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SPECIAL OPERATIONS FORCES, INFORMATION OPERATIONS, AND AIRPOWER: PRESCRIPTION FOR THE NEAR 21st CENTURY

by

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The Gulf War of 1990-1991 has been described as the pinnacle of second-wave warfare, characterized by massed field armies, maneuver formations based on the armored vehicle and airplane, second generation precision guided munitions (PGMs), and engagements involving thousands of soldiers, sailors, airmen, and marines. At the height of the conflict, over 500,000 United States (U.S.) servicemen were deployed in support of Operations DESERT SHIELD/DESERT STORM. The ensuing victory by U.S./Coalition forces and loss by Iraqi forces is one of the greatest lopsided outcomes in the history of warfare. Unfortunately, the demonstrated U.S. preeminence in conventional second-wave warfare may spell trouble for the 21st century. Potential adversaries will have taken note of our capabilities in this arena and will endeavor to develop methods and technologies that will negate our strengths either through asymmetric attack, innovation, or both. These actions will give rise to asymmetric warfare as the dominant paradigm.

Combined application of special operations forces (SOF), information operations (IO), and airpower (AP) may produce synergistic effects that will permit smaller forces to effectively and efficiently counter our adversaries adopting asymmetric warfare. We employ a heuristic approach in conveying our vision of combined SOF, IO, and AP operations.

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ABSTRACT

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Combined application of special operations forces (SOF), information operations (IO), and airpower (AP) may produce synergistic effects that will permit smaller forces to effectively and efficiently counter our adversaries adopting asymmetric warfare. We employ a heuristic approach in conveying our vision of combined SOF, IO, and AP operations.

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I. INTRODUCTION

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes.

Guilio Douhet

A. HYPOTHESIS AND BACKGROUND

The Gulf War of 1990-1991 has been described as the pinnacle of second-wave warfare (Alvin & Heidi Toffler, 1993, p. 8)[1], characterized by massed field armies, maneuver formations based on the armored vehicle and airplane, second generation precision guided munitions (PGMs), and engagements involving hundreds of thousands of soldiers, sailors, airmen, and marines. At the height of the conflict, over 500,000 U.S. military personnel were deployed in support of Operations DESERT SHIELD/DESERT STORM. The ensuing victory by U.S./Coalition forces and loss by Iraqi forces is one of the greatest lopsided outcomes in the history of warfare. Unfortunately, the demonstrated U.S. preeminence in conventional second-wave warfare may spell trouble for the 21st century. Potential adversaries will have taken note of our capabilities in this arena and will likely endeavor to develop methods and technologies that will negate our strengths either through asymmetric attack, innovation, or both. These actions will give rise to asymmetric warfare as the dominant paradigm for future conflict. Just as the 1920s and 1930s were times of great innovation in military doctrine, strategy, operational concepts,

organization, and technology that broke with contemporary standards, the Armed Forces of the United States must again look to the future as they develop force structures and doctrines that can successfully deter and counter this new type of "unconventional warfare."

This thesis will explore the synergistic effects that can be created through the combined employment of special operations forces (SOF), information operations (IO), and airpower (AP). Each of these disciplines, guided by distinct operating principles and defined by unique characteristics, provide capabilities, which if blended properly, may produce effects greater than their individual strengths (see Table 1.1). It is anticipated that the effects of a SOFIA[2] (SOF, IO, and AP) doctrine will allow the use of smaller forces in an engagement to confront a wide array of potential adversaries of the U.S. in the 21st century.[3]

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[1] The Tofflers postulate that societies conduct warfare in the same manner in which they produce wealth. In previous works they developed the ideas of "waves," or periods of history characterized by a dominant wealth producing paradigm. The "first-wave" depends on agriculture, the "second-wave" is industrial in nature, while the "third-wave" is distinguished by the preeminence of information processing. The Gulf War was fought as an industrial war by the U.S., hence they see it as mainly a case of *second-wave warfare.*

[2] Doctor John Arquilla of the Naval Postgraduate School suggested the term SOFIA based upon the Greek root of the word, which means "knowledge" and "wisdom". It seems especially appropriate for our doctrine because of the importance played by information operations in enabling both SOF and AP.

[3] Unfortunately, the increase in the number of situations requiring the application of military force may somewhat offset the manpower savings realized by this concept.

INFORMATION OPERATIONS (Subsets)	AIRPOWER (Tenets)	SPECIAL OPERATIONS FORCES (Characteristics)
Command and Control Warfare (C2W)	*Centralized Control & Decentralized Execution*	*Flexible Joint Forces able to develop/execute unconventional audacious, high payoff COA*
Intelligence Based Warfare (IBM)	*Flexibility & Versatility*	*Rapidly Deployable*
Economic Information Warfare (EIW)	*Concentration*	*Surgical Strike Capable*
Psychological Warfare	*Persistence*	*Small Scale Environment Dominance*
Hacker Warfare	*Priority*	*Sized, trained, equipped to operate along high tech continuum*
Electronic Warfare	*Balance*	*Regionally focused; culturally, linguistically, politically sensitive*
Cyberwarfare	*Synergy*	

Table 1.1: Characteristics/Tenets/Subsets of SOF, IO, and AP[4]

Basic SOFIA doctrine calls for the reduction of conventional forces (in most situations), and replacement with SOF elements, complemented by AP, and enabled by information operations. Discipline apportionment will be based upon the adversary faced by the SOFIA task force.[5] With a smaller footprint and greater flexibility than conventional forces, SOF can access more environments. IO can provide the SOFIA task force commander with "relative information superiority", and a means of affecting the opponents information systems and decision-making abilities. Possessing more

[4] Source: National Defense University. (1995). *What Is Information Warfare?* Washington, D.C.: U.S. Government Printing Office.
Source: [United States Air Force. (1997). *Air Force Doctrine Document 1*, October 1997.]
Source: [United States Special Operations command. (1997). *SOF Vision 2020* (Pamphlet).]

[5] SOFIA doctrine allows for the lead discipline to change based upon the environment. In some instances, SOF ground elements may be more applicable to the situation, while in others, AP may play the decisive role. In all cases, IO will be a force multiplier, but may also have a force applications role.

information about the operating environment than the enemy reduces the SOFIA commanders "decision cycle." A faster decision cycle affords the SOFIA task force two benefits: 1. Reduces the amount of factors it need be concerned with, allowing concentration (both of forces and mental acuity) on areas of primary concern,[6] and 2. Reduction in number of ground forces required to accomplish the mission. AP provides the SOFIA commander with battlespace mobility, ISR (intelligence surveillance and reconnaissance) and precision "fires."

Armed forces adopting a SOFIA operational concept will display increased mobility/reach, flexible/scalable lethality, and increased precision targeting. Where employed together, SOF, IO, and AP will be able to achieve limited battlespace superiority. SOFIA induced battlespace superiority will be bounded by the time available from notification to employment of forces,[7] by the relative information balance between opponents, and the scope of the operation. "Scope of the operation" includes number of forces involved, lethality of weapons employed, size of the area of responsibility (AOR), operational goals and duration of the action. Changes in any of the variables will affect the ability of SOF, IO, and AP to achieve battlespace superiority.

B. RELEVANCE

Decreasing resources, a shrinking pool of overseas bases for forward presence, and increasing non-traditional threats/missions necessitate development of a doctrine that does not rely upon large numbers of troops supplied with heavy equipment for every

[6] "Factors" affecting the operating environment include geography and "information quotient." Information quotient refers to the amount, complexity, and importance of certain types of information to a situation.

[7] This time would be used for preparation and rehearsal of forces.

situation. In spite of recent increases in the Department of Defense (DoD) budget, it is unlikely the U.S. military will see a return to the $300 billion dollar budgets of the mid-1980s. If so, it will be imperative to remember the military maxim "economy of force." A doctrine that blends the strengths and negates the individual weaknesses of SOF, IO, and AP may provide a solution that is more effective against our most probable adversaries, economical in terms of funding and manpower, and flexible enough to provide utility across the spectrum of conflict.

Since World War II, the United States has organized, trained, and equipped forces for "worst case" scenarios; nuclear or conventional war with peer competitors. Paradoxically, it has been postulated (and proven in the case of the U.S.) that the type of conflict/adversary an armed force trains to fight, is the one most likely to be deterred, and never engaged[8]. Forty-five years of Cold War with the former Soviet Union is a prime example.

When confronted with wars not fitting this dominant paradigm, the U.S. has consistently assumed that forces developed for high-end conflict would be just as capable in low-end conflicts. Our success rate in applying mismatched styles of war and forces is ambiguous. The Korean War (1950-1953) resulted in a stalemate that continues to this day. The Vietnam War (1965-1973) cost the U.S. over 50,000 dead and still the Republic of Vietnam collapsed. Only when the opponent has fully adopted our paradigm of conventional, second-wave warfare, have our victories been complete, as in Operations DESERT SHIELD/DESERT STORM.

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[8] The late Secretary of Defense, Les Aspin, stated "History suggests that we most often deter the conflicts that we plan for and actually fight the ones we do not anticipate" in *The Bottom-up Review: Forces for a New Era* (September, 1993), Washington, D.C.: Department of Defense.

Changes in the international system wrought by the demise of the Union of Soviet Socialist Republics (USSR) in 1991 will continue to affect the face of conflict through the next century. The dramatic transformation from a bipolar to a multi-polar world has unleashed forces that were suppressed, ignored, or misunderstood by the U.S. and the USSR. These forces include ethno-nationalism, religious fundamentalism, and quests for regional hegemony.

All three have the capacity to generate conflict unlike that which the U.S. is currently prepared to face. Historically called low intensity conflict, operations below conventional war on the continuum of conflict are actually quite varied and range from counter-insurgency, to counter-terrorism, to peace operations, to counter-proliferation, to humanitarian assistance. As such, they require a perspective different from conventional war, to successfully prosecute. Instead of being thought of as lesser cases of traditional war, they should be viewed as sui generis. While it is our belief that these types of conflicts are increasingly more likely, the U.S. must also continue to be prepared to deter and fight larger scale conflicts, such as those exemplified by the Cold War and the Gulf War. Without a credible ability to fight and win the big wars, the U.S. invites aggression from traditional peer competitors employing second-wave warfare technology.

C. METHODOLOGY

Development of an operational concept that encompasses SOF, IO, and AP is admittedly a large task. In order to convey our vision of combined SOF, IO and AP operations, we will adopt an heuristic approach to our subject. First, we will develop a snapshot of what we believe the operating environment may be like in the year 2010. For this we will employ the idea of "scenarios," as refined by Peter Schwartz (1996) in his

book *The Art of The Long View*. Our vision of the future is based upon a review of contemporary issues by a variety of authors. It is not our contention that this is the only possible future. What we do believe is that this is one of many possible futures that encompass some worst case scenarios. Following chapters will be structured around definitions, concepts, "SWOT" (strengths, weaknesses, opportunities, & threats) and utility analyses.

Definitions and concepts provide the reader with a review of commonly used words and ideas pertaining to the disciplines. A SWOT analysis allows us to determine both positive and negative attributes of the individual disciplines. The results of our SWOT analyses will assist us in determining the utility of each discipline, and the overall robustness of the SOFIA doctrine.

Strengths and weaknesses focus on the internal aspects of the discipline. For example, an inherent strength of AP is its flexibility. Aircraft can be dynamically retasked, that is, redirected from preplanned targets to targets of opportunity while in flight. On the other hand, a primary weakness of AP can be its limited "staying power." AP platforms tend to have relatively shorter duration times in action than ground forces due to fuel, ordnance, maintenance requirements, and crew endurance. All of these have an impact on principles of employment and concepts of operations associated with AP.

Opportunities and threats refer to factors external to the discipline that may effect our vision. An opportunity associated with IO is the possibility of decreased friendly and enemy casualties. Certain techniques associated with IO, such as manipulation of an adversary's information system, may allow us to achieve national goals without directly endangering lives. It may be possible to create a false impression, one that is favorable to

the U.S., of a contested battlespace and introduce it into an opponents information system. Decision-makers on the other side may then be influenced to acquiesce without U.S. forces having to engage in battle.

Threats are those forces that can diminish the effectiveness of the discipline. Misuse of SOF by political leaders and general-purpose forces (GPF) commanders is an example of an external threat. A lack of understanding on the part of decision-makers that control SOF can lead to improper employment, leading to failed missions and waste of valuable assets. Use of an Army Special Forces company in a regular infantry role by GPF commanders is an example of a threat.

Robustness is based upon the discipline's ability to function in a variety of roles, against a variety of adversaries, in a variety of situations. (See Table 1.2 for a list of traditional roles and uses for power, two major categories of adversaries, and probable future situations or missions).

ROLES
✓ *Compellence, deterrence, coercion, and punishment*
✓ *Preventative actions*
✓ *Pre-emptive actions*
ADVERSARIES
✓ *Peer competitor*
✓ *Niche competitor*
SITUATIONS/MISSIONS
✓ *Peace operations*
✓ *Humanitarian assistance*
✓ *Noncombatant evacuation operations*
✓ *Counter terrorism*
✓ *Counter proliferation*
✓ *Counter insurgency / Guerrilla warfare*
✓ *Direct action*
✓ *Special Reconnaissance*
✓ *Conventional war*

Table 1.2: Roles, Adversaries, and Situations/Missions.

Compellence, deterrence, and punishment are traditional "desired effects" of the use of power (both political and military). Preventive actions are those actions taken to deny an adversary the ability to develop, deploy, or employ a new capability. The 1982 Israeli airstrike on the Iraqi nuclear power plant at Osirak was designed to prevent Saddam Hussein's development of nuclear weapons. Preemptive actions are those actions taken to "spoil" an adversary's planned attack. The 1967 Israeli air attack on the Egyptian air force destroyed hundreds of aircraft hours prior to the planned invasion of Israel by Arab forces.

The robustness of our model will depend upon three variables: 1. Type of competitor (niche or peer); 2. Intensity of the conflict or mission (high intensity or low intensity); and 3. Wave progression of the opponent (first, second, or third-wave as described by the Tofflers). (See Figure 1.1) Our conflict visualization tool provides a graphic representation of how we will assess the robustness of our SOFIA doctrine.

For example, how well can a SOFIA task force function against a niche competitor armed with first-wave technologies, in a low-level guerrilla insurgency? How well could the same task force fare when pitted against a peer competitor with a sophisticated integrated air defense system (IADS) in a protracted major theater war?

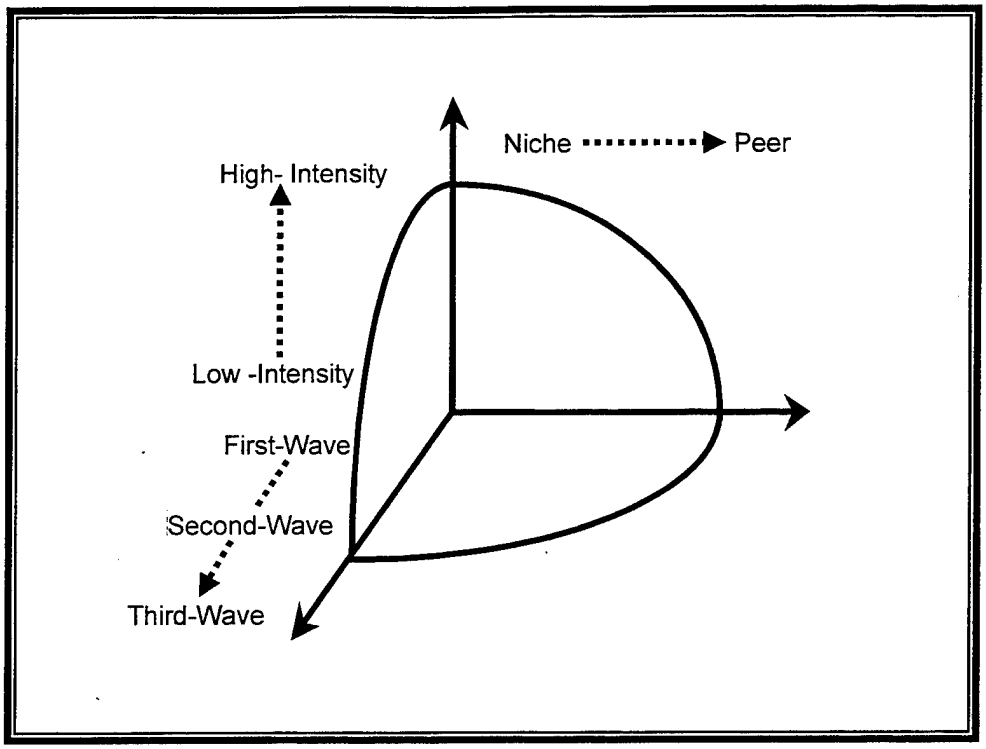

Figure 1.1: Conflict Visualization Tool

Utility is a measure of how well SOF, IO, and AP can accomplish different tasks. In his book, *Explorations in Strategy*, Colin Gray (1996) uses four questions to determine the utility of a discipline: 1. What uniquely, can the discipline do? 2. What can the discipline do well? 3. What does the discipline do poorly? and 4. What is the discipline unable to do? (p. 99) By answering these questions we can identify tasks that can be accomplished by a SOFIA task force, and begin to establish boundaries on the types of missions they should be assigned. What also will become apparent is that there will be some overlap with the types of missions that can be accomplished by alternative combinations of forces. What a SOFIA doctrine must focus on are those tasks that can best be accomplished by SOFIA forces, and avoid those that can best be accomplished by others. SOF, IO, and AP are uniquely suited to our envisioned future of asymmetric warfare, primarily because of the unorthodox and multidimensional reasoning (problem solving) skills associated with, and the technology inherent in the equipment used by,

practitioners of the disciplines. SOF personnel are less constrained by conventional thinking than GPF soldiers. Through participation in innovative and realistic training, SOF personnel learn to "put down the manual" and develop new methods of addressing problems. Limits are removed on what is an "acceptable answer." AP practitioners are accustomed to thinking in four dimensions (horizontal, vertical, longitudinal & time) vice the traditional three dimensions of ground forces. IO, as a relatively new concept, encourages operators to recognize the information quotient of every action. Relative superiority in information is analogous to achieving air superiority. It allows freedom of maneuver, while denying it to your opponents.

We have limited discussion of our SOFIA concept through the year 2010 for a variety of reasons. All three services have published visionary documents that project through the same time period and beyond, which provides us with some base documents to build upon and contrast with our vision of the future. It also provides a manageable period of time for extrapolating current trends in the political, economic, and technological realms.

II. OPERATING ENVIRONMENT

In this chapter we will construct a future based upon a review of contemporary literature. Noted authors such as Samuel Huntington, Heidi and Alvin Toffler, and Peter Schwartz will be used as primary sources for identifying possible future trends. We recognize that the ideas and concepts put forward by Huntington and the Tofflers are controversial, and that there are valid contradictory concerns regarding their ideas. It is not our contention that this chapter represents the only possible future. It is merely an attempt to provide the reader with a "worst case" environment in which the SOFIA doctrine may be applicable.

A. SCENARIO-BASED PLANNING

When dealing with force structure, it is imperative as the late Les Aspin (1993) said that we get it "not too badly wrong." A too narrowly focused vision of the future environment, one that fails to take into account key trends or misinterprets their effect, may generate inflexible concepts with disastrous results. The French and Belgian static defensive forts of the inter-war years were based upon a vision of the future that was remarkably similar to the past. On the other hand, German doctrine during the 1930s reflected thoughtful evaluation of newly proposed concepts and infant technological advances, which culminated in their development of Blitzkrieg. Visionaries such as B.H. Liddell-Hart, Heinz Guderian, Billy Mitchell, Guilio Douhet, and William Moffett are examples of leaders who were able to recognize the coming changes brought about by advances in technology and were able to think through the possibilities they suggested.

Strategic bombing, the aircraft carrier, armored maneuver warfare, combined arms operations, and close air support are just a few of the results.

Defining your vision of the future is the basis upon which everything rests. So how do we ensure that our "vision" does not lead to a solution that is "too wrong?" Volumes have been written concerning strategic planning, but a common theme is development of a model that will function in a variety of environments. In his book, *The Art of the Long View*, Peter Schwartz (1996) describes a method based on "scenarios." Scenario-based planning is a technique that allows you to think about possible futures by identifying *driving forces*, *predetermined elements*, and *critical uncertainties*. Developing plausible future environments from these guideposts allows the strategic thinker to ensure that their concepts and organizations will not be caught unprepared. At the very least, they will be more at ease with the situation because they will have thought through the implications of various scenarios. Best case, organizations and concepts will have been created and implemented that will allow them to face these future environments.

Driving forces are "the elements that move the plot of a scenario, that determine the story's outcome" (Schwartz, 1996, p. 101). *Predetermined elements* are those events that will prevail regardless of the scenario envisioned. *Critical uncertainties* are "intimately related to the pre-determined elements. You find them by questioning your assumptions about predetermined elements..." (p. 115). In the following sections we will identify key *driving forces*, *predetermined elements*, and *critical uncertainties* that will most likely impact the environment in which we expect our SOFIA doctrine to function.

1. Driving Forces Affecting the Operating Environment in the Year 2010

Schwartz suggests five broad categories for investigation of key driving forces: *society*, *technology*, *economics*, *politics*, and *environment*. Schwartz counsels that it is important to cull from your first iteration of driving forces only those that have a direct impact on your scenario. "Which are significant and will actually influence events? Which are irrelevant?" (1996, p. 107). Table 2.1 lists the results of our survey of current driving forces.

SOCIETY	TECHNOLOGY	ECONOMICS
✓ *Cyclic nature of Religious Fundamentalism* ✓ *Quagmire of Ethnic-Conflict*	✓ *Computers: increasing processing speeds & storage capacity, decreasing physical size, improving wireless connectivity* ✓ *Communications: increase in modes, speed, reach* ✓ *Sensors: increased discrete target detection* ✓ *Precision Navigation and Positioning systems (PNP) e.g.(GPS)* ✓ *Airpower Enablers: V/STOL, UAV, Stealth*	✓ *"Wave"conflict* ✓ *Increasing wealth disparity between first, second, and third-wave societies*

POLITICS	ENVIRONMENT
✓ *Increase in number and influence of Nongovernmental Organizations (NGOs), Transnational Criminal Organizations (TCOs), & Regional/Global networked "issue oriented" associations (e.g.Comprehensive Ban on Land Mines)*	✓ *Depletion of critical natural resources including oil, potable water, and agricultural lands* ✓ *Access to natural resources controlled by first and second-wave societies*

Table 2.1: Driving Forces Affecting the Operating Environment in the Year 2010

a. ***Society***

Paul Moscarelli (1996) in his article "Religion—Banner for Twenty-First Century Conflict" identifies religious fundamentalism as a driving force that will likely continue to have a major impact on world events. He describes it as a "...major conduit of political change in the international arena" and asserts that "...in a world of increasing complexity, believers are turning to their faiths in ever greater numbers for both moral guidance and group identification" (p. 31).

Differentiating "fundamentalism" from contemporary religious mores, Moscarelli (1996) believes "it is a strategy by which believers attempt to preserve their group identity" and "involves revival of former beliefs which are modified by leaders to achieve political goals" (p. 33). Key to his definition is the idea that fundamentalist strategy "is often innovative and rejects secular politics in charismatic fashion to renew group identity and expand popular support" (p. 33).

Moscarelli (1996) argues that the "morality" aspect of religion provides a rallying point for political activities. Questions of how power should be distributed and utilized inevitably fall into categories of good and evil. "Anything that can be portrayed as evil can be righteously opposed and such opposition can be rationally defended with religious precepts" (p. 32). This ability to view political struggles in black and white allows religious fundamentalists to use any means necessary, including violence, to achieve their ends (triumph of good over evil).

The increase in fundamentalist movements worldwide in the past twenty years can be seen as a response to the failed policies of secular governments in many first

and second-wave societies. Attempts to quickly modernize produced rising expectations, and when unmet, produced a backlash.

Swept into power by a fear of modernity, fundamentalist leaders have faced difficulty when forced to put their beliefs into action in the form of a functioning government. A paradox develops in that the more a fundamentalist government uses secular methods to solve its domestic and foreign problems, the more it begins to resemble a secular government.[9] The more it resists "secular solutions", the more it resembles the failed former government in its ability to provide economic prosperity for its people. "This no win situation keeps the door open for new fundamentalist or secular movements to surface and challenge the old" (Moscarelli, 1996, p. 46). The cyclic nature of these failed governments ensures that fundamentalism will continue to produce conflict in many areas of the world for years to come.

In Ethnic Conflict and International Security, Michael E. Brown (1993) explores the impact the resurgence in ethnic conflict has on both the regional and international levels. He defines "ethnic conflict" as "a dispute about important political, economic, social, cultural, or territorial issues between two or more ethnic communities" (p. 5). These conflicts range from the non-violent (Czechoslovakia's "velvet divorce") to "full scale military hostilities, and unspeakable levels of savagery, as seen in Angola, Bosnia, the Caucasus" (p. 5).

[9] Moscarelli cites Iran as the classic example of an Islamic nation that has experienced both "secular" and "revivalist" governments and the associated problems. Prior to 1979, the majority of Shi'ite Muslims in Iran accepted "secular" institutions adopted by the Shah. "In 1979, the fundamentalist revolution of Ayatollah Khomeini pushed the country hard in the direction of traditional thinking" (Moscarelli, 1996, p. 36). Faced with the realities of growing population, high unemployment, and a large debt from the war with Iraq, "forced the fundamentalist Iranian government to innovate and proclaim certain traditionally frowned upon practices to be in accordance with Islamic law" (Moscarelli, 1996, p. 36).

Since there have always been disputes between peoples of different cultures, it becomes important to understand why some disagreements result in conflict. Brown explores three levels of analysis in his explanation: systemic, domestic, and perceptual. "Systemic explanations of ethnic conflict focus on the nature of the security systems in which ethnic groups operate and the security concerns of these groups" (1993, p. 6). Those who subscribe to the systemic explanation point to two necessary causes: close proximity of two ethnic groups and "national, regional, and international authorities...too weak to keep groups from fighting and too weak to ensure the security of individual groups" (p. 6). Forced into providing for their own defense, ethnic groups invariably end up contributing to the destabilization of the situation. "The problems groups face is that, in taking steps to defend themselves-mobilizing armies and deploying military forces-they often threaten the security of others" (p. 6).

Domestic explanations for ethnic conflict include: "the effectiveness of states in addressing the concerns of their constituents, the impact of nationalism on inter-ethnic relations, and the impact of democratization on inter-ethnic relations" (Brown, 1993, p. 8). Jack Snyder in his essay "Nationalism and the Crisis of the Post-Soviet State" posits that "people look to states to provide security and promote economic prosperity. Nationalism, he maintains, reflects the need to establish states capable of achieving these goals" (p. 8). "When state structures are weak, nationalism is likely to be based on ethnic distinctions, rather that the idea that everyone who lives in a country is entitled to the same rights and privileges" (p. 8). This leads to a sharpening of distinctions between groups which can lead to persecution of minority groups and "...that ethnic minorities will demand states of their own" (p. 9).

The primary impact of democratization on ethnic conflict is "the tendency in multiethnic societies for political parties to be organized along ethnic lines" (Brown, 1993, p. 10). When this occurs, especially in winner-take-all elections, minority groups have little chance of ever gaining power. As such, they feel shut out, and are apt to push for increased autonomy or outright independence.

Perceptual explanations for ethnic conflict center on "false-histories many ethnic groups have of themselves and others" (Brown, 1993, p. 11). Stories passed from generation to generation concerning the groups' origins and perceived wrongs committed against it become fact: The group becomes convinced of the injustice of present situations based upon previous events. Interestingly enough, the focus of the groups hate often "mirror images" the original group. "Serbs for example see themselves as heroic defenders of Europe and they see Croats as belligerent thugs; Croats see themselves as valiant victims of oppression and Serbs as congenital aggressors" (p. 11).

The impact of ethnic conflict depends upon the outcome. Peaceful reconciliation of ethnic groups through mediation poses few problems for the international community. Ethnic separation on the other hand can include heavy regional and international involvement through insertion of peacekeeping/peace enforcement troops, questions of timing concerning recognition of "new states," and obligation of "new states" to abide by treaties signed by the former state. By far, ethnic war can potentially have the greatest impact on regional and international communities.

Brown (1993) describes seven ways in which ethnic wars can impact the "outside world": civilian slaughter, refugees, WMD, chain reaction effects, neighboring powers, distant interests, and international organizations. Civilian slaughter "poses a

direct challenge to important international norms of behavior, the maintenance and promotion of which is in the interest of the international community" (p. 17). Ethnic conflict often generates great numbers of refugees since attacks on civilian populations are a key tactic. The proliferation of WMD increases the possibility of the use of them by ethnic groups to achieve their aims. Chain reaction effects refer to the way in which ethnic conflict can spread. "If a multiethnic state begins to fragment and allows some ethnic groups to secede, other groups will inevitably press for more autonomy if not total independence" (p. 19). Neighboring powers can be brought into internal ethnic conflict if their "ethnic brethren" are being prosecuted in adjacent countries. For example, Serbian persecution of ethnic Albanians in Kosovo could lead to Albanian involvement. Distant interests include both military interventions by outside states to secure the safety of its citizens, and support of one side or the other in response to strategic goals. Ethnic conflict can undermine the credibility of international organizations. Defiance of both regional and international bodies can decrease their effectiveness in the current conflict and in future conflict. "Just as effective intervention would bolster the credibility of international action and possibly have a deterrent effect elsewhere, ineffective intervention has a demonstration effect of its own" (p. 21).

b. ***Technology***

Any sufficiently advanced technology is indistinguishable from magic.

Arthur C. Clarke

Among other things, technology is the manner in which input is transformed into output. Over the next ten years, the rate of technology change will continue unabated. While this increasing rate of change will produce technologies that

have yet to be imagined, it is "possible to predict trends in technological growth and development that occur over shorter time spans (10-30 years)" (Parker, 1998). According to Professor Patrick J. Parker (1998) of the Naval Postgraduate school, "90 percent of all the scientists and engineers who have ever lived are alive today." Based on the assumptions that the average productive lifetime of a scientist is 50 years, and that the average span of a generation is 20 years, the result is that technical population growth is exponential (1998). The implication, according to Professor Parker (1998), is that "the total body of knowledge and technological capability will double every 20 years" and that "half of all discoveries and inventions ever made were made in the last 20 years." Computers, communications, sensors, precision navigation and positioning, stealth, vertical/short takeoff and landing (V/STOL), and unmanned aerial vehicles (UAVs) are key technologies that will effect our vision of the future.

According to Moore's Law, "transistor density will double every 18 months" at the same cost (Parker, 1998). The implications of this are that computer processing speeds and memory storage size will increase dramatically. Professor Parker calculated that processing speeds will increase from 200 megahertz in 1995 to 60 gigahertz in 2020, and that memory size will increase from 32 megabytes in 1995 to 3.2 terabytes in 2020 on the average personal computer. From this Professor Parker (1998) predicts that "the desktop PC of the year 2020 will have more power than the largest supercomputer currently under development; yet will be no bigger nor more expensive than a PC today." Increasing computer power will be an enabler of our key technologies.

Communications will change in three manners: modes, speed, and reach. New means of communication will appear, while current means including

cellular/landline telephone, email/voicemail, Internet, radio, and personal pagers will be improved. These modes of communication will allow for information to be collected, transferred, and manipulated in a variety of ways, increasing redundancy, and resulting in greater reliability. Coupled with increased computer power, communications technologies will enable information to be tailored for presentation to specific audiences. The amount of data and the speed at which it can be sent will increase. Infant technologies like global cellular communications pioneered by the Iridium Corporation and Global System Mobile (GSM) will mature. The cost of such technologies will decrease, making them more accessible.

Sensor technology will also benefit from the increase in computing power. Overhead, air-breathing and terrestrial-based sensors will be able to detect a larger number of discrete target signatures. Reduced cost will allow for mass production of sensors that work in a networked mode. Redundancy of networked sensors will improve reliability and survivability. The result will be the ability to detect, identify, and geolocate an increasing number of types of targets.

Precision navigation and positioning technologies such as the Global Positioning System (GPS) will continue to mature. Redundancy, survivability, and security of the system will increase. PNP technologies will allow exact geolocation that will increase the accuracy of PGMs. Combined with improved sensors, PNP will decrease friendly fire incidents through positive identification and geolocation.

Stealth, V/STOL, and UAV technologies will allow friendly forces to gain access to non-permissive environments. Stealth will continue to defeat the majority of peer competitor technologies designed to detect it. Those systems that can defeat stealth

will remain few, and prohibitive in both cost and technical skill required to operate. V/STOL platforms such as the CV-22 OSPREY will mature and be deployed in large numbers. Usable payload, sensor type, datalink security, combat range, and survivability will increase. Combinations of V/STOL, UAV, and stealth technology will further increase access to denied areas without risking aircrew (a U.S. vulnerability).

c. ***Economics***

In their book *The Third-Wave*, Heidi and Alvin Toffler (1980) posited the idea of "transformatory changes in human history" which they labeled "waves." According to their theory the "agricultural revolution of 10,000 years ago launched the first-wave…; that the industrial revolution of 300 years ago triggered a second-wave of change; and that we, today, are feeling the impact of a third-wave of change" (Toffler, 1993, p. 8). Each wave is distinguished by the dominant means of producing wealth and its impact on all aspects of society, including government, family structure, the economy, and warfare. In *War and Anti-War*, the Tofflers (1993) further assert that "the deepest economic and strategic change of all is the coming division of the world into three distinct, differing and potentially clashing civilizations" (p. 20).

Each change in "wave" is accompanied by massive conflict as the new wealth producing paradigm clashes with the existing one. Stakeholders of the existing wave resist the new wave because it threatens to make their wealth producing systems "obsolete." Today, the changes brought about by the third-wave "threaten to slash many of the existing economic links between the rich economies and the poor" (Toffler, 1993, p. 25). Information will increasingly substitute for raw materials provided by first and second-wave societies, decreasing third-wave societies dependence. The Tofflers (1993)

predict that this "decoupling" will increase tensions between societies and may "provoke some of the worst bloodshed in the years to come" (p. 27).

d. ***Politics***

Transnational criminal organizations, non-governmental organizations, and globally supported, populous based, networked, single-issue organizations will increase in number and influence in the 21st century. All three have the potential to undermine the authority of traditional states, and may have their greatest impact in those societies experiencing social disorder preventing formation of a viable state government. TCOs and NGOs in particular have the potential to usurp the authority of fledgling governments by operating with impunity, demonstrating their extra-legal status. They may also appropriate the authority of the state by supplanting its monopoly on distribution of goods and services. The ability to reward and punish a regional populace may provide the TCO an area of influence/sanctuary.

As chairman for the Global Organized Crime Project, former Director of the Central Intelligence Agency, R. James Woosley (1998), described the gamut of activities and the impact TCOs have on governments:

> While organized crime is not a new phenomenon today, some governments find their authority besieged at home and their foreign policy interests imperiled abroad. Drug trafficking, links between drug traffickers and terrorists, smuggling of illegal aliens, massive financial and bank fraud, arms smuggling, potential involvement in the theft and sale of nuclear material, political intimidation, and corruption all constitute a poisonous brew—a mixture potentially as deadly as what we faced during the cold war.

Globally supported, populous based, networked, single-issue organizations and limited agenda NGOs like those who have championed the comprehensive land mine

ban will spread. Through leveraging of global communications it becomes possible to mobilize individuals around the world. These organizations may in and of themselves become a weapon of asymmetric warfare by targeting a nation's "will to resist." For example, the comprehensive landmine ban drive could be interpreted as an attempt to eliminate the military advantages enjoyed by those actors employing them.

e. ***Environment***

Natural resources have always been a source of conflict. "The archaeological record has described disputes over water resources when 5,000 years ago, the Tigris River and Euphrates River valley was used both as a reason for conflict and as a weapon" (Savana, 1996, p. 184). Obtaining adequate amounts of natural resources to maintain, let alone progress from one wave to another, will be a source of conflict in the 21st century. Potable water, arable land, and oil all show signs of reaching their maximum utility according to the 1980 *Global 2000 Report to the President* (p. 184).

Fresh water is a prerequisite for life. It is used for agricultural, domestic, and industrial purposes. Only 3 percent of the earth's water is fresh water. "To put fresh water in perspective, consider this: if the world's total water supply were only 1000 liters, the usable supply of fresh water would be only 0.003 liter, or one-half teaspoon" (Kinner, 1996, p. 164). Precipitation, rate of use, and quality of available water affect the amount available for man's use. The rate of use and quality of available water among second and third-wave societies is far greater than first-wave societies. First-wave societies tend to

use greater amounts on agriculture than second and third-waves.[10] Third-wave societies use greater amounts on industrial endeavors.[11] Increasing populations in first and second-wave societies will necessitate using greater amounts for agriculture, limiting their ability to progress to the next wave, which may produce inter-wave conflict.

Oil will remain the primary energy source for the 21st century. Religious fundamentalism and ethnic-conflict may impact the ability to access both Middle East oil fields and Caspian Sea deposits. Whichever region is best able to manage these driving forces will dominate the supply of petroleum products. Second and third-wave societies will have to take into account these forces as they develop strategies to access the regions.

In his article "Environmental Scarcities and Violent Conflict: Evidence from Cases," Thomas F. Homer-Dixon (1994) concludes that

> ...environmental scarcity causes violent conflict. This conflict tends to be persistent, diffuse, and sub-national. Its frequency will probably jump sharply in the next decades as scarcities rapidly worsen in many parts of the world. Of immediate concern are scarcities of cropland, water, forests, and fish, whereas atmospheric changes such as global warming will probably not have a major effect for several decades, and then mainly by interacting with already existing scarcities.

[10] Approximately 67 percent of the world's water supply is used to support agricultural production. Agriculture uses 82 percent of the available water in Asia, 40 percent in the United States, and 30 percent in Europe. In Egypt, more than 98 percent of all water used is for crop production while China and India use approximately 90 percent of their water supply to support agriculture (Kinner, 1996, p. 164).

[11] The amount of water used for industrial applications varies according to each nation's level of technological development. In Canada, industry accounts for 84 percent of all water used: in India, it takes a mere 1 percent (Kinner, 1996, p. 165).

> Countries experiencing chronic internal conflict because of environmental stress will probably either fragment or become more authoritarian. Fragmenting countries will be the source of large out-migrations, and they will be unable to effectively negotiate to implement international agreements on security, trade and environmental protection. Authoritarian regimes may be inclined to launch attacks against other countries to divert popular attention from internal stresses. Any of these outcomes could seriously disrupt international security. The social impacts of environmental scarcity therefore deserve concerted attention from security scholars.

2. Predetermined Elements Affecting the Operating Environment in the Year 2010

Schwartz (1991) identifies four strategies for looking for predetermined elements: *in the pipeline today, slow-changing phenomena, constrained situations, inevitable collisions* (pp. 111-112). *In the pipeline today* refers to those events or trends that have begun and will continue along a given path unless interrupted. Schwartz includes population growth, with associated demographics, as the prime example. While not bound by a specific time period, *slow changing phenomena* are those events that can be considered relatively constant for the period of your scenario. Schwartz includes in this category things such as growth of populations, the building of physical infrastructure, and development of resources (p. 111). *Constrained situations* are those that limit freedom of choice. Constrained situations allow for only a limited number of options that meet your requirements. *Inevitable collisions* are produced from irreconcilable positions. The demand for increased services while refusing to pay higher taxes produces an inevitable collision. (See Table 2.2 for synopsis of predetermined elements).

IN THE PIPELINE POPULATION	SLOW CHANGING PHENOMENA
✓ *Permanent migration & temporary refugees* ✓ *Disproportionate birthrates (higher in first/second-wave societies)* ✓ *Population concentration (urban vs. rural)* ✓ *Age demographics ("graying" of third-wave societies)*	✓ *Primacy of Nation-states* ✓ *Ascendance of information warfare* ✓ *Decline of conventional, second-wave warfare*

CONSTRAINED SITUATIONS BUDGET	INEVITABLE COLLISIONS SOCIETAL
✓ *U.S. defense budget* ✓ *Size of the U.S. Armed Forces* ✓ *Weapons systems*	✓ *Clash of Civilizations* ✓ *Ethno-nationalism*

Table 2.2: Predetermined Elements Affecting the Operating Environment in the Year 2010

a. ***In the Pipeline: Population***

In 1900, 1.7 billion people populated the earth. Today the number stands at approximately 6 billion, and continues to increase annually by 80 million, or one billion every 12-15 years (Zwingle, 1998, p. 38). "The United Nations estimates that by the year 2050 there could be from 7.7 billion to 11.2 billion in the world" (p. 38). Mass migration, internal and external refugees, regional birth rates disproportionate to the ability to support them, and demographics (including age composition and concentration) are just some of the problems that may produce conflict in the 21st century. In the short term, these problems will remain relatively constant.

Migration is the permanent relocation of people and is driven by the "pull" of better living conditions (good wages, freedom, land, or peace) in other locations, and

the "push" of worse conditions (low incomes, repression, overcrowding or war) at home (Parfit, 1998, p. 16). Defined as "forced migration," disease, famine, and war drive great numbers annually to other countries permanently. Refugees are those persons displaced on a temporary basis, which in reality can stretch into years. Internal refugees are displaced persons within their country of origin; external refugees are displaced persons who have left their country of origin. In 1997, the United Nations High Commission on Refugees provided aid to over 22 million persons displaced by conflict (p. 16).

Either permanent or temporary movements of large numbers of persons can create hardships that strain the international system. Government and natural resources can be overwhelmed. External refugees may bring ideas and customs that are in conflict with the host nation. Refugees can be brought into direct competition with the host nations population for everything from jobs, to homes, to food, to government assistance, creating a backlash of xenophobia.

"98 percent of population growth is in the developing world" where a variety of factors conspire to keep birthrates high, while limiting the region's ability to support them (Zwingle, 1998, p. 38). Poor medical care, lack of education, religious and societal norms, and political and economic instability are just some of the causes of disproportionately high birthrates. Lack of access to proper medical care drives women to have many children to ensure some reach adulthood. Economic instability forces parents to have large families as part of the traditional "social security" for old age. Religious and societal norms tend to disprove of contraceptive, the most straightforward and effective means of bringing down birthrates (p. 43). Disproportionately high birthrates mean that

first and second-wave societies will increasingly become "younger," while established third-wave societies will become "older."

b. ***Slow Changing Phenomena***

While we have raised the possibility of the increasing impact of NGOs and TCOs, nation-states will maintain their preeminent position in world-politics. They will continue to speak for the majority of mankind and will be the primary actors impacting our envisioned future.

Conventional, second-wave warfare will decrease in importance as the power of IW is effectively demonstrated. Third-wave societies will transition their forces to reflect their adoption of the "information age." First and second-wave societies will field a mix of forces and strategies reflective of their "wave progression," while incorporating aspects of available third-wave technology.

c. ***Constrained Situations***

In spite of recent modest increases to the U.S. defense budget, it is still arguable that the requirement for military forces exceeds what available resources can provide. Dissolution of the Soviet Union in 1991 convinced many of an impending "peace dividend" which would allow massive downsizing of the U.S. Armed Forces. Repeated cuts have reduced the size of the force almost 40 percent. These cuts have occurred as operational deployments have increased.

d. ***Inevitable Collisions: Societal***

Samuel P. Huntington (1996) suggests in his book, *The Clash of Civilizations and the Remaking of the World Order*, that conflict generated by many of the

aforementioned *driving forces* and *predetermined elements* will occur along the lines of civilizations. Civilizations, "defined by both common objective elements, such as language, history, religion, customs, institutions, and by the subjective self-identification of people" divide the world into eight sects: Western, Islamic, Sinic, Hindu, Japanese, Orthodox, Latin American, and possibly African (pp. 43-45).

3. Critical Uncertainties Affecting the Operating Environment in the Year 2010

Critical uncertainties attempt to capture those forces that could radically alter your scenario. In our scenario, the type of adversary we face is of critical importance. Our vision of the future is based upon the hypothesis that the U.S. will face primarily niche competitors who will utilize asymmetric warfare to avoid our traditional strengths (conventional, second-wave forces). If our hypothesis is incorrect, how viable is our SOFIA doctrine? Is it robust enough to handle peer competitors? Our second major critical uncertainty is the use of WMD. A variety of factors contribute to proliferation of nuclear, biological, and chemical (NBC) weapons. Will increased availability lead to increased use? Today, we have no viable defense against the most common envisioned means for employing these weapons. Will niche competitors see WMD as an asymmetric approach to combating U.S. forces? (See Table 2.3 for summation of critical uncertainties).

POTENTIAL ADVERSARIES	WEAPONS OF MASS DESTRUCTION
✓ *Predominance of Niche or Peer Competitors?* ✓ *Which will pose the greater threat to the U.S.?*	✓ *Will increased availability lead to increased use?* ✓ *Will Niche competitors see WMD as an equalizer?* ✓ *Will the threat of WMD limit the U.S.' ability to employ SOFIA forces?*

Table 2.3: Critical Uncertainties Affecting the Operating Environment in the Year 2010

a. ***Potential Adversaries: Niche or Peer Competitor?***

Peer competitors are those entities that are comparable in size, organization, economic stature, and military capability to the U.S. They will tend to "mirror image" our strategies in the political, economic and military arenas. They will require many of the same resources as the U.S. They will have similar national goals and a need to maintain regional areas of influence. Most third-wave societies, and many second-wave societies will fall into this category. Conversely, niche competitors are those organizations that challenge the U.S. in only limited categories. They will tend to be smaller in size, with a pronounced reliance upon dissimilar strategies. They will have more limited goals and may look entirely different in organization from the U.S. They may be either small state or non-state actors. Non-state niche competitors may have little need to control territory or population. Non-state actors may readily concede a lack of territorial integrity or total control over their populace. Many first-wave, and some second-wave societies will fall into this category. Non-state actors such as terrorists, transnational criminals, and NGOs will predominate.

b. ***WMDs: Increased use?***

WMD are those weapons that can create widespread destruction in far greater proportion to their size or cost. Nuclear, biological, and chemical weapons are historically included in this group. IW may soon be included in this category due to theoretical large-scale secondary effects. For example, an IW attack that disables the System Control and Data Acquisition (SCADA) system of a large oil refinery could produce the same results as a limited NBC strike. In the twentieth century, states have held a monopoly on the production and use of WMD. This has been due primarily to the technical skill required, the rarity of component materials, and the costs associated with the production of them. A variety of factors have led to the lowering of these barriers over the past decade.

"The so-called 'brain drain'—an exodus of scientists, technicians, and engineers out of former Soviet scientific communities—began in the late 1980s, when the Soviet Union was in the throes of dynamic social and economic change"[12] (Moody, 1996). The concern has been that "idle and unemployed personnel from the Soviet Union's sprawling nuclear, biological, and chemical weapons of mass destruction complexes might sell their know-how or emigrate to countries of proliferation concern" (1996). Countries with previous relationships with the USSR in respect to WMD technologies are primary customers, and include North Korea, Libya, Iran, and China (1996).

[12] For example, by 1994 the Russian Scientific Center for Virology and Biotechnology that specializes in biological warfare agent R&D, had lost about 3,500 personnel. Between 1991 and 1996, the All-Russian Scientific Research Institute of Experimental Physics, which specializes in nuclear warhead R&D, lost about 5,000 personnel (Moody, 1996).

Materials required to assemble NBC weapons have become easier to acquire. Many of the technologies integral to WMD production are dual use, frustrating attempts to slow proliferation. Biological and chemical weapons can be produced with the same types of systems used to manufacture pesticides and pharmaceuticals, or brew beer. Weapons grade nuclear material is the primary stumbling block to production of nuclear weapons, but acquisition of it has become easier with the disintegration of the Soviet Union. "In 1995, Russian law enforcement authorities acknowledged cracking 21 cases of theft of fissile material since mid-1992, some of it enriched, and prosecuting 19 Russian citizens" (Webster, 1996). "The chilling reality...is that nuclear materials and technologies are more accessible now than at any time in history", according to former Director of the Central Intelligence Agency, Mr. John Deutch (1996). IW means of conducting WMD attacks have even lower entry costs. The cost of developing and employing computer viruses, Trojan horses, and logic bombs is limited to a good computer, a skilled computer operator, and access. Bulgaria, the "Silicon Valley" of Eastern Europe, has experienced many of the same troubles as Russia. Large numbers of trained software engineers, computer scientists, and skilled computer operators have emigrated or contracted out their services to third parties.

B. OPERATING ENVIRONMENT 2010

Based upon our *driving forces*, *predetermined elements*, and *critical uncertainties* we envision a future framed by clashing "waves" and "civilizations." Religious fundamentalism and ethnic conflict will be the visible symptoms of this conflict as they simultaneously resist third-wave society, and strive to achieve the trappings of second-wave society (Tofflers, 1993). Population increases in first and second-wave societies

will exacerbate the competition for decreasing natural resources. NGOs and TCOs will increase in number and will have a greater impact on world politics, but will not supplant the nation-state as the primary actor. The rate of technological change will increase exponentially further widening the gap between the waves. The collection, processing, presentation, and dissemination of information will become a key aspect of warfare. Potential adversaries of the U.S. will most likely be niche competitors from either first or second-wave societies, but does not exclude third-wave niche competitors. Proliferation of WMD will increase due to lower barriers to entry. Holding U.S. infrastructure at risk with WMD may come to be seen as the "ultimate" asymmetric approach for our opponents. Peer competitors will be few. Niche competitors will predominate.

C. CONCLUSION

The purpose of this chapter has been to identify those *driving factors*, *predetermined elements*, and *critical uncertainties*, which may shape the future operating environment. Thinking through the scenario's suggested by these factors will allow force planners to develop an appropriately structured armed force to face the United States most probable adversaries. It is our contention that our SOFIA doctrine will be a natural choice for combating those opponents.

III. SPECIAL OPERATIONS FORCES

"Countries which are not proficient in conventional warfare are not likely to make excellent strategic use even of tactically successful special operations."
Colin Gray

Special operations forces, by definition, are inherently different from general purpose forces (GPF). They possess unique characteristics that allow them to accomplish missions that conventional forces are unable to perform effectively and efficiently. A popular misconception of special operations is that they are a phenomenon of the mid-to-late twentieth century (Cohen, 1978). In actuality there are many examples throughout the history of warfare that meet the standards set by today's definitions; Rogers' Rangers daring raid on St. Francis during the Seven Years War (Arquilla, 1996, p. 56), T.E. Lawrence's attacks upon the bridges supplying the Turkish Army in Palestine during World War One (p. 182), and Marion's Guerrillas during the American Revolutionary War with England. These examples provide a wealth of information from which basic truths of special operations can be drawn. Key among these is the ability of small forces to achieve victory over larger forces. While conventional forces rely upon destruction of the enemy, SOF focus mainly on rendering the enemy ineffective. This is accomplished by employing SOF in such a manner as to avoid an adversary's strength, or by neutralizing a key component of the opponent's command and control (C2).

The United States Special Operations Command (USSOCOM) currently embraces nine principal SOF missions and activities. These include: counterproliferation (CP), combating terrorism (CBT), foreign internal defense (FID), special reconnaissance (SR), direct action (DA), psychological operations (PSYOPS), civil affairs (CA), unconventional warfare (UW), and information operations (IO) (U.S. Special Operations

Forces Posture Statement, 1998, p. 3). The attributes that allow U.S. SOF to conduct these missions may allow them to execute operations, currently the domain of conventional forces, when faced with a future similar to the one envisioned in Chapter II.

In this chapter we will review commonly accepted definitions of key terms and concepts associated with SOF. This will allow the reader who is not familiar with SOF to better understand the discipline. Next we will conduct a SWOT analysis of SOF to determine its utility as a distinct discipline. Following chapters on IO and AP will be structured in the same manner.

A. DEFINITIONS

Joint Publication 3-05, *Doctrine for Joint Special Operations* defines special operations as "operations conducted by specially organized, trained, and equipped military and paramilitary forces to achieve military, political, economic, or informational objectives by unconventional means in hostile, denied, or politically sensitive areas" (JP 3-05, 1998, p. I-1). USSOCOM has developed five requirements that distinguish special operations from conventional military operations: 1. Unconventional training and equipment; 2. Political sensitivity; 3. Unorthodox approaches; 4. Limited opportunity; and 5. Specialized intelligence (SOF Posture Statement, 1998, p. 1). The SOF Posture Statement (1998) lists six characteristics of SOF that allows them to conduct special operations: 1. Mature professionals with leadership abilities; 2. Specialized skills, equipment, and tactics; 3. Regional focus; 4. Language skills; 5. Political, and cultural sensitivity; and 6. Small, flexible, joint structure.

While the boundaries and descriptors developed and set forth by USSOCOM are useful in defining U.S. SOF, Colin Gray (1996) suggests that "in order to secure a

sufficiently holistic understanding of special operations, it is useful to think of them in terms of three things: a state of mind; forces; and a mission" (p. 56). It is the "state of mind" that really defines special operations. Without the freedom accorded special operators to conceive of operations in unorthodox and innovate ways, special operations run the risk of being "reduced to a narrow, tightly defined set of missions that special operations forces already have trained to perform or to merely what bureaucratic definition and assignments formally allow" (p. 156). Once limited, special operations lose their greatest utility, their ability to address situations outside the capabilities of conventional forces.

B. CONCEPTS

1. The Theory of Special Operations

In his book *Spec Ops*, William McRaven (1995) develops a theory of special operations based upon a concept he calls "relative superiority." He defines it as "a condition that exists when an attacking force, generally smaller, gains a decisive advantage over a larger or well-defended enemy" (p. 4). Through case study he developed three basic properties of relative superiority. First, "relative superiority is achieved at the pivotal moment in an engagement" (p. 4). Secondly, "once relative superiority is achieved, it must be sustained in order to guarantee victory" (p. 5). Finally, "if relative superiority is lost, it is difficult to regain" (p. 6).

While sufficient to explain the success or failure of SOF conducting short duration direct action missions, relative superiority may not be applicable to the wide range of missions subsumed beneath the term MOOTW (missions other than war). The

Joint Doctrine Encyclopedia defines MOOTW as "operations that encompass the use of military capabilities across the range of military operations short of war" (p. 512). Representative examples of MOOTW missions include peace enforcement, counterterrorism, peacekeeping, NEO, nation assistance, counterinsurgency, counterdrug, and humanitarian assistance (Joint Doctrine Encyclopedia, 1997, p. 513). Many of these activities are missions that USSOCOM currently list as "collateral activities."[13] In Chapter II, we envisioned a future dominated by these types of missions. It is in these areas that we believe our SOFIA doctrine may be especially applicable. In Chapter VI we expand the concept of relative superiority to encompass these actions.

2. Integration of SOF and GPF

Integration of SOF and GPF involves coordinating the efforts of both forces to achieve a common goal, and leveraging the effects of one force for the benefit of the other. Integration allows each force to support the other by providing capabilities and resources the other does not have. For instance, SOF lacks the ability to move its forces worldwide. Conventional forces, in the form of strategic airlift, can provide this capability. Integration also prevents SOF and GPF from inadvertently working against the other. It prevents wasting resources through servicing a target twice. It prevents one force from destroying a target that is being exploited by the other. Integration of SOF and GPF is normally reflected in the designation of one as the "supported" or "supporting" command.

[13] Current USSOCOM collateral activities include coalition support, combat search and rescue (CSAR), counterdrug (CD), humanitarian demining (HD) activities, humanitarian assistance (HA), peace operations, security assistance, and special activities (SOF Posture Statement, 1998, p. 4).

3. "Supported" vs. "Supporting"

Operational control of SOF may be exercised by a variety of commanders at all levels within a joint force. Normally the theater special operations command (SOC) exercises C2 of SOF in support of the regional Commander-in-Chiefs (CINC) objectives (JP 3-05, pp. 34-41). When integrated with conventional forces, SOF is routinely subordinated (designated the "supporting command") to the GPF commander (the "supported command"). This is appropriate when facing peer and niche competitors engaging in second-wave conventional warfare. The danger is that this relationship may always be assumed by decision-makers as optimal, regardless of the opponent faced. When facing niche competitors utilizing first and third-wave technologies, SOF may be better suited for designation as the "supported command."

C. SWOT ANALYSIS

Analyzing the internal strengths and weaknesses, and external opportunities and threats of SOF, allows us to determine its utility as a separate discipline. Strengths and weaknesses are those characteristics of SOF that establish inherent limits of the discipline. Opportunities and threats are factors in the environment that may increase the effectiveness of SOF, or limit its effective application.

STRENGTH	WEAKNESS
✓ *Quality of personnel* ✓ *Sponsorship* ✓ *High state of readiness* ✓ *Small size* ✓ *Ability to task organize elements* ✓ *Variable lethality* ✓ *Variable profile (high, medium, low)* ✓ *High tooth-to-tail ratio* ✓ *Small "footprint"* ✓ *Economy of force* ✓ *Multilingual, culturally and politically sensitive*	✓ *Small in number* ✓ *Limited organic combat power* ✓ *Long lead time for training competent SOF* ✓ *Service training requirements at odds with Joint training* ✓ *Requires detailed intelligence often obtainable only through HUMINT* ✓ *Limited endurance in operations due to lack of organic support/logistics*
OPPORTUNITIES	**THREATS**
✓ *Increasing mission area applicability* ✓ *IO/IW* ✓ *Technology*	✓ *Conventionalization* ✓ *High OPSTEMPO/PERSTEMPO* ✓ *Opportunity for over-control or misuse by commanders/national decision-makers* ✓ *Need for secrecy impacts proper coordination* ✓ *"Free Lunch" syndrome* ✓ *Inadequate C2* ✓ *Inadequate intelligence support*

Table 3.1: SWOT Analysis of U.S. SOF

1. Strengths and Weaknesses of U.S. SOF

The primary strength of U.S. SOF is the quality of people who make up the organization. Individual services conduct highly competitive selection processes to ensure that only the best are accepted. Physical and mental requirements have been developed that ensure that those who pass will best be able to function in the fast-paced, dynamic environment of special operations. Sponsorship by high-level decision-makers ensures visibility and access to required resources.

The small size of SOF units makes them easier to maintain in a high state of readiness and to transport quickly by air. The ability to task organize elements allows

SOF to put "the right folks on the right job." Smaller forces mean a smaller footprint, logistics trail, and greater operational security, all of which contribute to the ability of SOF to conduct operations with a variable profile.

Regional indoctrination in the form of language training, culture familiarization, and development of political savvy, allows SOF to interact successfully with foreign military and civilian personnel. Understanding the local culture and language implies a genuine interest in the affairs of the people SOF are engaging which may increase effectiveness during humanitarian or peace operations. Political savvy ensures that SOF personnel are aware of the possible implications of their actions on the domestic, regional, and international stages.

Paradoxically, the same attribute that provides SOF many of its strengths (small size), also contributes to the primary weakness of SOF. Being small in size reduces the organic combat power of most SOF units. SOF ground forces must rely upon the resources they carry on their back. This limits the number and types of weapons they may use in an operation. Limited organic combat power reduces SOF effectiveness when facing a larger force. When involved in DA missions, SOF relies upon the concept of "relative superiority." Once lost, it becomes extremely difficult to regain due to the disparity in sizes between units.

The long lead-time required to produce competent special operators is an inherent weakness of SOF. The American political system and culture do not lend themselves well to long-term strategic planning. This is a required skill when attempting to develop forces to meet future requirements. If you misjudge the future and produce the wrong type or an

insufficient number of forces, it will be impossible to quickly produce competent SOF to fill the gap.

The tension between service and joint training requirements can impair the ability of SOF to achieve a high state of readiness. Joint training requires different service elements to allocate time to operations that exercise the application of the individual services skills in support of a common goal. The more "specialized" the skill of the service element, the more individual training they will require to achieve and maintain proficiency prior to conducting joint training. For instance, SOF aircrews have quarterly, semi-annual, and annual training requirements that must be met to achieve and maintain proficiency in their weapon system. There are a limited number of aircraft, and their flight time must be divided between real-world operations, training, and exercises. Each fraction can only be increased by decreasing one of the others. Therefore, the more joint training that is mandated, the less time available to conduct service specific training. Without the service specific training, the service element may not be able to perform its specialized role in support of the joint mission.

Special operations often require extremely detailed intelligence obtainable only through human intelligence (HUMINT) sources. Others require knowing the intentions of adversaries, which may be difficult to discern when facing opponents utilizing first-wave technologies. When involved in DA missions, it may crucial to know information such as which way a door opens, or how a first-wave opponent is executing C2 of his forces. U.S. intelligence collection systems are optimized for collection against second and third-wave information systems. It may be impossible to provide the granularity of information required by SOF to conduct some of its operations.

2. Opportunities for, and Threats to, U.S. SOF

In Chapter II, we developed a future scenario heavily influenced by Samuel Huntington's (1996) "clash of civilizations" and the Toffler's (1980) "wave theory." Both hypothesize that future conflicts will occur primarily between societies of different wave progression, and different civilizations. Based on this future, the U.S. will likely face a multitude of niche competitors (primarily first and third-wave societies) and few peer competitors (primarily second and third-wave societies). As suggested by Huntington, we believe that the majority of these conflicts will occur at the "fault lines" between civilizations. Marked by ethnic strife, religious fundamentalism, and resource disputes, most will take the form of lower intensity conflicts. U.S. involvement could include peace operations, humanitarian assistance, demining activities, or "policing" activities. SOF have the characteristics and skills required to successfully operate in these environments.

The greatest threat facing SOF is that of "conventionalization." Conventionalization is a process by which special operations forces take on the characteristics, roles, and missions of conventional forces (Cohen, 1978). The larger SOF becomes, the more formalized its roles and missions become, and the more narrowly defined the scope of operations that it can perform. Once this happens, SOF loses its greatest utility, its ability to creatively address situations that have never before occurred.

High visibility, the vested interest of sponsors and advocates, and a relatively low cost-to-gain ratio (free lunch syndrome) invites both misuse and overuse of SOF by national decision-makers. The wide range of capabilities of U.S. SOF makes them a choice of first resort for many decision-makers. Unfortunately, this preoccupation with

the benefits of using SOF can lead to high operational tempos (OPSTEMPO) and personnel tempos (PERSTEMPO). High OPSTEMPO/PERSTEMPO can negatively impact morale, retention, and training, reducing combat effectiveness of SOF.

D. UTILITY OF U.S. SOF

Utility refers to the types of tasks that a discipline can perform and how well it can accomplish them. Colin Gray (1996) uses four questions to determine a discipline's utility.

WHAT UNIQUELY, CAN THE DISCIPLINE DO?
✓ *Provide physical access to remote or denied areas, in low-medium threat environments*
✓ *Successfully engage foreign military and civilian personnel*
✓ *Provide interface between coalition warfare partners*
✓ *Act decisively as the "supported" force in first-wave warfare*
WHAT CAN THE DISCIPLINE DO WELL?
✓ *Achieve "desired effects" in greater proportion to resources expended*
✓ *Mobilize and deploy quickly*
✓ *Conduct operations at the tactical, operational, or strategic levels of war*
✓ *Conduct covert or clandestine operations*
✓ *Act successfully as either the "supported/supporting" force in second, and third-wave warfare*
WHAT DOES THE DISCIPLINE DO POORLY?
✓ *Provide the effects of "physical presence" over a wide geographic area*
WHAT IS THE DISCIPLINE UNABLE TO DO?
✓ *Occupy and hold territory for long period of time*
✓ *Engage larger forces in sustained combat*

Table 3.2: Utility of U.S. SOF

1. What Uniquely, Can the Discipline Do?

SOF has four primary utilities: 1. Provide access; 2. Engage foreign military and civilian personnel; 3. Provide interface between coalition warfare partners; and 4. Act decisively as the "supported" force when facing first-wave opponents.

SOF ability to provide access to remote or denied areas is based upon the technology and tactics, techniques, and procedures (TTP) employed by the different service elements. SOF aircraft, surface vessels, and submarines employ a combination of PNP, terrain avoidance/terrain following (TA/TF) radars, low observable technologies, and offensive/defensive electronic warfare suites designed to allow them to avoid, and if need be, defeat enemy defenses. SOF personnel employ special TTP such as terrain masking, and high altitude, low opening/high altitude, high opening (HALO/HAHO) airborne insertion.

Foreign language skills and cultural/political sensitivities of U.S. SOF make them optimal for interfacing with both foreign military and civilian personnel. During DESERT STORM, SOF performed as coalition support teams (CSTs), providing translation services and "ground truth" to U.S. commanders. In Bosnia-Herzegovina, U.S. SOF formed joint commission observer (JCO) teams to interact with civilian Bosnian authorities and to provide "ground truth" to U.S./NATO commanders.

When confronting adversaries employing first-wave technologies, SOF is best able to act as the lead component for U.S. forces. U.S. conventional forces are optimized for fighting peer competitors employing second-wave technologies. It many instances, the U.S. will be unable to bring to bear its technologically superior forces against niche competitors employing first-wave technologies. The cultural and political sensitivities of SOF will allow them to better understand this type of low intensity conflict.

2. What Can the Discipline Do Well?

Colin Gray (1996) develops a list of nine broad categories of strategic utility of special operations grouped into two general categories in his book *Explorations in*

Strategy. Master claims include "economy of force" and "expansion of choice." Economy of force refers to the fact that SOF "can achieve significant results with limited forces" (p. 168). Expansion of choice refers to the fact that "special operations can expand the options available to political and military leaders" (p. 174). SOF provide political leaders with a low cost (in terms of commitment and number of potential friendly casualties) alternative to achieve political and military objectives. SOF can be used as a force multiplier supporting conventional forces during larger scale conflicts, or as the supported force during low-to-medium intensity conflicts against first and third-wave niche competitors.

3. What Does the Discipline Do Poorly?

SOF, by themselves, are unable to provide the effects of physical presence over a large geographic area due to the small number and size of their units. Physical presence provides a visible symbol of commitment. There are few, if any, substitutions for physical presence. However, SOF, enhanced with information superiority and battlespace mobility, will be able to extend the effects of their physical presence over a much larger area.

4. What Is the Discipline Unable To Do?

SOF are unable to engage larger forces in sustained combat, or to hold territory when threatened with larger forces. The small size and number of SOF units limits their organic combat power. Without augmentation from conventional forces, such as on call AP, they will be unable to sustain any initial relative superiority.

E. CONCLUSION

Our analysis of SOF revealed that their primary utility is their ability to engage niche competitors effectively, from first and third-wave societies. SOF strengths (including quality of personnel, regional orientation through language, cultural, and political training, small size, variable lethality, and variable profile) provide them with characteristics not found in GPF.

IV. INFORMATION OPERATIONS

Dominating the information spectrum is as critical to conflict now as occupying the land or controlling the air has been in the past.

General Ronald R. Fogelman, USAF

In accordance with our methodology, this chapter will begin with a review of key terms and concepts that are integral to the understanding of IO. From there we will conduct a SWOT analysis that will yield the utility of IO in relation to our envisioned future.

A. DEFINITIONS

A variety of definitions that range from the narrow to the all encompassing have been put forth purporting to define information operations. A definition of IO developed by the U.S. Air Force encompasses the majority of the concepts and ideas held by the authors.

> Information operations comprise those actions taken to gain, exploit, defend, or attack information and information systems and include both information-in-warfare and information warfare and are conducted throughout all phases of an operation across the range of military operations (AFDD 2-5, 1998, p. 2).

While broad, the USAF definition does clearly convey the key idea of the pervasive nature of IO. It is more a unifying concept than an individual discipline. It cuts across functional and administrative boundaries and binds traditional disciplines together. It is not restricted to a particular phase of a campaign or level of warfare. IO may have tactical, operational, and strategic effects. It may be approached from either a technical or psychological angle. It is as much about recognizing your own vulnerabilities as it is targeting your adversaries. With these ideas in mind, it is important to understand two

"conceptually distinct, but extremely interrelated pillars" of IO: *IW* and *information-in-warfare*. (AFDD 2-5, 1998, p. 3)

Information-in-warfare "involves the Air Force's extensive capabilities to provide global awareness throughout the range of military operations based on its integrated intelligence, surveillance, reconnaissance (ISR) assets; its information collection and dissemination activities; and its global navigation and positioning, weather, and communications capabilities" (AFDD 2-5, 1998, p. 2.). IW is "information operations conducted to defend the Air Force's own information and information systems or conducted to attack and affect an adversary's information and information systems" (AFDD 2-5, 1998, p. 2).

Martin Libicki (1995) in his book *What Is Information Warfare?* avoids directly defining IW but instead categorizes the various activities that have come to be associated with IW. C2W is "the military strategy that implements Information Warfare on the battlefield and integrates physical destruction. Its objective is to decapitate the enemy's command structure from its body of command forces" (p. 9). C2W includes operations security, military deception, psychological operations, electronic warfare, and physical destruction. "IBW occurs when intelligence is fed directly into operations (notably, targeting and battle damage assessment), rather than used as an input for overall command and control" (p. 19). Electronic warfare focuses on "radioelectronic and cryptographic, thus war in the realm of communications. EW attempts to degrade the physical basis for transferring information, while cryptographic warfare works between bits and bytes" (p. 27).

Psychological operations encompasses "the use of information against the human mind...there are four categories of PSYOPS: 1. operations against the national will; 2. operations against opposing commanders; 3. operations against troops; and 4. cultural conflict" (p. 35). Hacker warfare is attacks against civilian computer resources with the intent of an attack ranging from "total paralysis to intermittent shutdown, random data errors, wholesale theft of information, theft of services, illicit system's monitoring, the injection of false message traffic, and access to data for the purpose of blackmail. Among the popular devices are viruses, logic bombs, Trojan horses, and sniffers" (pp. 49-50). EIW deals with denying an adversary access to information that "would cripple the economies of those nations, bringing them to their knees" (p. 67). Cyberwarfare is by far the most futuristic/conceptual of Libicki's categories and includes information terrorism, semantic attacks, simula-warfare and Gibson-warfare. Semantic attacks are conducted such that "a system under attack operates and will be perceived as operating correctly, but will generate answers at variance with reality" (p. 77). Simula-warfare posits that computer simulations of warfare may eventually be good enough, that they can be used to convince an adversary that they would lose an actual battle. Gibson-warfare deals with virtual warfare conducted by virtual characters within cyberspace, but is not seen as relevant to national security at this time (p. 82).

B. CONCEPTS

1. IO Process Ownership

An enduring point of contention associated with IO is the concept of "ownership." Where you stand on ownership, depends on your definition of IO and where you report.

If you subscribe to a narrow definition similar to traditional C2W (military deception, operational security, psychological operations, electronic warfare, physical destruction), you are more likely to perceive IO as a discrete discipline to be controlled by a single organization. If you support an expanded view of IO, similar to the USAF definition, it is easier to embrace the idea of shared ownership. Both positions have merit, but by adopting Libicki's categories, we are able to begin to progress beyond the conceptual/theoretical, to the concrete. These categories allow us to assign responsibility to organizations for development of applications. For example, C2W is primarily the concern of the Department of Defense, and specifically the Joint C2W Center (JC2WC) at Kelly Air Force Base, Texas, while the Departments of Commerce and State may best foster EIW strategies.

2. Paradox of the "Late Modernizer"

The traditional interpretation of the concept of the "late modernizer" is that by delaying your adoption of a new technology, you can reap the benefits of others research and development (R&D) costs (Gerschenkron, 1962). You can avoid the mistakes others have made, spend your R&D dollars in those areas which were most promising, or even adopt others R&D results wholesale. The paradox of the "late modernizer" in relation to IO is that the benefit may actually go to the group that pioneers a technology.

By "owning" the initial technology, it is possible that others will become dependent upon your organization for it. For example, Intel produces the Pentium II microprocessor chip for a large percentage of personal computers. Microsoft provides software for an even greater percentage of systems. As dependence increases, it becomes possible for the supplying organization to provide "chipped" products to consumers.

Chipped products may be hardware or software that has been modified in some manner. The modification may allow the originator unauthorized access at a later date (a backdoor), or include a logic bomb that destroys system data at a key moment.

3. IW, A Wasting Asset?

A wasting asset is a concept or technology application that becomes less potent with every use. For example, initial uses of "Q-Ships" by the British during World War One were quite successful. Q-Ships were highly modified sailing ships stuffed with lumber for added buoyancy and outfitted with guns (Thomas, 1924). Appearing to be defenseless cargo ships, they would lure German U-boats into attacking them. Since the Q-Ships appeared defenseless, the U-boats would normally approach on the surface and provide a warning to their intended target. When in range, the Q-Ships would run up the white war ensign, slide the movable gun platform into the open, and commence firing (1924). Q-Ship successes declined rapidly as the Germans realized what was happening, and altered their tactics.

The concept of the "wasting asset" may be especially applicable to IW. For instance, Libicki's hackerwarfare approaches may only be successful once. Breaching an adversary's computer security systems alerts them to their vulnerability. It may cause them to radically improve their defenses, or even go "off-line", removing themselves from public internets. The result, no more access to their systems. This must be taken into account when deciding when to use IW.

4. The Unintended Consequences of IW Attacks

While intended to lead to the destruction of their adversaries' U-boat fleet, British Q-Ships may instead have lead to the adoption of unrestricted submarine warfare by the Germans. Following several run-ins with Q-Ships, the Kaiser's fleet discontinued providing warnings to intended targets for fear of being attacked by apparently "defenseless" cargo ships. Some have speculated that the sinking of the Lusitania may be one of the unintended consequences of this shift in U-boat doctrine.

Due to the networked nature of most modern information systems, unintended consequences have become increasingly probable and significant. For instance, the intention may be to demonstrate your resolve through non-lethal means. Computer Network Attack (CNA) appears to be the most effective means of accomplishing your goal of darkening the enemy's capital. A virus is inserted into your opponent's main electrical power distribution SCADA system with the intent of turning off city streetlights. Unbeknownst to you, a large city hospital is attached to the same electrical grid. Knocking out the electricity results in the deaths of several patients on life support systems. Your adversary then uses the deaths as material for a propaganda blitz, turning world opinion against you. The result, instead of strengthening your position, you have weakened it.

5. IO: Two Approaches

If the purpose of IO/IW is to "affect adversary information systems while defending one's own information and information systems," it becomes apparent that there are two primary means of achieving this goal. The first approach is technical in nature, while the second approach focuses on the psychological. The technical approach

relies upon U.S. technological superiority to gain access to, and to manipulate, corrupt, or destroy the data in an adversaries information systems. The desired effect of the technical approach is to degrade or eliminate the opponents' ability to collect, process, and disseminate information to decision-makers. The psychological approach attempts to "convey selected information and indicators to foreign audiences to influence their emotions, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals" (Joint Pub 3-53, 1996, p. 12). The purpose is to "induce or reinforce foreign attitudes, and behavior favorable to the originator's objectives" (p. 12).

Either approach can utilize the precepts of the other. For instance, perception management is the altering of a person's or organization's perception of reality. It can be accomplished through limiting, overloading or distorting the data used by an entity to make a decision. Perception management can be accomplished through either technical or non-technical means. Active, technical means can include injecting false information into a data stream through CNA. Non-technical means may include the use of military deception. Forward deploying aircraft to a specific airfield, for observation by your adversary, is an example of a passive, non-technical means of feeding false data into your opponent's OODA (observe-orient-decide-act) loop. The likelihood of success of each approach is dependent upon the wave progression of the adversary (See Table 4.1).

	PSYCHOLOGICAL	TECHNICAL
FIRST-WAVE	*High*	*Low*
SECOND-WAVE	*Medium*	*Medium*
THIRD-WAVE	*Medium/High*	*High*

Table 4.1: Likelihood of Success of PSYOPS or Technical Approaches to IO/IW Against Different "Wave Progressions."

Information systems include both the decision-makers and the infrastructure that supports the decision-making process. Offensively, IW attempts to influence the decision-maker or effect the infrastructure that supports decision-making. Supporting infrastructure includes those systems that collect, process, and disseminate information to the decision-makers. Defensively, IO must protect the supporting structure and the decision-maker from the adversary. The OODA loop is a simple model that illustrates the decision-making process (See Figure 4.2).

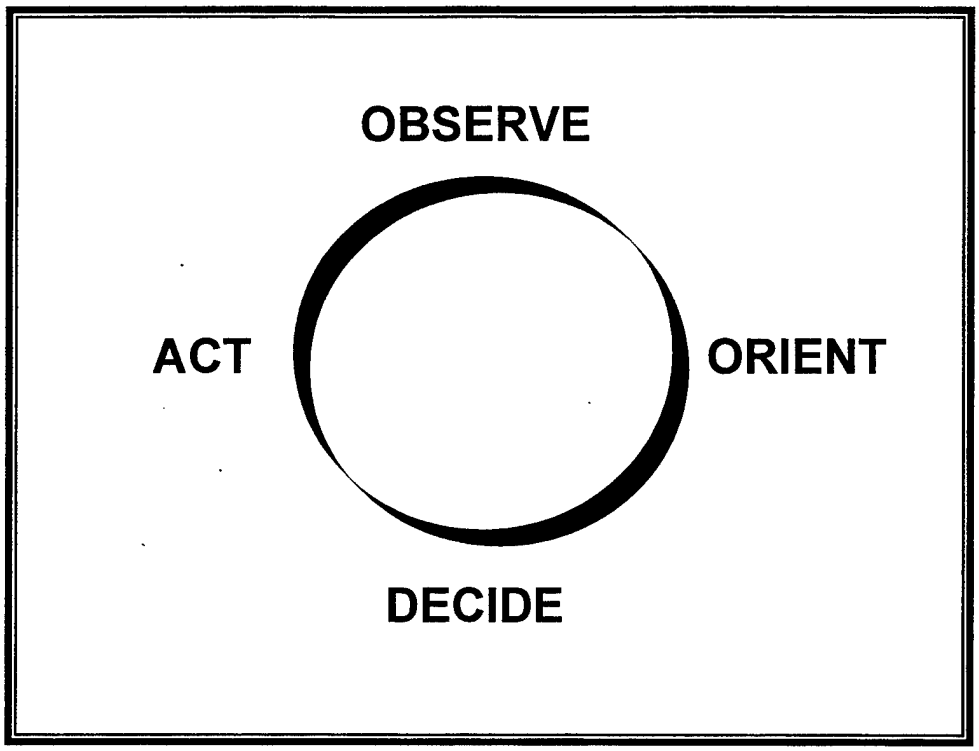

Figure 4.1: The OODA Loop

First-wave opponents are the least likely to be susceptible to U.S. "technical" approaches to IO/IW primarily because the information systems utilized by those societies will not be reliant upon networked computers. Societal structure and interpersonal relationships are key factors in first-wave information systems. Most technology associated with first-wave information systems will be mechanical or stand-alone, making manipulation, corruption, or interception of data nearly impossible. Second and third-wave societies will be more vulnerable to the "technical" approach simply because their information systems and decision-makers are more reliant upon networked computer and mechanical systems to collect, manipulate, and disseminate data.

Success of the IO/IW psychological approach will depend upon the number and type of information sources available to a society. Those with limited sources may be

unable to confirm or deny "suspect" information, while societies with multiple information avenues will be able to crosscheck "suspect" information through other sources.

The types of information sources available to a society will also affect the success of the psychological approach. It will be easier for the U.S. to use its technological superiority to inject its "message" into second and third-wave societies, but they may have less effect due to the ability to "crosscheck." Though the U.S. may have a more difficult time accessing first-wave societies information systems, it will be easier to disseminate the "message" once in, since there are only a limited number of information avenues.

6. Relative Information Superiority

Information dominance conveys the idea of total awareness of an environment. It implies that one side has "near perfect" knowledge of a situation which allows it freedom of maneuver. Relative information superiority suggests that one side has more information than the adversary. Their knowledge of the environment may not be very good, but it is better than the opponent's.

The implication is that it is neither necessary (nor possible) to achieve information dominance. A small advantage in the amount or type of information one opponent has over another can produce a disproportionate positive result. For example, two fighter pilots engaged in aerial combat may know the speed, armament, and range of their adversary's plane. It could be assumed that the engagement could go to either side, but suppose one pilot knows the other's tactics. Armed with that information, the pilot will have a decided advantage.

7. IW Targeting and Combat Assessment

Targeteering involves matching a target with the appropriate weapon to produce a desired effect. That effect may be to deny, disrupt, destroy, or deceive & exploit. Combat assessment determines whether you have achieved your desired effect. To make this determination, targeteers must develop measures of effectiveness (MOEs) that reflect progress toward the desired effect. For example, if the desired effect is to make an enemy runway unusable, an appropriate MOE may be length of usable runway after an attack. If the length is less than that required for aircraft to operate, it can be inferred that the runway is "unusable" and that you have achieved your "desired effect."

Defining telling MOEs for many IW methods is difficult. Manipulation of an opponent's databases through CNA or psychological operations against an adversary's decision-makers, may provide no direct causal effect that can be measured. Bombs explode, physical structures disappear. Data is corrupted in a fuel distribution system, what is the immediate effect that can be measured? It may take several hours, days, or weeks for the effects to be seen or felt. And once fuel shortages occur, who can say with certainty what caused it? Maybe it was the air raid that destroyed a key bridge, or the SOF direct-action (DA) operation that convinced workers to stay away from the distillation plant. Either way, the tenuous causal chain between the attack and the "desired effect" can create difficulties for IW proponents in convincing commanders of the utility of IW attacks.

8. IW Targeting and the "Desired Effect" Question

Tension exists between the two most common desired effects for a target (destroy vs. deceive & exploit). Is it best to destroy a target, or to "protect" it because it provides

entry into the opponents information systems? A cost-benefit analysis must be conducted to determine the worth of both approaches. The worth of either approach is normally a function of time. The longer the "target" is maintained as a source of information or avenue for access, the less utility it will yield as the campaign progresses. At that time, destruction of the target is warranted.

C. SWOT ANALYSIS

STRENGTHS	WEAKNESSES
✓ *Impact of investigation of IO/IW* ✓ *Technological superiority over many 1st, 2nd, and 3rd wave societies* ✓ *Ability to achieve "desired effects" from a distance* ✓ *Information-in-war technologies*	✓ *Over dependence on information-in-war technologies* ✓ *Technological superiority ineffective against some 1st, 2nd, and 3rd wave societies* ✓ *Increased intelligence requirements for IO* ✓ *Change in type of intelligence required for IO*
OPPORTUNITIES	**THREATS**
✓ *Decrease friendly/adversary casualties* ✓ *Opportunity to create "technology dependencies" world-wide*	✓ *Volume of information compounds "access" and "specificity" problem* ✓ *Vulnerability to foreign "technology dependence"* ✓ *Possible WMD responses to IO/IW attacks* ✓ *Vulnerability created by rapid modernization*

Table 4.2: SWOT Analysis of U.S. IO/IW Capabilities

1. Strengths and Weaknesses of U.S. IO/IW Capabilities

The primary strength of U.S. IO/IW is the emphasis placed upon the investigation of IO strategies, IW applications, and their potential impact on warfare. Being among the first to think through the ramifications of IO/IW allows the U.S. to identify information

system vulnerabilities, and to develop defenses. Identifying our own vulnerabilities also assists the U.S. in identifying vulnerabilities of potential adversaries.

Technological superiority over many first, second and third-wave societies provides the U.S. with a means of applying many of the concepts and strategies developed through investigation of IO/IW. Hackerwarfare, IBW, and CNA all depend upon computers, routers, servers, and fiber optic cable. The U.S. is a world leader in the production and application of these technologies. As such, it possesses a large population with the skills required to carry out these types of operations.

IO/IW may allow the U.S. to achieve desired effects from a greater distance and at less cost. CNA, IBW, EBW, PSYOP, hackerwarfare, and cyberwarfare can all be accomplished from a distance. The increasingly interconnected systems of the world will allow the U.S. to access an adversary's information systems through cyberspace. They all require less support in terms of manpower and equipment to conduct.

The ability to collect, process, filter, and disseminate relevant information to the appropriate decision-makers, at the right time, will increase U.S. IO/IW application effectiveness. Information-in-war technologies may also provide increased security and reliability to U.S. information systems through networking and encryption.

The primary weakness of U.S. IO/IW may be our dependence upon information-in-war technologies. The computer has become an integral part of most weapon systems, making them susceptible to many of the viruses, worms, and logic bombs that have effected civilian systems. Many are tied together in networks that supply targeting and C2 information. Our weapon systems have become dependent upon this information for successful operation. These information links will thus likely become prime targets for

our adversaries. For example, without a functioning GPS system, many next generation PGMs become useless. Disruption of the theater air control system could reduce U.S. air campaigns to uncoordinated strikes. Disruption of satellite communications could inhibit forces operating out of line-of-sight of command centers.

U.S. technological superiority may also prove to be ineffective when directed against first- and second-wave information systems. How do you conduct a CNA when an opponent does not use computers? How do you intercept signals with satellites when they use drums to communicate?

2. Opportunities for, and Threats to, U.S. IO/IW Capabilities

IO/IW may provide the U.S. with the opportunity to decrease the number of casualties on both sides during future conflicts. As targets shift from the physical to the informational, the lethality of war may decrease. For instance, attacks on opponents' C2 systems may be possible through computer viruses, instead of by GBU-27 2,000-lb. bombs. Enemy commanders and decision-makers may be rendered ineffective through focused, personalized PSYOP campaigns. IBW may produce even greater precision in weapon systems, decreasing collateral damage. The logic being the more precise intelligence fed directly into a weapon, the greater probability that it will be targeted against "the right target."

The type and amount of intelligence required to conduct many IO/IW operations is substantially different from requirements for second-wave, conventional warfare. Physical location will give way in importance to functional location of information systems. How information systems are logically connected and how they are used to support decision-makers at all levels will become of prime importance. Weapon system

order-of-battle (OB) intelligence will give way to information system OB. Current U.S. technical means of collecting intelligence may become obsolete, or at the very least will have to change drastically. Determining the types of computers, operating systems, and communications protocols will require access to the system through cyberspace or through physical presence. Cyberspace access in particular faces the problem of specificity. The amount of information passing through cyberspace continues to increase. Identifying what is relevant and what is not will make successful application of IO/IW technologies more difficult.

Pioneering critical information system technologies may allow the U.S. to create worldwide "dependencies." As a major producer and supplier of computers, cellular communications, internet hardware, and microprocessor chips, it may be possible to implant "backdoors", logic bombs, and a variety of Trojan Horses that could allow the U.S. to gain access to, or shut-down an opponents' system.

Just as the U.S. may be able to create technology dependencies, other nations may be able to "mirror image" this strategy. More and more software is being created overseas. For example, India is a large producer of programs, many of which are used by U.S. private and commercial information systems. An adversary could take advantage of this and recruit "insiders" to chip software destined for the U.S.

Paradoxically, changing technologies and increasing the gap between the U.S. and other first, second, and third-wave societies may create a window of vulnerability. First, transition to a new technology entails changes in doctrine, organization, and strategy. Effectiveness drops until operators become proficient in the new methods of doing business. New technologies may also have different vulnerabilities that may not have yet

been identified. In addition, if the U.S. does not extract the most utility from each technology before progressing to the next, it risks wasting resources and losing its comparative advantage over potential adversaries. Second-wave technology may be able to be employed in such a manner that it allows adversaries to innovate around newer, third-wave technologies.

For instance, during World War II Germany opted to spend its limited resources on next-generation "vengeance" weapons designed to win the war (Overy, 1996). V-1s, V-2s, and Me-262 jet fighters were so advanced that they could only be produced in small numbers. This competition for resources strangled production of proven systems such as the Me-109 and Focke-Wulf 190 fighters. The Allies decided against leaping to the next technology, focusing instead on improving and expanding production of existing systems, such as the P-51 Mustang. In the end, older technologies beat out the newer ones.

If IO/IW is perceived as a form of WMD, the response of an adversary to an IW attack becomes of great importance. Current Russian policy calls for nuclear retaliation for any IW attack. This disproportionate response may limit the U.S. ability to employ IO/IW against opponents armed with NBC weapons, if such a threat can be made credibly.

D. UTILITY OF U.S. IO/IW

Utility refers to the types of tasks that a discipline can perform and how well it can accomplish them. Colin Gray (1996) uses four questions to determine a disciplines utility.

WHAT UNIQUELY, CAN THE DISCIPLINE DO?
✓ *Highlight the vulnerability of information systems, and the potential impact of those vulnerabilities on future warfare*
✓ *Disrupt second and third-wave information systems, in a non-destructive manner, from a distance to achieve "desired effects"*
WHAT CAN THE DISCIPLINE DO WELL?
✓ *Provide potentially non-lethal means of achieving "desired effects"*
✓ *Reduce casualties on both sides through PGMs enhanced with IBW*
✓ *Achieve disproportionate effects in relation to resources required to conduct the operation*
✓ *Substitute for traditional forms of power (conventional, second-wave ground, air, and naval forces) when facing second and third-wave adversaries*
✓ *Enhance the effectiveness of SOF and GPF*
WHAT DOES THE DISCIPLINE DO POORLY?
✓ *Disrupt first-wave information systems*
✓ *Compellence, deterrence, and coercion; demonstrative effects of IO/IW to date have been poor*
WHAT IS THE DISCIPLINE UNABLE TO DO?
✓ *Provide "physical presence"*

Table 4.3: Utility of U.S. IO/IW Capabilities

1. What Uniquely, Can the Discipline Do?

U.S. IO/IW has two primary utilities: 1. Highlight the vulnerability of information systems, and the potential impact of those vulnerabilities on future warfare; and 2. Disrupt second, and third-wave information systems in a variety of ways, from a distance, to achieve primarily strategic objectives. IO/IW provides a lens through which to assess potential adversaries and U.S. information systems. Identification of weaknesses allows

the U.S. to develop both offensive and defensive strategies for dealing with information system vulnerabilities.

Technological superiority provides the U.S. with the means to conduct CNA, IBW, C2W, PSYOPs, and perception management from a distance. Conducting operations at a distance reduces the number of friendly troops in range of your opponent, decreasing the number of potential casualties.

2. What Can the Discipline Do Well?

U.S. IO/IW can do five things well: 1. Provide potentially "non-lethal" means of achieving desired effects; 2. Reduce friendly, and enemy casualties through PGMs enhanced by IBW; 3. Achieve disproportionate effects in relation to resources required to conduct the operation; 4. Substitute for traditional forms of power (conventional ground forces, airpower, & naval forces) when facing second and third-wave adversaries; and 5. Enhance the effectiveness of SOF and GPF.

IO/IW provides several "non-lethal" means of achieving a variety of "desired effects" (deny, disrupt, destroy, deceive & exploit). Corruption of data through CNA, or the use of High Power Microwaves (HPM) and High Energy Radio Frequency (HERF) weapons may allow the U.S. to achieve the full gamut of desired effects against computer based information systems. Psychological operations against key decision-makers may be tailored to produce a variety of desired effects, including defection, sympathy with the enemy, or disloyalty. Enemy casualties may be reduced through increased precision targeting of PGMs using IBW. Availability of better intelligence during the targeting of PGMs ensures that weapons hit the "right target." Being able to identify, and hit the "right target" the first time, may reduce collateral damage.

IO/IW can produce effects disproportionate to the resources required to conduct the operation. CNA destruction of an enemy logistical database may inhibit the mobilization and deployment of their forces, all for the cost of a skilled operator and an average computer. IO/IW can substitute for traditional forms of power when facing second and third-wave adversaries. U.S. IO/IW capabilities provide the ability to achieve many of the same desired effects that are possible with conventional air, naval, and ground forces. For instance, CNA, IBW, C2W, PSYOPS, and perception management, can degrade command and control of enemy forces, or incapacitate weapon systems through semantic attacks. SOF and GPF effectiveness and efficiency may be enhanced through the use of IO/IW. Achieving information superiority will allow U.S. forces to avoid enemy strengths, precisely identify targets, and focus efforts on true enemy centers of gravity.

3. What Does the Discipline Do Poorly?

U.S. IO/IW currently has a limited ability to conduct three tasks: 1. Disrupt first-wave information systems; 2. Compel or deter; and 3. Substitute for traditional forms of power when facing first-wave adversaries. By avoiding computer information system dependency, first-wave societies negate the technological advantage held by the U.S. The psychological approach becomes by default the only means of affecting first-wave information systems. This requires understanding of the information avenues they do have, and cultural sensitivity to the society's "story." The U.S. has a poor track record in both areas. U.S. IO/IW has failed to demonstrate an ability to compel or deter potential opponents. EIW, PSYOPS, IBW, C2W, and perception management have failed to

ensure Saddam Hussein complies with United Nations resolutions.[14] Mismatched capabilities and targets limit the substitutability of U.S. IO/IW for conventional forces when facing first-wave adversaries.

4. What Is the Discipline Unable To Do?

U.S. IO/IW is unable to provide the effects of "physical presence."[15] Physical presence provides a visible sign of commitment that is difficult to duplicate with IO/IW. Just like AP, IO/IW in all likelihood cannot alone defeat an army in the field. Information systems and decision-makers at that level will have a greater resiliency to both the technical and psychological approaches once engaged. Even if their information systems can be accessed, it will not immediately affect the ability of the individual soldier to continue the fight. That will require someone to remove the weapon from his hands.

[14] There is no evidence of a coherent, protracted IO/IW campaign designed to compel compliance with UN resolutions. Just as random applications of conventional forms of power are unlikely to have an effect, fragmented/disjointed applications of IO/IW are unlikely to achieve the United Nations "desired effect."

[15] The authors are aware that as part of USSOCOM's FID mission, there are small SOF teams deployed in over 144 countries. Physical presence, as discussed here, refers to the effects generated by large numbers of ground troops.

V. AIRPOWER

Although the breadth and scope of future operations may be different, AP will continue to support the policies employed by our government to influence the behavior of other state, and non-state actors. AP's global range and versatile capabilities provide our leaders with a viable option when dealing with world crises. In a future characterized by predominantly niche competitors, the critical question is, how can AP be used to achieve national security objectives through actions designed to deter, or coerce other actors into behaving in a manner that is consistent with our national interests?

The attributes of AP are well suited to the post-Cold War environment where, according to one study, "The time lines are short; the cost of failure high; and accurate, and timely information, and action is critical" (Fogelman, 1997). AP can be employed across the entire spectrum of operations from peacekeeping to total war. In order to maximize the utility of AP against niche competitors its limitations must be recognized, but more importantly the benefits derived from increased mobility/reach, flexible/scalable lethality, and increased precision targeting must be exploited (see Table 1.1 for the tenets of AP).[16]

Again, we will define key terms and concepts in order to provide the reader with a baseline understanding of AP. The SWOT analysis will be the primary tool used to divine the utility of AP in relation to our SOFIA doctrine.

[16] The tenets of AP and how they apply to AP specifically should not be confused with how the same characteristics are used to explain the synergistic effects that can be achieved through the combined strength of SOF, IO, and AP.

A. DEFINITIONS

Winston Churchill once wrote: "Airpower is the most difficult of all forms of military force to measure or even express in precise terms" (Fogelman, 1997). AP ultimately encompasses the broad realm of air and space assets from all branches of the Armed Services, as well as coalition forces. However, this study will have a narrower scope. It will focus primarily on USAF assets, definitions, and terms to explain the utility of AP.

What AP can achieve is outlined by the Air Force's Core competencies: air superiority, global attack, agile combat support, rapid global mobility, and precision engagement (AFDD1, 1997, p. 39). These characteristics are the backbone of AP, and the underlying concepts from which Air Force doctrine is formed. We will use these concepts to explore the effectiveness of AP, but more importantly how these concepts will apply against niche competitors. We will conduct a SWOT analysis to determine the utility of AP and the contributions it can make to a SOFIA doctrine.

B. CONCEPTS

The Air Force vision of "Global Reach—Global Power" and the military's joint vision of "Full Spectrum Dominance" highlight plans to meet U.S. strategic objectives for the 21st Century. These strategies outline how the U.S. will wage war against traditional competitors, but explain less well how the U.S. will deal with the more likely niche competitor. Another problem that will have to be addressed is how to deter a niche competitor from ever thinking about challenging the United States.

1. Early Views of AP

Early AP theorists, Brig. General William "Billy" Mitchell, Giulio Douhet, and Alexander De Seversky all saw AP as the new means to conduct war, although they may have over exaggerated its effectiveness. They all believed that wars could be won in the air. Mitchell defined AP as, "the ability to do something in the air. It consists of transporting all sorts of things by aircraft from one place to another"(Melinger, 1997, p. xii). He believed that AP could function independently and be used for far more than supporting land and sea forces. Strategic bombing could bring about victory by destroying the enemy's war-making capability and their will to fight. Mitchell strongly believed that an independent Air Force could achieve this victory without ground forces by bombing the enemy's vital centers making it impossible for the enemy to continue waging war (p. 79).

Italian General Giulio Douhet believed that the control of the air would become crucial to war fighting. He understood the effects AP could achieve by virtue of its speed, flexibility, range, and firepower. The two places that he may have exaggerated the effectiveness of AP were in the notion that whoever controlled the air would also control the ground and the psychological effects that bombing would have on civilian populations (Melinger, 1997, p. xiv).

Alexander De Seversky, a WWII fighter ace, was another strong advocate of AP who thought that a finite number of planes and bombs, delivered on specific targets, would equal victory. He also believed that destroying selected targets could achieve victory (Melinger, 1997, p. 268) and downplayed the relative importance of armies and navies, in comparison with AP (p. 269).

2. U.S. Strategy

The *National Security Strategy for a New Century* outlines America's three central goals: 1. To enhance our security with military forces that are ready to fight, and win; 2. To bolster America's economic revitalization; and 3. To promote democracy abroad (United States, 1998).

The National Military Strategy supports these goals through its policy of shape, respond, and prepare now. This strategy is designed to protect the Nation and its interests, and promote a peace that benefits America and all like-minded nations.

This strategy includes a new, special emphasis on the critical importance of an early, decisive halt to armed aggression to provide wider options for the use of military force, and to create a window for diplomatic resolution of a crisis. The ability to achieve this strategy depends on the speed, range, agility, and overwhelming firepower that AP can offer. This strategy is founded on the assumption that, with technology, a more agile aerospace force can substitute for large, slow-arriving forces and deliver more firepower in the process. This initial action will presumably minimize the number of friendly casualties, and help to solidify political support for military action (United States Air Force, 1998, p. 4).

3. Global Reach—Global Power

The Air Force vision for the 21st century is to ensure that the national security of the U.S. is protected during an era defined by fast breaking crises and diverse contingencies. This global vision is based on the objectives of: sustaining deterrence, providing versatile combat forces; supplying rapid, global air mobility; controlling the high ground; ensuring information dominance; and building U.S. influence. By utilizing

the capabilities of speed, range, maneuverability, and precise, lethal firepower, U.S. AP will be unchallenged directly and can fully support the global vision (Sheila E. Widnall). This vision fails to point out that in situations where AP is unable to locate and target the adversary because of terrain or population masking, the role of AP may have limited effectiveness.

4. Full Spectrum Dominance

Current U.S. military policy concentrates on creating joint doctrine that can be applied to a broad spectrum of potential adversaries. This vision is based on the concept of full spectrum dominance. *Joint Vision 2010* outlines how this objective can be achieved through the integration of four concepts; (dominant maneuver, precision engagement, focused logistics, and full-dimensional protection) (United States Air Force, 1996-1997, p. 24).[17] Integrated properly, these concepts will enable our forces to achieve full spectrum dominance against most second, and some third-wave adversaries. AP's capabilities are vital to successful control of the battlefield, and are directly proportional to the ability to acquire and target the enemy.

5. Deterrent Capability

Forces that cannot win will not deter.

Nathan F. Twining (Westenhoff, 1990, p. 72)

AP has a mixed record regarding its ability to deter potential adversaries. It is difficult to prove a causal relationship between AP and its effectiveness as a deterrent, however AP remains essential in supporting the foundation of U.S. military strategy to

deter conflict by providing a credible and lethal force that is capable of reaching out and touching the enemy. According to Colin Gray (1996) in his book *Explorations In Strategy*, there are two theories of deterrence, punishment and denial. "In principle, a candidate enemy may be deterrable either by the threat to punish him in ways that hurt him very badly or by the threat to defeat his armed forces in the field and thereby deny him achievement of his objectives" (p. 33). Alexander George and William Simon (1994), in their book on coercive diplomacy, define deterrence as "a strategy that employs threats to dissuade an adversary from undertaking a damaging action not yet initiated" and coercive diplomacy as "a response to an action already undertaken" (pp. 7-8).

Airpowers deterrent utility is based upon its ability to hold adversary's vital organs at risk. "Vital organs" are those entities that the opponent places the greatest value on and may include leadership, population, infrastructure, armed forces, or territory. State actors will be the most responsive to AP's deterrent effect. Non-state actors will be the least vulnerable, and in fact may be encouraged to challenge the U.S. when only threatened with AP.

Prior to operations DESERT SHIELD/DESERT STORM, U.S. AP had a questionable track record in regards to its deterrent capability. It is arguable that against the Soviet Union, a conventional second-wave peer competitor, AP was instrumental in deterring conflict. Long range bombers equipped with nuclear weapons and a credible ability to penetrate Soviet airspace allowed U.S. AP to hold most of its vital organs at risk. In Vietnam, AP was unable to deter the North's support for first-wave,

[17] For more information on the definition and concepts of "Full Spectrum Dominance" refer to *The Air Force and Joint Vision* 2010, pp. 24-28, 36.

unconventional guerrilla's fighting in the South. It was also unable to deter the Viet Cong from operating autonomously in the South, regardless of support from the North. Due to political restrictions, AP was unable to hold at risk many of North Vietnams vital organs. Leadership and infrastructure were for the most part off-limits. In the South, the Viet Cong had neither territory nor recognizable concentrations of armed forces that could be held at risk by U.S. AP.

While AP may have failed to deter Saddam Hussein from invading Kuwait, its deterrent utility has increased since its exceptional performance during DESERT STORM. In October 1994, the U.S. deployed 122 combat aircraft to Southwest Asia in ten days, in response to a buildup of Iraqi armor on the Kuwaiti border. Within days, Iraqi forces had begun to withdraw from border areas. As former Secretary of Defense William Perry commented, "When we deployed F-15s, F-16s, and A-10s in large numbers, I think they got the message very quickly" (Fogelman, 1997)

The demonstrative effect of APs ability to hold at risk states vital organs was also successfully applied in Kosovo. In October 1998, NATO conducted several days of air exercises with the intent of convincing Yugoslav President Slobodan Milosevic to comply with United Nations (UN) resolutions regarding protection of ethnic Albanians within the region. Within weeks a settlement was reached that included a withdrawal of Yugoslav security forces from Kosovo and the introduction of international observers.

C. SWOT ANALYSIS

In his book *Explorations In Strategy*, Colin Gray (1996) conducted an in-depth review of AP from which he developed a list of its primary utilities (p. 99). Unfortunately, his work fails to capture the strengths, weaknesses, opportunities, and

threats associated with AP when pitted against our most probable future adversaries (first- and third-wave niche competitors). Table 5.1 summarizes our analysis of AP from which we will determine this utility.

STRENGTHS	WEAKNESSES
✓ *Speed, range, flexibility, reaction time, mobility* ✓ *Economy of force* ✓ *Lift capability* ✓ *Core competencies* 1. *Air and Space superiority* 2. *Global reach/rapid mobility* 3. *Agile combat support* 4. *Precision engagement/strike capability* ✓ *High percentage of units self-deployable* ✓ *Intelligence, surveillance, and reconnaissance (ISR)* ✓ *Credible/Capable Lethality* ✓ *3rd dimension* ✓ *Limited Battlespace control*	✓ *Staying power: Limited individual platform endurance during operations (0-24 hours)* ✓ *Long lead time for training competent airmen/aircrew* ✓ *Requires fixed airfields and large support infrastructure for sustained operations (low tooth-to-tail ratio)* ✓ *Aircraft vulnerable when on the ground* ✓ *Implementation of technological superiority against first-wave societies…high tech vs. low tech*
OPPORTUNITIES	**THREATS**
✓ *Technology…increasing capability* 1. *Reduced requirement for fixed airfields and support infrastructure (V/STOL, increased platform capabilities)* 2. *Reduced requirement for aircrew (UAV/UCAV)* ✓ *Situational awareness*	✓ *Degradation of Combat Power* 1. *Retention rates of pilots* 2. *High operation/personnel tempo …small number of forces in too high demand* ✓ *Technological Achilles' heal* 1. *Increasing sophistication of IADS* 2. *Decreasing size of armed forces…scarce resources* ✓ *Conventional Culture*

Table 5.1: SWOT Analysis of U.S. Airpower

1. Strengths of U.S. AP Capabilities

Airpowers primary strengths are speed, range, and flexibility. From these three bedrock strengths, a multitude of secondary strengths may be derived. Key among these is the ability to react within hours to developing situations worldwide either through

precision attack, establishment of air superiority over the contested area or deployment of U.S. forces using air mobility assets.

Precision attack reduces the number of sorties and weapons required to service a target. These attacks can be carried out by forward deployed aircraft, or launched from the U.S., as in the case of 8th Air Force B-52 strikes conducted from Barksdale AFB, Louisiana during operation DESERT STORM. Another example of the power of precision attack is the 20 August 1998 Tomahawk cruise missile attack on the Shifa Pharmaceutical Plant in Khartoum, Sudan and a terrorist training area in Afghanistan. While air superiority cannot guarantee that a ground or naval action will be successful, it does provide the U.S. with the ability to maneuver forces free from harassment from the air. Tactical and strategic airlift provides the U.S. the ability to move a variety of forces within hours of a crisis, to include self-deployment of U.S. strike, attack, reconnaissance, surveillance, and bomber platforms.

Air superiority, coupled with a precision strike capability (the combination of precise target acquisition, munitions, and weapons delivery) gives AP the ability to exploit the vertical dimension thereby gaining limited control over the battlespace. AP can not ensure that the ground campaign will be successful, but it does provide greater mobility and freedom of movement. Dominating the airways keeps logistical traffic unimpeded, making sure that troops, equipment, and supplies are delivered when, and where they need to be.

> In World War II, the Eighth Air Force attacked something like 50 target sets in all of 1943. During DESERT STORM, the coalition struck 150 individual targets in the first 24 hours of that 100-hour war. But very early in the next century, the Air Force may be able to engage 1,500 targets within the first hour, if not the first minutes of a conflict.
>
> ***Gen. Ronald R. Fogelman (1997)***

Precision attack is the second half of the AP equation making target acquisition and destruction more effective. More accurate weapon systems and discrete targeting will ultimately reduce the number of sorties flown and the number of weapons required for each individual target. AP's ability to identify and destroy a is dependent upon accurate intelligence. AP will rely on information superiority to identify critical command and control nodes to manipulate or destroy the enemy's OODA loop.

Air Force Special Operations Command's (AFSOC) ability to quickly adapt to a variety of environments and specialization in unconventional tactics gives them an edge over conventional forces when facing the U.S.'s most probable future adversaries. AFSOC is equipped with specially modified fixed-wing (MC-130 E/H/P, AC-130 H/U) and rotary wing (MH-53J/MH-60) aircraft. These aircraft are equipped with a variety of PNP systems to included GPS, Doppler, inertial navigation system (INS), TF/TA radar, weather radar, forward looking infrared (FLIR), and threat detection/threat avoidance electronic warfare suites that allow them to operate at low-level at night. Highly competent crews using state of the art equipment, maintain the ability to penetrate virtually undetected into the most austere and potentially hostile locations in the world with a very small footprint. Their expertise in the area of navigation and ability to construct airborne instrument approaches allows them to pinpoint their destination and create landing opportunities that would otherwise be impossible. Their continuous

scenario-based training[18] provides SOF with the unique ability to tailor force packages to match the specific operation.

The MC-130E has the capability to refuel both the MH-60 and the MH-53 and is able to receive gas from either the KC-10 or the KC-135 giving that combination of aircraft unlimited range and staying power over the target area.[19] With this capability it is possible to design force packages with small footprints that can accomplish a wide assortment of tasks.

2. Weaknesses of U.S. AP Capabilities

> One general inference to be drawn has been that in twentieth-century war, defeat will almost always be avoided (and outright victory likely gained) by the side that has secured air superiority. Indeed, a more comprehensive perusal would probably show that virtually the only exceptions concern counterinsurgency warfare.
>
> ***Neville Brown (Westenhoff, 1990, p. 39)***

Although air superiority proved essential to a quick victory in the Gulf it may not always be the defining factor in determining the outcome of conflicts, especially when dealing with asymmetric warfare. Vietnam is an example where air superiority was unable to guarantee victory on the ground. Niche competitors fighting asymmetrically will limit the role of AP by preventing it from utilizing its overwhelming capabilities to exploit the battlespace.

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[18] SOF aircrews continuously fly scripted real world missions practicing simulated airfield seizures, and deep in country penetration while accomplishing the infiltration and exfiltration of troops and equipment.

[19] Some SOF aircraft have the ability to self-deploy. Two MC-130E Combat Talons flew 28.4 hours from Hurlburt Field, FL to Prince Sultan AB, Saudi Arabia. This flight required four in-flight refuelings and an augmented crew to achieve. Major T.R. Sands, USAF, Aircraft Commander, 8SOS, Hurlburt Field, FL.

AP offers a highly capable force that can be lethal in its execution, but its ability to deter is arguable in an environment that is more ambiguous than the conventional confrontations that have characterized past wars. The fewer the targets of strategic importance that a country has the less it is threatened by them being destroyed. Relying on AP to deter an adversary who is not protecting territory or against an enemy who is able to hide behind a "veil of anonymity"[20] greatly increases the probability of failure.

The ability to keep aircraft on station is difficult due to dependence on fuel and limited munitions. These limitations may be mitigated through air refueling, but aircraft must still return to base (RTB) when it exhausts its munitions. Crew duty day restrictions and high maintenance requirements limit continual employment, which can be overcome only by increasing the number of platforms. An enemy who is able to effectively terrain mask can wait out AP and can gain limited maneuverability. This forces the U.S. to use valuable assets to maintain "eyes on target," which may further expose aircrews to the danger of enemy firepower.

Technological superiority may not generate the expected benefits in the future. Stealth fighters and bombers will have limited utility against first-wave competitors who are target poor. Fighting low-tech conflicts with high-tech equipment may prove to be very expensive and very ineffective. Widening the technological gap provides the enemy with the opportunity to innovate around us and exploit our weaknesses.

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[20] Gordon McCormick, *Low-Intensity Conflict*, course offered in the SOLIC curriculum, Naval Postgraduate School, Fall, 1997. The "Veil of Anonymity" exists when an enemy cannot be targeted until they present themselves in the open. They may either blend into the environment or into the population. The Vietcong were able to blend in with the South Vietnamese people and pick the time and place of their choosing to wage battle.

3. Opportunities for U.S. AP Capabilities

Technology will ensure that AP stays on the cutting edge. Innovations in stealth technology, aircraft systems, GPS, active and passive radar systems, navigational systems, and "smart"/"brilliant" weapons will add to the arsenal of weapons that AP can bring to bear against the enemy. These, along with other technological advances will further widen the gap between the U.S. and future adversaries making it difficult for them to challenge the U.S. directly.

V/STOL (vertical/short field takeoff and landing) and UAV/UCAV (unmanned aerial vehicle/uninhabited combat aerial vehicle) add a new dimension to AP that will provide commanders varied force employment options against niche competitors who are not threatened by overwhelming force.

The CV-22 OSPREY is a V/STOL aircraft that the Air Force is predicting will define the way SOF will operate in the future. Its defensive systems, cargo carrying capacity, inflight refueling capability and range make it an ideal platform for infiltrating small force packages into non-permissive environments. Another great contribution to AP is the remote controlled UAV that has a loiter time of up to 40 hours. UAV's make it possible to operate in high-risk environments without endangering aircrews. Accurate and timely decisions can be made by commanders utilizing real-time imagery that is passed by satellite links ("Air Force Unveils Predator UAV," 1997). The UCAV is a conceptual development of a highly sophisticated vehicle, able to withstand plus-or-minus twenty-G's, making it capable of defeating nearly all opposing antiaircraft missiles. These vehicles will have unlimited reach and can easily be controlled by a pilot half way around the world by fiber optics and satellite links (Lambeth, 1996).

These new platforms will add to the robustness of AP by providing a cheaper, more effective means of gathering intelligence, conducting surveillance and reconnaissance, as well as providing viable strike platforms. Unmanned systems which possess the flexibility to change, cancel, and reprioritize targeting assignments while in flight could reduce the cost and the personnel risk associated with manned aircraft. Technology may make it to where even troop transport can be accomplished with these vehicles by using them to infiltrate or exfiltrate teams through enemy defensive systems.

Stealth technology adds even more to our capability by allowing AP to penetrate and destroy targets while remaining virtually undetected. The F-22 RAPTOR with its stealth technology is planned to come on line in the year 2004. The Air Force plans to procure 442 F-22's replacing its top of line, but aging F-15 (Lambeth, 1996). Stealth capability enhanced with the capabilities of future technology in sensors, precision weapons, and awareness aids will play a vital role in making sure no adversary can match our aerial superiority. Future munitions will have near-zero-miss-distance accuracies that may allow them to be smaller, requiring less of them to be built. Next generation sensor-fused smart weapons will have the ability to recognize, identify, and sort targets as their sensors guide them, giving them greater accuracy (1996).

Improved situational awareness may prove to be the greatest opportunity available to AP in the next century. The ability to package and implement global information pertaining to threat status, target location, individual aircraft status, mission status, and ground troop location will maximize U.S. situational awareness while denying it to the enemy.

4. Threats to U.S. AP Capabilities

Retention of qualified aircrew is a growing threat to the combat readiness of U.S. AP. The increasing exodus of military pilots from all services poses a particularly difficult problem. Most pilots require up to two years of training prior to being certified "mission ready". Pilots who leave the service today take with them years of experience that cannot be replaced with newly minted aircrew members. The result is a smaller and less experienced force that is unable (with current production rates) to regenerate itself. Personnel that remain in the service experience higher PERSTEMPOs caused by both higher OPSTEMPOs and a smaller force; combined they have the potential to negatively impact combat readiness.

D. UTILITY OF U.S. AP

Utility refers to the types of tasks that a discipline can perform and how well it can accomplish them. Colin Gray (1996) uses four questions to determine a disciplines utility.

WHAT UNIQUELY, CAN THE DISCIPLINE DO?
✓ *Provide timely global mobility to U.S. forces (hours vs. days/weeks/months)*
✓ *Conduct world-wide offensive military operations from CONUS locations*
✓ *Deliver PGMs*
✓ *Bypass adversaries fielded military forces and strike strategically*
✓ *Successfully conduct massive, debilitating, parallel strikes on second and third-wave societies (both peer competitor and small state niche competitors)*
WHAT CAN THE DISCIPLINE DO WELL?
✓ *Task organize*
✓ *Achieve "desired effects" in greater proportion to resources expended*
✓ *Mobilize and deploy quickly*
✓ *Maintain "aerial occupation" of enemy territory in regions in which U.S. is able to "sense" adversary (primarily desert or ocean)*
✓ *Employ multi-spectral "sensing" technologies (visible, non-visible, RF, acoustic) for target identification*
✓ *Collect, process, produce, and disseminate near-real time intelligence*
✓ *Conduct operations at the tactical, operational, or strategic levels of war*
WHAT DOES THE DISCIPLINE DO POORLY?
✓ *Effectively/efficiently engage first-wave societies*
✓ *Effectively/efficiently identify and engage niche competitors*
WHAT IS THE DISCIPLINE UNABLE TO DO?
✓ *Provide the "effects" of physical presence*

Table 5.2: Utility of U.S. Airpower

1. What Uniquely, Can the Discipline Do?

Speed, range, and lift allow AP to provide timely, global mobility of U.S. forces much faster than sea or land transport. The ability to utilize speed and range allows the U.S. to engage the enemy from the CONUS with devastating effect. Conducting offensive air strikes from the U.S. reduces the need to deploy personnel and equipment to more dangerous forward staging bases. B-52s from Barksdale AFB, Louisiana conducted

bombing operations against Iraq during the Gulf War, which freed up valuable ramp space at forward staging bases for fighters, tankers, and special operation aircraft.

AP allows you to leap over fielded military forces and deliver weapons directly against centers of gravity, including leadership, population, and infrastructure (Meilingerm, 1997, p. 9).[21] AP utilizes speed, range, and flexibility to provide the U.S. the capability to conduct massive, parallel, debilitating strikes against second and third-wave peer and small state niche competitors.

2. What Can the Discipline Do Well?

AP can provide economy of force to achieve disproportionate results by accurately delivering PGMs that can do more damage than a whole army battalion in coercing a second or third-wave peer competitor into complying with U.S. demands. Threats to conduct U.S. lead airstikes were successful in forcing Yugoslavia into complying with UN/NATO resolutions, where approximately 8000 ground forces in neighboring Bosnia were unable to persuade Milosevic into complying with resolutions.

AP can conduct "aerial occupation" of regions in which the U.S. is able to sense the adversary and reach out and touch him, and may bé particularly effective in open desert and ocean environments.[22] AP can use sensors in the form of RC-135 RIVET JOINT, E-3B AWACS, E-8C JSTARS, U-2s, satellites, and UAVs to collect, process, produce, and disseminate real time information to disrupt, preempt, deny, or counter enemy actions. In open environments AP can seriously limit the enemy's land, sea, and

[21] Giulio Douhet idea translated by Sheila Fischer.

[22] U.S. and coalition forces have accomplished this in both northern and southern Iraq since the end of the Gulf War. Operation SOUTHERN WATCH restricts Iraqi movement of aircraft and air defense systems in the south, while NORTHERN WATCH accomplishes the same in the north.

air movement, thereby denying him the ability to seize, hold, or exploit objectives. Speed, range, flexibility, and lethality allow AP to compensate for deficiencies in both land and sea forces (Gray, 1996, p. 99).

3. What Does the Discipline Do Poorly?

AP can achieve limited effects against first-wave societies whose infrastructure is predominately low tech. It is hard to make an impact on a society when the only targets available to bomb are a farmer's field or a dirt road. AP has limited strategic utility against a society that is not dependent on second- and third-wave technology. AP is not the weapon of choice against non-state niche competitors who have no population, or geographic region to defend. The U.S. wastes valuable assets and endangers U.S. lives when misusing AP to seek out and destroy individual soldiers/guerrillas maneuvering in the jungle.

4. What Is the Discipline Unable to Do?

AP is unable to provide the effects of "physical presence" in areas that AP cannot sense, identify, and discretely target the enemy. This becomes a critical deficiency when warfare moves away from open battle areas to urban and jungle warfare.

Colin Gray (1996) advances the ideas that AP is unable to cost-effectively transport very large, bulky cargo, seize and hold territorial objectives, and accept an enemy's surrender (p. 99). While this may be very true and relevant in traditional conventional type conflicts, this shortcoming may not be as relevant or as important in smaller scale asymmetric conflicts.

E. CONCLUSION

Regardless of how strong the United States is, militarily and politically, our national security interests stand to be threatened. There is some chance of being challenged directly, where AP will likely have unmatched success against the adversary. However, there is a greater probability of being confronted by niche competitors where the effectiveness of AP is less clear. During these times of uncertainty and downsizing AP will continue to play an important role in military strategy because of its versatility. If employed properly, AP can be instrumental in the defeat of niche opponents.

How much of AP's traditional strengths can be brought to bear against future opponents is entirely dependent on the adversary. It is imperative that SOF and AP be employed in such a manner as to leverage the others strengths. AP will follow traditional doctrine to achieve air superiority and achieve battlespace dominance by direct target acquisition, and destruction when fighting peer competitors. However, when facing niche competitors AP will more likely play a supporting role. Aerial refueling, ISR, battlefield mobility, C2, and inter-/intra-theater airlift will be the primary missions.

VI. SOF, IO, AND AP INTEGRATION

In previous chapters we: 1. Summarized the individual strengths, weaknesses, opportunities, and threats associated with SOF, IO, & AP; and 2. Characterized their robustness and utility by identifying the types of tasks, and breadth of application of each discipline. In this chapter, we will explain how the individual disciplines can enhance the effectiveness of the others. From this we will develop a subjective categorization of the robustness of the SOFIA doctrine in comparison with an emphasis on GPF. Finally, we will conclude with a review of suggested case studies for further research.

A. SYNERGISTIC EFFECTS

SOF, IO, and AP each have separate and distinct attributes. These attributes give them the ability to successfully address a variety of situations. For instance, IO provides the commander with the capability to disrupt second and third-wave information systems from a distance. AP allows a commander to infiltrate long distances into denied or remote regions. SOF provides a commander with a culturally and linguistically skilled force capable of conducting covert and clandestine operations. Individually they may provide part of the "answer"; together they may provide a more complete answer.

1. SWOT Considerations

In general, integration of the individual disciplines can have eight possible outcomes (See Table 6.1). It will only be beneficial to integrate in four instances (blocks 1,2,7,8): 1. Strengths/opportunities of one negate the weaknesses/threats of another; 2. Strengths/opportunities of one magnify the strengths/opportunities of another; 3. Weaknesses/threats negate the weaknesses/threats of another; and 4. Weaknesses/threats

magnify the strengths/opportunities of another. Integration is only beneficial in these four instances because the result either magnifies an existing strength or opportunity, or nullifies a weakness or threat. In blocks 3, 4, 5,and 6, the result of the integration of the disciplines produces a negative result. A negative result identifies combinations of the disciplines that do not lend themselves to the successful application of the SOFIA doctrine.

Further analysis must be conducted to determine whether the negative outcomes of integration outweigh the positive utilities produced by the integration of SOF, IO, and AP. This analysis is beyond the scope of this research.

1 *Strengths/opportunities NEGATE weaknesses/threats*	***2*** *Strengths/opportunities MAGNIFY strengths/opportunities*
3 *Strengths/opportunities NEGATE strengths/opportunities*	***4*** *Strengths/opportunities MAGNIFY weakness/threats*
5 *Weaknesses/threats NEGATE strengths/opportunities*	***6*** *Weakness/threats MAGNIFY weakness/threats*
7 *Weakness/threats NEGATE weakness/threats*	***8*** *Weakness/threats MAGNIFY strengths/opportunities*

Table 6.1: Possible Outcomes of Integration of Individual Disciplines

We have listed the extremes, but assume that there will be no absolutes when integrating the disciplines. It will be incumbent upon commanders to make subjective decisions when applying the doctrine to operational problems. A key maxim of the SOFIA doctrine is that the mix of disciplines will be based upon their strengths, weaknesses, opportunities, and threats, and their utility against a given adversary. SOFIA

doctrine faces the same problem as joint doctrine. Maximum effectiveness is the goal, not equal representation.

2. Utility Considerations

The individual utilities of each discipline can be used to complement the utility of another. For example, SOF can provide physical access to remote or denied areas in low-to-medium threat environments. AP can deliver PGMs. IO can enhance the effectiveness of PGMs through application of IBW. A possible result, SOF airpower may be uniquely suited to deliver IBW enhanced PGMs in remote or denied territories. We are not necessarily advocating the use of MC-130H COMBAT TALON IIs as PGM delivery systems, but there may be some application. It must be remembered that SOFIA doctrine is not tied to specific weapons systems. It may be that future SOF aircraft incorporating more powerful defensive systems and stealth characteristics will be capable of delivering PGMs to remote or denied areas.

B. SOFIA DOCTRINE ROBUSTNESS

Applying the definition developed in chapter one, SOFIA's doctrinal robustness can be seen as depending upon its ability to function in a variety of roles, against a variety of adversaries, in a variety of situations. It is measure of the cumulative utility of the doctrine. When superimposed upon our "conflict visualization tool" from chapter one (See Figure 1.1), we can see the areas in which our SOFIA doctrine will have the most utility. The more area of utility, the greater robustness of the SOFIA doctrine (see Figure 6.1).

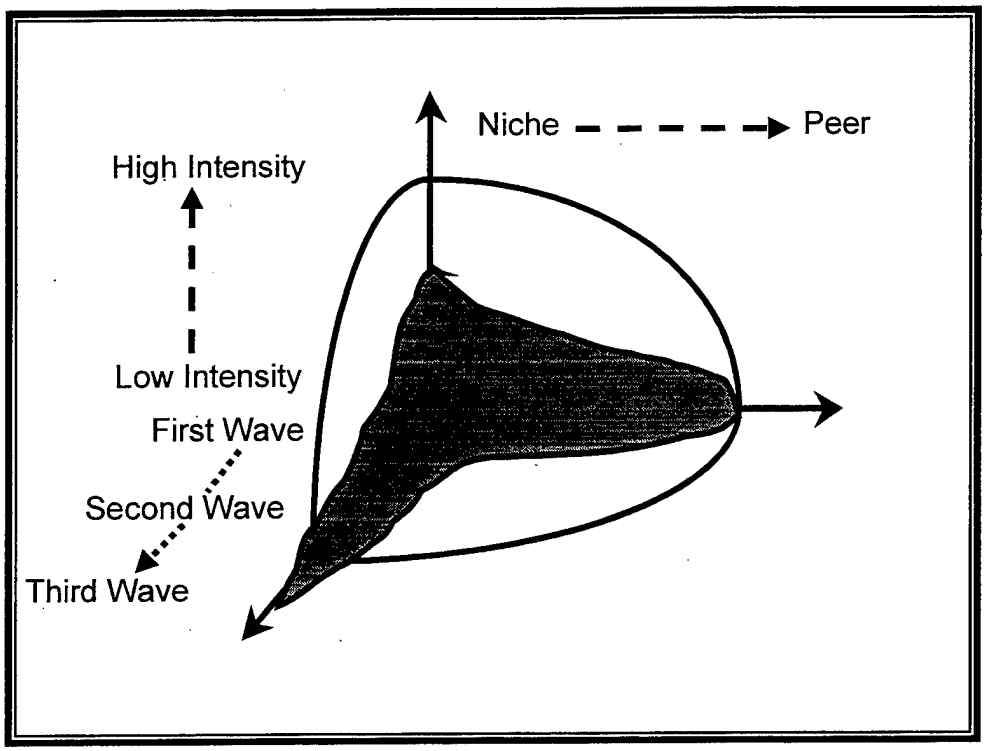

Figure 6.1: SOFIA Area of Most Utility/Robustness

The SOFIA doctrine will have applicability across the spectrum of conflict (low-to-high intensity), and against both peer and niche competitors utilizing first, second, and third-wave technologies. Areas of greatest utility will be those in which the U.S. cannot bring to bear its technologically superior GPF. The SOFIA doctrine will be most effective against niche competitors in low-to-mid intensity conflicts utilizing first and second-wave technologies.

C. COMPARISON OF SOFIA AND GPF ROBUSTNESS

In chapter one, we stated our assumption that the SOFIA doctrine will have relevance due to three factors: 1. Decreasing resources; 2. Shrinking pool of overseas bases for forward presence; and 3. Increasing non-traditional threats/missions. In chapter two we defined our vision of the future. At the beginning of this chapter, we projected the

utility and robustness of the SOFIA doctrine based on our SWOT and utility analyses of the individual disciplines. Comparison of SOFIA and GPF robustness further delineates applicability of the doctrines, and may assist force planners in making resource allocation decisions. Robustness ratings are subjective and based upon a relative scale of POOR, GOOD, BETTER, and BEST (See Table 6.2)

INTENSITY	COMPETITOR	WAVE	SOFIA	GPF
LOW	PEER	1ST WAVE	N/A	N/A
		2ND WAVE	BETTER	GOOD
		3RD WAVE	BEST	GOOD
	NICHE	1ST WAVE	BEST	POOR
		2ND WAVE	BETTER	GOOD
		3RD WAVE	BETTER	POOR
MID	PEER	1ST WAVE	N/A	N/A
		2ND WAVE	GOOD	BEST
		3RD WAVE	BETTER	BEST
	NICHE	1ST WAVE	BEST	GOOD
		2ND WAVE	BETTER	BETTER
		3RD WAVE	BETTER	POOR
HIGH	PEER	1ST WAVE	N/A	N/A
		2ND WAVE	GOOD	BEST
		3RD WAVE	BETTER	BETTER
	NICHE	1ST WAVE	BEST	BEST
		2ND WAVE	BETTER	BETTER
		3RD WAVE	BETTER	GOOD

Table 6.2: Comparison of SOFIA vs. GPF Utility/Robustness

As displayed in table 6.2, the SOFIA doctrine will be most capable against niche competitors engaging the U.S. in low-to-medium intensity conflicts. GPF will continue to maintain its preeminence in combating peer competitors in mid-to-high intensity conflicts.

D. SOFIA BATTLESPACE SUPERIORITY

"Battlespace superiority" implies a position of relative strength over your adversary that is achieved through the strengths and opportunities, and unique utilities of SOF, IO, and AP. It allows the force that possesses it to maintain the initiative/upper-hand. SOFIA induced battlespace superiority is bounded by the time available from notification to employment of forces, by the relative information balance between opponents, and the scope of the operation. "Scope of the operation" includes number of forces involved, lethality of weapons employed, size of the area of responsibility (AOR), operational goals and duration of the action. Changes in any of the variables will affect the ability of SOFIA forces to achieve battlespace superiority.

While similar to the idea of "relative superiority", as developed by William McRaven (1995) in his book *Spec Ops*, we believe that SOFIA induced battlespace superiority has broader application. McRaven's theory is based upon his analysis of primarily direct action missions. Battlespace superiority takes into consideration factors common to all of our proposed future missions/situations (See Table 1.2).

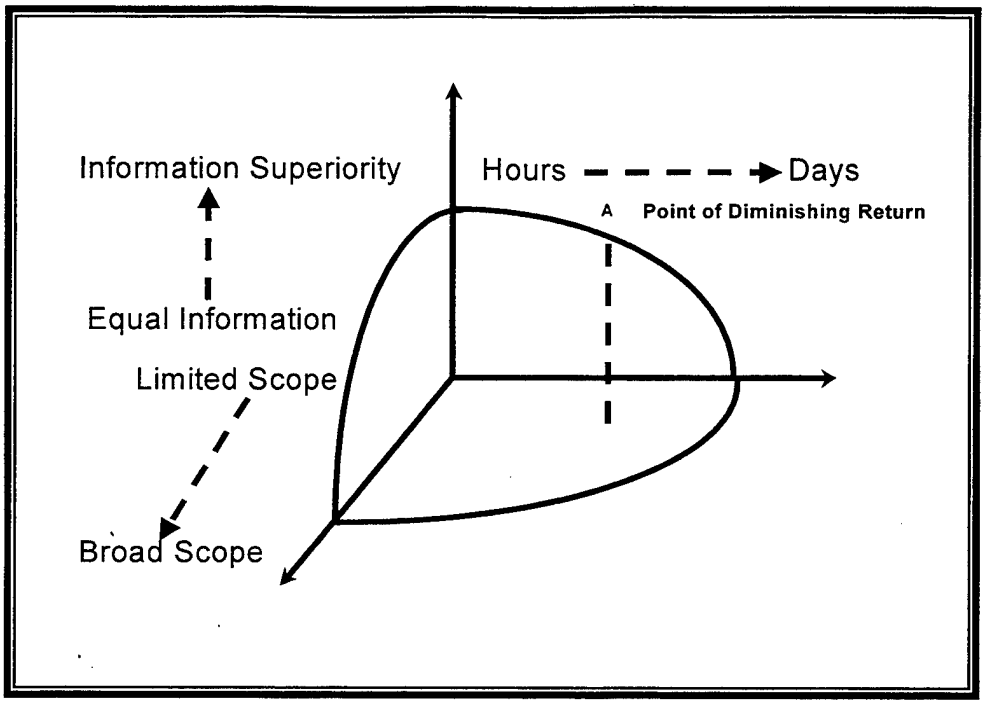

Figure 6.2: SOFIA-Induced Battlespace Superiority

In general the greater amount of time provided SOFIA forces to plan and rehearse an operation, and to collect, process, and disseminate information among key players, the greater the scope of operation they can undertake. There is a point in the time line though at which benefits are dramatically reduced (See Figure 6.2, point A). The primary cause of this effect is longer preparation times that may increase the chance of discovery of the operation, and provide the opposition time to prepare. Information balance between SOFIA forces and the opponent will be the key factor in determining the scope of the operation in which battlespace superiority can be obtained. Information superiority reduces the SOFIA forces OODA loop. The reduced OODA loop allows the SOFIA forces to maneuver their smaller ground elements between multiple decisive points. This ability to move from decisive point to decisive point, faster than the adversary can, may reduce the need for large numbers of ground troops. The close integration of IO and AP will provide the effects of the "missing" ground troops. AP will provide mobility about

the airfield and augment ground element firepower. IO/IW will increase the efficiency of the OODA loop in the observe, orient, and decide phases of the cycle.

E. SOFIA-INDUCED SYNERGIES

Tables 6.3 and 6.4 summarize the results of our SWOT analyses conducted in Chapters III, IV, and V. In Section A of this chapter we described the potential outcomes of the integration of the individual disciplines, and identified the four instances in which it is beneficial. In this section we will provide specific examples of the benefit of integration.

	STRENGTHS	WEAKNESSES
SPECIAL OPERATIONS FORCES	✓ Quality of personnel ✓ Sponsorship ✓ High state of readiness ✓ Small size ✓ Ability to task organize elements ✓ Variable lethality ✓ Variable profile (high, medium, low) ✓ High tooth-to-tail ratio ✓ Small "footprint" ✓ Economy of force ✓ Multilingual, culturally sensitive	✓ *Small in number* ✓ *Limited organic combat power* ✓ *Long lead time for training competent SOF* ✓ *Service training requirements at odds with Joint training* ✓ *Requires detailed intelligence often obtainable only through HUMINT* ✓ *Limited endurance in operations due to lack of organic support/logistics*
INFORMATION OPERATIONS	✓ *Impact of investigation of IO* ✓ *Technological superiority over 1st, 2nd, and many 3rd wave societies* ✓ *Achieve "desired effect" from a distance* ✓ *Information-in-war technologies*	✓ *Dependence upon information-in-war technologies* ✓ *Technological superiority ineffective against some 1st/2nd wave societies* ✓ *Increased intelligence requirements* ✓ *Change in the type of intelligence required*
AIRPOWER	✓ *Speed* ✓ *Range* ✓ *Flexibility* ✓ *Lift capability* ✓ *High percentage of units self-deployable* ✓ *Intelligence, surveillance, and reconnaissance (ISR)* ✓ *Lethality* ✓ *3rd dimension*	✓ *Limited individual platform endurance during operations (0-24 hours)* ✓ *Long lead time for training competent airmen/aircrew* ✓ *Requires fixed airfields and large support infrastructure for sustained operations (low tooth-to-tail ratio)* ✓ *Aircraft vulnerable when on the ground*

Table 6.3: Strengths and Opportunities of SOF, IO, and AP

	OPPORTUNITIES	THREATS
SPECIAL OPERATIONS FORCES	✓ *Increasing mission area applicability* ✓ *IO/IW* ✓ *Technology*	✓ *High OPSTEMPO & PERSTEMPO* ✓ *Conventionalization* ✓ *Opportunity for overcontrol/misuse by commanders/national decision-makers* ✓ *Need for secrecy impacts proper coordination* ✓ *"Free Lunch" syndrome* ✓ *Inadequate C2* ✓ *Inadequate intelligence support*
INFORMATION OPERATIONS	✓ *Decrease friendly/adversary casualties* ✓ *Ability to create "technology dependencies" worldwide*	✓ *Volume of information* ✓ *Vulnerability to foreign "technology dependence"* ✓ *Increasing the technology gap through modernization* ✓ *WMD response to IW attacks*
AIRPOWER	✓ *Technology* 1. *Reduced requirement for fixed airfields and support infrastructure (V/STOL, increased platform capabilities)* 2. *Reduced requirement for aircrew (UAV/UCAV)*	✓ *High OPSTEMPO & PERSTEMPO (negatively effecting pilot/aircrew retention)*

Table 6.4: Opportunities for, and Threats to, SOF, IO, and AP.

1. Strengths and Opportunities NEGATE Weaknesses and Threats

The inherent speed, range, and flexibility of AP combined with the ability of IO/IW to affect second and third-wave information systems from a distance, can negate the limited organic combat power of SOF. By their nature, SOF possess little firepower. Ground elements (including Army Special Forces, Navy SEALS, and AF Special Tactics teams) are limited by the mission requirement that equipment be man portable. This

limits them primarily to small arms. Air elements (other than AC-130H/U and AH-6 "gunships") are designed to transport troops, not to engage targets.

Conventional AP can supply the missing firepower of SOF. Fighter and attack aircraft can provide air superiority and service targets designated by SOF elements. IO/IW can attack the adversary's information systems, reducing the effectiveness of his C2. Reducing the effectiveness of his C2 through IO/IW limits his ability to respond to the action. Limited ability to respond to the action provides the SOFIA force the freedom to conduct their operation.

The multilingual capability and cultural sensitivity of SOF may overcome the ineffectiveness of the technological superiority of U.S. IO/IW systems used against first-wave adversaries. The U.S. IO/IW technical approach relies upon the technical superiority of U.S. information systems/applications. But as described in chapter four, first-wave societies will not be susceptible to this approach because the information systems utilized by those societies will not be reliant upon networked computers. In those cases, the psychological approach will be most effective. But in order to successfully implement PSYOPS against those societies, it will be essential to understand the people, culture, and "stories." SOF provides this capability.

The opportunities suggested by UAVs and UCAVs may negate the high OPSTEMPO/PERSTEMPO of both SOF and AP personnel. SOF and AP personnel conduct reconnaissance and surveillance operations. UAVs and UCAVs coupled with a variety of information-in-war technologies may be able to accomplish the same missions. Planned Tier II+ (conventional high altitude endurance) UAVs such as GLOBAL HAWK, or low observable Tier III- (low observable high altitude endurance) systems

such as DARKSTAR will allow the U.S. to put a variety of sensors on target for greater periods of time than traditional manned reconnaissance platforms.

2. Strengths and Opportunities MAGNIFY Strengths and Opportunities

The speed, range, and flexibility of AP and the impact of investigation of IO/IW capabilities/systems can magnify the strengths of small size, variable lethality, and high state of readiness of SOF. AP can provide the mobility and decrease time lines for placing SOF elements in position. IO/IW investigation of the vulnerability of information systems can pin point critical nodes for attack, whether it be destruction or manipulation. The small size, variable lethality, and high state of readiness of SOF allows the U.S. to take advantage of the options presented by IO and AP.

The ability of AP to optimally position ISR systems, and process and disseminate collected information magnifies the strength of IO/IW to affect second and third-wave information systems from a distance. Manned airborne ISR systems such as RC-135 RIVET JOINT or U-2, allows the U.S. to position sensors optimally to collect intelligence that supports EW and IBW efforts. Near real time dissemination of this information to decision-makers enhances the ability of the U.S. to effectively target opponents information systems.

3. Weaknesses and Threats NEGATE Weaknesses and Threats

The threats of increasing volume of information and increasing the technology gap through modernization to IO/IW may negate the threat of inadequate C2 of SOF. The greatest threat to SOF C2 is lack of information, and a poor ability to disseminate information to appropriate decision-makers. While IO/IW is threatened by the ever

increasing amount of information available electronically and the risks posed by increasing the technology gap through modernization, these both may provide solutions to the SOF C2 problem. Greater information availability may mean that their will be more relevant information to be collected and processed. Increasing modernization of U.S. information-in-war technologies may provide the SOF community with systems better equipped to provide information to decision-makers.

4. Weaknesses and Threats MAGNIFY Strengths and Opportunities

The small size of SOF units limits organic combat power. The small number of SOF units limits the number of operations in which they can participate. The speed, range, flexibility, and ability to self-deploy of AP may be magnified by the aforementioned SOF weaknesses. The small number and size of SOF units makes them easily air transportable. The ability to move them by air means they can be transferred from operation to operation quickly.

F. CONCLUSION

1. Suggested Historical Cases.

SOFIA doctrine is at the conceptual stage of development. The benefits of widespread, planned, and coherent integration of SOF, IO, and AP have yet to be proven in the field. A brief review of conflict during the twentieth century suggests several cases that may prove useful in highlighting historical examples of SOF, IO, and AP integration. We have attempted to categorize examples using a variety of variables that we have highlighted throughout our thesis. Additional research would be required to either prove or disprove the merit of each case for integration.

Tables 6.5 and 6.6 summarize some examples that may warrant further investigation. Table 6.5 highlights SOF, IO, and AP participating in primarily DA missions of varying length. Table 6.6 includes actions that are included in the concept of MOOTW.

	OPERATION JUST CAUSE	SON TAY	DESERT SHIELD DESERT STORM
ROBUSTNESS			
ADVERSARY "WAVE"	*FIRST/SECOND*	*FIRST/SECOND*	*SECOND*
COMPETITOR	*NICHE*	*NICHE*	*NICHE*
INTENSITY	*LOW*	*MEDIUM*	*HIGH*
SCENARIO FACTORS			
POPULATION?	-	-	-
RESOURCES?	*YES*	-	*YES*
TECHNOLOGY?	*YES*	*YES*	*YES*
ETHNO-NATIONALISM?	*YES*	-	-
RELIGION?	-	-	*YES*
NGOs/TCOs?	-	-	-
CLASH OF CIVILIZATAIONS?	*YES*	*YES*	*YES*
RELATIVE DISCIPLINE UTILITY			
SOF	*HIGH*	*HIGH*	*LIGHT*
IO	*MEDIUM*	*MEDIUM*	*HIGH*
AP	*MEDIUM*	*MEDIUM*	*HIGH*
TYPE OF OPERATION	*DA*	*RESCUE*	*DA/SPECIAL RECONNAISSANCE*
SOFIA NATIONALITY	*U.S.*	*U.S.*	*U.S./COALITION*
OUTCOME	*SUCCESS*	*FAILURE/SUCCESS*	*SUCCUESS*

Table 6.5: SOF, IO, and AP direct action missions.

Operation JUST CAUSE began on 20 December 1989 with the purpose of capturing Manuel Noreiga and the establishment of a democratic government in Panama. SOF were responsible for several missions in conjunction with this operation including assaults on the Omar Torrijos International Airport, and the Rio Hato and Paitilla airfields. AP assets involved included AC-130H SPECTRE, AH-6, F-117

NIGHTHAWK, MH-60 BLACKHAWK, and a variety of tactical and strategic airlift for movement of forces both inter and intra-theater. SOF forces included the 75th Ranger Regiments, 4th Psychological Operations Group, 96th Civil Affairs Battalion, Air Force Special Tactics teams, and SEAL teams (United States Special Operations Command, 1998, p. 19). Information operations included actions conducted by the 4th Psychological Operations Group.

Operation KING PIN, the raid on the Son Tay prison camp in North Vietnam, began on 20 November 1970. Air Force intelligence photo interpreters had detected signs of American POWs at the camp in May of that year. The raid itself was unsuccessful in rescuing any prisoners, but was successful in demonstrating the competency of U.S. SOF. Air assets included MC-130E COMBAT TALON I, A-1 SKYRAIDER, MH-53 PAVELOW, HH-3 JOLLY GREEN GIANT, F-105 WILD WEASELS, and RC-135 RIVET JOINT (Vanderbroucke, 1993). SOF consisted of both specialized AP and a ground element comprised mainly of U.S. Army Special Forces soldiers. IO included military deception operations conducted by U.S. Navy fighters simulating an attack on Haiphong harbor to overload and confuse the North Vietnamese IADs.

Operation DESERT STORM included a variety of SOF, IO, and AP missions encompassing DA, SR, and CSAR actions. DA and SR missions include the attack on Iraqi early warning radars, and the hunt for SCUD missile launchers and C2 nodes. Air assets included both specialized and conventional systems. SOF included USAF Special Tactics teams, USN SEAL teams, and USA Special Forces. Primary IO actions revolved around PSYOPS, EW and perception management.

	BOSNIA-HERZOGOVINA	SOMALIA
ROBUSTNESS		
ADVERSARY "WAVE"	*SECOND/THIRD*	*FIRST*
COMPETITOR	*NICHE*	*NICHE*
INTENSITY	*VARIABLE*	*LOW*
SCENARIO FACTORS		
POPULATION?	*YES*	*YES*
RESOURCES?	*YES*	*YES*
TECHNOLOGY?	*YES*	*YES*
ETHNO-NATIONALISM?	*YES*	*YES*
RELIGION?	*YES*	-
NGOs/TCOs?	*YES*	*YES*
CLASH OF CIVILIZATAIONS?	*YES*	*YES*
RELATIVE DISCIPLINE UTILITY		
SOF	*HIGH*	*HIGH*
IO	*MEDIUM*	*MEDIUM*
AP	*HIGH*	*MEDIUM*
TYPE OF OPERATION	*PEACE OPERATIONS*	*PEACE OPERATIONS NATION BUILDING*
SOFIA NATIONALITY	*U.S./NATO*	*U.S./UNITED NATIONS*
OUTCOME	*ON-GOING*	*FAILURE*

Table 6.6: SOF, IO, and AP MOOTW missions.

Operation JOINT ENDEAVOR/JOINT GUARD began in 1995 and continues to the present as part of the stabilization forces (SFOR) deployed to Bosnia-Herzogovina tasked with "peace enforcement (including separating the warring factions, establishing demilitarized zones, and maintaining security) and support for the withdrawal of UN forces from the former Yugoslavia" (United States Special Operations Command, 1998). SOF are centered around both the Joint Special Operations Task Force–2 (JSOTF-2) and the Combined Joint Special Operations Task Force (CJSOTF). This operation includes both U.S. and NATO country SOF. AP assets have included both specialized and

conventional platforms. Notable IO actions have involved EC-130E COMMANDO SOLO, ground-based psychological operations forces, and perception management efforts in an attempt to promote the missions of SFOR.

Operation RESTORE HOPE/UNOSOM II ran from 1992-1995 in Somalia with primary missions of ensuring fair and adequate distribution of food supplies, and capture of General Mohammed Farah Aideed. U.S. SOF included elements of the 5th Special Forces Group, SEAL Team 1, and the 96th Civil Affairs Battalion. AP included AC-130H SPECTRE and MH-60 BLACKHAWK. IO actions were centered on a joint psychological operations task force (JPOTF) that produced both leaflets and radio broadcasts. After the failure of Task Force RANGER to capture General Aideed, U.S. forces were withdrawn from Somalia.

2. The Next Step.

While "looking back" provides us with examples of previous SOF, IO, and AP integration, only by "looking forward" will it be possible to "operationalize" the SOFIA doctrine. In chapter two we attempted to identify and highlight some of the factors that we feel will affect the operating environment early in the next century. Our summary of these factors and description of the environment need to be expanded into three to five scenarios and used to test suggested SOFIA TTP. This is beyond the scope of this thesis; but we believe that this study has provided the conceptual framework necessary to engage in such research.

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