AN UNHEALTHY OBSESSION? SUPERSONIC AIRPOWER IN AN ERA OF UNCONVENTIONAL OPERATIONS

by

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ABSTRACT

The use of airpower capabilities in unconventional warfare has become increasingly common in recent years and with that comes an interesting dichotomy: contemporary conflict is more often conducted through counterinsurgency and counterterror missions focused on winning hearts and minds, however states often respond to these situations using conventional forms of airpower. In the most recent unconventional operations Western forces have increasingly shown a preference for the supersonic fighter jets. While supersonic airpower is certainly useful across a variety of platforms and missions, the breed of unconventional warfare that the international community is confronting today commonly occurs in the context of absolute air superiority in which such supersonic power is significantly less useful than subsonic capabilities. While supersonic procurements were a strategic choice during the Cold War, their use is now a 'preference of necessity' since most Western forces do not possess the subsonic fighter capabilities best suited to unconventional warfare. This study considers the influence US procurement preferences have on Allied governments' air procurements and analyze the perceptions, conceptions and assumptions that shape them. It argues that continued, unquestioned supersonic procurement is informed by the perceptual predispositions held by the procurement elite as to what war means and looks like, and the equipment required to fight one. As a result, not only are procurement preferences towards supersonic jets determined by perceptual predispositions in the United States but they, in turn, result in an 'only choice' framework whereby the procurement patterns of allied states are dictated by the perceived necessity to 'fit' their procurements into those advocated by the United States because of long-term clientelistic relationships. This relationship is demonstrated by analyzing this pattern of US influence on Canadian military procurement patterns. This study asserts that this clientelistic relationship with the United States has, in fact, hindered Canada's ability to create and maintain full service air force capability and operability, as budget realities and US pressure have forced allies to focus solely on the procurement of supersonic jets rather than procuring strategically relevant purpose-built aircraft for the contemporary security environment.

PREFACE

All research and analysis included herein is original. This study, including all research, writing, and analytical work was conducted solely by the author, K.S. Heard. The identification and design of the research program was determined by the author with supervisory support from Dr. Michael Byers.

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To my grandfather,

For teaching me everything important in life.

1. INTRODUCTION

The use of airpower capabilities in unconventional warfare has become increasingly common in recent years and with that comes an interesting dichotomy: contemporary conflict is more often conducted through counterinsurgency and counterterror missions, however states often respond to these situations using conventional forms of airpower. Unfortunately, there is little practical or doctrinal guidance outlining the benefits, limitations, and parameters of the use of air power in unconventional operations, nor the aircraft most suitable for these missions. In the most recent unconventional operations Western forces have increasingly shown a preference for the supersonic fighter jets, such as the F-16, F-18 and, more recently, the F-22. Similarly, contemporary Western procurement has been centered on the procurement of the F-35 Joint Strike Fighter, yet another supersonic jet program. But is this a strategic necessity or a procurement preference of political and military professionals? While supersonic airpower is certainly useful across a variety of platforms and missions, the breed of unconventional warfare that is confronting the international community today commonly occurs in the context of absolute air superiority in which such supersonic power is significantly less useful to the mission objectives than subsonic aircraft. Although supersonic procurements began as a strategic choice during the Cold War, their use is now a preference of strategic necessity since most Western forces do not possess the subsonic fighter capabilities to respond to unconventional warfare.

This study will focus on the influence US procurement preferences have on Allied governments' strategic procurements patterns and analyze the perceptions, conceptions and assumptions that shape the United States and its allies' procurement patterns. In doing so, I argue that continued, unquestioned supersonic procurement is informed by a tripartite relationship between perceptual predispositions held by the procurement elite, the clientelism amongst US-ally relationships that results from these predispositions, and the political economic realities faced by allied governments in defence budgeting. In

doing so, I argue that not only are procurement preferences towards supersonic jets determined by perceptual predispositions in the United States but they, in turn, result in an 'only choice' framework whereby the procurement patterns of United States allies are dictated by the perceived necessity to 'fit' their procurements into those advocated by the United States because of their clientelistic relationship. It will also be shown that this pattern of US influence on the military procurement patterns of its allies has actually hindered Canada's ability to create and maintain full service air force capability and operability, as aircraft costs increase, available budgets decrease and US pressure forces allies to focus solely on the procurement of supersonic jets rather than procuring strategically relevant purpose-built aircraft for the contemporary security environment.

Contemporary conflict blends aspects of both traditional war and contemporary peacekeeping and therefore our responses, as well as our procurement patterns, should adapt appropriately towards a more purpose-driven air fleet. This article scrutinizes formal documents, governmental and military reports, and news articles pertaining to military air procurement in the United States and Canada over the past twenty years. The motivation for this case selection is based on a number of criteria. First, the initial analysis is limited to the United States as it serves as the best correlation in the past 75 years between hegemonic status, a highly developed grand strategy, a lack of an associated shift in procurement patterns, and wide-reaching influence on the militaries of other allied countries. The secondary analysis on the impacts on allied states is limited to Canada as it constitutes the purest example of a clientelistic military relationship with the United States, characterized by high levels of burden sharing by the United States on behalf of Canada. Secondly, Canada has supported the US request to procure F-35s over the past ten years while seeing a stagnation in the procurement of ground support and purpose-built aircraft by allied forces. Wherever the lower bound of the influence of the United States may lie in shaping its allies' procurement patterns, this case speaks to the US' influence in shaping allied air fleets.

This article will test the overarching hypothesis that US air procurement preferences towards supersonic jet programs shape its allies' procurement patterns towards similar programs and that these

programs institutionalize operability gaps in Allies' abilities to respond to unconventional conflict. Both the motivations for and the framework through which these patterns are pursued are necessary components of the question of whether the US procurement preference towards supersonic airpower has forced allies to lose focus on the necessity of purpose-built aircraft in the contemporary security environment. The logic behind this hypothesis is that in an international system dominated by United States interests and influence, where the US acts as the military hegemon, allied states will fall in line with, or emulate United States procurements based on their reliance on US military capabilities. As such, it can be deduced that as the US has increased its advocacy of its supersonic programs, its allies are likely to follow suit to gain and maintain military and political favour. Unfortunately, while many of the US' allies are powerful states in their own right, few have the military budgets to supplement supersonic jet programs with the contemporary necessities of purpose-built aircraft.

The project proceeds as follows. Part I briefly summarizes the relevant literature on military procurement, the US' supersonic procurement program and its requirements for allied forces. This section will also discuss and define relevant concepts so as to frame the analysis that follows. Part II, discusses the impact of perceptual predispositions, clientelism and the political economics of defence on the US and Canada through a discussion of historical factors as well as the macroeconomics of military expenditure. Part III then summarizes the findings from this analysis, and advocates for the adoption of a 'smart specialization' strategy to ameliorate the institutionalized intellectual, bureaucratic and geopolitical gaps caused by perceptual predispositions. This section also explores alternate airframes that are better adapted to the range of possible threats in the contemporary security environment which also leave room for alternate procurements of complementary aircraft in allied budgeting.

1.1 Definitional Context

In order to ensure conceptual clarity, discussing the definitional parameters of key concepts used within this work is necessary. First, establishing a baseline for what we mean in terms of unconventional warfare is essential. The United States Department of Defense defines unconventional warfare as "a

violent struggle among state and non-state actors for legitimacy and influence over the relevant populations. Unconventional warfare favors indirect and asymmetric approaches, though it may employ the full range of military and other capabilities, in order to erode an adversary's power, influence, and will" and consists of "activities conducted to enable a resistance movement or insurgency to coerce, disrupt or overthrow an occupying power or government by operating through or with an underground, auxiliary and guerrilla force in a denied area."[1] As a result, responding forces are tasked with seven primary missions, "foreign internal defense, special reconnaissance, direct action counter-terrorism, counter-proliferation, psychological operations, and information operations.[2] This differs from what the strategic community defines as conventional warfare, which is

> A form of warfare between states that employs direct military confrontation to defeat an adversary's armed forces, destroy an adversary's war-making capacity, or seize or retain territory in order to force a change in an adversary's government or policies. The focus of conventional military operations is normally an adversary's armed forces with the objective of influencing the adversary's government. It generally assumes that the indigenous populations within the operational area are non-belligerents and will accept whatever political outcome the belligerent governments impose, arbitrate, or negotiate. A fundamental military objective in conventional military operations is to minimize civilian interference in those operations.[3]

This distinction is fundamentally important to the purposes of this paper as it makes clear how different the mission requirements for each warfare typology are vis-à-vis one another. Fighting a conventional war with only counterinsurgency tactics and no 'first day' strike capabilities without air superiority would be ill-informed and a risk to armed personnel, just as the reverse is true: fighting an unconventional war with only conventional capabilities, such as supersonic jets, does not bode well for mission success. There are, of course, instances where the airframes associated with each type of warfare are exceptionally useful to other missions, such as the use of A-10s in Iraq in 2003. This project does not deny the usefulness of supersonic airpower in military operations today, only that these cannot be the sole air combat capabilities available to allied forces in unconventional operations. While some subsonic platforms have received attention in spite of resistance (the A-10, Skyraider, Skyhawk, Corsair, Harrier,

[1] Rod Paschall. *Special Operations & Unconventional Warfare in The Next Century.* Brassey's: New York, NY, 2010, 2.
[2] United States Army. *Army Special Operations Forces: Unconventional Warfare. (*Department of the Army: Washington, D.C., 2008): 4.
[3] Ibid, 6.

supersonic hybrids like the Jaguar, and helicopter platforms) it has been attention necessitated by the lack of concerted focus on ground attack and ground support (GA/GS) capabilities over time. These platforms are certainly being used by some states in conflict today, but they, overall, are airframes that were developed in the 1960s-1970s. Little to no research and development funding or procurement funding has targeted new GA/GS platforms and as a result new technological advances in GA/GS capabilities have not occurred.

The concept of perceptual predispositions also plays a defining role in the substantive discussion provided in this paper and therefore warrants clarification. A concept developed by Robert Jervis in his work *Perception and Misperception in International Politics*, perceptual predisposition refers to expectations, perceptions, historical experience, and how we interpret incoming information. He notes that expectations create predispositions that lead actors to "notice certain things and to neglect others,…, to immediately and often unconsciously draw certain inferences from what is noticed,…, and to find it difficult to consider alternatives."[4] New information will be perceived through a "prism" formed from assumptions about other actors and about cause and effect in the international environment. The information will be categorized and understood accordingly. This can lead to premature cognitive closure, in which limited or incomplete images of others' intentions lead to mistaken perceptions.[5] As such, he notes that perceptual predispositions include how decision-makers learn from history, and especially how historical analogies shape decision-makers' understanding of events and influence their actions. Jervis points out that the learning process often is not entirely conscious. Moreover, lessons learned from historical experience (i.e. understanding war as conventional because an individual lived or served during the World Wars or Cold War era) tend to be characterized by over-generalization. Hence, in applying such lessons decision-makers tend to simplify the outcomes as merely "success" or "failure"; place undue

[4] Robert Jervis, *Perception and Misperception in International Politics*, (Princeton, NJ: Princeton University Press, 1976): 176.
[5] Ibid.

weight on dramatic outcomes; and ignore dissimilarities between previous and current situations as well as differences in their specific causes.[6]

[6] Ibid.

2. THE SCHOLASTIC AND HISTORICAL CONTEXT OF AIR POWER AND PROCUREMENT IN UNCONVENTIONAL OPERATIONS

The contemporary security environment has shifted since the Cold War, and even since September 11, 2001. However, this shift in grand strategy and planning has not begun to inform discussions regarding the appropriate use and type of airpower most appropriate to the new security threats and missions that the West undertakes in the post-Cold War world. Procurement patterns show no change to ameliorate this gap, with a continued, unquestioned focus on supersonic airpower. For middle power allies this has resulted in procurements that support the United States' preferred defence trajectories rather than considering and responding to the gaps in our own. As such, it is integral that we recognize the limitations and inherent dichotomy of both the traditional war-fighting and the traditional peacekeeping ethos when considering the role of air capability, acknowledging the gaps adherence to the United States' F-16, F-18 and F-35 programs have created in Canada's military preparedness in the contemporary security environment.

Thomas Barnett, a senior military analyst for the US Naval War College and former Strategic Planning Analyst with the US Department of Defence, discusses this shifting environment in the context of United States military's tendency to plan, procure, and conduct themselves according to the strategic environment of the last war. Barnett builds on the work of Friedman, Huntington, and Fukuyama. By analyzing recent American military history and strategy he sets the parameters for where our forces will likely be headed in the future and outlines the unique role that America will play in establishing international stability. He notes that since the end of the Cold War, America's national security establishment has been searching for a new operating theory to explain how this seemingly "chaotic" world actually works, but it has only been since the 9/11 attacks that the US has truly attempted to respond effectively to the security problems of the present rather than planning for the future based on the past. Barnett discusses the shifting strategic environment in the context of the social, political, economic, security and cultural shifts that have transformed the post-Cold War world, bringing the security shift

from traditional superpower threats to that of unconventional threats from previously insignificant actors.[7] The fundamental question Barnett strives to address is that while the international system is no longer typified by superpower threats and the clash of ideological blocs, what has replaced it and how should we respond? Barnett's work forms the underlying theoretical framework for this study. He argues that the security environment has shifted from that typified by conventional warfare to one typified by operations other than war and peace enforcement missions. This paper seeks to build on this determination by questioning whether the United States and its allies have actually taken steps to shift their operational and tactical planning and capabilities to reflect this new strategic environment. While doctrine has shifted in some areas, procurement patterns for air power have not and we must strive to understand why.

A number of scholars and military experts have acknowledged the interesting and increasingly prominent role that air power has taken on in military operations since the end of the Cold War. The role for strategic airpower has shifted significantly from a traditional warfighting role, to that of a protection and deterrent role for military and civilian personnel and civilians more generally. Recognizing this connection Colonel Michael Melillo builds on Thomas Barnett's work regarding the shifting security environment, bringing Barnett's work from a broad theoretical observation to a tangible issue directly relevant to military planning. He characterizes the US military's strategic preference towards .conventional warfare planning as 'tunnel vision' which "prevents defence planners from recognizing the military's vulnerabilities against potential adversaries."[8] While he notes that 9/11 changed the internal calculus, and there was a recognition of the need to face a more adaptive enemy, Melillo argues that Iraq is a prime example of the US and its allies struggling to prevail in irregular warfare.[9] He questions why this is, arguing that American forces have and continue to promote a culture that seeks to ignore the requirements and challenges of irregular warfare, resulting in the need to "relearn appropriate techniques with each new experience of the phenomenon."[10] He notes that "the US military has long equated

[7] Thomas P.M. Barnett. *The Pentagon's New Map: War and Peace in the Twenty-First Century*. (Putnam's Sons: New York, NY, 2004).
[8] Michael R. Melillo. "Outfitting a Big-War Military with Small-War Capabilities." *Parameters* 36, no. 3 (2006): 3.
[9] Ibid.
[10] Ibid, 4.

conventional military operations as the acme of the professional art" and that overcoming this understanding of the "American way of war as a 'Way of Battles' with an institutional preference for big wars and a preoccupation with high-technology conventional warfare are paramount for ensuring American military readiness in the future."[11] Melillo calls on the American military and its allies to effect a transformation that changes its cultural resistance to non-traditional wars, however transforming this into policy and practice that guides strategic and relevant air procurement will be a battle fought amongst high-ranking officers with conventional warfighting experience rather than the troops impacted by the hard lessons of unconventional warfare and utilizing supersonic power in unconventional operations.

Brooks L. Bash of the United States Air Force discusses the connections between peace operations and US national security interests, arguing that given these connections, the employment of air power in unconventional operations will be a natural consideration. Unfortunately, Bash concludes that while there have been shifts to accommodate and address unconventional operations in Army, Navy, and Marine Corps doctrine, there has been little movement in the Air Force (or the various air divisions of the aforementioned services) as to practical or doctrinal guidance outlining the benefits, limitations, shape or structure for the use of air power within the operations other than war paradigm.

Bash constructs a comprehensive framework to categorize and analyze the current and future role of air power in unconventional operations and recommends several developments in air command and control doctrine and organization. He concludes that, at present, air power's role has been primarily auxiliary in unconventional operations, however, it is likely the most suitable medium for conducting operations other than war as it reduces the risk to interveners' lives, offers safe but effective civilian protection capabilities, and differs in capability from that currently available to UN ground troops.[12] While Bash considers the use of airpower in unconventional operations mostly in a positive role he does acknowledge the inherent dichotomy between supersonic air power and the mission objectives. This paper

[11] Ibid, 5.
[12] Brooks L. Bash. "The Role of United States Air Power in Peacekeeping." *Air Power Journal* June (1994): 7.

does not contest Bash's conclusions, the role of air power in unconventional operations should be considered the omnipresent and strategically relevant approach. The issue is the assumption that by air power we mean supersonic jet power, rather than purpose-built airpower directly relevant to the specific operational objectives of unconventional operations.

In *Peacekeeping at the Speed of Sound,* John Hillen delves into whether the assumption that coercive air power should be used in unconventional operations is ultimately flawed. In his evaluation of the mission in Kosovo he argues that the international community exhausted its airpower options in Kosovo by jumping to coercive diplomacy through supersonic airpower before considering other types of intervention, not because of airpower's proven track record in unconventional operations, but because, as Eliot Cohen has written, airpower, "like modern American courtship, offers instant gratification without commitment."[13] Hillen argues that in the instances where airpower has been used in unconventional operations "the impact of airpower remains significant but becomes *less decisive in unconventional operations as one moves along the spectrum of conflict away from war and towards peacetime uses of the military."*[14] However, he parts with prominent theorists such as Martin van Creveld who maintains that "in a world where almost all wars are fought not between states, but within them, many if not most of [airpower's] elements have become useless and obsolete."[15] Hillen notes that his study partially backs up van Creveld's statement but "it is important to note that the diminishing returns from airpower in OOTW apply to the *coercive elements of supersonic airpower only*— the elements addressed by much or most of airpower theory and doctrine."[16] Other elements of airpower, such as transportation, logistics and supply, intelligence collection, command and control (C^2), reconnaissance and surveillance, and psychological operations (PSYOP) have proven decisive in many OOTWs where coercive power was not feasible.[17] Hillen's conclusions are vastly important to this study because of the distinction he makes between the

[13] Ibid.
[14] Ibid, 17. (emphasis added)
[15] Van Creveld in Ibid, 13.
[16] Ibid, 22. (emphasis added).
[17] Ibid, 7.

relevancy of coercive supersonic air power and that of supporting airpower. This distinctive conclusion is paramount for this study as it recognizes the continuing role for airpower in peace operations but argues that coercive supersonic air power, while the focus of much military planning, needs to be supplemented to respond to the contemporary threat environment.

Unfortunately, while much of the relevant scholarship points to the need for a shift in doctrinal and practical procedures regarding the role of air power in unconventional operations, this has not been reflected in procurement patterns and the United States continues to push its allies to focus military procurements on its current supersonic program, the F-35 Joint Strike Fighter. Of additional concern is the budgetary implications of the F-35 program on allies' air operability and capability. While the United States can claim a full service air fleet that is operable across a variety of conflict situations, allies with limited military budgets, such as Canada, are significantly constrained by a lack of funding. In pursuing the F-35 program, militarily weaker allies will be forcing themselves into a constrained understanding of capability—while they may have the most capable fighter jet this does not mean that they will come close to having a remotely capable—or operable—air fleet.

As Atsushi Tago and Srdjan Vucetic note, the military relationship between the US and it's militarily weaker allies must be understood as a patron-client relationship, or clientelism more generally. Utilizing David A. Lake's index for US Security Hierarchy (which measures bargaining mechanisms through which states voluntarily trade autonomy and sovereignty for order and security), Tago and Vucetic argue that the US increasingly provides security to its weaker security client states, such as Canada and Japan, while also making requirements, such as customer loyalty in the area of weapons procurement, an implied necessity.[18] However, the logic of this security hierarchy is widely understood by Canadian and Japanese pundits, many of whom like to describe the F-35 as the "only choice."[19] Even government officials often relate the outcome of their nations' fighter aircraft acquisitions to alliance ties.

[18] Atsushi, Tago, Srdjan Vucetic. "The Only Choice": Canadian and Japanese F-35 Decisions Compared. *International Journal* 68, no. 1 (2012): 3.
[19] Ibid.

Tago and Vucetic compare the F-35 procurement processes in Canada and Japan in order to examine the relationship between procurement and alliance, and therefore the nature of what Lake calls American "political authority" in the world.[20] However, while their findings are important and influential in understanding why the F-35 program is the 'only choice' for US allies in the realm of fighter procurement, it fails to discuss why the F-35 is the focus of procurement at all given the contemporary security environment. Additionally, although they discuss the economic implications for allies undertaking F-35 procurement, they fail to acknowledge the force capability implications that it imposes on less wealthy militaries in which the F-35 procurement will take up the majority of budgetary allowances for decades. This paper attempts to address these gaps in understanding the motivation to supersonic capabilities for the client states in the US alliance.

Finally, Ernie Regehr takes a hard-line stance on the usefulness of supersonic fighter aircraft: that, in reality, Canada has no use for them at all. Regehr recognizes that contemporary Canadian defence policy focuses on three areas: defending Canada, defending North America, and contributing to international peace and security. While these silos may not have changed much in the past seventy years Regehr argues that in the officially acknowledged absence of military threats air defence has become a "military mission in support of a civilian responsibility – for which fighter aircraft are far from optimal."[21] The way in which these silos are addressed has changed significantly and, as such, the type of equipment used to respond must change as well.

First, he notes that while air defence is essential to defending Canadian sovereignty and enforcing domestic and international law, it is no longer an air defence that requires supersonic aircraft. As Paul T. Mitchell, a professor at the Canadian Forces College, has noted, "the most likely avenue of attack from the air on Canada today is not from a lumbering Bear bomber, but rather a small, privately-owned

[20] Ibid.
[21] Ernie Regehr, "Fighter Aircraft (2): Defence at Home and Abroad. *Disarming Arctic Security*. (The Simons Foundation: June 18, 2015). http://www.thesimonsfoundation.ca/sites/all/files/Fighter%20Aircraft%20%282%29%20-%20Defence%20at%20Home%20and%20Abroad%20-%20DAS%2C%20June%2018%202015.pdf

commercial aircraft."[22] While supersonic jets such as the F-18 and F-35 are able to intercept and escort aircraft in Canadian airspace it is clear that their capabilities should not be the major procurement priority for Canada given their limited applicability for domestic and continental air defence as well as unconventional warfare. It does not necessitate an F-35 procurement and, more often than not, the aircraft best suited to these types of threats are aircraft that have the ability to fly low and slow—and, incidentally, have a variety of additional surveillance, reconnaissance and ground support capabilities in international peace support and combat missions and cost-effective to operate and maintain. While supersonic capabilities are certainly useful to have if intercepting Boeing or Airbus civilian aircraft in Canada's extensive airspace, this is something that can be accomplished with the existing fleet of F-18s, or with the purchase of Super Hornets.

Similarly, in the context of continental defence, supersonic aircraft are no longer the norm. As James Fergusson notes, "in the absence of a global struggle such as the Cold War," Canada "faces few, if any direct military threats."[23] The Canadian military's main continental defence missions concern border policing and drug interdiction. As a result, the potential usefulness of an advanced multi-role fighter with long-range strike, stealth, and supersonic capabilities is entirely negligible in terms of national and continental air defence. This same point was pushed by former deputy defence minister Charles Nixon, when he noted "fighter aircraft cannot contribute anything substantial" to meeting the objectives of contemporary Canadian defence policy.[24]

Many proponents of the F-35 program argue that it is truly a multi-mission aircraft with various capabilities suited to a range of threat environments. This is certainly true, the F-35 program has developed a wide range of models, including a STOL version designed to replace the Harrier jump jet. While these developments are certainly more promising than prior supersonic procurements in terms of

[22] Paul T. Mitchell, "How to get more air force for the dollar," The Ottawa Citizen, 12 October 2010. http://www.ottawacitizen.com/story_print.html?id=3655573&sponsor=
[23] James Fergusson, "The right debate: airpower, the future of war, Canadian strategic interests, and the JSF decision," Canadian Foreign Policy Journal, 17:3, 204-216.
[24] Charles Nixon, "Canada does not need fighter jets, period," The Globe and Mail, 08 July 2014. http://www.theglobeandmail.com

responding to aspects of unconventional warfare. However, there are two issues. First, the F-35s are still supersonic jets, meaning they are still—despite specific model specifications—best suited to flying at 15,000 feet or higher, at supersonic speeds, and have highly customized stealth capabilities. All of these baseline capabilities mean that their ability to respond to unconventional threats are 'add-ons' rather than their core capabilities. Even with the development of high power sensors, laser-marking equipment for ground forces, and precision guided bombs that allow supersonic fighters to adapt to the unconventional threat environment they are not adaptations that change the suitability of supersonic power, writ large, to the asymmetric threats being faced. Supersonic jets still fly far too fast, and at too great an altitude to be able to respond quickly and accurately to changes on the ground. Additionally, to use these new systems in close combat and ground support situations both the pilots and systems officers would need to have up-to-the-second intelligence, and perfect munitions accuracy, both of which are difficult to come by in close combat, even when flying low and slow.

While Regehr's analysis in timely and illuminating, his conclusion that Canada has no use for supersonic fighter aircraft whatsoever is a bridge too far. To be unprepared in situations where the West does not hold overwhelming air superiority, or should instances of conventional warfare arise once again with contemporary great power foes would be a massive oversight in Canada's strategic defence. However, what is glaringly clear is that these capabilities are well taken care of with Canada's existing F-18 fleet, with upgrades for the RCAF's electronic warfare capabilities. Adding newer models of the F-18 to this fleet while simultaneously procuring purpose-built aircraft suitable for ground support, surveillance, and reconnaissance will leave Canada much better off than with a new fleet of F-35s.

3. THEORIZING THE TRIPARTITE LINK IN U.S. AND ALLIED AIR PROCUREMENT

In theorizing the connections between US and allied procurement and the presence of perceptual predispositions in the decision-making process we argue first argue that defence procurements in US allies with limited defence budgets are influenced by three intertwined factors. First, the perceptual predispositions of procurement elites affect the range of airframe options initially considered for a procurement in the U.S. Second, due to the clientelistic defence relationships that the US has with its allies these options are also the only choices seen to be available to allied states if they want to remain on good terms with the United States. Finally, because of the political economic constraints of countries like Canada with limited defence budgets and the increasing cost of aircraft, allied states with limited defence budgets are often constrained to 'sole' procurements—those aircraft pushed by the U.S. as vital with no funds left for the procurement of other types of aircraft.

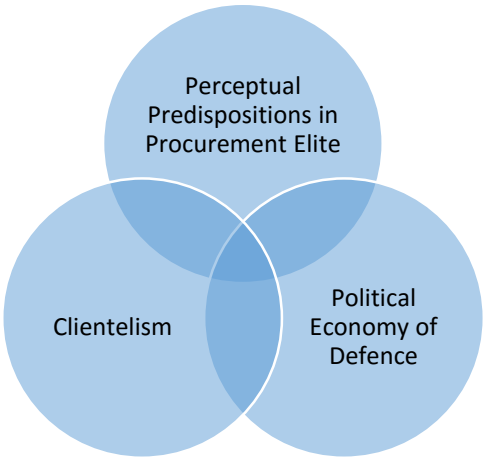

Figure 1: Mapping the Tripartite Influences on Procurement

As such, I argue that there are two potential decision-making pathways for procurement to take. Given the recent shift in grand strategic thinking to account for the changes in the international security environment, the first option is that procurement patterns also shift resulting in reflective procurement within the US and, given the clientelistic relationship with US allies, relevant allied procurements as well. However, in reality, we can see this first track has not occurred and as such, the second track better

reflects the procurement reality. The second track reflects the established division between US grand strategy and its procurement patterns (grand strategy acknowledges shift in security environment and plans accordingly while this acceptance has not shifted within the procurement arena) which results in US procurement programs (such as the F-35 Joint Strike Fighter) that are unreflective of the contemporary threat environment. These unreflective procurement preferences then dictate allied procurements as it is perceived by allied actors to be the 'only choice due to their historical clientelistic relationship with the US.

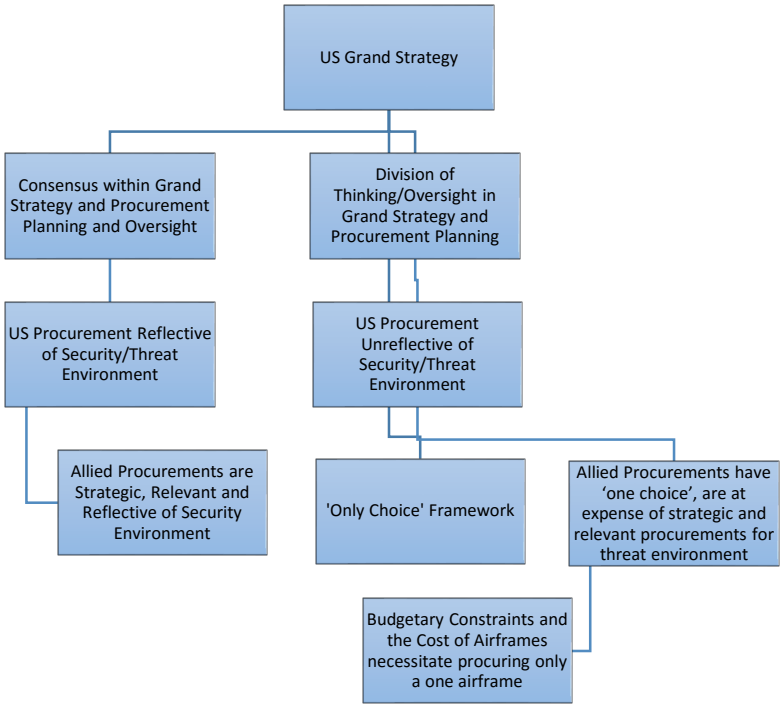

Figure 2: Theoretical Model Demonstrating the Flow of Perceptual Predispositions into US and Allied Procurement Patterns

The theory presented above must be understood as a critique of the rational choice framework as the author agrees with Robert Jervis and Robert Keohane that, in practice, perceptual predispositions and bounded rationality mean that analysis and decision-making is not necessarily fully rational; it is constrained by inescapable limitations in the knowledge and processing capabilities of individuals and decision-makers. The mind cannot cope directly with the "complexity of the world" and as such, we

"construct a simplified mental model of reality and then work within it.[25] Although we behave rationally within the confines of our mental model, it is not always well suited to the requirements of the real world.[26] As such, we must distinguish between the real world and decision-makers' perceptions of and reasoning about it.

The concept of perceptual predisposition often has long-ranging effects within a military framework. As Jervis notes, military decision makers are subject to inappropriate learning because of "the complexity of the subject matter, small and biased sample of cases to study, the conditions under which learning takes place, and decision-makers' failure to realize how much they are influenced by their views of the past." Michael Horowitz and Allan Stam (2012) discuss how military experience drastically changes the range of options and costs a leader is willing to consider and accept. Similarly, the mere fact that that the majority of decision-makers overseeing the Planning, Programming, Budgeting and Execution (PPBE) Process, the Joint Capabilities Integration and Development System, and the Defense Acquisition System—the three decision-making support systems associated with military acquisition in the United States—are individuals who have served in the military or at the Department of Defense during the Cold War leave them vulnerable to perceptual predisposition as these predispositions are most often formed by early life experience.[27]

[25] Jervis, 181.
[26] Ibid.
[27] Ibid.

4. THE SINGULARITY OF AIR POWER AND PROCUREMENT: A HISTORICAL STUDY

It should be recognized that this phenomena of 'buying in' to U.S.-led procurements of supersonic jets is not unique to the F-35 program. In practice, it has been evident in allied procurement patterns over the last three globalized supersonic procurements (with the exception of the F-22 Raptor, which was not made available outside of the United States). United States allies bought in to United States development and procurement of the F-16 Fighting Falcon, the F-18 Hornet and its improved Super Hornet platforms, and, the F-35 Joint Strike Fighter, at the expense of a number of purpose-built aircraft throughout history. The only difference being that, in the past, this preference has been justified by the types of conflicts for which we were preparing. This trend was most obvious when the F-104 Starfighter was sold to US allies after the US realized it was poorly suited for the task for which it had been designed, and was then used for other, even less suitable tasks. The Starfighter platform resulted in so many casualties it was nicknamed the Widowmaker. The Starfighter was not built to be a strike aircraft and thus resulted in many accidents and casualties. This was, of course, allowed to continue as the US sold its allies the F-104 Starfighter platform knowing it was not suitable for the missions it was built for or adaptable to its allies' needs. As a result, these platforms had decreased capabilities in the areas for which they were originally designed and their capabilities are well outside the speed, altitude, and accuracy parameters necessary for ground support. As a result of this diversification of capabilities, many of the multirole fighters are no longer effective at either their stated or adapted purposes.

Similarly, fighter platforms are increasingly reworked to 'adapt' to the contemporary environment. While F-18's continue to form the base of Canadian strike aircraft, they are also slowly morphing to constitute the base combat aircraft for the RCAF more generally. With increased budget cuts over the last twenty years since the disintegration of the Soviet threat, the CF-18 is fast becoming Canada's 'go-to' combat platform as much of the Air Force's budget is spent on their maintenance while the rust-out of purpose-built aircraft, such as its CP-140 Aurora fleet, continues to damage the RCAF's

operability and relevance in the contemporary security environment. While the initial motivations for procuring the CF-18 were fundamentally based in ameliorating and responding to the Soviet threat, with the threat of conventional warfare dissipated it is remarkable that a conventional air warfare platform purpose-built specifically for first-day strike capabilities continues to be the only platform the RCAF possesses that is remotely suitable for use in combat situations beyond surveillance and reconnaissance roles across the bulk of its unconventional, peace-oriented missions since the dissipation and disappearance of conventional warfare in the international system. As a result, these platforms had decreased capabilities in the areas for which they were originally designed and their capabilities are well outside the speed, altitude, and accuracy parameters necessary for ground support. As a result of this diversification of capabilities, many of the multirole fighters are no longer effective at either their stated or adapted purposes. In reality, Canada possesses only two ground support airframes, a limited number CH-147 Chinooks and a small number of Griffins refitted with sensors and machine guns in Afghanistan, and no close-range attack and support capabilities. This type of operational gap is particularly concerning given the type of conflicts Canada is responding to overseas and the nature of the enemies our troops are confronting.

History shows us that there has been a conceptual singularity as to what constitutes war and how it is conducted over the life-span of military aviation and the development of air power as a coercive element of warfighting. However, this historical context is only perpetuating the commonality of the perceptual predisposition of procurement leadership to conventional forms of air power rather than adapting pragmatically to the requirements of the security environment at hand and the air power it requires. Program proponents will argue that the F-35 program is needed because of the long time it takes to develop the technology, and that one cannot assume the present-day situation will prevail in 20-30 years. This is certainly true but its prioritization over the procurements of aircraft built for conflicts occurring now does not ensure stability long-term either. That same reasoning—that we must be prepared for all types of warfare—has not transferred into procurements for the type of conflict that we see today,

largely because the aircraft needed for contemporary warfare are not the 'cool, new toys' that years of research and development have gone into—they are planes built with capabilities Western militaries have had for nearly a century.

Requiring that Canada has conventional warfighting and strike capabilities is a rational decision. Procuring more advanced and incredibly expensive airframes when the CF-18s are still highly effective operationally is misinformed. While this supersonic capability may need replacing in Canada in the next fifteen years it can be done at a much more reasonable cost with a procurement of US-owned Super Hornets. Procuring the F-35 at the expense of better-suited airframes to protect and support our troops in close combat situations, which also happen to be more fiscally feasible as well, is an indication of a structural predisposition to preparing for a war that may never happen against an enemy that does not exist while ignoring the state of warfare as it is. Additionally, it should be noted that Canada will consistently have access to F-35 airframes due to the strong alliances between allies and the fact that Canada tends to undertake military combat missions solely within an alliance framework. As a result, it is unlikely that a combat mission in which Canada is involved will ever lack access to the capabilities that an F-35 can provide. Even with the current Canadian F-35 procurement plan our F-35 contribution would be marginal, particularly when compared to the vast contributions Canada could make in close combat initiatives should that money be reallocated to a more suitable procurement of A-10s, BAE Hawks, or Apache helicopters. As such, the following sections will discuss the underlying motivations and assumptions that have continued to drive this procurement in the face of setbacks, cost inflations, limited functionality, and the lack of a clear applicability of such a platform to the contemporary security environment.

5. MOTIVATIONS FOR CONTINUED PROCUREMENT: PERCEPTUAL PREDISPOSITIONS, CLIENTELISM, AND THE POLITICAL ECONOMY OF DEFENCE

There are a number of reasons for the continued focus on supersonic air power in procurement strategies in the contemporary threat environment—the least of which is that of its capabilities in close support missions. The following sections will discuss the conceptions, assumptions and incentives that have motivated this continuing trend in procurement strategy in an environment no longer typified by traditional great power, or air to air combat.

5.1 Discussing the Constraints of Supersonic Air Power: Unconventional Operations and Perceptual Predispositions' Impact on Relevant Procurement

That supersonic jet power is not the appropriate type of air power for conducting unconventional operations is abundantly clear to the average observer. Unconventional warfare requires extensive ground troop deployment because of the nature of counterterror and counterinsurgency combat itself. As such, the air support required for these missions need to have high-level precision capability in their armaments that only a combination slower speeds, and lower altitude can provide. While supersonic airpower's high-speed, high-power technology is often marketed as the "next generation strike weapons system designed to meet an advanced threat while improving lethality, survivability, and supportability" and is said to be the "cornerstone of a multi-mission joint force possessing unprecedented effectiveness to engage and destroy both air and ground threats" it is precisely these capabilities that make it wholly unsuited to conducting peace missions. These missions are invariably conducted in situations of total air superiority with a focus on force neutrality, civilian protection, and only very limited, close-range lethality against enemy targets.[28] Unfortunately, although the militaries of the Western world have begun

[28] Lam, Danny, Brian Paul Cozzarin. "The Joint Strike Fighter/F-35 Program: A Canadian Technology Perspective. *Air and Space Power Journal* 28, no. 2 (2014): 332.

to recognize the shift in the security environment away from conventional threats, the air procurement standards have failed to shift accordingly.

There are a number of reasons why we see a shift in strategic understandings of what the contemporary security environment looks like— and the force readiness and capabilities it requires— without an associated shift in the actual practice of military procurement. The prime reason for the lack of an associated conceptual shift to more purpose-built aircraft procurement in response to the Pentagon's acceptance of the 'new normal' is relatively simple: while the study of what the new security environment looks like is done by many young, highly educated defence professionals and Department of Defense research analysts, procurement processes are still run by high-ranking military officers whose life experience continually informs their focus for air procurements based on their experiences living and fighting wars and therefore what types of air power will be most useful in response to all threats.

This phenomenon was developed by Robert Jervis in his work *Perception and Misperception in International Politics* "How Decision Makers Learn from History," which discusses the role of perceptual predispositions, arguing that what leaders learn from key historical events and experiences shapes their interpretation of new incoming information.[29] Previous events provide decision-makers with a range of imaginable situations, and allow them to detect patterns and causal links that can help their understanding of the world. As such, leaders' experiences and understandings of historical events influence their perceptual predispositions without the leaders being aware of it, shaping their views, approaches, and biases in line with their experiences and limiting the range of imaginable situations and responses possible to them. Statesmen and military officials are particularly subject to inappropriate learning because of "the complexity of the subject matter, small and biased sample of cases to have experienced and studied, the conditions under which learning takes place, and decision-makers' failure to realize how much they are influenced by their views of the past."[30]

[29] Jervis, 176.
[30] Ibid.

The phenomenon of perceptual predispositions speaks directly to the division between policy and practice concerning the new security environment accepted by the Department of Defense. There is a strict division between those developing the theory of the 'new normal' and those in leadership positions whose policy preferences, and therefore procurement strategies, are based largely in their own past historical experiences within a more traditional framework for war. At present, procurement strategies are overseen by policymakers and high ranking military officers who operated within a traditional military operational environment focused on the conventional role for airpower in conflict: air-to-air combat, flying fast, with big guns and bombs. As Colonel Michael Melillo argues, the core problem that American forces have is that they promote a culture that seeks to ignore the requirements and challenges of irregular warfare, resulting in a requirement to "relearn appropriate techniques with each new experience of the phenomenon."[31] This was particularly evident when, at the beginning of the War in Afghanistan, the US military largely overlooked that they already had developed manuals for counterinsurgency—during the Vietnam War—that had been left untouched, untrained, and entirely forgotten.

For example, in evaluating the make-up of procurement decision-making team, the background of Frank Kendall III, Under-Secretary of Defense for Acquisition, Technology and Logistics came to light. A graduate of the United States Military Academy (West Point) during the 1960s, Kendall went on to serve with the US Army in partitioned Germany during the height of the Cold War in the 1970s and continued serving with the US Army Reserve for the remainder of his time in active duty while also pursuing a career as a human rights lawyer. He, in addition to Jamie M. Morin (Director of Cost Assessment and Program Evaluation at the DoD) and Dr. Michael J. Gilmore (Director of Operational Test and Evaluation at the DoD) "placed high priority on strengthening the Air Force's nuclear enterprise, particularly that of the Air Force's Global Strike Command."[32] While Dr. Morin and Dr. Gilmore are

[31] Melillo, 26.
[32] United States Department of Defense. "Frank Kendall III: Under-Secretary for Acquisition, Technology and Logistics." Accessed December 11, 2014. http://www.defense.gov/bios/biographydetail.aspx?biographyid=248

both civilians, each worked within the defense industry and at the Department of Defense during the Cold War era, with the entirety of their careers spent within the procurement and weapons testing industry. This perceptual bias is not constrained to these individuals and verifiably typifies the predispositions of most procurement elites who have spent their careers either as officers or civilian actors within the defence establishment. While the grand strategists of the Department of Defense were forced to adapt to a changing security environment after the strategic and intelligence failures associated with 9/11, those overseeing procurement were not. However, their impact should not be seen as any less damaging. A good grand strategy without the equipment to implement it effectively and efficiently is not a strategy at all.

Interestingly, the effects of perceptual predispositions on procurement do not have the same influence on ground procurements across the services. Generals today are not procuring tanks at the expense of APCs and Humvees—they are procuring them alongside these options. The explanation is relatively simple—they are closer to the conflict. This results in two considerations during procurement decision-making. First, hearts and minds are won on the ground, not from the air. As a result, counterinsurgency strategy and the operational needs of ground troops to accomplish the missions at hand are front and center in procurement decisions for ground technology. There is no disparity between the needs of ground troops and the procurement elite because the appropriate equipment makes a more obvious difference in mission success and force protection. Secondly, due to the proximity of ground troops to the conflict (which is more often than not close combat scenarios and dealing with adversaries with limited access to new technology, for example, improvised explosive devices, AK-47s, and—at the high end—anti-aircraft guns and surface to air missiles) protecting troops so they can do their jobs effectively is also at the forefront of procurement decisions. Contemporary ground procurements are not reflecting 'big budget' shifts because the nature of warfare today does not require big budget technology. As a result, while ground procurements reflect the type of 'low-tech' warfare at hand because warfare has

changed completely in the ground environment, air procurements have not—not because war has not changed but because 'war *in* the air' (in terms of high-risk air-to-air combat) has all but disappeared.

While there is certainly a role for supersonic jets in any air fleet, the lack of focus on more purpose-built aircraft and the decommissioning of some of their more effective models (particularly the A-10 Thunderbolt II) demonstrates the impact that their historical experience had on their conceptualization of what war means and therefore what types of missions, actions and materiel it requires. Put simply, for the USAF and the air divisions of the US Navy and Marines,[33] there is a lack of recognition that close support missions for troops in combat should and do constitute a prime responsibility and a necessity for effective force capability.[34] When confronted with the continuing relevance of aircraft like the A-10 Thunderbolt II (which is one of the most effective air power platforms of the past two decades) it becomes clear that the Air Force "never wanted to buy and operate the A-10 in the first place, and it protests that other—unsuitable—aircraft are good enough for the job."[35] "Other missions, including 'strategic' or 'global strike' targets miles away from any battlefield, are the real object of the Air Force's desire—and, as such, the vast majority of its budget is targeted towards the development and procurement of supersonic jet platforms. Consequently, the Air Force has tried multiple times over the decades to decommission or retire many of its purpose-built aircraft, "despite [their] vastly superior performance in the dirty wars we have actually fought."[36] In a hierarchical and bureaucratic environment such as the US military establishment there is little room for push-back from lower-ranking officers or civilian analysts within the procurement pipelines and there is often times a large division

[33] The Army's mission is largely reflected in the airframes they possess (see Appendix II—US Army) however, this is not true of all the services and can be explained by an institutional divide between them. While the Marine Corps supplements in these areas with adaptable airframes, the Air Force and Navy prefer to use their airframes for missions specific to their service's specific strategic goals, very few of which relate to close combat and ground troop support. As a result, they view ground support air procurements as the realm of the US Army, rather than a competency that should be available across all services in order to support each other in major missions. Unfortunately, over the past twenty years the Army's budget has been substantially decreased to supplement the Air Force's growing budgetary allowances. Similarly, the Navy retains very high budgetary allowances for air procurements, but continue to view most ground support operations as outside of their strategic realm.
[34] William B. Mitchell. *Winged Defense: The Development and Possibilities of Modern Air Power- Economic and Military. (*University of Alabama Press: Tuscaloosa, AL, 2009): 181.
[35] War Is Boring, *The US Air Force is Trying to Trick Us Into Getting Rid of the A-10,* November 6, 2014, accessed November 9, 2014. https://medium.com/war-is-boring/the-u-s-air-force-is-trying-to-trick-us-into-getting-rid-of-the-a-10-b32efd62f620
[36] Ibid.

between the leadership driving the procurement strategies, the knowledge departments that oversee grand strategy, and those that develop the aircraft put forward by the procurement elites.

The absence of conventional military threats, now and in the foreseeable future ought to have profound implications for defence planning.[37] In contemporary defence procurements, the real need has little to do with traditional military combat capacity, and everything to do with transferable domestic to international capabilities in enhancing public safety and the rule of law and protecting our troops.[38] Just as the presence of military threats must drive defence planning, the absence of threat ought to be equally consequential for defence planning.[39] It would, therefore, be prudent for military planning and procurement to honor the priorities that are set by the environment rather than those that constitute a pre-disposed definition of war.

5.2 Discussing the Constraints of Supersonic Air Power: The Economics of Targeted Supersonic Procurement and the Impacts for Client Allies' Procurement Strategies

Perceptual predispositions, while most evident in the US Department of Defence, are not unique to the United States; perceptual predispositions are evident across most states' military establishments. Similarly, the frame of 'traditional war' and Cold War power relations affects the perceptions of policymakers and political leadership in the same way. As a result, most defence strategists and procurement elite in Canada assume the same; that we need to replace the CF-18s with another fleet of supersonic fighter jets. Although not unique to the United States or militaries more generally, the impact of perceptual predisposition has far greater impacts on American allies due to their exceptionally disparate military budgets vis-à-vis the United States and their increasingly clientelistic relationship with the United States military to fill the capacity gaps left by shortfalls in defence funding.

[37] Regehr, 2.
[38] Ibid.
[39] Ibid.

According to the Stockholm International Peace Research Institute (SIPRI)'s data reflecting global military expenditures by country, the United States spent 610 billion dollars on its military in 2014, a sum reflective of 3.5 percent of the United States' gross domestic product (GDP). This reflects a military expenditure four times the next country's expenditure (People's Republic of China) and more than the next eight countries combined in 2014. The largest and most concerning disparity being between the US and her close allies is Canada's military expenditure, totalling $19.6 billion and just 1.0 percent of Canadian gross domestic product.

Table 1: Defence Spending by Country

Rank	Country	Spending ($ Bn.)	% of GDP
—	**World total**	**1,776.0**	**2.3**
1	United States	610.0	3.5
2	China	216.0	2.1
3	Russia	84.5	4.5
4	Saudi Arabia	80.8	10.4
5	France	62.3	2.2
6	United Kingdom	60.5	2.2
7	India	50.0	2.4
8	Germany	46.5	1.2
9	Japan	45.8	1.0
10	South Korea	36.7	2.6
11	Brazil	31.7	1.4
12	Italy	30.9	1.5
13	Australia	25.4	1.8
14	United Arab Emirates	22.8	5.1
15	Turkey	22.6	2.2
16	Canada	19.6	1.0

Source: SIPRI 2014 Military Expenditures Database

This budgetary disparity between the US and Canada's defence programs is further reflected when comparing the number, age, and diversity of aircraft capabilities in service for each country. Canada's air fleet is limited to search and rescue, reconnaissance, heavy lift and fighter capabilities, with each of these capabilities encompassing largely legacy models and a very limited number of aircraft.[40] In

[40] See Appendix A for a more extensive analysis of capabilities, age, number and diversity of Canadian active duty military aircraft.

the contemporary security environment the size and operational flexibility of the RCAF makes it largely impossible for Canada to contribute substantially to operations other than war in the air. While Canada does possess transport, surveillance, reconnaissance and command and control air capabilities most of these capabilities are outdated, or represent a very limited number of airframes. Additionally, Canada possesses no ground attack or support air capabilities, leaving a gap in its ability to contribute to unconventional warfare operations.

The wide disparity between the United States and many of its key allies poses a strange dichotomy for US-allied relationships regarding military procurement; countries such as Canada rely on the United States to fill many of the capability gaps in their military services left by shrinking military budgets, but where the United States fills capability gaps it expects these allies to support its key procurement programs, regardless of cost. As such the procurement preferences of the United States set the agenda and expectations for the future necessities of force readiness amongst its allies. For countries such as Canada, with a limited military budget and a constant, uphill battle to justify their international military relevance, a clientelistic relationship with the United States both helps and hinders their development. For example, while the United States' capabilities bolster and plug the gaps in many areas of Canadian national security, it hinders the Canadian military from developing these force capabilities internally through the procurement of relevant platforms and materiel, instead imposing US supersonic jet procurements as a necessity of a continuing clientelistic relationship. Unfortunately, this drastically limits their options for force and fleet redevelopment as their military budgets are limited in such a way that in pursuing the past two procurement patterns focusing on CF-18 Hornets and more recently the F-35 Joint Strike Fighter have bankrupted the procurement budget of funds available for platforms that are necessary for Canada to continue to operate as a full service air force. As Dan Middlemiss states,

> In future operations in support of Canadian foreign policy it will become increasingly difficult to justify the cost of a modest fleet of JSFs (joint strike fighters – F-35) for the air force. There would be almost no requirement for such aircraft to support Canadian naval or army deployments on a 'standalone' basis, and, while they would be useful – and fully interoperable – augmenters to

coalition forces, their high acquisition and sustainment costs would likely rule them out as cost-effective contributors to Canadian foreign deployments anyway. [41]

While the supersonic focus has had an impact on military procurements overall in Canada, it is particularly at the expense of the procurement of other air power platforms that are particularly well adapted to the current security environment. The difficult reality regarding supersonic jet procurements in middle power, non-militarized states such as Canada is that after procuring these aircraft there are no funds left to procure anything else. "In February 2011, the Pentagon put a price of $207 million on each of the 32 aircraft to be acquired in Fiscal Year 2012," which then rose to $304.15 million "if its share of research, development, test and evaluation is included."[42] With a full defence budget of only $19.6 billion in 2014, this nearly $10 billion dollar price tag hardly seems feasible or desirable given the limited operational returns. While this is problematic in its own right, the F-35 is also not projected to have baseline operationality until 2019, will not have its weapons system online until 2023 and its inter-aircraft surveillance and communications mechanisms not fully functional until 2032.[43] As such, the United States is convincing its allies to overextend their budgets now, in support of an aircraft that has little applicability and use to the security environment as it is, and a strong likelihood of environmental irrelevance when it becomes fully operational nearly two decades from now.[44] This logic also does not take into account the time these aircraft will spend out of service over the next twenty years being outfitted with the required updates for full functionality. Yet this logic, while flawed, appears to be effective as we continue to see allies procuring these jets despite their need for purpose-built aircraft in order to be operationally relevant here and now.

[41] Dan Middlemiss in "A Military in Support of Canadian Foreign Policy: Some Fundamental Considerations," Centre For Foreign Policy Studies, Dalhousie University, Halifax, Nova Scotia.
[42] War Is Boring, *The US Air Force is Trying to Trick Us Into Getting Rid of the A-10*, November 6, 2014, accessed November 9, 2014. https://medium.com/war-is-boring/the-u-s-air-force-is-trying-to-trick-us-into-getting-rid-of-the-a-10-b32efd62f620
[43] Ibid.
[44] The author is not arguing that advances in supersonic air power should not be made. In fact, these advances must continue in order to balance advancements made by international adversaries such as China and Russia. However, the F-35 program is large, cumbersome, and not well-suited to allied states such as Canada who need new air capabilities immediately for a much smaller cost. The US should certainly pursue new supersonic capabilities in order to maintain its technological edge for present and future warfare, but marketing the F-35 to its allies who lack the funding to maintain and procure basic capabilities for a full-service air force is ill-advised.

The United States has a vested interest in ensuring this clientelistic relationship with its allies continues. By pushing for interoperability through commonality the United States is able to ensure the development of economies of scale—"cost advantages that enterprises obtain due to size, output, or scale of operation, with cost per unit of output generally decreasing with increasing scale as fixed costs are spread out over more units of output"; thereby spreading the relative costs of their military procurements amongst their allies while continuing to reap the majority of military and economic gain. As such, its predisposition to acquire conventional, high-tech, and expensive weapons systems is unlikely to change as allies continue to perpetuate this framework but continuing to buy in to conventional weapons programs despite their relative inapplicability to contemporary threats vis-à-vis purpose-built air platforms. The interlinkages between predisposed conceptions of war, power, status, and economics and their perpetuation through allies' perceptions of having no other choice but to comply, only allows for the continuation of the unquestioned procurement of supersonic jet programs rather than those platforms well-adapted to the kinds of threats our service members are confronting here and now.

6. RECOMMENDATIONS

6.1 Alternative Air Power Platforms

In comparison to the United States the disparity in Canada's air capabilities is vast. US aircraft are numerous, used by all services, and cover the entire spectrum of air capabilities.[45] However, with the political economic and budgetary realities this is to be expected—Canada simply does not have the monetary resources for the type of air fleet that the US does. Canada, like most states, will never have the means to develop and sustain a full range of military capabilities. So we necessarily have to make decisions that will support certain future roles and responses but will preclude others. The issue, however, is not that Canada's funds are limited, it is that the budget it does have is not being spent building the capabilities that are actually of use. Canada is procuring supersonic fighter aircraft, in an era when they are hardly used, when it already has those capabilities in its existing fleet of CF-18s. This leaves Canada with two choices: either strategic specialization in one or two key air capabilities so that Canadian allies can rely on the RCAF to make reliable contributions to specific missions or maintain a full service air fleet by making smart, strategic investments in the air capabilities necessary to responding to the entire spectrum of threats. This section will explore the latter option by proposing a unique solution: taking the budget for the F-35 program and dividing the pie. I propose continuing with the procurement of a limited number of F-35's (3-7) in order to supplement Canada's aging F-18s and orient our air crews to the technology, while using the remaining funds to add GA/GS capabilities the RCAF's repertoire. F-35s or Super Hornets can then be procured on an as needed basis, over time and in line with Canada's available budget, as the remainder of the F-18 fleet requires replacement and updating. Utilizing the remaining funds earmarked for the F-35 procurement will allow Canada to have the best of both worlds—the ground support and ground attack capabilities needed for conflict today and the supersonic airpower that will

[45] See Appendix B for a more extensive analysis of active duty US military aircraft and their capabilities.

allow the Canadian Forces to remain on the cutting edge of defence technology. The next section outlines the best GA/GS airframes available to Canada in this context.

For the past twenty-five years the U.S. Air Force has been attempting to quietly decommission the A-10 Thunderbolt II close air support aircraft, affectionately known as the 'Warthog.' However, this move is not backed up by a lack of functionality or operability on the part of the A-10, in fact, it has been one of the most effective and efficient demonstrations of air power in the four major conflicts that have shaped the security environment since the end of the Cold War—the Gulf War, Kosovo, Afghanistan, and the 2003 invasion of Iraq. In these conflicts "the A-10 outperformed all other U.S. aircraft in killing tanks and other vehicles and supporting infantry in combat at both very short—'danger close'—and longer ranges."[46] It has also served a multiplicity of combat purposes, excelling in search and rescue and "in battlefield interdiction against conventional forces with modern air defences, as well as the destruction of those enemy air defences and shooting down enemy helicopters.[47] Conceptually speaking, the A-10 is likely the most versatile and effective air platform for responding to the wide range of threats possible in the contemporary security environment.

In terms of combat effectiveness, the A-10 has extensive capabilities that far outweigh the combat capabilities in terms of peace missions of supersonic jet power. However, "in the face of explicit instruction in four different versions of the House and Senate defence bills, the Air Force has concocted a new pretext to continue its longstanding divestiture campaign—retaining the A-10 will slow down the already years behind schedule for the F-35...as the F-35 program must have the A-10's maintenance personnel."[48] However, in the face of the these arguments the A-10 continues to be first in line to be decommissioned despite its high operability and functionality standards and "Official Air Force cost data

[46] War Is Boring, *The US Air Force is Trying to Trick Us Into Getting Rid of the A-10*, November 6, 2014, accessed November 9, 2014. https://medium.com/war-is-boring/the-u-s-air-force-is-trying-to-trick-us-into-getting-rid-of-the-a-10-b32efd62f620
[47] Ibid.
[48] Ibid.

that show the A-10 to be the cheapest combat aircraft in its inventory to operate, notwithstanding a program to give the A-10 new wings and electronics to remain viable until 2030."[49]

The USAF also argues that the A-10 is no longer a necessitated platform as "it is a single mission aircraft, not as versatile as its other multi-role aircraft."[50] While this is categorically false and ignores the A-10's reputable history in engaging in four contemporary conflicts in a multiplicity of roles, the consequence of this argument has severe implications for the United States military and its capabilities to respond to contemporary conflict. The decommissioning of the A-10 "will strip away the A-10 force when its unmatched capability is most needed in combat in Afghanistan, Syria and Iraq."[51] "These are precisely the kind of conflicts for which the A-10 is better suited, more effective and cheaper to operate than any other aircraft in the US or its allies' inventory."[52] With the A-10s capabilities and the type of conflicts the US and its allies are engaging in abroad it should be clear that the A-10 is its best option for efficiency and effectiveness in the contemporary threat environment. However, the Air Force, in particular, continues to advocate for the F-35 program that "struggles to achieve a cosmetic-only declaration of initial operational capability in December 2016."[53] In reality, even if the trajectory of the F-35 program improves drastically "it [only] will finish its combat-realistic operational testing in 2019—the transition point for declaring initial operational capability."[54] Finally, even by 2019 it is unlikely that the F-35 will have the capability to provide close air support; the least of its problems being its lack of effectiveness in unconventional operations which require aircraft that fly lower, slower and with a high degree of precision in its weapons system.

The AH-64 Apache attack helicopter, while largely unconsidered as a strategic option to replace the ground support aspects of supersonic air power is a purpose built airframe well attuned to unconventional threats. Built for ground troop support and troop transport it also holds attack capabilities

[49] Ibid.
[50] Ibid.
[51] Ibid.
[52] Ibid.
[53] Ibid.
[54] Ibid.

and a well-armoured body with highly accurate targeting capabilities. The Apache is well positioned to engage with ground threats to both ground troops and aircraft in situations of total air superiority, and has the necessary capabilities to fly lower and slower to ensure better ground troop protection and target accuracy than the systems in supersonic jet platforms. Similarly, the Marine Corps plan for a newly outfitted MV-22 Osprey featuring enhanced weapons systems is also well-suited to unconventional operations as it blends the vertical flight capabilities of helicopters with the speed, range, altitudes and endurance of fixed wing transport aircraft. This move to arm the Osprey fleet, is also an indication of the UMSC's realization of the F-35B's poor suitability for peace missions, ground and Osprey support, noting the need "to hit small targets in crowded conditions without risking civilian casualties."[55] While this capability gap was previously filled by Harriers, there have been moves towards retirement for the fleet leaving a gap that F-35s cannot fill.

Additionally, as Paul T. Mitchell noted, if industrial regional benefits are the concern, "a turboprop aircraft like Embraer's 'Super Tucano' or Beechcraft's AT-6B (whose engines are manufactured by Pratt and Whitney Canada in Nova Scotia) would easily fit this bill."[56] Costing less than $6 million dollars per aircraft the RCAF would receive ten times the number of airframes than an F-35 procurement for aircraft that are built for domestic and continental defence tasks, well suited to ground support operations, and are "cheap to operate and maintain."[57] Similarly, airframes such as the BAE Hawk and the T-45 Goshawk, both generally employed in training capacities, were designed with close air support capabilities. The options available to allied governments that serve to bolster both their domestic and international military capabilities are numerous, cost effective, and fully operational. Yet, decision makers' focus on traditional understandings of the military's role as that of a conventional force in a conventional war and allied governments' deference to US-backed procurements as the only choice available to them points to deep perceptual predispositions at both the individual, and state level. This

[55] Ibid.
[56] Paul T. Mitchell, "How to get more air force for the dollar," The Ottawa Citizen, 12 October 2010. http://www.ottawacitizen.com/story_print.html?id=3655573&sponsor=
[57] Ibid.

has drastically limited allied governments such as Canada from procuring and maintaining effective air force capabilities in the contemporary security environment.

Many proponents of the F-35 program argue that it is truly a multi-mission aircraft with various capabilities suited to a range of threat environments. This is certainly true, the F-35 program has developed a wide range of models, including a STOL version designed to replace the Harrier jump jet. While these developments are certainly more promising than prior supersonic procurements in terms of responding to aspects of unconventional warfare. However, there are two issues. First, the F-35s are still supersonic jets, meaning they are still—despite specific model specifications—best suited to flying at 15,000 feet or higher, at supersonic speeds, and have highly customized stealth capabilities. All of these baseline capabilities mean that their ability to respond to unconventional threats are 'add-ons' rather than their core capabilities. Even with the development of high power sensors, laser-marking equipment for ground forces, and precision guided bombs that allow supersonic fighters to adapt to the unconventional threat environment they are not adaptations that change the suitability of supersonic power, writ large, to asymmetric warfare. Supersonic jets still fly far too fast, and at too great an altitude to be able to respond quickly and accurately to changes on the ground. Additionally, to use these new systems in close combat and ground support situations both the pilots and systems officers would need to have up-to-the-second intelligence, and perfect munitions accuracy, both of which are difficult to come by in close combat, even when flying low and slow.

Secondly, while the F-35 certainly does have multi-mission capabilities what is of particular concern is how feasible the procurement of all the necessary F-35 platforms would be for a country like Canada with a very small military budget. It may be a multi-mission aircraft for countries like the United States but the difficulty Canada has (and will continue to have) in funding the F-35 program means that the capacities that specific models of the F-35 have for unconventional warfare may be out of reach for countries with limited funds. In this way, by focusing solely on supersonic power, the F-35 program

forces allies to choose between gaining favour with the United States or being able to respond strategically and capably to contemporary existential threats.

Additionally, the options available in terms of aircraft that can supply close air support are not limited to traditional airframes. In fact, if the goal is to pursue top-of-the-line technology adaptable to a range of conflict environments (including both traditional and unconventional military engagements), allies with more limited military procurement budgets would be better served focusing their budgets on the research and development and procurement of unmanned aerial vehicles (drones), which are less expensive, safer for RCAF personnel and better suited to close air support. This allows allies to continue to focus procurements on new technological advancements that are relevant today and will continue to be relevant in the future.

6.2 Readjusting Intellectual, Bureaucratic, and Geopolitical Structures

There are many challenges to changing the perceptual predispositions and clientelism that permeates procurement patterns in Canada. These range from geopolitical pressures emerging from the United States and international alliance systems, a limited defence research community in Canadian academia and governmental capacity within the Department of National Defence, and the bureaucracy and military professionalism that permeates the procurement decision-making process. This section provides recommendations for the readjustment of these key areas to allow Canadian air procurements to reflect the strategic, operational and tactical needs of CAF personnel in combat today and in the future.

Confronting the geopolitical context within which Canada procures materiel is of the utmost importance because it is the close relationship it has with the United States that has allowed for the lack of focus in Canadian air procurements. It is doubtful this relationship will deteriorate in the near or distant future, nor would it be in Canada's best interest for it to do so. However, for too long Canada has allowed the US to 'back seat drive' Canadian defence policy, particularly in the realm of procurement. It is time Canada asserts itself as an equal partner in its military relationship with the US; perhaps not in monetary

or materiel resources but in quality. In doing so it is important for Canada to very specifically define the image it wants to portray to the world with a defence policy that reflects its values. Canada does not have the resources to conduct all types of military operations in a 'big' way so it is therefore important to assert to the US and other allied states that where we do intervene we will do so well with a well-trained, well-equipped force that has the appropriate resources and training to lead.

This does not mean abandoning or decommissioning other capacities, such as supersonic power. It is certainly valuable to any air force and allows Canada to contribute to allied missions in a limited way. It merely means that these capacities should not be the focal point of procurement; they should be procured only on an 'as needed basis' to maintain the current fleet levels. Instead, Canada needs what I call 'Smart Specialization.'

The Smart Specialization framework focuses on three key requirements. First, *focusing on the range of airframes that are best suited to the military missions Canada is best suited to.* Canada is a leader in the realm of humanitarian operations, drug interdiction, and reconstruction and stabilization—adding close combat capabilities to these specializations would not be a grand leap as many of these missions flow out of initial close combat scenarios. In this sense, Canada should be focused on building out its surveillance and reconnaissance, command and control, and ground support capabilities.

Secondly, Canada should be focusing its procurements on aircraft that will allow it to be a '*lead nation'* in certain international missions, rather than minimal but highly costly procurements across a range of capabilities or those already largely held by other allies. NATO has repeatedly called upon Canada to increase its military capabilities. One way to do so without substantially increasing spending is to *put procurement focus on the mission-specific aircraft that are best attuned to the missions Canada can lead.* Canada is never going to be the global leader in air-to-air combat—it does not have the personnel or monetary resources to retain pilots, procure the substantial numbers of supersonic jets, or foot the maintenance costs on a short- or long-term basis. Nor will it come close to the capacities of the United States, France, or Great Britain in terms of resources, training, and available personnel in this area.

Identifying where Canada can lead—likely in humanitarian, close combat, and stabilization efforts—will allow it to be a global military leader without the bill.

Hence, the third condition for smart specialization is '*affordability.*' Part of identifying what missions Canada can be a leader in also requires monetary considerations, namely, what types of airframes are well-built, reasonable to maintain, and are a*ffordable enough that Canada can procure a substantial number of them.* If Canada is going to take on global leadership in any area it cannot be done with a few, unaffordable airframes. It has to be done with a number of high quality, complementary aircraft that work well together within the same or similar missions. This strategy does not necessarily need the newest and fastest aircraft available, Canada needs the airframes that are going to give us the necessary capabilities and technology at a reasonable price. Smart Specialization is built on the understanding that rather than getting rid of the F-35 program all together, the best solution is to 'divide the budgetary pie' allocated to the F-35 procurement to procure a limited number of F-35 platforms and allocate the remainder of the budget to GA/GS procurements.

From a bureaucratic perspective, there are two issues that need to be addressed. Within the military hierarchy there is a necessity for deference and respect for one's superior. However, in many ways, this hierarchical deference has inhibited innovative and strategic procurements, and supported the prevalence of perceptual predispositions in the procurement process. The procurement elite are dominated by high-ranking officers, their unique perceptual predispositions discussed earlier but this does not mean there is a lack of young, junior ranking officers and civilian personnel working on procurement as well. However, their ideas do not often get off the ground due to the engrained deference given to superiors within the Department of Defense in the US and the Canadian Department of National Defence.

What we propose to aid in assuring that all viable procurement ideas are seriously considered is akin to a decision-making tribunal and will require a more focused role for Defence Research and Development Canada in procurement. First, we suggest allowing for two separate brain storm sessions overseen by DRDC personnel, the first being a forum for ideas from the junior level officers and civilian

personnel and the second being the equivalent for the senior officers and civilian personnel. This will allow all ideas to be heard by the DRDC without the structural pressure. Second, these propositions will be reviewed by DRDC Defence Scientists for their feasibility and appropriateness for the identified missions and necessary capabilities. Third, all feasible options will be presented to the junior and senior levels of procurement personnel. At this time, individuals or teams will have the opportunity to present the cases for each aircraft to a 'tribunal' which will be made up of randomly selected personnel compromising one senior level officer, one junior level officer, one senior level civilian procurement specialist, one junior level civilian procurement specialist, and one impartial defence expert from the academic community. This will allow for largely balanced decision-making that will allow for the debate and consideration needed to make a strategically relevant procurement decision reflective of Canadian priorities and the security environment as a whole.

7. CONCLUSIONS

"The history of man is written in choice—whether simple or complex, on a whim or after much consideration, coolly calculated or inflamed by passion, the judgements we form and the choices we make define who we are and what we want for the future."[58] Yet, as demonstrated in this article, decision makers are rarely accountable for, or understand the biases, perceptions, or inferences that underlie and guide the decisions them make and their decisions have long-ranging impacts in defence procurement due to clientelism and the state of the political economy of defence. Understanding and acknowledging these links is more than a pursuit for academia; it is critical for effective and informed decision making more generally. This is particularly true of the national security and defence establishment as these underlying influences and biases have real world implications on operational effectiveness. As evidenced by contemporary procurement patterns, and in particular those associated with supersonic jet procurements, acknowledging and understanding how we arrive at decisions can quite literally be a matter of success or failure. Unconventional operations are what form the bulk of the US and allied involvement overseas and must be reflected in the types of air capabilities we seek to procure. Although not unique to the United States or militaries more generally, the impact of perceptual predispositions, clientelism, and the political economy of defence has far greater impacts on American allies due to their exceptionally different military budget constraints vis-à-vis the United States and their clientelistic relationship with the United States to fill the capacity gaps left by their dwindling military funding.

Purpose-built ground support aircraft including the A-10 Thunderbolt II, AH-64 Apaches, and the newly remodelled MV-22 Ospreys are more useful and effective platforms for the necessities of unconventional operations. Yet, in tandem with the United States, countries like Canada continue to focus their procurement strategies on supersonic fighter jets such as the F-16 Fighting Falcon, F-18 Hornet, and the F-35 Joint Strike Fighter. There are a number of reasons for the continued focus on

[58] Lloyd (Chad) Jones. *Patterns of Error: Perceptual and Cognitive Bias in Intelligence Analysis and Decision Making. (*Monterrey, CA: Naval Postgraduate School, 2005): 1.

supersonic air power in procurement strategies in the contemporary threat environment—perceptual predisposition of the procurement elite based on historical conceptions of war, status, and power, and the macroeconomics and clientelism of the United States' alliances—the least of which is what is actually required of the contemporary security environment.

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APPENDICES

APPENDIX A: COMPREHENSIVE LISTING OF CANADIAN ACTIVE DUTY MILITARY AIRCRAFT

Aircraft	Type	In service	Notes
McDonnell Douglas CF-188	fighter/attack fighter lead-in trainer	92 48 (ca.)	98 CF-188A and 40 CF-188B delivered. 17 crashed and 8 retired.
Raytheon CT-156 Harvard II	Trainer	25	24 leased in 2000, 2 added in 2002. One lost 2014.
BAe CT-155 Hawk	lead-in fighter trainer (LIFT)	20[5]	20 delivered 2000–2002, plus 2 in 2004 to replace losses. With 419 squadron and 2 CFFTS
De Havilland Canada CT-142	navigation and tactics trainer	4	
Canadair CT-114 Tutor	Air Demonstration	25	Replaced by CT-156 Harvard II and CT-155 Hawk in 2000. Only used by "The Snowbirds"; replacement expected by 2020. 190 delivered.
Airbus CC-150 Polaris	Strategic Transport Tanker	3 2	
Boeing CC-177 Globemaster	strategic airlift	5	
Bombardier CC-144 Challenger	utility transport VIP transport	6	
de Havilland Canada CC-138 Twin Otter	utility transport / Search and Rescue	4	

Aircraft	Type	In service	Notes
Lockheed CC-130 Hercules	tactical transport / Search and Rescue	8 6 2 5	
Lockheed Martin CC-130J Super Hercules	medium haul tactical lift	17	
de Havilland Canada CC-115 Buffalo	Search and Rescue	6	Retirement pending replacement decision.
Lockheed CP-140 Aurora	Maritime Patrol/ASW SAR	18	
Lockheed CP-140A Arcturus	Maritime patrol/SAR	1	For training.
Agusta-Westland CH-149 Cormorant	Search and Rescue	14	In 1987, 50 ordered to replace CH-124 Sea Kings and CH-113 Labradors but cancelled 1993. Nine similar VH-71 Kestrels obtained from the US.
Boeing CH-147F Chinook	medium/heavy lift helicopter.	15	Six CH-147D used in Afghanistan in 2008, since stored. 15 long range CH-147Fs with EW equipment delivered starting June 2013.
Bell CH-139 Jet Ranger	Trainer	13	

Aircraft	Type	In service	Notes
Bell CH-146 Griffon	Utility	98	85 delivered as tactical helicopters and 15 SAR. Eight modified in 2009 as armed escorts for CH-147 Chinooks in Afghanistan.
Sikorsky CH-124 Sea King	ASW / utility	27	41 delivered, to be replaced by 28 CH-148 Cyclones.
Sikorsky CH-148 Cyclone	ASW / utility	6	First six delivered June 2015

APPENDIX B: COMPREHENSIVE LISTING OF ACTIVE DUTY AMERICAN MILITARY AIRCRAFT

United States Air Force

Aircraft	Role	Quantity	Note
A-10 Thunderbolt II	Ground-attack aircraft	280	To be replaced by F-35A, scheduled to be in service with the USAF until 2028.
Lockheed AC-130 Spectre	Gunship	14 12 1	
Rockwell B-1 Lancer	Bomber	62	All assigned to active duty units; FY 2014 numbers; Only supersonic bomber aircraft active in the U.S. Air Force.
Northrop Grumman B-2 Spirit	Bomber	20	All assigned to active duty units; FY 2014 numbers
Boeing B-52 Stratofortress	Bomber	78	Slated to remain in service until 2045.
Lockheed C-5 Galaxy	Cargo aircraft	64 12	All C-5A were retired from service. All C-5B and C-5C are to be upgraded to C-5M Supergalaxy.
Beechcraft C-12 Huron	Cargo aircraft Surveillance aircraft	16 6 2 4/41	

Aircraft	Role	Quantity	Note
C-17 Globemaster III	Cargo aircraft	222	
Gulfstream C-20	VIP/Passenger transport/Cargo aircraft	5 2	
Learjet C-21	VIP/Passenger aircraft	17	
Fairchild C-26 Metroliner	Cargo aircraft	11	
Boeing C-32	Passenger aircraft	6 2	
Gulfstream C-37	VIP/Passenger aircraft	9 2	
Gulfstream C-38	VIP/Passenger aircraft	2	
Boeing C-40 Clipper	Passenger aircraft	14	1 on order
Lockheed C-130 Hercules	Cargo aircraft	275	C-130E were retired from service.
Lockheed Martin C-130J Super Hercules	Cargo aircraft	10 79	129 planned
C-144	Transport aircraft	2	*427th SOS*
C-146A Wolfhound	Transport aircraft	14	*524th SOS*
Boeing E-3 Sentry	Airborne command-and-control aircraft	22 10	One E-3B For Testing
Boeing E-4	Airborne command-and-control aircraft	4	
E-8 Joint STARS	Airborne command-and-control aircraft	16	One E-8C For Testing

Aircraft	Role	Quantity	Note
E-9A Widget	Surveillance aircraft	2	
Northrop Grumman E-11A	Battlefield Airborne Communications Node	4	
EC-130H Compass Call	Electronic-warfare aircraft	14	
EC-130J Commando Solo III	Electronic-warfare aircraft	3 4	
F-15 Eagle	Air superiority fighter	159 34	Currently being upgraded to remain in service beyond 2030 the aircraft will eventually be replaced by the F-35A.
F-15E Strike Eagle	Multirole Strike fighter	219	Currently being upgraded to remain in service beyond 2030.
F-16 Fighting Falcon	Fighter aircraft	913	To be replaced by the F-35A. One destroyed in July 2015.
F-22 Raptor	Air superiority fighter	186	No longer in production, with 177 in active service.
F-35 Lightning II	Fighter aircraft	47	In production with 1763 planned, currently 47 for testing
HC-130 Combat King/Combat King II	Search and rescue aircraft	24 11	78 HC-130J planned
KC-10 Extender	Tanker aircraft	59	Supposedly to be replaced by the KC-Y. but likely to remain in service until 2043
KC-135 Stratotanker	Tanker aircraft	396	To be replaced by the KC-46
LC-130 Hercules	Cargo aircraft	10	
MC-130 Combat Talon II/Combat Shadow	Multi-mission aircraft	18 27	

Aircraft	Role	Quantity	Note
Boeing OC-135B Open Skies	Observation aircraft	2	used as part of Treaty on Open Skies
Boeing RC-135	Reconnaissance aircraft	22	
T-1 Jayhawk	Trainer aircraft	178	Originally 180. Two crashed after mishaps.
T-6 Texan II	Trainer aircraft	449	
T-38 Talon	Trainer aircraft	492	
T-41 Mescalero	Trainer aircraft	4	
Cessna T-51	Trainer aircraft	3	
Diamond T-52	Trainer aircraft	20	
Cirrus T-53	Trainer aircraft	3	
Lockheed U-2 Dragon Lady	Reconnaissance aircraft Trainer aircraft	26 5	To be replaced by the RQ-4 Global Hawk block 40.
Pilatus U-28	Utility aircraft	19	
Boeing VC-25	VIP Transport	2	Used as Presidential Transport, Air Force One
Lockheed WC-130 Hercules	Weather reconnaissance aircraft	10	53d Weather Reconnaissance Squadron
WC-135 Constant Phoenix	Weather Reconnaissance aircraft	2	
Sikorsky HH-60 Pave Hawk	Search and rescue helicopter	99	To be replaced by the HH-60W from 2019
UH-1N Twin Huey	Utility helicopter	62	
TH-1 Iroquois	Trainer helicopter	37	
PZL C-145 Skytruck	STOL Utility aircraft	10	
de Havilland Canada UV-18	STOL Utility aircraft	3	

Aircraft	Role	Quantity	Note
CV-22 Osprey	Cargo VTOL aircraft	17	50 planned
Mil Mi-8	Utility helicopter	6	Evaluations
Mikoyan MiG-29	Air superiority, Multirole fighter	3	Evaluation only
Sukhoi Su-27	Air superiority fighter	2	Used for "Aggressor" training

United States Army

Aircraft	Role	Quantity	Note
C-12 Huron	Cargo/Transport	17 14 17	
Gulfstream C-20	Cargo/Transport	4	
C-26 Metroliner	Cargo/Transport	12	
C-27J Spartan	Cargo	7[]	Former Air Force aircraft used by Army Special Operations Command for training.
C-31 Troopship	Cargo/Transport	2	Used for the Golden Knights Gold Team and Black Team
Gulfstream C-37	Cargo/Transport	2 1	
de Havilland DHC-7	Electronic Warfare/Reconnaissance	8 2	Previously designated as RC-7B
RC-12 Huron	Reconnaissance	12 6 18	
Cessna UC-35	Utility aircraft	20, 7	

Aircraft	Role	Quantity	Note
Bombardier Dash 8	Intelligence, Surveillance and Reconnaissance	7	
Cessna 208 Caravan	Transport	3	
AH-6 Little Bird	Attack helicopter	47	
AH-64 Apache	Attack helicopter	756	
CH-47 Chinook	Cargo helicopter	394 48	464 new CH-47F to be delivered
EH-60 Black Hawk	Electronic-warfare helicopter	64	
MH-47 Chinook	Multi-mission helicopter	11 23 27	
MH-60 Black Hawk	Multi-mission helicopter	23 35	
OH-58 Kiowa	Observation helicopter	618	A / C models are currently under replacement by UH-72
TH-67 Creek	Trainer helicopter	180	
UH-60 Black Hawk	Utility helicopter	751 592 100	1227 planned
UH-72 Lakota	Utility helicopter	307	148 on order
Antonov An-26	Undesignated foreign aircraft	3	
Antonov An-2	Undesignated foreign aircraft	1	
Mil Mi-24	Attack helicopter with transport capabilities	1	Acquired from Germany and used for adversary training. Retired to Fort Bliss Old Ironsides Museum.

United States Coast Guard

Aircraft	Role	Quantity	Note
Gulfstream C-37	Long Range Command & Control aircraft	2	Two USCG VC-37As provides VIP transport for high-ranking members of the Department of Homeland Security and U.S. Coast Guard using the designation *Coast Guard 01 or Coast Guard 02*. The C-37A enjoys commonality of parts and supplies with more than a dozen C-37As operated by the Department of Defense.
HC-130 Hercules	Search and rescue aircraft	5 22 6	The Coast Guard's fleet currently includes five HC-130H (1500 series), 22 HC-130H-7 (1700 series), and six HC-130J models of the famous Hercules, widely recognized as the West's premier military transport. Many of the HC-130Bs are slated to be replaced by HC-130Js.
HC-144 Ocean Sentry	Search and rescue aircraft	18	The HC-144A will assume medium range surveillance and transport requirements, replacing the HU-25 and some HC-130s.
HH-60 Jayhawk	Medium Range Recovery (MRR) helicopter	41	There are 42 total Jayhawks in the Coast Guard air fleet, with 35 in operational use. A number of the MH-60s have completed an upgrade and are redesigned as MH-60T.
HH-65 Dolphin	Short Range Recovery (SRR) helicopter	101	There are 101 H-65s in the inventory. As part of the ongoing H-65 Conversion / Sustainment Project, all HH-65Bs have been upgraded to HH-65C configuration, equipped with Turbomecca Arriel 2C2 engines.

United States Marine Corps

Aircraft	Role	Quantity	Note
C-9 Skytrain II	Cargo/Transport aircraft	2	
C-130 Hercules	Cargo aircraft	1	Single aircraft assigned to the US Navy's Blue Angels, known as Fat Albert
EA-6B Prowler	Electronic-warfare aircraft	25	To be retired by 2019.
F/A-18 Hornet	Fighter aircraft	48, 86, 95	To be replaced by ten squadrons of F-35B and four squadrons of F-35C.

Aircraft	Role	Quantity	Note
F-5E/F/N Tiger II	Fighter aircraft	13	Used for adversary training
KC-130 Hercules/Super Hercules	Tanker aircraft	26 48	
UC-12 Huron	Utility aircraft	5 7	UC-12W replacing UC-12F/M models.
UC-35 Citation	Utility aircraft	2 10	
AH-1 SuperCobra	Attack helicopter	128	To be upgraded to/replaced by AH-1Z Viper beginning in 2009
AH-1Z Viper	Attack helicopter	33	189 planned
CH-53E Super Stallion	Cargo helicopter	147	To be replaced with 225 CH-53K beginning in 2018.
UH-1Y Venom	Utility helicopter	92	160 planned
VH-3 Sea King	Marine One VIP Transport helicopter	11	Used as Presidential Transport
VH-60 Whitehawk	Marine One VIP Transport helicopter	7	
AV-8B Harrier II	VTOL Attack aircraft	112	To be replaced by F-35B
MV-22 Osprey	Multi-mission VTOL aircraft	204	126 on order
TAV-8B Harrier II	VTOL Training aircraft	16	To be replaced by F-35B
F-35 Lightning II	VSTOL Fighter aircraft	30	353 ordered

United States Navy

Aircraft	Role	Quantity	Note
C-2 Greyhound	Carrier-based Cargo/Transport aircraft	35	
Gulfstream C-20	Cargo/Transport aircraft	4	

Aircraft	Role	Quantity	Note
Gulfstream C-37	Cargo/Transport aircraft	1 3	
C-40 Clipper	Cargo/Transport aircraft	14	1 on order
C-130 Hercules	Cargo/Transport aircraft	20	
CT-39 Sabreliner	Cargo/Transport aircraft	1	
Beechcraft C-12 Huron	Cargo/Transport aircraft	15	
Fairchild C-26 Metroliner	Cargo/Transport aircraft	6	
Lockheed Martin KC-130	Aerial Refueling	6	
E-2 Hawkeye	Carrier-based Airborne Command and Control aircraft	69	To be replaced by E-2D starting in 2014
E-6 Mercury	Electronic-warfare aircraft	16	
EA-18G Growler	Carrier-based Electronic-warfare aircraft	114	35 on order.
EP-3 ARIES II	Electronic-warfare aircraft	15	
F-5F/N Tiger II	Fighter aircraft	30	Used for adversary training
F/A-18 Hornet	Carrier-based Fighter aircraft	348	To be replaced by F-35C
F/A-18E/F Super Hornet	Carrier-based Fighter aircraft	319	49 on order.
F-35 Lightning II	Carrier-based Fighter aircraft	4	NAS Pax River SDD aircraft, 260 planned
P-3 Orion	Maritime patrol aircraft	115	To be replaced by P-8
P-8 Poseidon	Anti-Submarine-warfare aircraft	15	122 planned
T-6 Texan II	Trainer aircraft	49 12	
Beech T-44	Trainer aircraft	52	
T-45 Goshawk	Carrier-based Trainer aircraft	218	
Cessna UC-35	Utility aircraft	1	
HH-60 Rescue Hawk	Search-and-rescue helicopter	49	

Aircraft	Role	Quantity	Note
MH-53 Sea Dragon	Multi-mission helicopter	29	
MH-60 Seahawk	Anti-submarine warfare helicopter	166	291 planned
	Multi-mission Helicopter	234	275 planned
SH-60 Seahawk	Anti-submarine warfare helicopter	60	
TH-57 Sea Ranger	Training helicopter	44	
		85	