center for Strategic and Budgetary Assessments, 2010), 85.
[211] Robbin Laird, "Countering China: Hypersonic Missiles, Sensors, Stealth, & Speed", *Breaking Defense,* 8 April 2013, http://breakingdefense.com/2013/04/countering-china-hypersonic-cruise-missiles-sensors-stealth-and/, (accessed 6 August 2014).
[212] Brad W Gladman, *Intelligence and Anglo-American Air Support in World War Two: The Western Desert and Tunisia, 1940-1943* (London: Palgrave Macmillan, 2009), *passim.*

command and control (C2), jammers, electronic warfare (EW), and data links."[213] Some authors, including retired Lieutenant-General Deptula, argue these developments represent a fundamental challenge to the American C2 construct. In particular, the cruise and ballistic missiles described can threaten the fairly large and exposed Combined Air and Space Operations Centre (CAOC), and the important communications and ISR from space-based assets can be targeted through kinetic and non-kinetic means, and cyber-attacks may compromise CAOC operations.[214] In this regard, and to maintain the speed and flexibility inherent in air power, USAF senior advisors have suggested looking at options to develop a more distributed C2 system that can function when connectivity is targeted and possibly degraded or severed.[215]

The guiding principle of air power command and control is centralised control and decentralised execution. It holds that the main way to maximize the flexibility of air power is to command it at a level with access to all available intelligence, and for the sake of speed to decentralize the execution of operations in a way that enables prompt support. The challenge will be to develop an agile and flexible command and control model that more securely integrates the streams of information (securely in network opposed environments) coming from all environments in a way that enables the application of precision and appropriate force, assesses its effect, and allows relevant action towards the desired end. There has been some movement on this front in the past five years, where the USAF has looked at "replacing heavily used legacy equipment and building new information architectures to serve the demands of dynamic modern warfare.[216] Other authors have pointed to a need to change from centralized control and decentralised execution to one based on a "centralized command, distributed control, and decentralized execution".[217] Whether the promises of technologies enabling such a shift will be realized remains to be seen, but key allies must keep pace with the evolution of USAF and US military command and control to ensure their seamless integration into a coalition. That integration, and the effective capabilities they provide, will ensure them a place at the table when determining coalition desired end-states and strategies.

5.11 The pursuit of "Game-changing technologies"

Technology and effective air power have gone hand-in-hand since the first manned flights more than a century ago. Maintaining a technological advantage over one's adversaries has been a key goal of the USAF since its formation in 1947, and that remains one of its top priorities.[218] Some authors have pointed to an atrophy of USAF science and technology, research and development, and acquisition communities, calling on senior USAF leadership to improve its resourcing and conduct an overhaul to "restore the technical expertise and professional excellence lost in the

[213] Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, 2014* (Washington DC: Office of the Secretary of Defense), 9, http://www.defense.gov/pubs/2014_DoD_China_Report.pdf, (accessed 12 August 2014).
[214] Lt Gen David A. Deptula, "A New Era for Command and Control of Aerospace Operations", *Air & Space Power Journal* (July-August 2014), http://www.airpower.maxwell.af.mil/digital/pdf/articles/2014-Jul-Aug/SLP-Deptula.pdf, (accessed 5 August 2014).
[215] *Ibid.*
[216] Robert K. Ackerman, "Air Force Morphs Command and Control", *Signal Online,* June 2009, http://www.afcea.org/content/?q=node/1959, (accessed 14 August 2014).
[217] Lt Gen David A. Deptula, "A New Era for Command and Control of Aerospace Operations", 13.
[218] *America's Air Force: A Call to the Future*, 18.

years following the Cold War."[219] In comparison to the efforts during the Cold War where the early USAF leaders "built a dominant Air Force technology enterprise…[today's] Air Force S&T community pales by comparison, a result of the dissolution of Systems Command in 1992 and the steady atrophy of the link between the Service's strategic direction and its R&D activities."[220] There is thus a need to reinvest in the service's S&T and R&D community, and to re-establish the link to the strategic leadership. That said, the latest USAF strategy has an ambitious program outlined to maintain its technological advantage.

The strategy points to a need to focus efforts on those technologies that amplify the speed, range, flexibility and precision of air power. Some of the more promising areas to be investigated include aircraft and weapons operating at hypersonic speeds, the move to which "will have a profound impact that can revolutionize the way we approach our core missions in the future – from investments, to force posture, to tactics, techniques, and procedures."[221] As well, the exploration of nanotechnology will open new possibilities for material structures and size, creating stronger and lighter components that will increase speed and range. Moreover, the cost of launching assets into space at a high cost per pound becomes less prohibitive with lighter payloads.[222] The challenges posed by operating in contested environments, especially those far from logistical support, might be mitigated to some degree through the development of directed energy technology, and the persistent, precise, and possibly reversible effects by some classes of directed energy weapons offer more options to the Joint Force commander.[223] In the field of unmanned and autonomous systems, the USAF plans to invest in unmanned systems that are more autonomous and will "place less demand on critical and vulnerable communications infrastructure" while providing additional capacity or redundancy for overworked space assets.[224] These assets could be used to "swarm, suppress, deceive or destroy [and their] weapon effects might range from kinetic to non-kinetic; permanent to reversible; single-use to self-recharging."[225] Presumably, the development of nanotechnologies will reduce their weight, allow for greater range and endurance, and with reduced manufacturing costs over time will allow quantity and mass. However, the development of these 'game-changing technologies' in a time of budget austerity is all the more difficult, especially if the USAF is required to maintain, and continues to build, what some authors have called an expensive 'middle-weight' fighter force unsuited to anticipated threat environments.

5.12 The USAF fighter force

In measuring current USAF plans in light of the future challenges discussed above, including the possibility of both high-end military operations against capable opponents to relatively low-end or irregular conflicts, some scholars have argued that the USAF "is building a "middle-weight" force structure" unsuited to either. On the one hand, the argument continues, the planned force structure will be too sophisticated and expensive to deploy and sustain for the low-end challenges,

[219] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, xii.
[220] *Ibid.,* 49.
[221] *America's Air Force: A Call to the Future*, 18.
[222] *Ibid.*
[223] *Ibid.* The internally generated or stored energy for this class of weapon lessons the need to move large stocks of munitions into and within the theatre.
[224] *Ibid.,* 19.
[225] *Ibid.*

and lacks key "capabilities to address challenges at the high-end of the military competition."[226] According to Thomas Ehrhard, the special assistant to the Chief of Staff of the US Air Force, the F-35 Lightning II is a prime example of this middle-weight force. Its limited range "makes it largely unsuitable for land-based operations in the western Pacific without substantial aerial refueling."[227] Placing them on bases in-theatre would put them at risk from Chinese ballistic and cruise missiles. Moreover, Ehrhard continues, "the F-35 does not carry enough air-to-air missiles to deal with mass incursions of modern PLA fighters with greater missile-carrying capacity, and it lacks the multi-azimuth low-observable (i.e., stealth) features to survive in an all-aspect high-threat environment."[228] On the relatively low-end or irregular conflicts, the stealth features and high purchase cost make it too expensive to operate and sustain when compared to the Predator or Reaper UAVs, which had performed beyond expectations in Iraq and Afghanistan.[229]

Given the operational challenges posed by A2/AD environments, future air operations will differ from the past where short-range, multi-role fighter-bombers had a significant deterrent effect and operational value. The spread of advanced air defence systems may mean that the operational value of non-stealth aircraft will decrease rapidly in anything but conflicts where the skies are uncontested – precisely the environments to which such aircraft are too expensive to deploy.

The solution to this conundrum for the USAF, as with any air force on earth – large or small, comes from the direction received in the form of policy goals and levels of expectation. Getting sufficient resolution on exactly what a government expects of its military is the first step in charting a path towards those goals. As argued above, the US and other western nations have long suffered from a serious 'strategy deficit' that further complicates defence planning, and yet it must be done even without clear ends. The range of threats and the capabilities of potential adversaries require consideration of a multi-dimensional fighter force able to deploy effective and affordable capabilities able to deal with the anticipated threat level.

The complete US military withdrawal from Iraq has had some unintended consequences in the context of the weakening of an absolutist regime in Syria, although one with secular trends, and the inability to form a stable, power-sharing arrangement in Iraq. The result has seen the rise of the Islamic State (IS), the fruit of this regional chaos. Thus, despite wishing to disentangle itself from the Middle East, the Obama administration is now using air power in a carefully orchestrated campaign to avoid sparking a regional sectarian war, while attempting to halt the advance of Islamic State forces. The decision to remove all US air assets from Iraq seems to have limited options and the intensity of the response against Islamic State forces.[230] But options from continuing strikes against IS leadership to the adoption of a more comprehensive approach

[226] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 44.
[227] *Ibid.*
[228] *Ibid.*
[229] *Ibid.,* 44-45; also see Clark A. Murdock, Rebecca Grant, Richard Comer, and Thomas P. Ehrhard, *Special Operations Forces Aviation at the Crossroads,* (Washington DC: Center for Strategic and International Studies, 2007), 8.
[230] "Energy Security and Transition Nature of the New Radical Religious Terrorism Threat in the Middle East, *Hazar,* 14 August 2014, http://www.hazar.org/blogdetail/blog/energy_security_and_transition_nature_of_the_new_radical_religious_terrorism_threat_in_the_middle_east_884.aspx, (accessed 26 August 2014).

seeking to target concentrations of IS forces and its supply and logistics networks across Syria and Iraq are being considered.[231] While US air power can be used to bolster resistance, it would serve only to weaken rather than cripple the IS movement. The only real option to degrade IS severely would involve ground forces. Both options risk the US being drawn more deeply into the Syrian conflict, which is something that has been avoided to this point. Any operation to support either the rebels, which are not a homogenous entity, or the Syrian regime would risk domestic political fallout and also international condemnation. Moreover, arming rebel groups and hoping they will fight IS carries the risk that advanced weapons will fall into the hands of potential US adversary groups, and would complicate the delicate negotiations with Iran over its nuclear program.[232]

In any such operation in the region, the costs of US air power will have to be considered. In attempting to balance operational abilities with fiscal realities, it is clear that certain platforms are more expensive to operate and sustain in operations, and some have capabilities that are simply not needed for low-end or irregular warfare. The cost per flying hour of an F-15 Eagle, according to a 2014 memorandum from the US Department of Defense (DoD) Comptroller's office, exceeds $20,000, and that of an F-22 Raptor is $21,464.[233] While the effects delivered by these aircraft are indispensable in certain circumstances, the cost in maintenance, fuel, and increased airframe wear for irregular warfare operations make their use for truly low-intensity operations questionable. It is only because of the legacy, and arguably 'middle-weight', fighter force developed to confront the Warsaw Pact that these aircraft are employed in conflicts where their capabilities far exceed the requirement. However, it must be acknowledged that on occasion operations against low-technology adversaries may require a capability overmatch. In the case of the current operations in Iraq and Syria, for example, the presence of robust Syrian air defences has forced the US to rely on its F-22 and cruise missiles to strike IS and other targets in Syria. While this certainly is a technology overmatch between the IS forces and the USAF, especially since some form of coordination seems to have been done and Syrian air defences have remained passive, in rare instances this is necessary. It does not, however, invalidate the need to find the 'right match' of technology to the specific environment.

There is considerable ongoing debate about the right balance of capabilities in the next generation fighter force. As stated previously, the emerging and anticipated A2/AD environments may make non-stealthy fighters of little value, and over-designed and too expensive for low-end threat environments. Some scholars have pointed to the value of "low-tech aspect of airpower in small wars", showing the cost-effectiveness of two-seat training aircraft like the Brazilian Tucano.[234] One of the main advantages of these kinds of light turboprop aircraft in low-intensity operations is that the cost per flight hour drops to roughly "$1000-$2,000 per flight hour with a more flexible

[231] "US aircraft hit 90 Islamic State targets in three days: Pentagon", *The Economic Times*, 19 August 2014, http://articles.economictimes.indiatimes.com/2014-08-19/news/52983180_1_islamic-state-mosul-dam-arbil, (accessed 26 August 2014).
[232] "The U.S. Explores Options Against the Islamic State", *Forbes*, 25 August 2014, http://www.forbes.com/sites/stratfor/2014/08/25/the-u-s-explores-options-against-the-islamic-state/, (accessed 26 August 2014).
[233] John P. Roth, "Fiscal Year (FY) 2014 Department of Defense (DoD) Fixed Wing and Helicopter Reimbursement Rates" (Washington DC:
[234] James Corum and Wray R. Johnson, *Airpower in Small Wars,* 432.

aircraft able to fly from more airfields and provide more coverage in benign environments."[235] This requirement has been picked up by the USAF in its Light Attack Armed Reconnaissance (LAAR) program and the USN with its Imminent Fury program in 2009, both of which chose the Embraer Super Tucano.[236] Despite the contract decision being fought by Hawker Beechcraft in yet another contentious USAF program, it is important to note the realization that even the legacy fighter force, not to mention the fifth-generation fleet being developed, is too expensive and over-designed for low-end threat environments.

Attempting to get the 'right technology' which is both affordable and effective to deploy to meet specific threats bolsters some seemingly radical advice to dramatically scale back the planned F-35 procurement and re-open the F-22 line. Given the politics involved in doing so, it remains unlikely to occur but the logic of the position is difficult to ignore. If the purpose of defence analysis and advice is to take political direction to a series of capability options to deliver on those goals, then it is not entirely impossible that radical advice might not be accepted. It will depend upon how serious the US political leadership is to the so-called rebalance to the Pacific and the military challenges therein, and whether it is willing to invest in the capabilities required to address them effectively. As General George Kenney, Commander of the Allied Air Forces in the Southwest Pacific from 1942 to 1945, once said, "Air power is like poker. A second-best hand is like none at all – it will cost you dough and win you nothing".[237] With the continuing development of Russian and Chinese fifth-generation fighters, something that does not seem to have been anticipated when the F-22 line was first reduced from 700 aircraft to 442 in 1993, 339 in 1997, and finally to 187 in 2012 after which Defense Secretary Robert Gates closed the production line, the need for more F-22s is more apparent to ensure expected levels of US air dominance.[238] In recent years, the USAF has maintained a requirement for 381 F-22s, and numerous war games and studies have confirmed a minimum requirement for 260 combat-coded (battle-ready) F-22s. Other studies have concluded

> that the platform's quality can be stretched only so far to compensate for a lack of quantity, specifically in a Chinese A2/AD scenario in the Taiwan Strait. Recent war games have concluded that far more numerous, albeit less capable, third-generation and fourth-generation Chinese fighter aircraft would overwhelm projected U.S. fighter forces.[239]

Moreover, the F-35 is no substitute for the F-22 in an air dominance role. The F-22 is larger and more maneuverable aircraft with greater missile carriage, and is unmatched in the role for which it

---

[235] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 82; also see Bruce Rolfsen, "USAF Eyes Propellor Planes for Irregular Wars", *Defense News* Vol. 23, Issue 47 (12 August 2008), and Marcus Weisgerber, "ACC Officials Want Air Force Irregular Warfare Fleet of Aircraft", *Inside the Air Force,* 7 November 2008.

[236] Gerardo Gonzalez, "Light Air Support: Another Contentious USAF Acquisition", *Defence Talk*, 19 January 2012, http://www.defencetalk.com/light-air-support-las-laar-contentious-usaf-acquisition-39486/, (accessed 26 August 2014).

[237] Lt. Col. Charles M. Westenhoff, "Military Air Power: The CADRE Digest of Air Power Opinions and Thoughts, (Maxwell AFB: Airpower Research Institute, 1990), 15; also quoted in *Global Vigilance, Global Reach, Global Power for America,* 2014, http://www.af.mil/Portals/1/images/airpower/GV_GR_GP_300DPI.pdf, (accessed 7 August 2014), i.

[238] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs," 15.

[239] *Ibid.*

was designed. Without sufficient protection from the F-22s eliminating air-to-air and surface-to-air threats, the F-35s would be far more vulnerable. The aircraft's greater range and super-cruise features make it far more suitable for the kind of A2/AD systems being developed. The decision to end production of the F-22 was based on the assumption that other countries would be decades behind in the development of their own fifth-generation fighters, and yet China has already begun testing the J-20 as its attempt to enter the fifth-generation fighter game. These developments have caused some authors to suggest reopening the F-22 production line to bring the numbers up to the USAF minimum requirements, with the costs of the additional numbers, and the other necessary capability investments to counter A2/AD systems, absorbed through the elimination of the USAF's legacy fighter force, reduction of the number of F-35s to be procured, and through another attempt at base realignment and closure.[240] The investment in the F-22 program has brought the price to a point where it is competitive with the F-35, and is a proven design which, aside from the oxygen system difficulties, came off the line with zero defects.[241] While the likelihood of the program being restarted is low, as the Air-Sea Battle concept is further developed, the demonstrated requirement for increased numbers of this aircraft might force a serious reconsideration of the decision. If so, key allies may once again seek to have the fighter reconsidered for export. In any case, the USAF continues to assess its fighter force in the context of its strained budget and the anticipated requirements of the uncertain security environment.

5.13 Base Realignment and Closure (BRAC) and overseas basing

The difficulty in embarking on a new round of procurement in support of the range of USAF missions and responsibilities at a time of fiscal austerity and defence budget debate is finding means to cut excess or unnecessary capabilities and infrastructure to afford investment. One area often looked at is the massive amount of continental US (CONUS) basing that the USAF maintains. The theory goes that unloading some of the unnecessary basing in the United States would allow for improved infrastructure – hardening, capacity, and forward defence against missile and other attack – of the existing bases in key theatres, and also for the expansion and increased presence in new locations in support of regional allies. It would also free up resources that could be put towards the development of, inter alia, the NGS-B and other capabilities. But the political costs and thus difficulty of reducing basing in the US should not be underestimated.

BRAC has its origins in the administration of John F. Kennedy, when he directed Secretary of Defense Robert McNamara to develop and implement a BRAC in alignment with the defence priorities of the 1960s. McNamara closed some sixty bases in the early 1960s without Congressional approval or even involvement. In response, Congress demanded and got oversight and more control over the BRAC process in the late 1960s and 1970s. In 1977, for example, President Jimmy Carter approved Public Law 95-82, whereby DoD would be required to notify Congress when a base was a candidate for closure, prepare studies on the strategic, local, and

[240] *Ibid.;* Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 85, 88, and 93. It is important to note that it is the Special Assistant to the Chief of Staff of the US Air Force making these suggestions. While politics always trumps advice and there are many powerful obstacles to such a plan, that such a senior advisor is calling for a drastic reduction in F-35 numbers to afford more important future capabilities is significant.

[241] Robert P. Haffa Jr., "Full-Spectrum Air Power: Building the Air Force America Needs", 15.

environmental consequences of the closure, and wait sixty days for a Congressional response.[242] Since then, through bi-partisan commissions to study BRAC, some progress has been made along these lines, but it remains a very difficult and politically contentious issue. From 1989 to 1997 after four "base closing rounds, only 21 percent of the military installations in the continental United States have been reduced"[243], and additional excess infrastructure still exists. In practical terms, this excess capacity is "bleeding away funds the Air Force urgently needs for modernization."[244] Despite this, the 2005 BRAC seeking to close ten major USAF installations, which would have saved $2.6 billion annually, only "a fraction of what is required to rationalize the CONUS excess."[245]

With the advent of Chinese and other national A2/AD environments discussed, the general post-Cold War tendency to abandon overseas bases no longer makes as much sense as it once may have. Indeed, the lack of overseas basing restricts the projection of US military power, and while it is not suggested that the US should replay its commitment to Europe in the Cold War through a massive and provocative expansion of its overseas basing, developing new bases in the Pacific theatre to the level necessary to project power quickly may be more difficult.[246] The reasons for this are apparent, and include the often shifting politics in the host nation, especially as tensions rise. Moreover, often these nations have interests that may at times share some commonality with those of the US, but may differ in key ways. For example, although Australia is a close US ally – something strengthened through its support of the US in both Iraq and Afghanistan – some have advised caution in embracing the Air-Sea Battle concept to avoid provoking China, an important trading partner.[247] It is here where a clear US policy on Asia-Pacific and a coherent message at all levels of the US system would be beneficial in convincing close allies and potential providers of US bases of the seriousness with which the US takes the Pacific 'rebalance'. In its absence, and with a multitude of political, economic, and military levers the Chinese can pull to put pressure on potential US allies, gaining their support becomes all the more problematical. Not only are many uncertain of the sincerity of the US Pacific 'rebalance', but they also know that allowing US bases on their territory may well make them a primary target in any conflict with the US. While US presence and significant hardening of those bases brings with it a deterrent value, that only goes as far as the strength of the US commitment. To date, there is cause to question that political commitment.[248]

---

[242] "Base Realignment and Closure", *Global Security*, http://www.globalsecurity.org/military/facility/brac.htm, (accessed 12 August 2014).
[243] *Ibid.*
[244] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 20.
[245] *Ibid*.; also see Department of Defense, *Base Closure and Realignment Report, Volume 1 Part 2 of 2: Detailed Recommendations*, (Washington DC: May 2005).
[246] Christopher J. Bowie, *The Anti-Access Threat and Theater Air Bases* (Washington DC: Center for Strategic and Budgetary Assessments, 2002), iii-vii.
[247] Benjamin Shreer, *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia*, 7.
[248] Again, as Victor Davis Hanson argues, the Pacific Pivot is "is mostly a linguistic artifact, not a muscular reality", see "The World's New Outlaws: With America's presence in the world receding, regional hegemons flex their muscles" *National Review Online* 3 December 2013 http://www.nationalreview.com/article/365292/worlds-new-outlaws-victor-davis-hanson#; also see David S. McDonough, "Obama's Pacific Pivot in US Grand Strategy: A Canadian Perspective" *Asian Security*, Vol.9 Issue 3, 165-184; "Blowback in the Pacific: The US military's 'Pacific Pivot' is raising tensions with China and prompting local resistance" *The Nation*, 21 January 2013; "Visits by Panetta, Obama to Asia

Not only has the political commitment been intermittent and uncertain, but "repeated attempts to obtain military construction funding for the hardening of vulnerable forward base facilities in the Pacific have perennially failed to survive the Air Force budget process."[249] Investment in existing forward bases critical to power projection and crisis stabilization such as "building hardened shelters and supporting base infrastructure improvements at Anderson AFB, Guam, or expanding aircraft dispersal sites on islands like Saipan, Tinian, or Wake, are not in the current [2009] Air Force program."[250] While this may change given appropriate attention and scarce funding, there is no simple or quick way to overcome these issues to demonstrate to potential allies the serious US commitment. Thus, projecting the kind of air power needed in these environments will require "survivability, strategic reach, persistence, and sustaining operations in opposed network environments."[251]

Planning effective and affordable military capabilities for a nation with truly global interests, from whom a leadership role in military operations around the globe is expected from its allies, and to the strength and presence of the US Navy and USAF the strength of the world economy owes much is extraordinarily difficult. As has been stated throughout this paper, that task is made far more difficult when the US economy is struggling, where defence budgets are declining, and in the absence of clear policy goals, levels of ambition, and supporting national security strategies that align scarce resources to those ends. While such clear goals, if they existed, would not eliminate all of these problems, their absence further complicates coherent strategic planning. That said, the job of doing so remains and the US military has embarked on an ambitious Air-Sea Battle concept that represents a central feature of US and USAF strategic thinking for a way to counter many of the significant threats and challenges likely to be faced in the foreseeable future. Yet confronting A2/AD environments is not the only challenge being posed in the always evolving security environment, and the use of capabilities designed for the higher-end A2/AD threat environments are very expensive and over-designed for efficient use against lower-technology enabled opponents. Finding the appropriate capability mix to ensure the right assets can be deployed rapidly and efficiently to provide effective aerospace power against a range of threats is something towards which all nations on earth struggle. It is made more difficult in the absence of clear policy guidance, which not only prevents the formulation of tightly focused defence and supporting USAF strategies demanded in times of fiscal austerity, but makes the execution of those strategies all the more problematical because the subordinate parts of the national security apparatus are not tied together by a unifying vision. Moreover, it makes the job of those allies who may share the same (or similar) interests and challenges in regions around the world more difficult in terms of finding appropriate roles or operational methods, or in developing relevant capabilities with which to make a meaningful contribution.

Pacific to punctuate U.S. 'Asia-Pacific pivot'", *East-Asia Intel Reports,* 14 November 2012; "Obama's Absence Leaves China as Dominant Force at Asia-Pacific Economic Cooperation Summit", *New York Times,* 7 October 2013; Charlie Campbell, "At APEC, Obama's Replacement Flies U.S. Flag as Best He Can", *Time*, 7 October 2013; Rodolfo C. Severino, "The United States in the East Asia Summit", *Regional Outlook 2011/2012 Southeast*, 10-13.

[249] Thomas P. Ehrhard, *An Air Force Strategy for the Long Haul*, 40.

[250] *Ibid.*

[251] *Ibid.*

6 Conclusions

This detailed analysis into US strategic thinking and the concept and capability direction the USAF is taking in response has implications for the Canadian policy development community, as well as for the joint and RCAF force development communities. That said, the analysis at this stage is incomplete. The capability investment and response by the other US services to the range of threats identified in the US strategic direction is needed to provide the complete case for the US direction in terms of aerospace capabilities and concepts. Moreover, even a comprehensive understanding of the most important Canadian ally is an insufficient base upon which to draw recommendations for Canadian policy and military force development. Thus, other papers focusing on the other US services will supplement this paper, as will an analysis of the direction being taken by other key allies. On the whole, when complete this analysis could serve as a very useful resource for Canadian defence and national security policy formulation, as well as RCAF and joint force development. Despite being the first in a series of analytical papers, there are some preliminary recommendations which can be made.

The awareness of the orientation of key allies – those with whom Canada and the CAF likely will partner in both continental and deployed operations – in terms of how they view the world, their geostrategic imperatives, and their policy goals and strategies to attain them will assist in setting the context around which to develop Canadian policies in line with desired outcomes and which align a national approach in areas and regions of interest. The Government of Canada has recently expressed its enduring interest in, for example, the Pacific region of the world. An understanding of the US approach to this region in economic, diplomatic, and military terms is essential when developing a uniquely Canadian method to the protection and advancement of its own interest. If that approach includes a shared appreciation of the regions threats, an awareness of US military developments is valuable in defining a role for the Canadian military in any regional operation. An awareness of the full Joint Operational Access Concept and subordinate Joint Concept for Entry Operations and Air-Sea Battle concept, in the context of an assessment of the US political commitment being expressed and enacted, is valuable in crafting a Canadian policy that protects and advances its own interests and those of its allies. It is thus recommended that the Canadian policy development community adopt this general approach, if not already practiced, to include a comprehensive understanding of US policy development and orientation, as well as the main thrusts in concept development and capability investment. With that in mind, a structured dialogue with senior military leadership in Canada will assist in the formulation of relevant Canadian defence policy in the context of current and planned military capabilities.

In terms of military force development, a certain amount of caution is recommended in the tools used to come to terms with future uncertainty and a volatile security environment. This paper has argued that some, but not all, of that uncertainty can be mitigated through clear policy direction derived from a structured interplay and frank dialogue between the military and political leadership. Furthermore, a case might be made that such tools as the future security environment analysis are best left to the policy development process, and that military advice should flow from an understanding of the future directions in warfare that are, in turn, informed by a comprehensive understanding of the capability investment and concept development course being charted by key allies in the context of domestic defence requirements and policy direction. It is therefore recommended that both the joint community and RCAF capability and concept development communities use this analysis to construct realistic scenarios based on a

comprehensive understanding of the main pillars of allied strategic thinking. The understanding of the nature of future warfare in all domains could thus serve in the crafting of advice to government to aid in the advance of policy goals that are attainable for existing and planned military capabilities, and in the mobilization of resources towards desired ends.

This general analytical approach is less a call for a return to classical strategy, although there is certain logic in so doing, than one for efficiency and effectiveness in responding to an uncertain future. For a small but capable military relative to many of its potential allies, the CAF (and RCAF in particular) cannot afford the time and staff effort required to ponder a future it has no capacity to summon. Instead, it should spend its efforts on shaping appropriate policy to identify roles and missions it is capable of conducting, and which provide the GoC with its desired end-states for domestic, continental, and international operations. These efforts would be assisted greatly through a comprehensive understanding of how close allies view the world and its threats and challenges, and how they plan to face them.

This page intentionally left blank.

References

Ackerman, Robert K.. "Air Force Morphs Command and Control", *Signal Online,* June 2009.

Agence France-Presse, "Russia Announces Plans To Upgrade Nuclear, Air Defense Forces", *Defense News,* 10 September 2014.

"Air-Sea Battle: Service Collaboration to Address Anti-Access & Area Denial Challenges". Washington D.C.: Air-Sea Battle Office, May 2013.

America's Air Force: A Call to the Future. Washington DC: Department of the Air Force, 2014.

Archambault, Peter. "Context is Everything: The Air India Bombing, 9/11 and the Limits of Analogy". *Commission of Inquiry into the Investigation of the Bombing of Air India Flight 182, Research Studies Volume 1: Threat Assessment and RCMP/CSIS Co-Operation.* Ottawa: Public Works and Government Services, 2010.

"Australia to Procure Stand-Off Missiles", *Military Technology* Vol.28, Issue 9, (September 2004).

Barnett, Correlli. *The Swordbearers: Studies in Supreme Command in the First World War*. London: Eyre and Spottiswoode, 1963.

Baron, Kevin. "The U.S. Navy's new and improved Anti-Iranian small boat defenses", *Foreign Policy ,* 21 September 2014. http://e-ring.foreignpolicy.com/posts/2012/09/21/the_us_navy_s_new_and_improved_anti_iranian_small_boat_defenses, (accessed 22 July 2014).

"Base Realignment and Closure", *Global Security*, http://www.globalsecurity.org/military/facility/brac.htm, (accessed 12 August 2014).

"Belarus denies sales of S-300 air defence systems to Iran". *RIA Novosti*. 4 August 2010, http://en.ria.ru/military_news/20100804/160070974.html, (accessed 23 July 2014).

Biddle, Stephen. "Afghanistan and the Future of Warfare" *Foreign Affairs*, Volume 82 No2, 31, (March/April 2003).

Biddle, Stephen. "Special Forces and the Future of Warfare: Will SOF Predominate in 2020?", *Strategic Studies Institute, US Army War College,* 24 May 2004.

Biddle, Stephen. *Afghanistan and the Future of Warfare: Implications for Army and Defence Policy.* Washington DC: Strategic Studies Institute, November 2002.

"Blowback in the Pacific: The US military's 'Pacific Pivot' is raising tensions with China and prompting local resistance". *The Nation*, 21 January 2013.

Bosher, J. F.. "The Franco-Catholic Danger, 1660-1715", *History* Vol. 79 Issue 255 (February 1994).

Bowie, Christopher J.. *The Anti-Access Threat and Theater Air Bases.* Washington DC: Center for Strategic and Budgetary Assessments, 2002.

Brodie, Bernard. *Strategy in the* Missile *Age.* Santa Monica, CA: RAND, January 15, 1959.

Brom, Shlomo and Yiftah Shapir. *The Middle East Military Balance, 2001-2002.* Cambridge Mass.: Massachusetts Institute of Technology Press, 2002.

Bruzdzinski, Jason E.. "Demystifying Shashoujian: China's "Assassin's Mace" Concept" in *Civil-Military Change in China: Elites, Institutes, and Ideas After the 16th Party Congress*, eds. Andrew Scobell and Larry Wortzel. Carlisle PA: Strategic Studies Institute, 2004.

Brzezinski, Zbigniew. *The Grand Chessboard: American Primacy and Its Geostrategic Imperatives.* New York: Basic Books, 1997.

Burney, D.H., W.A. Dymond, and J.L. Granatstein. "Linkage: Foreign Policy, Interests and Prosperity". Calgary: Canadian Defence and Foreign Affairs Institute, 2008.

Campbell, Charlie. "At APEC, Obama's Replacement Flies U.S. Flag as Best He Can" *Time*, 7 October 2013.

Chandrasekaran, Rajiv and John Pomfret. "Aided by U.S., Pashtun Militias Move Closer to Kandahar," *Washington Post,* 27 November 2001.

Chase, Michael S., Andrew S. Erickson, and Christopher Yeaw, "Chines Theater and Strategic Missile Force Modernization and its Implications for the United States," *The Journal of Strategic Studies,* (February 2009), 67-114.

Churchill, Winston S. *Marlborough: His Life and Times.* London: George G Harrap & Co, 1934.

Cliff, Roger, Mark Burles, Michael S. Chase, Derek Eaton, and Kevin L. Pollpeter. *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States.* Santa Monica: RAND Corporation MG524, 2007.

Cohen, Eliot A.. *Supreme Command: Soldiers, Statesmen, and Leadership in War.* New York: The Free Press, 2002.

Cordesman, Anthony H. and Adam C. Seitz. *Iranian Weapons of Mass Destruction: The Birth of a Regional Nuclear Arms Race?* Washington DC: Center for Strategic and International Studies Press, 2009.

Cordesman, Anthony H. and Martin Kleiber. *Iran's Military Forces and Warfighting Capabilities: The Threat in the Northern Gulf.* Washington, D.C.: Center for Strategic and International Studies Press, 2007.

Cordesman, Anthony H.. *The Iraq War. Strategy, Tactics, and Military Lessons.* Washington DC: Center of Strategic and International Studies Significant Issues Series, September 2003.

Cordesman, Anthony. "U.S. Strategy and Added Sanctions on Iran: The Role of the Administration and Congress in a "Good Cop, Bad Cop" Approach". Washington D.C.: Center for Strategic & International Studies, 6 February 2014, http://csis.org/publication/us-strategy-and-added-sanctions-iran-role-administration-and-congress-good-cop-bad-cop-a, (accessed 6 February 2014).

Corum, James S. and Wray R. Johnson. *Airpower in Small Wars: Fighting Insurgents and Terrorists.* Lawrence Kansas: University Press of Kansas, 2003.

de Jomini, Baron Antoine-Henri. *The Art of War.* Philadelphia: J. B. Lippincott & Co., 1862.

Department of Defense. *Base Closure and Realignment Report, Volume 1 Part 2 of 2: Detailed Recommendations*. Washington DC: May 2005.

Deptula, Lt Gen David A.. "A New Era for Command and Control of Aerospace Operations". *Air & Space Power Journal* (July-August 2014).

Deputy Secretary of Defense Ashton B. Carter and Vice Chairman of the Joint Chiefs of Staff James A. Winnefeld Jr.. "Prepared Testimony, House Armed Services Committee". Washington DC, 1 August 2013.

Directory of U.S. Military Rockets and Missiles AGM-158, http://www.designation-systems.net/dusrm/m-158.html, (accessed 6 August 2014).

Dueck, Colin. "The Accommodator: Obama's Foreign Policy", *Policy Review* Issue 169 (Oct/Nov 2011).

Erhard, Thomas P.. "Air Force UAVs: The Secret History". Arlington VA: The Mitchell Institute for Airpower Studies, 2010.

Ehrhard, Thomas P.. *An Air Force Strategy for the Long Haul.* Washington DC: Centre for Strategic and Budgetary Assessments, 2009.

"Energy Security and Transition Nature of the New Radical Religious Terrorism Threat in the Middle East". *Hazar,* 14 August 2014.

Erwin, Sandra I.. "Hagel: Congress Needs to Get Real About the Defense Budget". *National Defense* vol. 98, Issue 727 (June 2014).

Erwin, Sandra I.. "Air Force Takes Steps Toward 'Smart' Tanker". *National Defense* (June 2003).

Estimated Impacts of Sequestration-Level Funding. Washington: United States Department of Defense, April 2014.

Farrell, Philip. "Control Theory Perspective of Effects-Based Thinking and Operations: Modelling "Operations" as a Feedback Control System." Ottawa: DRDC Ottawa Technical Report TR 2007-168, 2007.

Ferguson, Niall. *The Cash Nexus. Money and Power in the Modern World, 1700–2000.* New York: Basic Books, 2001.

Fisher, Richard Jr.. "Growing Asymmetries in the China-Japan Naval Balance." *Assessment and Strategy Center,* November 22, 2005, http://www.strategycenter.net/research/pubID.83/pub_detail.asp, (accessed 21 July 2014).

Fitchett, Joseph. "Swift Success for High-Tech Arms," *International Herald Tribune,* 7 December 2001.

Freedman, Lawrence. "Strategic Coercion," in Freedman, ed., *Strategic Coercion: Concepts and Cases*. Oxford: Oxford University Press, 1998.

French, David. *The British Way In Warfare 1688-2000.* London: Unwin Hyman, 1990.

Fukuyama, Francis. "The End of History?" *The National Interest*. Summer 1989. http://ps321.community.uaf.edu/files/2012/10/Fukuyama-End-of-history-article.pdf, (accessed 3 September 2014).

Fukuyama, Francis. *The End of History and the Last Man.* New York: Free Press, 1992.

Gabrielson, Mark. "Shashoujian: A Strategic Revelation or Simply an Idiom?", http://www.chinausfocus.com/culture-history/shashoujian-a-strategic-revelation-or-simply-an-idiom/, (accessed 15 July 2014).

Gertler, Jeremiah. "Air Force KC-X Tanker Aircraft Program: Background and Issues for Congress." Washington DC: *Congressional Research Service,* 2010.

Gertz, Bill. "Russian Strategic Bombers Near Canada Practice Cruise Missile Strikes on US: Nuclear launch rehearsal conducted in North Atlantic", *The Washington Free Beacon*, 8 September 2014.

Gladman, Brad and Peter Archambault. "A Role for Effects-Based Planning in a National Security Framework". *Journal of Military and Strategic Studies,* Vol 13 No 2, (Winter 2011).

Gladman, Brad W.. *Intelligence and Anglo-American Air Support in World War Two: The Western Desert and Tunisia, 1940-1943*. London: Palgrave Macmillan, 2009.

Gladman, Brad. *Continental Air Defence: Threat Perception and Response.* Ottawa: DRDC CORA TM 2012-257, November 2012.

Gladman, Brad W.. *The Requirements for a Canada Command Integrated Operating Concept.* Ottawa: DRDC CORA TR 2006-039, 2007.

Global Vigilance, Global Reach, Global Power for America, 2014, http://www.af.mil/Portals/1/images/airpower/GV_GR_GP_300DPI.pdf, (accessed 7 August 2014).

Gonzalez, Gerardo. "Light Air Support: Another Contentious USAF Acquisition", *Defence Talk*, 19 January 2012.

Gordon, Michael. "'New' U.S. War: Commandos, Airstrikes and Allies on the Ground," *New York Times,* 29 December 2001.

Government of Canada. *A Role of Pride and Influence in the World: Defence.* Ottawa: Her Majesty the Queen in Right of Canada, 2005.

Government of Canada. *Canada First Defence Strategy.* Ottawa: 2008.

Government of Canada. *Challenge and Commitment. A Defence Policy for Canada.* Ottawa: Minister of Supply and Services Canada, 1987.

Government of Canada. *Defence in the 70s: White Paper on Defence.* Ottawa: Queen's Printer, 1971.

Government of Canada. *White Paper on Defence.* Ottawa: Queen's Printer, 1964.

"GPS.Gov Space Segment", http://www.gps.gov/systems/gps/space/ (accessed 1 August 2014).

Grant, Rebecca. "9 Secrets of the Tanker War," *IRIS Independent Research* September 2010.

Grant, Rebecca. "Playing With Fire," *Air Force Magazine* Vol. 92, Issue 7 (July 2009).

Gray, Colin S. "The Airpower Advantage in Future Warfare: The Need for Strategy". *Airpower Research Institute Papers Research Paper 2007-2.* Maxwell AFB Alabama: Airpower Research Institute, 2007.

Gray, Colin. *Fighting Talk: Forty Maxims on War, Peace, and Strategy.* Westport, CT: Praeger Security International, 2007.

Gray, Colin. *Irregular Enemies and the Essence of Strategy: Can the American Way of War Adapt?* Carlisle, PA: Strategic Studies Institute, US Army War College, March 2006.

Grossman-Vermaas, Robert. "Future Perfect: Effects-based Operations, Complexity and the Human Environment." Ottawa: DOR (Joint) Research Note 2004/01, 2004.

Haffa, Robert P. Jr. and Michael W. Isherwood. "Long-range Conventional Strike: A Joint Family of Systems", *Joint Forces Quarterly* Issue 60, 1st quarter (2011).

Haffa, Robert P. Jr.. "Full-Spectrum Air Power: Building the Air Force America Needs." Washington D.C.: The Douglas and Sarah Allison Center for Foreign Policy Studies Special Report No. 122, 12 October 2012.

Hagel, Chuck. "Statement on Strategic Choices and Management Review". Washington DC: Office of the Secretary of Defense, 31 July 2013.

Haghshenass, Fariborz. "Iran's Asymmetric Naval Warfare". Washington D.C.: The Washington Institute for Near East Policy, Policy Focus 87, September 2008.

Halevy, Dalit and Ari Yashar. "Iran Displays Its New S-300 Equivalent Missile," *Arutz Sheva*, 25 April 2014, http://www.israelnationalnews.com/News/News.aspx/179917, (accessed 23 July 2014).

Hammes, T. X.. "Offshore Control: A Proposed Strategy for an Unlikely Conflict". *Strategic Forum.* No. 278 (June 2012).

Hanson, Victor Davis. "The World's New Outlaws: With America's presence in the world receding, regional hegemons flex their muscles" *National Review Online,* 3 December 2013.

Hanson, Victor Davis. "Obama's Ironic Foreign Policy" *Victor Davis Hanson Private Papers,* 16 December 2013. http://victorhanson.com/wordpress/?p=6838#more-6838, (accessed 14 February 2014).

Harper, Jon. "34 nuclear launch officers involved in Air Force cheating scandal," *Stars and Stripes*, 15 January 2014, http://www.stripes.com/news/us/34-nuclear-launch-officers-involved-in-air-force-cheating-scandal-1.262223, (accessed 25 July 2014).

Herwig, Holger. *The First World War, Germany and Austria Hungary, 1914-1918.* London: Arnold Publishers, 1997.

Hewson, Robert. "Dragon's Teeth – Chinese Missiles Raise Their Game," *Jane's Navy International*, February 2007.

Hildreth, Steven A.. "Iran's Ballistic Missile Programs: An Overview," *Congressional Research Service,* February 4, 2009.

Hone, Tom. "Understanding Transformation," *Transformation Trends,* 16 January 2004.

Huntington, Samuel P.. "The Clash of Civilizations?" *Foreign Affairs* 71 (Summer 1993).

Huntington, Samuel P.. *The Clash of Civilizations and the Remaking of the World Order.* New York: Simon and Schuster, 1996.

Indyk, Martin S., Kenneth G. Lieberthal, and Michael E. O'Hanlon, *Bending History: Barack Obama's Foreign Policy.* Washington D.C.: Brookins Institution Press, 2012.

Indyk, Martin S., Kenneth G. Lieberthal, and Michael E. O'Hanlon. "Scoring Obama's Foreign Policy" *Foreign Affairs*, Vol.91 Issue 3 (May/June 2012).

International Institute for Strategic Studies, "19 November 2003 – President Bush Delivers IISS Address," 19 November 2003, http://www.iiss.org/conferences/recent-keyaddresses/president-bush-delivers-iiss-address (accessed 21 February 2013).

Jennings, Gareth. "USAF announces initial basing plans for KC-46A tanker", *HIS Jane's Defence Weekly*, 24 April 2014.

Joint Operational Access Concept. Washington D.C.: Department of Defense, 17 January 2012.

Kagan, Frederick W.. "A Dangerous Transformation," *The Wall Street Journal,* 12 November 2003. http://www.opinionjournal.com/extra/?id=110004289 , (accessed 19 November 2004).

Kaplan, Robert. "Why Is China Really Provoking Its Neighbors?", http://www.realclearworld.com/articles/2014/02/13/why_is_china_really_provoking_its_neighbors-full.html, (accessed 2 July 2014).

Kazianis, Harry. “Behind the China Missile Hype”, *The Diplomat,* January 20, 2012, http://thediplomat.com/2012/01/behind-the-china-missile-hype/, (accessed 21 July 2014).

Keck, Zachary. “China Conducts Third Anti-Missile Test”, *The Diplomat,* 24 July 2014, http://thediplomat.com/2014/07/china-conducts-third-anti-missile-test/, (accessed 6 August 2014).

Keegan, John. *A History of Warfare.* New York: Alfred A. Knopf, Inc., 1993.

Kopp, Carlo and Peter A. Goon, “Inquiry into Australian Defence Force Regional Air Superiority.” *Air Power Australia*, (February 2006).

Krepinevich, Andrew F. and Barry Watts. *Regaining Strategic Competence: Strategy for the Long Haul.* Washington: Center for Strategic and Budgetary Assessments, 2009.

Krepinevich, Andrew F.. *Why AirSea Battle?* Washington D.C.: Center for Strategic and Budgetary Assessments, 2010.

Krepinevich, Andrew. “Strategy in a Time of Austerity”. *Foreign Affairs*, Vol. 91, Issue 6, (Nov/Dec 2012).

Labs, Eric J.. *Options for Enhancing the Department of Defense’s Unmanned Aerial Vehicle Programs.* Washington DC: Congressional Budget Office, 1998

Laird, Robbin. “Countering China: Hypersonic Missiles, Sensors, Stealth, & Speed” *Breaking Defense,* 8 April 2013, http://breakingdefense.com/2013/04/countering-china-hypersonic-cruise-missiles-sensors-stealth-and/, (accessed 6 August 2014).

Lamance, Rich. “SecAF outlines top priorities during ‘State of AF’ address”. *Air Force News Service,* 24 February 2014.

Loeb, Vernon. “An Unlikely Super-Warrior Emerges in Afghan War”. *Washington Post,* 19 May 2002.

Luttwak, Edward N.. *Strategy: The Logic of War and Peace*, revised ed.. Cambridge, MA: The Belknap Press of Harvard University Press, 2001.

Mader, Georg. “Powered Punch: Developments in Air-to-Ground Missiles and Air-Launched Cruise Missiles”. *Military Technology,* Vol.34 Issue 2, (2010), 29.

Maldonado, Elisha. “Iran Denies U.S. Request for Drone Return, Demands Apology”. *International Business Times,* 13 December 2011.

Malenic, Marina. “USAF Chief Wants Space Acquisition Authority To ‘Migrate Back’ To The Service”, *Defense Daily* Vol. 241, Issue 33 (24 February 2009).

Mazarr, Michael. “The Rise and Fall of the Failed-State Paradigm”. *Foreign Affairs* January/February 2014. http://www.foreignaffairs.com/articles/140347/michael-j-mazarr/the-rise-and-fall-of-the-failed-state-paradigm, (accessed 18 December 2013).

McDonough, David S.. "Obama's Pacific Pivot in US Grand Strategy: A Canadian Perspective". *Asian Security*, Vol.9 Issue 3, 165-184.

Mead, Walter Russell. "Grand Strategy: The End of History Ends" *The American Interest* December 2013. http://www.the-american-interest.com/wrm/2013/12/02/2013-the-end-of-history-ends-2/, (accessed 7 January 2014).

Mehta, Aaron. "Boeing Takes $272 Million KC-46 Hit", *Defense News,* 25 July 2014.

Aaron Mehta, "Ready for Retirement, Can Predator Find New Home?", *Defense News*, 13 May 2014, http://www.defensenews.com/article/20140513/DEFREG/305120020/Ready-Retirement-Can-Predator-Find-New-Home-, (accessed 20 October 2014).

Mehta, Aaron. "RFP For US Bomber Coming Soon, USAF's Top Buyer Says", *Defense News*, 13 June 2014.

Moore, Arthur. "The Asia Pivot: Old Policy, New Name" *Geopolitical Monitor,* 9 February 2014) http://www.geopoliticalmonitor.com/the-asia-pivot-old-policy-new-name-4920/, (accessed 11 February 2014).

Moore, Larry R.. "China's Antisatellite Program: Blocking the Assassin's Mace". *Asian Perspective,* Vol. 38 Issue 1 (2014).

Mueller, John. *Retreat from Doomsday. The Obsolescence of Major War.* New York: Basic Books, 1989.

Murdock, Clark A., Rebecca Grant, Richard Comer, and Thomas P. Ehrhard. *Special Operations Forces Aviation at the Crossroads.* Washington DC: Center for Strategic and International Studies, 2007.

Murray, Williamson and Robert H. Scales, Jr.. *The Iraq War. A Military History*. Cambridge, Mass: Harvard University Press, 2003.

National Air and Space Intelligence Center, "Ballistic & Cruise Missile Threat", (Wright-Patterson AFB, OH: NASIC, 2009), 15, http://www.afisr.af.mil/shared/media/document/AFD-130710-054.pdf, (accessed 22 July 2014).

Nicholson, Gerald. *Marlborough and the War of the Spanish Succession.* Ottawa: Queen's University, 1955.

Nye, Joseph. "What New World Order?" *Foreign Affairs* Vol. 71 No.2, (Spring 1993).

"Obama's Absence Leaves China as Dominant Force at Asia-Pacific Economic Cooperation Summit". *New York Times,* 7 October 2013.

Office of the Law Revision Counsel, *United States Code* http://uscode.house.gov/browse/prelim@title10&edition=prelim, (accessed 9 January 2014).

Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, 2009.* Washington DC: Office of the Secretary of Defense, 2009.

Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, 2014.* Washington DC: Office of the Secretary of Defense, 2014.

Passas, Nikos. "Corruption in the Procurement Process/Outsourcing Government Functions: Issues, Case Studies, Implications". Boston: Northeastern University, 2007.

Pennington, Reina J.. "Tankers: Never loved until they're needed", *Air & Space.* October/November 1997.

Putrich, Gail. "Pentagon pulls space decisions from USAF, NRO," *Defense News*, July 8, 2008, http://www.vnfawing.com/forum/viewtopic.php?t=1908&start=210&sid=ad831a136e9e5e (accessed 31 July 2014).

Quadrennial Defense Review Report. Washington DC: US Department of Defense, 6 February 2006.

Quadrennial Defense Review Report. Washington DC: US Department of Defense, February 2010.

Reed, John. "RQ-170 Stealth Drone Used in Bin Laden Raid". *Defencetech,* 18 May 2011.

Ritter, Gerhard. *The Sword and the Scepter: The Problem of Militarism in Germany*. 4 volumes. London: Allen Lane, 1969-1973.

Rolfsen, Bruce. "USAF Eyes Propellor Planes for Irregular Wars". *Defense News* Vol. 23, Issue 47 (12 August 2008).

Roosevelt, Ann. "LAS Cancellation Could Lead Back to DoD Oversight of USAF Programs," *Defense Daily,* Vol. 253, Issue 8 (3 December 2012).

Roth, John P.. "Fiscal Year (FY) 2014 Department of Defense (DoD) Fixed Wing and Helicopter Reimbursement Rates". Washington DC, 2015.

"Russia Completes Air Defense System Deliveries to Iran–Ivanov", RIA Novosti, January 16, 2007, http://en.ria.ru/russia/20070116/59156706.html, (accessed 22 July 2014).

Saunders, Phillip C. and Charles D. Lutes. "China's ASAT Test: Motivations and Implications", *Joint Forces Quarterly* Issue 46 3rd Quarter, 2007.

Scarborough, Rowan. "Pentagon Likely to drop weapons buyer nominee", *The Washington Times*, 1 June 2005.

Severino, Rodolfo C.. "The United States in the East Asia Summit", *Regional Outlook 2011/2012 Southeast*, 10-13.

Shane, Scott and David E. Sanger. "Drone Crash in Iran Reveals Secret U.S. Surveillance Effort", *New York Times,*7 December 2011.

Shanker, Thom. "Conduct of War is Redefined by Success of Special Forces," *The New York Times,* 21 January 2002

Shreer, Benjamin. *Strategy: Planning the unthinkable war, 'Air Sea Battle' and its implications for Australia.* Canberra: Australian Strategic Policy Institute, April 2013.

Smolynec, Gregory, Don Neill, Brad Gladman, Peter Archambault, Michael Roi, Charles Morrisey. *Defence Scientists' Reflections on CFD's Future Security Environment 2007-2030.* Ottawa: DRDC CORA TN 2008-01, 2008.

Sommer, Geoffrey, Giles K. Smith, John L. Birkler, and James R. Chiesa. *The Global hawk Unmanned Aerial Vehicle Acquisition Process: A Summary of Phase 1 Experience.* Santa Monica, CA: RAND Corporation, 1997.

Spykman, Nicholas J.. *The Geography of the Peace.* New York: Harcourt, Brace & World, Inc., 1944.

Strachan, Hew. "The Lost Meaning of Strategy," *Survival,* Vol. 47 No. 3, (October 2005).

Strachan, Hew. *The Direction of War: Contemporary Strategy in Historical Perspective.* New York: Cambridge University Press, 2014.

Statement of General Duncan J. McNabb, USAF, Commander, United States Transportation Command, Before the House Armed Services Air & Land Forces and Seapower & Expeditionary Forces Subcommittees [Hearing] On the State of the Command, 25 February 2009.

Summary of the Bipartisan Budget Act of 2013, 10 December 2013.

Sustaining U.S. Global Leadership: Priorities for 21st Century Defense. Washington DC: The White House, January 2012.

Talmage, Caitlin. "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz", *International Security,* Vol. 33, No.1 (Summer 2008), 82-117.

The National Military Strategy of the United States of America (Washington DC: The Office of the Secretary of Defense, 2011), 3.

The National Security Strategy of the United States. Washington DC: The White House, May 2010.

"The U.S. Explores Options Against the Islamic State", *Forbes*, 25 August 2014. http://www.forbes.com/sites/stratfor/2014/08/25/the-u-s-explores-options-against-the-islamic-state/, (accessed 26 August 2014).

Till, Geoffrey. "Asia's Naval Expansion: An Arms Race in the Making?", *Adelphi Series.* London: International Institute for Strategic Studies, 2012.

Trimble, Stephen. “USAF reveals plan to replace JSTARS with business jets by 2022”, *Flight Global,* 27 January 2014, http://www.flightglobal.com/news/articles/usaf-reveals-plan-to-replace-jstars-with-business-jets-by-395241/, (accessed 14 August 2014).

Tyson, Ann Scott and Josh White, “Top Two Air Force Officials Ousted,” *The Washington Post*, 6 June 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/06/05/AR2008060501908.html, (accessed 25 July 2014).

Tyson, Ann. “US is prevailing with its most finely tuned war,” *The Christian Science Monitor,* 21 November 2001.

United States Code Title 10, Subtitle D – Air Force, chapter 807 section 8062 http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title10-section8062&num=0&edition=prelim, (accessed 9 January 2014).

“US aircraft hit 90 Islamic State targets in three days: Pentagon”, *The Economic Times*, 19 August 2014.

“US Air Force, Boeing Finalize KC-46A Tanker Aircraft Design”, *Boeing News Release* (nd), http://boeing.mediaroom.com/US-Air-Force-Boeing-Finalize-KC-46A-Tanker-Aircraft-Design (accessed 28 July 2014).

US Government Accountability Office. “Financial Audit: U.S. Government’s Fiscal Years 2013 and 2012 Consolidated Financial Statements”, 27 February 2014.

Van Auken, Bill. “Why was a nuclear-armed bomber allowed to fly over the US?”, *Global Research,* 7 September 2007, http://www.globalresearch.ca/why-was-a-nuclear-armed-bomber-allowed-to-fly-over-the-us/6723, (accessed 25 July 2014).

Van Tol, Jan, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas. *AirSea Battle: A Point-of-Departure Operational Concept.* Washington DC: Center for Strategic and Budgetary Assessments, 2010.

“Visits by Panetta, Obama to Asia Pacific to punctuate U.S. ‘Asia-Pacific pivot’” *East-Asia Intel Reports,* 14 November 2012.

2007, http://en.ria.ru/russia/20070116/59156706.html, (accessed 22 July 2014).

Watson, Paul and Richard T. Cooper. “Blended Tactics Paved Way for Sudden Collapse”, *Los Angeles Times,* 15 November 2001.

Wayne, Leslie. “Air Force at Unease in the Capital”, *The New York Times*, 16 December 2004, http://www.nytimes.com/2004/12/16/business/16tanker.html?_r=1&, accessed 25 July 2014.

Weisgerber, Marcus. “ACC Officials Want Air Force Irregular Warfare Fleet of Aircraft”, *Inside the Air Force,* 7 November 2008.

Weisgerber, Marcus. “DoD Looking at Sequestration Impact to 2014 Budget”, *Defense News,* 5 June 2013.

Wertz, See Jay. “Filling Stations in the Sky”, *Aviation History* Vol. 19, Issue 5 (May 2009).

Westenhoff, Lt. Col. Charles M.. “Military Air Power: The CADRE Digest of Air Power Opinions and Thoughts”, Maxwell AFB: Airpower Research Institute, 1990.

Wortzel, Larry M.. *China’s Military Potential.* Carlisle PA: Strategic Studies Institute, 1998

Yarger Harry R.. *Strategic Theory for the 21st Century: The Little Book on Big Strategy.* Carlisle, PA: Strategic Studies Institute, US Army War College, February 2006.

List of symbols/abbreviations/acronyms/initialisms

A2/AD	Anti-Access/Area Denial
ABM	Anti-Ballistic Missile
AFB	Air Force Base
ASAT	Anti-Satellite
ASB	Air-Sea Battle
AWACS	Airborne Warning and Control System
BBA	Bi-Partisan Budget Act
BCA	Budget Control Act
BMD	Ballistic Missile Defence
BRAC	Base Realignment and Closure
C2	Command and Control
CAF	Canadian Armed Forces
CAOC	Combined Air and Space Operations Centre
CFAWC	Canadian Forces Aerospace Warfare Centre
CJOC	Canadian Joint Operations Command
CONUS	Continental United States
DARO	Defense Airborne Reconnaissance Office
DND	Department of National Defence
DoD	Department of Defense
DSTKIM	Director Science and Technology Knowledge and Information Management
ECCM	Electronic Counter-Counter Measures
FY	Fiscal Year
GoC	Government of Canada
GPS	Global Positioning System
IOC	Initial Operational Capability
IRGC	Islamic Revolutionary Guard Corps
IRGCN	Islamic Revolutionary Guard Corps Navy
IRIN	Islamic Republic of Iran Navy
IS	Islamic State
ISR	Intelligence, Surveillance, Reconnaissance

JASSM	Joint Air-to-Surface Stand-off Missile
JCEO	Joint Concept for Entry Operations
JOAC	Joint Operational Access Concept
JROC	Joint Requirements Oversight Committee
LAAR	Light Attack Armed Reconnaissance
LEO	Low-Earth Orbit
MRBM	Medium Range Ballistic Missile
NATO	North Atlantic Treaty Organization
NGS-B	Next Generation Strike – Bomber
NMS	National Military Strategy
NORAD	North American Aerospace Defense Command
NPT	Non-Proliferation Treaty
NSC	National Security Council
NSS	National Security Strategy
OSD	Office of the Secretary of Defense
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PRC	People's Republic of China
R&D	Research and Development
RBR	Radiation Belt Remediation
RCAF	Royal Canadian Air Force
RFP	Request For Proposal
S&T	Science and Technology
SAC	Strategic Air Command
SACEUR	Supreme Allied Commander Europe
SAM	Surface to Air Missile
SATCOM	Satellite Communications
SOF	Special Operations Forces
TPFDD	Time-Phased Force and Deployment Data
UAV	Unmanned Aerial Vehicle
USAF	United States Air Force
USN	United States Navy
WMD	Weapon(s) of Mass Destruction

DOCUMENT CONTROL DATA

(Security markings for the title, abstract and indexing annotation must be entered when the document is Classified or Designated)

1. ORIGINATOR (The name and address of the organization preparing the document. Organizations for whom the document was prepared, e.g., Centre sponsoring a contractor's report, or tasking agency, are entered in Section 8.)

Defence Research and Development Canada – CORA
101 Colonel By Drive
Ottawa, Ontario K1A 0K2

2a. SECURITY MARKING (Overall security marking of the document including special supplemental markings if applicable.)

UNCLASSIFIED

2b. CONTROLLED GOODS

(NON-CONTROLLED GOODS)
DMC A
REVIEW: GCEC DECEMBER 2012

3. TITLE (The complete document title as indicated on the title page. Its classification should be indicated by the appropriate abbreviation (S, C or U) in parentheses after the title.)

The future of allied air power: The United States Air Force

4. AUTHORS (last name, followed by initials – ranks, titles, etc., not to be used)

Gladman, B.W.

5. DATE OF PUBLICATION (Month and year of publication of document.)	6a. NO. OF PAGES (Total containing information, including Annexes, Appendices, etc.)	6b. NO. OF REFS (Total cited in document.)
October 2014	78	173

7. DESCRIPTIVE NOTES (The category of the document, e.g., technical report, technical note or memorandum. If appropriate, enter the type of report, e.g., interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)

Scientific Report

8. SPONSORING ACTIVITY (The name of the department project office or laboratory sponsoring the research and development – include address.)

Defence Research and Development Canada – CORA
101 Colonel By Drive
Ottawa, Ontario K1A 0K2

9a. PROJECT OR GRANT NO. (If appropriate, the applicable research and development project or grant number under which the document was written. Please specify whether project or grant.)	9b. CONTRACT NO. (If appropriate, the applicable number under which the document was written.)

10a. ORIGINATOR'S DOCUMENT NUMBER (The official document number by which the document is identified by the originating activity. This number must be unique to this document.)	10b. OTHER DOCUMENT NO(s). (Any other numbers which may be assigned this document either by the originator or by the sponsor.)
DRDC-RDDC-2014-R82	

11. DOCUMENT AVAILABILITY (Any limitations on further dissemination of the document, other than those imposed by security classification.)

Unlimited

12. DOCUMENT ANNOUNCEMENT (Any limitation to the bibliographic announcement of this document. This will normally correspond to the Document Availability (11). However, where further distribution (beyond the audience specified in (11) is possible, a wider announcement audience may be selected.))

Unlimited

13. ABSTRACT (A brief and factual summary of the document. It may also appear elsewhere in the body of the document itself. It is highly desirable that the abstract of classified documents be unclassified. Each paragraph of the abstract shall begin with an indication of the security classification of the information in the paragraph (unless the document itself is unclassified) represented as (S), (C), (R), or (U). It is not necessary to include here abstracts in both official languages unless the text is bilingual.)

This Scientific Report is the first in a series of reports for the Commanding Officer of the Canadian Forces Aerospace Warfare Centre. Their purpose is to inform discussions of capability and concept development within both the Royal Canadian Air Force (RCAF) and the Canadian Armed Forces (CAF), as well as providing an important input into Canadian policy development. The methodology adopted begins with an analysis of the policy and supporting strategy framework of, in this case, the United States (US) to develop an understanding of the direction being given to its military on the areas of the world and threats against which it is to prepare. On the basis of this understanding of the key tenets of US strategic thinking it is possible to identify those concepts and capabilities being developed to prepare the US Air Force (USAF) to meet those threats. The findings of this analysis are that the new Air/Sea Battle concept is a main pillar of US strategic thinking, and one with capability development implications for the RCAF and CAF in general. At the same time, the USAF is seeking to find cost-effective means to project effective air power into low- to mid-intensity conflicts such as the ongoing mission in Syria. When completed, this larger analytical effort could serve a range of functions within the Department of National Defence and the CAF, from focusing RCAF capability and concept development through to informing joint force and policy development.

Le présent rapport scientifique est le premier d'une série de rapports à l'intention du commandant du Centre de guerre aérospatiale des Forces canadiennes. Leur but est de guider les discussions sur le développement de capacités et de concepts au sein de l'Aviation royale canadienne (ARC) et des Forces armées canadiennes (FAC) ainsi que de présenter des renseignements importants pour le développement de la politique canadienne. La méthodologie adoptée a d'abord consisté à procéder dans le présent cas à une analyse de la politique et du cadre de la stratégie d'appui des États-Unis en vue d'acquérir une compréhension de l'orientation que ce pays donne à ses forces armées quant aux régions de la planète et aux menaces contre lesquelles elles doivent se préparer. En fonction de cette compréhension des principes clés de la pensée stratégique américaine, il est possible de cerner les concepts et les capacités développés en vue de préparer la Force aérienne américaine (USAF) à faire face à ces menaces. Cette analyse permet de conclure que le nouveau concept de combat aéroterrestre est un pilier principal de la pensée stratégique américaine et qu'il a des répercussions sur l'ARC et les FAC en général pour ce qui est du développement des capacités. Parallèlement, l'USAF cherche à trouver des moyens économiques de projeter efficacement sa puissance aérienne dans le cadre de conflits dont l'intensité est de faible à moyenne, comme la mission actuelle en Syrie. Une fois mené à terme, ce grand projet d'analyse pourrait être utile dans le cadre d'un large éventail de fonctions au sein du ministère de la Défense nationale et des FAC, qu'il s'agisse d'orienter le développement des capacités et des concepts de l'ARC, de guider le développement des forces interarmées ou d'éclairer l'élaboration des politiques.

14. KEYWORDS, DESCRIPTORS or IDENTIFIERS (Technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selected from a published thesaurus, e.g., Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus identified. If it is not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title.)

Capability Based Planning, Concept Development, Air Power, US Air Force, USAF, Air-Sea Battle, Next-Generation Strike, Aerial Refueler, F-35, F-22, Anti-Access, Area-Denial, Joint Concept for Entry Operations, Joint Operational Access Concept, Shashoujian, BRAC