

Why Airpower?

Airpower and the “Deep Fundamentals” of Warfare^{©1}

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Introduction

It is a great honor and pleasure to share these thoughts with you. Chile is a proud democracy and as the US Department of State observes, “Relations between the United States and Chile are better now than at any other time in history.”² My mission today, however, is not to celebrate the great friendship between our two countries, but to give you some thoughts regarding Airpower, especially military Airpower. Airpower is in the midst of a revolution as profound as the revolution that began with the jet age. We are just beginning to discern the next generation of Airpower.

Twenty-five centuries ago the Greek philosopher and mathematician, Pythagoras, contemplated what he described as “the music of the spheres.” That is, he believed that the universe—the bodies swirling around earth, its center—was ordered so harmoniously that the interaction of these planets created “celestial music.” We humans could not hear it, because we humans were created after the symphony was well underway and hence, to us, it was indiscernible background noise.

Airpower often is like that, isn't it? To us, Airpower seems to have existed “always”. The majority of people on the planet were born when nations' air forces were long established. Thus, we all too rarely reflect on “why Airpower?” “What,” we seldom ask ourselves, “are the fundamental bases of its power, and how might Airpower evolve over the next decade?” Let us contemplate those questions today with an eye toward understanding what the answers to “what?” and “why?” might mean.

This essay has three parts. The first part explains the nature of changes in competition, including conflict, that have been occurring for the past several epochs. The second part examines the deep fundamentals of the battlespace to understand why Airpower—power applied through and from air, through and from orbital and sub-orbital space, and through and from cyberspace—will emerge as the dominant form of military power in this century. The third part explains why Airpower is essential for a modern democracy.

¹ The views expressed are those of the author and do not necessarily reflect the views of the firm, Toffler Associates. I am grateful to Jeffrey Barnett, Dr. Jae Engelbrecht, and Williams Huggins, my Toffler Associates colleagues, for their help developing this essay.

² “Background Note: Chile,” US Department of State, Bureau of Western Hemisphere Affairs, January 2008.

Let us begin by looking at the waves of civilization that have washed across the planet, focusing on the disruptive wave of our era: the Third Wave.

Part One: The Wave Theory of Competition

First Wave Agrarian Age



Family Centered
Necessity
Land and Labor
Small Units
Local Market
Take What You Get
Survival
Compete for Land/Water
Local
Goods for Money
Occasional Change

Second Wave Industrial Age



Hierarchy
Mass Production, et al
Capital, Land, Labor
Scale
Regional Market
Standardization
Tangible Value
Compete for Capital
Transportation
Paper for Money
Moderate Change

Third Wave Information Age



Network
De-massification
Knowledge, Information
Small Units Act Small
Global Market
Customization
Intangible Value
Compete for Knowledge
Communication
Digits for Money
Constant Acceleration

The First Wave

Alvin and Heidi Toffler originated the “wave theory of conflict.” In their book, *Creating a New Civilization: The Politics of the Third Wave*³, the Tofflers explain that the sweep of history is best understood in terms its three separate of waves of civilization. As these waves arose, spread, coexisted, and collided, they defined the histories we read today.

The First Wave of civilization “was and still is inescapably attached to the land.”⁴ It was the product of the agricultural revolution and began whenever humankind changed from nomadic hunting and gathering to the more pastoral and sedentary life of flocks and farming. The land yielded its sustenance, wealth, and bounty

³ Alvin and Heidi Toffler, with a Foreword by Newt Gingrich, *Creating a New Civilization: The Politics of the Third Wave* (Washington DC: The Progress and Freedom Foundation, 1994). Read all the Tofflers’ books to understand the idea better.

⁴ The Tofflers do not use “civilization” in the very narrow and largely “religious” sense that Samuel Huntington uses it. See Samuel P. Huntington, “The Clash of Civilizations?” *Foreign Affairs* 3 (Summer 1993), pp. 22-49.

according to the rhythm and tempo of the seasons. The foaling and fleecing of the flock, the planting and harvest of the fields framed everyday life. This rhythm also framed conflict. Warfare in the First Wave usually was seasonal. Belligerents planned wars around the agrarian calendar. The ancients describe this eloquently, but even as late as the American Civil War, soldiers routinely deserted to return to their land for planting. War was also about the land, the dominant source of subsistence and wealth. The historian Robert L. O'Connell writes "agriculture would dictate that war among the settled would be essentially about territory, both on the battlefield and in a larger political sense."⁵ The way we make war, the Tofflers tell us, is the way we make wealth, and the wealth of First Wave societies was embedded in their land.

What human qualities are and were treasured in the First Wave? Carl Builder, drawing heavily on the Tofflers' works, suggests that families and clans of First Wave societies value animal-like strength and cunning.⁶ Strength overpowered enemies and the cunning of the likes of T'ai Kung, or Sun Tzu, or Wu Tzu, or Machiavelli introduced additional mystery and deception to amplify the effects of physical power. Armies, bands of warriors, dominated First Wave military operations.

The Second Wave

The Second Wave emerged and, depending on your point of view, either simplified or complicated society and life. The Tofflers observe that:

Industrial civilization, the product of the great Second Wave of change, took root most rapidly on the northern shores of the great Atlantic Basin. As the Atlantic Powers industrialized, they needed markets and cheap raw materials from distant regions. The advanced Second Wave powers thus waged wars of colonial conquest and came to dominate the remaining First Wave states and tribal units all over Asia and Africa.

It was the master conflict again—Second Wave industrial powers versus First Wave agrarian powers—but this time on a global rather than domestic scale, and it was this struggle that basically determined the shape of the world until recent times. It set the frame within which most wars took place.⁷

⁵ Robert L. O'Connell, *Ride of the Second Horseman: The Birth and Death of War* (New York: Oxford University Press, 1995), pp. 82-83. In a conversation at Carlisle Barracks, O'Connell explained that his subsistence taxonomy is another way of looking at Waves. See also Robert L. O'Connell, *Of Arms and Men: A History of War, Weapons, and Aggression* (New York: Oxford University Press, 1989).

⁶ Carl H. Builder, "Peering Into the Future: Trying to Get the Enterprise Right," unpublished lecture to the National Reconnaissance Office, 11 March 1997.

⁷ Alvin and Heidi Toffler, *Creating a New Civilization*, p. 12.

The Second Wave created “mass societies that reflected and required mass production.”⁸ Builder notes that Second Wave societies valued “organization and discipline,” simply because planning for mass production (to increase wealth) and producing mass warfare (to steal or protect wealth) required those values.⁹ When humans organize for mass production, then standardization, rationalization, mass transportation, and all kinds of engineering become important. Successfully waging war in the Second Wave required a massive war economy—money still and forever constituting Cicero’s “sinews of war”—the *levée en masse*, military engineers, and a mass of killing appliances and machines.¹⁰

Concentrating mass, that very Second Wave notion, continues to appeal to those who treasure mass for the talismanic “decisiveness” that some believe mass can produce. “Winning” is about out-producing competitors in masses of delivered lethality. The Second Wave battlefield, even when manned aircraft and missiles enter it, is a linear battlefield defined by land, sea, air, and, to some degree, near-earth space.¹¹ The FEBA (forward edge of the battle area), the FSCL (fire support coordination line), and notions of the high, deep, and rear battle may all be products or vestiges of this Second Wave thinking. It is the same thinking that gave us the notion of military “control”: sea control; airspace control, and space control.¹² To Second Wave thinkers the antipodes of concentration and dispersion, the choice of massing or de-massing, are choices vexed only by the need to “concentrate mass” at the decisive point and time and knowing that massing presents a like-minded enemy with very economical targets.¹³ Armies and massed firepower dominated Second Wave military operations.

Getting Into the Third Wave

The Third Wave is the Wave sweeping over our societies today. In the words of the Tofflers:

⁸ Alvin and Heidi Toffler, *Creating a New Civilization*, p. 13.

⁹ Carl H. Builder, “Peering Into the Future.”

¹⁰ One need only to scan Frederick, Jomini, Clausewitz, von Moltke, Schlieffen, and Schlichting to recognize that the machinery of warfare extended to the mechanical way in which massed armies were formed, trained, and employed. Even today, for example, the motto of the German *Führungsakademie der Bundeswehr* is “The mind moves the mass.” See Daniel J. Hughes, ed., translated by Daniel J. Hughes and Harry Bell, *Moltke on the Art of War: Selected Writings* (Novato, CA: Presidio Press, 1993).

¹¹ One must ask whether the notion that “space” is an “area of responsibility” (AOR) to be assigned to a US unified commander reflects the extension of terrestrial linear thinking to space?

¹² Second Wave thinking includes holding the belief that all systems are closed systems. See Erich Jantsch, *The Self-Organizing Universe* (Oxford: Pergamon Press, 1980), p. 7 quoted in Margaret J. Wheatley, *Leadership and the New Science: Learning about Organization from an Orderly Universe* (San Francisco: Berrett-Koehler Publishers, Inc., 1992), p. 18.

¹³ Airmen often criticize soldiers for their obsession with “mass,” but the airman’s mass raid or “gorilla package” show a closer bond than usually admitted.

...We are speeding toward a totally different structure of power that will create not a world cut in two but sharply divided into three contrasting and competing civilizations—the first still symbolized by the hoe; the second by the assembly line; and the third by the computer.

In this trisected world the First Wave sector supplies agricultural and mineral resources, the Second Wave sector provides cheap labor and does the mass production, and a rapidly expanding Third Wave sector rises to dominance based on the new ways in which it creates and exploits knowledge.

Third Wave nations sell information and innovation, management, culture and pop culture, advanced technology, software, education, training, medical care, and financial and other services to the world.¹⁴

What human qualities does it take to flourish and make wealth in the Third Wave? It takes knowledge, intelligence, initiative, and creativity. The vestiges of old forms remain, but are altered. Third Wave data and information replace First Wave “lore” and Second Wave “doctrine,” just as the scientific method replaced some superstitions. But there may be, as the Tofflers observe, some surprising parallels between the greatly demassified and customized First Wave and the greatly demassified and customized Third Wave. As one example, are not the knowledge, intelligence, and creativity of the Third Wave closely akin to the “cunning” of the First Wave?¹⁵

The Third Wave is as different from the Second Wave as the Second Wave is from the First Wave. Our genes come from well before the First Wave and many of our *memes* only appear to be Second Wave ones.¹⁶ A lot will change before human nature and our genetic makeup changes.¹⁷ Second Wave armed forces, organized as authoritarian hierarchies long ago, want to remain authoritarian hierarchies. If knowledge, intelligence, initiative, and creativity are the keys to success in the Third Wave, then ought not our armed forces be organized in ways attending to liberating and using those traits of knowledge, intelligence, initiative, and creativity? But, by and large, the armed forces are organized into

¹⁴ Alvin and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the Twenty-first Century* (Boston: Little, Brown and Company, 1993), pp. 21-23.

¹⁵ Another example might be the nature of work in the Third Wave. In the First Wave, work occurred in and around the home. Children stayed close to parents. In a world of increasing telecommunications capabilities, might not more work occur in the home? Might not more parents find it possible to work and attend to their children in the home? As a third example, consider that the First Wave citizen-soldier brought the scythe from the field or the squirrel gun from the farm to fight in First Wave wars. Can we not envision the Third Wave citizen-soldier bringing the computer, the software, the business innovation, and the advanced technology of the Third Wave to the militia and to the fights of tomorrow? And yet, we see Second Wave thinking seducing us into overlooking such similarities. How are such oversights possible?

¹⁶ Richard Brodie, *A Virus of the Mind: The New Science of the Meme* (Seattle: Integral Press, 1996).

¹⁷ Desmond Morris, *The Naked Ape: A Zoologist's Study of the Human Animal*, (New York: McGraw-Hill Book Company, 1967). See also Will and Ariel Durant, *The Lessons of History* (New York: Simon and Schuster, 1968), who assert that states behave like humans writ large.

separate hierarchies with, some argue, variety and texture provided by a lot of “stovepipes.”¹⁸ *Confusion, indecisiveness, rigidity, or ignorance in hierarchies, if such things are present, can be imposed on the fighting forces from the top down.* More importantly, David Ronfeldt tells us that where “knowledge” is the commodity being transacted in the Third Wave, the best way to make that transaction is through a network, not a hierarchy.¹⁹ Yet, do we not see “military intelligence” organized in hierarchical forms even today?

Complicating the problem of transitioning our thinking from Second Wave thinking to Third Wave thinking is awareness that three very different forms of society now co-exist on our planet. Even as the “rapidly expanding Third Wave sector rises to dominance,” the First and Second Waves still demarcate large societies with billions of people around the planet. Moreover, Third Wave societies have within them Second Wave sectors, just as Second Wave societies have Third Wave sectors within them. People still farm. People still mine. People still manufacture. The First and Second Wave have not disappeared. The values and attributes of the First Wave and the Second Wave compete with the values and attributes of the Third Wave. Conflict—constructive or destructive—often is required to resolve these conflicts. *The world is dangerously “trisected,” but Third Wave power—including technology—has tipped the scales in favor of those forces that understand how the Third Wave affects the deep fundamentals of the operational space. My thesis is that only Airpower capitalizes on the deep fundamentals of today’s operational space.*

Part Two: The Deep Fundamentals of Operational Space

The Deep Fundamentals

In their most recent book, *Revolutionary Wealth*, Alvin and Heidi Toffler “probe three of the fastest changing, most powerful, and most fascinating of all the deep fundamentals” affecting the economy today. They assert these deep fundamentals are time, space, and knowledge, and undertake a rich exploration of the significance of these fundamentals for matters economic.

But what about matters military? Are there similar “deep fundamentals”—deeper than or elaborations of those developed by Clausewitz—that help us better understand forces, maneuver, winning, armies, navies, and air forces, and so forth? Let’s see.

¹⁸ Carl Builder *The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of US Air Force* (New Brunswick NJ: Transaction Publishers, 1993).

¹⁹ David Ronfeldt, *Tribes, Institutions, Markets, Networks: A Framework About Societal Evolution* (Santa Monica: RAND Report P-7967, 1996). The chart on p. 17 is instructive. See also John Arquilla and David Ronfeldt, *The Advent of Netwar* (Santa Monica: RAND, 1996).

Probing for deep fundamentals in order to understand the underlying dynamics of a system is, of course, not new. In 10th and 11th Century Scholasticism, scholars began to distinguish between the “essence” of a thing or state and the “accidents” of a thing or state.²⁰ Accidents are manifestations and derivatives of some deeper essence or essences. Essence, on the other hand, is the nature of a thing—its “deep fundamentals”—considered independently of the existence of things.

Pulling this thread, the “nature” of warfare is what it always has been and always will be: an asocial activity wherein animate and inanimate matter exists, moves, and is moved in time and space to create one form of military power or another. Awareness of the relationships between time, space, and matter—creating relational power, and the multitudinous ways in which time-space-matter is being employed or can be employed—may be called “knowledge.” *Thus, the deep fundamentals of warfare are time, space, matter, and knowledge; all the ways in which time, space, matter, and knowledge are used intentionally and arise by chance²¹ to create greater power than an adversary possesses at any moment in time and space.*

Time and its importance in the relevant operational space, has accelerated and increased epoch by epoch, manifest in faster platforms and speedier engagements. Speed makes the synchronization and deconfliction of matter in time and space as severe challenges as preserving “situational awareness” or knowledge of everything relevant in a rapidly changing operational space. For example, speed of light weapons—laser and other cyber weapons—are asynchronous with less-than-speed-of-light weapons (such as tanks and ships), their legacy concepts of operations, and the old processes used for decision-making.

Airpower alone offers the opportunity to span Second Wave Warfare and Third Wave warfare and change the calculus of opposed power rapidly. Airpower, to use Ilya Prigogine’s thoughts, has the ability to create a new “initial condition” in a dissipating system to either restore stability or create greater instability by introducing an unexpected (by the adversary) change in the environment.²²

Space, the distance between different bits of matter in the operational space, is more than the range arcs of platforms and weapons. It is also the proximity between belligerents and the proximity between combatants and non-combatants. The relevant operational space today goes far beyond what were formerly believed to be the boundaries of the “battlefield” or the “battlespace.” Today, the

²⁰ Accidents, according to these thinkers and at the risk of gross over-simplification, possessed no independent or self-sufficient existence, but existed only in another being, substance, or appearance (defined by Kant as a sensuous object existent or possible in space and time).

²¹ Perhaps arising not just by chance, but also by unexpected friction.

²² Prigogine, Ilya, *Order Out of Chaos*, New York: Bantam Books, 1984, p. 121.

relevant operational space—including the cyberspace—is as close to being unbounded as one can imagine.

Airpower is energy applied through and from the air, through and from orbital and sub-orbital domains, and through and from cyberspace. Airpower applied through and from the media that overarch and interconnect the other media—the land and the sea—is the only form of military power that capitalizes on the rapid movement through and engagement in physical space.

Matter, the physical objects and their characteristics in the operational space, can utilize speed of movement—transiting space in the briefest intervals of time—to create force advantages by changing the locus of action, creating other linear “fronts,” and creating non-linear surprise. Different force elements bring different (or, in worse cases, wastefully duplicative) forms of matter to the fray and Service competencies pivot on experience in employing specific forms of matter to create or to contribute to the creation of superior power in time and space. Surface forces, unlike air forces, rely on huge and heavy amounts of matter, have huge logistics requirements, and are hard to move and conceal.

Airpower is the most economical form of matter in the operational space. Precision targeting and precision attack can badly hurt enemies in contact, enemies massed, and enemy leadership deep in enemy homeland.

Knowledge Of the deep fundamentals of warfare, the preeminence of knowledge is the new news. Knowledge is the awareness of everything operationally relevant—including the non-combatant forms of matter—in the conflict space, including the relationships between matter in time and matter in space, time differentials, space or distance differentials, and knowledge differentials. Knowledge creates temporal advantages, identifies the critical space and critical time, and can match, or overmatch, the right matter to the right matter. Stealth technology, for example, transforms many areas of knowledge into materials and structures that reduce an adversary’s knowledge of the position of a particular cluster of matter to the degree that engagement by adversarial matter is made more difficult.

Airpower has, and has always had, the ability to transform its vantage to advantage. The line of sight limitations that land forces have and naval forces have do not exist for air forces.

Fundamentals Affect Force

Of course different force elements—armies, navies, and air forces—can be understood by their cultures. In his book, *The Masks of War*, Carl Builder asserts that beyond culture, different force elements manifest “distinct and enduring

personalities.”²³ But different force elements—armies, navies, and air forces—also can be understood by the way in which their signature “matter” operates in time and space and the relationships of their matter and knowledge to an artificial construct called “momentary certainty” in time and space. If time could be stopped and all relevant matter frozen in time and space, one could theoretically achieve true knowledge, certain knowledge, of that moment—beyond the intuitive *coup d’oeil*—and perhaps the next moment. That this construct is artificial does not mean it is not useful. It must be useful because armies, navies, and air forces all pursue it. Given the expansiveness and complexity of the operationally relevant space, achievement is more difficult for some than for others.

	Time	Space	Matter	Knowledge
Land Forces	Slowest	Limited by speed, the terrain, the need to mass and fight, and force protection	Heavy, less maneuverable, needs direct and indirect fires, huge logistics tail	Limited by line of sight and dependent on inorganic knowledge systems
Naval Forces	Slower	Limited by speed, the area required to mass and fight, and the need for self defense	Limited by speed, the terrain required to mass and fight, and force protection	Limited by line of sight and dependent on inorganic knowledge systems
Airpower	Fast	Limited by fuel	Most economical	The advantage of vantage

Armies

For example, in simplistic terms armies exist because nations (and non-state groups) create them to control the ground and to close with enemies and subdue them. However, the Third Wave undercuts the value of armies. Armies—especially opposing Third Wave forces—face significant challenges in

²³ Carl Builder’s *The Masks of War: American Military Styles in Strategy and Analysis* (John Hopkins University Press, 1989). According to Builder:

The Army sees itself, ultimately, as the essential artisans of war, still divided into their traditional combat arms—the infantry, artillery, cavalry (armor)—but forged by history and the nature of war into a mutually supportive brotherhood of guilds. (p. 33)

The Navy, more than any of the other services and over anything else, is an institution. That institution is marked by two strong senses of itself: its independence and stature. (p. 31)

The Air Force, conceived by the theorists of air power as an independent and decisive instrument of warfare, sees itself as the embodiment of an idea, a concept of warfare, a strategy made possible and sustained by modern technology. The bond is not an institution, but the love of flying machines and flight. (p. 32)

compensating for temporal, spatial, material, and knowledge deficits that ground operations naturally impose.

Armies transit space—the ground—slowly. To compensate for slow closing speeds in time, armies pursue mechanization to transport soldiers, and longer-range artillery, rockets, air-movement, and air-attack platforms to strike adversaries. But these compensatory measures are inadequate without knowledge. Given that the earth is not flat, armies are beset by line of sight challenges—from the curvature of the earth, to terrain features, to cultural features like buildings, to camouflaged, concealed, and covered enemies, to buried landmines—that make even momentary certainty within and beyond the line of sight almost impossible to acquire. Nonetheless, to compensate for the restrictions that line of sight limitations place on armies, armies acquire “knowledge” systems that use airborne platforms and other sensors to extend their ability to sense and strike within and beyond their line of sight. Armies spawn “air forces” for their own survival.

Navies

Navies operate on and beneath a fluid medium, but have challenges similar to armies. They exist to control the seas and to influence activities and adversaries on the land. They have the freedom to move in any direction, but move relatively slowly. Line of sight restricts their ability to acquire knowledge organically unless air platforms are integral. Surface ships also are difficult to mask and because they are difficult to mask, also are difficult to hide and protect. Navies, like armies, depend on airborne and space systems to extend their ability to sense and strike within and beyond their line of sight. Navies, like armies, require “air forces” for their survival in modern battlespaces.

Airpower; Air Forces

Of all the force elements it would appear that air forces—which include space and cyberspace forces—are best positioned to master the deep fundamentals of time, space, matter, and knowledge in the new operational space.

Aircraft transit the ground beneath them at speeds faster than 400 miles per hour and can strike well beyond the range of the organic air platforms of armies or navies. Sensor platforms operate at high altitudes and from space, overcoming many of the disadvantages that line of sight limitations place on armies and navies. Space systems capitalize on sensors using multiple phenomenologies and communications systems that can transmit information globally. Air forces do not need to spawn armies and navies.

In order to magnify the ability of joint and allied forces to possess beyond-line-of-sight knowledge and to compensate for the limitations operational media impose

on armies and navies, the US Air Force moved to create an Air Force Intelligence, Surveillance, and Reconnaissance directorate at its headquarters. The Air Force also announced it would create a Cyber Command to consolidate resources for fighting in cyberspace and defending Defense Department networks. Thus, other force elements' limitations—the limitations on land forces and naval forces—sustain another force's métier.

We must therefore agree with Professor George Stein of the US Air War College when he concludes

In essence, then, the range of operations conducted by air, space and cyber assets implied in the missions of global vigilance, reach and power shows that it is only the fully integrated employment of these assets in 21st century operations across all domains that will finally realize the potential of airpower: *the ability to apply power and effects quickly to any target on or above the planet.*²⁴

Part Three: Why Democracies Need Airpower

Five Things to consider about Airpower

Why Airpower? *We are able to have this thing, this capacity, this capability called "Airpower" because governments fulfill the social responsibility entrusted to them, because of the ingenuity, will, and industry of the humans who every day create their nation's Airpower, and because we well reckon the risks and dangers of not delivering military Airpower to our governments and our citizens.* Let's look at each of these features.

First, Governments create air forces and citizens sustain air forces. If we return to the roots of military aviation, we know that Governments create air forces on behalf of their citizens. Air forces don't create air forces; they create Airpower. Airpower is the ability to use the air forces that our governments created and our citizens sustain in order to dominate the air, space, and cyberspace realms. *Command of the air—our governments know—protects a nation's sovereignty, deters most forms of aggression, increases the survivability and effectiveness of terrestrial forces, takes the fight far forward (even into an enemy's homeland), and is critical to a nation's survival.* Although governments know this value does not mean that the citizens who sustain us understand "why" the government created the air force, so they must be reminded periodically, especially in peacetime.²⁵ Air forces are a national treasure and we airmen are the stewards of that treasure. Airmen do not "own" the air forces the government and citizens provide. Airmen merely use the air forces provided to create

²⁴ George J. Stein, unpublished manuscript, "Twenty-first Century Airpower: the Integrating Imperative."

²⁵ Chile has yet to create its own "Air Force Association" to help it in educational outreach and to network with many other nations' Air Force Associations.

Airpower. Airmen “own” Airpower. Reminding citizens of the value of Airpower is not a trivial responsibility.

Second, Airpower alone offers Governments two ingenious notions. The ingenious notions to which I refer do *not* include the notion that science and engineering can overcome gravity, although in the time of the Brazilian, Alberto Santos-Dumont, and the American Wright brothers, that was bold notion. *No, the first and most important ingenious notion to which I refer is the idea that Airpower offers governments alternatives to the carnage, and slaughter, and cost of massed armies in contact.* For example, Allied Airpower opened an aerial “front” in Europe in an attempt to relieve our Russian ally, destroy German war-making capacity, and prepare Europe for ground invasion. In the Pacific, Airpower finally forced Japan’s surrender and prevented a contested land invasion of Japan’s home islands, thereby averting what were estimated to be in the most optimistic case a minimum of 500,000 US casualties (and millions of Japanese military and civilian casualties).²⁶

Although Giulio Douhet’s *Rules for the Use of Airplanes in War* and *The Command of the Air* and Billy Mitchell’s *Winged Defense* were revolutionary for their time, World War II validated their basic theories. Today Mitchell and Douhet are perhaps no longer viewed as being any more radical than Alfred Thayer Mahan in his *The Influence of Sea Power Upon History, 1660-1783* or Carl von Clausewitz writing *On War*.

A second ingenious idea—that remains controversial even today—is that Airpower, used alone, can deter or prevent existential war and, failing that, produce overwhelming strategic effects should war occur. What makes this idea controversial in the US, and perhaps elsewhere, is US combat experience since *Operation Desert Storm* and the sometimes fanatical theology of “jointness.”²⁷ Air forces—space systems, transport, fighters, unmanned aerial systems,²⁸ air refueling tankers, and reconnaissance and surveillance aircraft—can and do support surface operations. But all should keep in mind that nations create air forces to preserve their sovereignty, for war prevention, war-fighting, and war-winning, not for suppressing

²⁶ D. M. Giangreco, “Casualty Projections For The U.S. Invasions Of Japan, 1945-1946: Planning And Policy Implications,” *Journal Of Military History*, 61 (July 1997), p. 551

²⁷ A very senior USAF officer, speaking under the promise of non-attribution, described what “jointness” was coming to mean: “Here in the Pentagon, when the other Services talk to the Air Force ‘jointness’ means ‘what’s ours is ours and what’s yours is joint.’” See also my “Annulling Marriages: Reframing the Roles, Mission, and Functions Debate,” *Airpower Journal* (Winter 1993), pp. 55-67 and “Interservice Rivalry In Action: The Endless Roles And Missions Refrain?” *Airpower Journal* (Summer 1996), pp. 48-59.

²⁸ No system is truly “unmanned.” Richard L. Haver, vice president for intelligence operations for the Northrop Grumman Corporation, observes that all aerial systems, even tethered balloons, have humans integral to the system.

insurgencies or fights against irregulars. Perhaps there are only a few small conflicts that can be prevented or controlled by the application of Airpower. Airpower is about big fights and existential wars. Airmen should not lose their sense of service, purpose, and value in an era of small fights.

Small fights can be and often are mean and mortal fights, certainly, but for the nations that have invested heavily in air forces, these fights are not existential.²⁹ Consider this: the US Department of Defense reports that in the five years since the beginning of *Operation Iraqi Freedom* in 2003 there have been 4,003 Americans killed in combat and over 29,000 wounded.³⁰ Any loss is a tragic loss. But by contrast, and in no way intended to trivialize the losses in Iraq, in the US in the last *single year* for which we have authoritative data—the year 2006—consider that more than 42,600 people were killed in US highway vehicle accidents and 2,575,000 people were injured.³¹ Over five years at 40,000 fatalities annually would amount to 200,000 highway fatalities compared to 4,000 combat fatalities over the same period, yet the magnitude of those deaths on the highway did not result in and will not stimulate trillion dollar investments. Demanding that air forces designed to resist and overcome existential threats be radically altered to curb lesser threats—and no responsible person I know is recommending this—might be foolhardy, if not reckless.

Third, human will, more than human intellect, sustains Airpower. Much in the same way that national leaders of the stature of O'Higgins, San Martin, and Jefferson are rare, few military leaders have the foresight of an Ogarkov or Rickover. Among airmen, forward thinkers like Douhet, Mitchell, Boyd, and Warden needed strong will. *Douhet and Mitchell were court-martialed, Douhet imprisoned, and Warden passed over for promotion for their strong-willed and single-minded Airpower advocacy and activism.* Historically, the scientific, technical, and operational hurdles Airpower has to overcome to bring forth and sustain a separate air force are nothing compared to the bureaucratic barriers that rivals erect.

Barriers to entry are not the only challenges. There often are barriers in budgets, barriers to modernization, and barriers to high command. Armies and their generals still dominate the militaries of our time. Thus, sustaining air forces demands strong and tireless acts of the will. While intellect may be distributed in approximately the same proportions globally, “will” is not distributed equally.

“Will” among air forces may be inversely proportional to size. The economics of what I will call “scarcity” demand and often summon stronger will than the

²⁹ A European colleague observed “War for Europeans has always been a matter of what Sun Tzu called ‘the survival of the state.’ War for the US has always been discretionary.”

³⁰ As of 10:00 AM, March 31, 2008. <http://www.defenselink.mil/news/casualty.pdf>

³¹ “Highway Safety Facts 2006,” US Department of Transportation, March 2008

economics of surplus. Large air forces have more elasticity—that is, they can tolerate more mistakes—than smaller ones. Smaller air forces—Australia, Chile, Denmark, Japan, New Zealand, Norway, The Netherlands, Singapore, South Korea, Sweden, and so forth—may be sustained by stronger will and the demand for greater innovation. The very modern force you are acquiring—like the relationships this modern force enables—are testimony to enlightened government resource allocation and determined air chiefs. Without the potent will and innovative approaches to operations that smaller air forces provide, the larger air forces of allies might tend toward complacent stagnant thinking.

Fourth, Airpower helps drives modern economies. Military aviation begets civil aviation and civil aviation is transformational. The eras of sail, steam, road, rail, and diesel did not make globalization a reality. Modern communications and the airplane did. As the Airbus CEO observed “Today, commercial aviation—directly and indirectly—contributes 8% of global GDP and supports 29 million jobs. Aviation also transports 40% by value of inter-regional exports of goods, facilitating access to new markets for developing countries.”³² Last year in Chile, for example, tourism grew by over 12 percent and contributed over \$6,581.7 billion Chilean pesos to the economy. In January 2008 the *Santiago Times* reported

Commercial air traffic in Chile jumped by 18.4 percent in 2007, the highest one-year gain in a decade, according to the country’s Civil Aviation Board (JAC).

In total, more than 9 million people took to the skies last year, 1.4 million more than in 2006. More than four million passengers flew domestically. In fact, domestic air travel spiked by a whopping 21.2 percent in 2007.

LAN, which saw its earnings rise by 45 percent last year, continues to dominate the domestic market. LAN enjoys a 69.1 percent market share. Competitors Aerolíneas del Sur and Sky Service control just 16.6 percent and 14.3 percent of the domestic market, respectively.

More and more Chileans are also traveling abroad—especially to other Latin American countries, JAC reported. The number of passengers on international flights rose by 16.1 percent. The top destinations were Buenos Aires, Argentina (23 percent); Sao Paulo, Brazil (11.1 percent); Lima, Peru (7.7 percent) and Madrid, Spain (7.4 percent).

Chile also enjoyed a strong year as a tourist destination, despite investing relatively little—just US\$8 million—in tourism promotion. According to the World Tourism Organization, tourist visits to Chile rose by 12 percent in 2007, the highest gain for any country in the hemisphere. Other increasingly popular destinations in the Americas were Argentina, where tourism rose by 11 percent, and the United States, which enjoyed a 10 percent gain in tourist visitors.³³

³² Tom Enders, “Rising to the Challenge,” *The Guardian*, March 13, 2008

<http://www.guardian.co.uk/commentisfree/2008/mar/13/climatechange.theairlineindustry>

³³ “Chile Tourism And Air Traffic Flying High,” *Santiago Times*, January 31, 2008.

Fifth, and most importantly, neglecting Airpower is neglecting protection of a democracy's sovereignty. Airpower may have come into being as the handmaiden of other force elements—armies—but Airpower has demonstrated the capacity to destroy the combat effectiveness of opposed Industrial Age armed forces more quickly than any other force element. *Airpower is, I argue, the highest form of military power in the future. Why? Because Airpower capitalizes on the advantages that exploiting the deep fundamentals of warfare creates.*

Conclusion

Not all will accept my conclusion that Airpower is true strategic power; the highest and most useful form of military power. If we work to educate our leaders and citizens, more will consider and evaluate what I hold to be true.³⁴ Education, like Airpower, requires will, my fellow airmen. Will requires speaking truth to power and asserting air-minded alternatives and solutions to problems formerly dealt with by land forces and naval forces. Do not expect this to be easy.

³⁴ Airpower is especially important to Chile given its strategic geography and topography.