TOWARD DEVELOPMENT OF AN INTEGRATED AEROSPACE POWER DOCTRINE

THESIS

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DOCTRINE

THESIS

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Preface

When the Air Force Space Battlelab sponsored this work, they intended to have space control doctrine written. I, also, intended to write space control doctrine, but through the research discovered the wrong questions may have been asked. This work is provocative and open to a great deal of interpretation depending on personal perspectives. If it is considered in its entirety, it provides a stimulus for thought, but a reader may still not agree with my ultimate conclusions.

I would like to acknowledge the support of the Air Force Space Battlelab for allowing total academic freedom in pursuit of my ultimate conclusions. I would like to make clear, however, that the Air Force Space Battlelab does not endorse all of the opinions, declarations, and conclusions expressed within this paper.

Every attempt has been made to accurately quote all individuals interviewed as part of the research effort. Any misquote or quotation taken out of context was unintentional. Furthermore, the authors who are quoted in this paper do no necessarily endorse the declarations or conclusions drawn

recognition. Majors Mike Dickey, Winthrop Idle and Sam McCraw, and Lieutenant Colonels Tony Russo and Cynthia McKinley were very candid, sincere, and insightful in my meetings with them. They appeared genuinely interested in my work, which provided motivation during the difficult times. Retired Colonel Marv Kramer opened doors to new perspectives by volunteering to help facilitate meetings with some of his former colleagues and personal friends. These new viewpoints were valuable, and would not have been garnered otherwise.

Captain Bill Thomas was very forthright in his comments during our meeting and through his personal correspondence. His feedback and insights provided a great deal of substance to the doctrine development model. Also, he was very supportive through his encouragement of the effort and direction of this work.

Professor Dennis Drew, through all of his writings on the topic of Air Force doctrine, established the base for this work. Everyone in the Air Force owes him a great deal for his constant commitment to making doctrine better. On a personal level, he made time to meet with me, and provided his honest opinions on my work. Ultimately, though it may be different than any envisioned, his thoughts framed this work. Professor Drew also pointed the way for me to find Professor I.B. Holley Jr.

It was an especially great experience to meet Professor Holley. I am very grateful to the Air Force for affording me the opportunity to meet such a great

man. More so, I am grateful to the professor for his timely advice, for sharing with me the Duke campus and his life stories, and for caring about doctrine so much that he is put his thoughts and ideas down on paper. Sir, I do hope I can live up to the standard you have set.

I want to thank Captains Troy Endicott, Dan Jones, George Nagy and Kari Wallace for their assistance while I was writing this. These fellow classmates turned offers into actions. Their actions helped me to finish this work.

Unquestionably, this could not have been completed without the support of my family. Heide never questioned my unconventional approach, even though it made our home life less than normal. She supported all of the TDYs and resisted reorganizing my many piles of books. While in the throes of finishing this, Heide went to Colorado Springs in advance of our PCS. Playing Mr. Mom was quite revealing. It provided me with an insight into the challenges that TDYs and short tours create for military spouses. For that perspective I am, honestly, grateful.

Both of my daughters were a pure joy. Although the six weeks of intense writing were far from easy, they were easier because of having two great girls. Their smiles and giggles reinvigorated my weary spirit and kept me pressing on towards completing this project. At times their questions were tedious, but their eyes showed me why I set out on this journey in the first place.

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List of Acronyms

ABC	Aerospace Basic Course
ACC	Air Combat Command
ACSC	Air Command and Staff College
ACTS	Air Corps Tactical School
AFA	Air Force Association
AFB	Air Force Base
AFDC	Air Force Doctrine Center
AFDD	Air Force Doctrine Document
AFDWC	Air Force Doctrine Working Committee
AFDWG	Air Force Doctrine Working Group
AFI	Air Force Instruction
AFIT	Air Force Institute of Technology
AFMC	Air Force Materiel Command
AFNS	Air Force News Service
AFPD	Air Force Policy Directive
AFSB	Air Force Space Battlelab
AFSC	Air Force Specialty Code
AFSPC	Air Force Space Command
AFSST	Air Force Space Support Teams
AFT	Alternative-Focused Thinking
AFTTP	Air Force Tactics, Techniques, and Procedures
AOR	Area of Responsibility
ARI	Airpower Research Institute
ARPA	Advanced Research Projects Agency
ASAT	Anti-Satellite
ASBC	Air and Space Basic Course
AU	Air University
BMD	Ballistic Missile Defense

CINC	Commander in Chief
CoS	Control of Space
CSAF	Chief of Staff of the Air Force
DIA	Defense Intelligence Agency
DCI	Director of Central Intelligence
DRU	Direct Reporting Unit
FEBA	Forward Extent of the Battle Area
FOA	Field Operating Agencies
GEO	Geosynchronous Orbit
GPS	Global Positioning System
GSO	Graduate Space Operations
ICBM	Intercontinental Ballistic Missile
IRBM	Intermediate Range Ballistic Missile
ISR	Intelligence, Surveillance, and Reconnaissance
LEO	Low Earth Orbit
MAJCOM	Major Command
MILSATCOM	Military Satellite Communications
MOE	Measure of Effectiveness
MOL	Manned Orbital Laboratory
MOOTW	Military Operations Other Than War
NASA	National Aeronautics and Space Administration
NCA	National Command Authority
NRO	National Reconnaissance Office
NSF	National Space Force
OTS	Officer Training School
PME	Professional Military Education
PRA	Primary Review Authority
RAAF	Royal Australian Air Force
RASFOR	Rapid Space Force Reconstitution

SAAS	School of Advanced Airpower Studies
SBL	Space-Based Laser
SLV	Space Launch Vehicle
SMC	Space and Missile Center
SME	Subject Matter Experts
STS	Space Transportation System (Space Shuttle)
TTP	Tactics, Techniques, and Procedures
UAV	Unmanned Aerial Vehicle
US	United States
USA	United States Army
USAF	United States Air Force
USCINCSPACE	Commander in Chief, US Space Command
USMC	United States Marine Corps
USN	United States Navy
USSPACECOM	United States Space Command
VFT	Value-Focused Thinking
WPAFB	Wright-Patterson Air Force Base

TOWARD DEVELOPMENT OF AN INTEGRATED AEROSPACE POWER DOCTRINE

I. Introduction

Military historians are exasperating fellows; they profess to help the decision-maker, the activist military commander, to see more deeply into his problem. They are exasperating because instead of simplifying the commander's problem they only show him how much more difficult it is than it appeared at first.   - Holley (61:5)

Since last August, the United States has engaged in multiple attacks overseas. Although these incidents have raised eyebrows because of the similarity to the Hollywood movie *Wag the Dog,* more importantly, they have demonstrated the National Command Authority's willingness to use force when the risk to American lives was low. The key to these operations has been airpower, emphasizing the concept of striking at the heart of the enemy, without placing ground forces in harm's way, is alive and well. Furthermore, the attacks bring to light the significance of missiles and space assets in the way the United States currently conducts its foreign affairs.

Last August was when the Air Force Space Battlelab sponsored this work. Part of AFSB's charter is to address doctrine. One of the first initiatives submitted concerned the lack of space doctrine. In particular, there was concern the Space Control mission area was underdeveloped in current doctrine documents. The AFSB initially brought the issue to Air Force Space Command Plan's Directorate (AFSPC/XP), who recognized the need, but lacked the manpower to accomplish the task. They then looked to the newly formed Air Force Doctrine Center (AFDC), hoping they would write the doctrine. The

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AFSB interpreted a remark from those at the doctrine center that they "did not write doctrine but facilitated the writing of doctrine" to mean the AFDC only staffed doctrine for approval. When the Battlelab was approached to sponsor thesis work for students at the Air Force Institute of Technology (AFIT) they felt this was their opportunity to have space control doctrine written. They approached AFSPC/XP with this solution, and XP stood up to co-sponsor the thesis to write of space control doctrine (76).

Before any doctrine could be written, a methodology for writing doctrine had to be established. The initial hope was to find an existing process. A thorough literature review, however, showed that doctrinal scholars, such as retired Major General (USAFR) I.B. Holley, Jr., professor emeritus at Duke University, and retired Colonel (USAF) Dennis M. Drew, professor at the School of Advanced Airpower Studies (SAAS), have long called for systematic doctrine development without significant progress. Drew has suggested several models for developing doctrine (32;33), but they were focused on historical research. A major problem with space control is there is no significant historical basis upon which to build. Space control doctrine would have to be developed using more than just experience.

The idea that doctrine was primarily a decision-making tool led to the realization that perhaps new innovations in decision-making theory might be appropriate. Value-focused thinking (VFT), as described by Ralph Keeney, is a potentially powerful theory. Over the past five years, the Air Force has examined the concept, but has never come close to full utilization. In using VFT, values are thoroughly considered and explicitly stated before any alternatives are contemplated. These values capture the "why's" of

what decision-makers (in this case the Air Force) want to do. A marriage between VFT and doctrine development could be very efficacious.

Values are an important topic in the Air Force these days. A declining Air Force culture is also of major concern. One possible cause of the decay of culture is the weakness of Air Force doctrine. Carl Builder has addressed this issue in *The Icarus Syndrome*. His fundamental thesis is:

> The institutional problems now troubling the Air Force will not be resolved until it once again orients itself to a mission worthy of devotion by an independent military institution—not to its ends (more, better, higher, faster, farther), but to the ends of those its serves (cheaper, quicker, easier, safer). Redefining air power won't ensure the institutional health of the Air Force; but its health can't be recovered without it. Thus, fixing air power theory is a necessary, but not a sufficient, prerequisite to fixing the Air Force. (12:205)

Building on Builder's suggestions, the Air Force needs to not only redefine air power, but also then translate it into doctrine.

If Carl Builder is correct, the United States Air Force (USAF) is in trouble. It has lost sight of the vision for its existence. Originally, the Air Force's primary reason for becoming an independent service was the ideas encapsulated in airpower theory. Somewhere along the way, the Air Force lost its reason for being because it gave up on that theory and forgot about the ends because of an overemphasis of the means.

Along the road to losing its *raison d' etre*, the Air Force has underutilized its space and missile assets, mostly because they are a different means than the airplane. Artificial concepts, like "aerospace," have been contrived to combine air and space into one institution. From the traditional environmental approach of air, land, and sea,

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however, space is definitely a separate environment from air. The differences between aerodynamics and astrodynamics are too great to even consider an environmental "aerospace" concept.

However, if aerospace is approached from a perspective based on operating from the third dimension the concept seems much more sound. Indeed, from that perspective many of the features of air and space are similar. They merge even more if the focus is on the "ends" they provide to national defense.

Some contend today's aerospace doctrine is really nothing more than doing a "find and replace" of the words "air and space" with the single word "aerospace" that is following on the heels of a "find and replace" for the word "air" with the words "air and space." An actual consideration of the concept of aerospace based on operating from the third dimension has not taken place. If this concept were investigated it might prove quite revealing and actually create a conceivable bond between air and space operations.

Space operations have been subordinated to a support role for, perhaps, too long. Historically, this has been the result of both limited technology and cautious space policies. Today, and presumably far into the future, the force enhancement provided by space will be of the utmost importance. It is so important that it must be protected. In order to protect the force enhancement mission, the space control mission is imperative. Space control means space operations have to move beyond just support.

Space can potentially provide much more than mere support to air, sea, and land forces. If it is to ever reach this potential, space must be considered beyond force enhancement. A deep analysis of what space can provide, taken beyond present treaty

and technology limitations, is absolutely necessary. More so, this analysis should include the entire concept of "aerospace."

Initiating a doctrine development model based on value-focused thinking and then applying it from scratch to the concept of operating in the third dimension will not be a panacea for all of the Air Force's ills. It is the first step to invigorating the Air Force. It is the right step to recapturing Air Force culture. It is where the Air Force should go.

Purpose of Thesis

This work addresses the issue of space control doctrine for the Air Force. In order to properly address this issue, there are two aspects of the work: doctrine development and space control. In the end, both these aspects will be considered as one. They are, however, distinct concepts with their own pitfalls. Both are riddled with controversy and both are critical to the Air Force. Before they can be examined together, they have to be considered separately.

The Air Force does not have a systematic, analytical, intellectually based way of developing doctrine. Although the AFDC is producing doctrine on a regular basis, these documents are far from perfect. Before more doctrine is drafted, a new approach should be taken. This approach places values before alternatives, marrying the concepts of value-focused thinking with doctrine development. A doctrine development model utilizing VFT could help the Air Force produce quality doctrine.

The importance of space assets is growing exponentially. This importance is no longer solely felt by the military. In the next century, commercialization of space will

hold the economic promise that the seas held in past centuries. Commercialization is also blurring the distinctions regarding access to space products. These products are of extreme value in achieving battlespace awareness, an awareness that is critical to effective military campaigns. Maintaining our ability to freely operate in space while limiting an adversary's ability is critical to national security. These abilities constitute space control. Today, the Air Force does not have doctrine that adequately addresses space control issues. Spectrums of issues exist, which require proper consideration.

Another issue running a parallel course to these two aspects is the state of the Air Force. The Air Force appears to be on the verge of, if not already engulfed in, a major struggle because of a number of factors. First, Air Force culture looks as though it has declined to the point of near non-existence. Likewise, the worship of the airplane has overtaken the devotion to airpower. Furthermore, airmen see themselves as specialists rather than professionals in arms. Additionally, airmen have lost any knowledge and understanding of Air Force doctrine they may have once had. All told, the essence of being part of airpower appears to have been lost or set aside.

Simultaneously, space is emerging. Some suggest Space Command is for the Air Force what the Army Air Corps was for the Army during the interwar years and at the close of the Second World War. While others, including prominent members of Congress, suggest that maybe one of the other services would provide better stewardship for space. The simple fact is if treatment of space continues as it has for the past forty years, some of these suggestions may become reality.

On the other hand, space and air can be merged into an aerospace concept—a concept based on the fundamental objectives of operating from the third dimension. Doctrine developed using values as the foundation can provide the Air Force with an aerospace power vision. This vision can provide airmen with a common belief, which will serve as a unifying force and a shared bond.

Methodology

Given the distinct nature of the two elements to this thesis, it was approached using a three-step process. The first step was developing an understanding of doctrine, with the intent of it leading to the formation of a doctrine development model. In the second step the debate surrounding space control was addressed to develop an understanding of the issues. The final step incorporated merging the first two items into answering the questions of space control doctrine.

Throughout the methodology the principles of value-focused thinking were applied. VFT was incorporated in outlook more than in a formal process. At no point were "value hierarchies" developed. An aspect of this thesis is an affirmation of the real power of VFT being found in the idea that values should guide thinking. Therefore, thinking about values was present throughout the research.

Research for this project centered on reviewing literature and on interviewing individuals who are considered to be subject matter experts (SMEs). *Air University Review* and *Airpower Journal* were two primary sources for individual's thoughts on doctrine, space issues, and space doctrine. The time frame for these articles varied between the late 1970s through the actual writing of the draft. For information before the

1980s, Robert Frank Futrell's two volume series, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force* were an invaluable source. David N. Spires' *Beyond Horizons: A Half Century of Air Force Space Leadership* was also greatly utilized. Materials published by Air University Press at Maxwell AFB, Alabama, were also relied upon greatly. Doctrinal expertise was sought from three places: the Air Force Doctrine Center (AFDC), the School of Advanced Airpower Studies (SAAS), and Professor I. B. Holley, Jr. Space control expertise was sought primarily from personnel at headquarters AFSPC.

Interviews were designed to achieve two goals. First, since the individuals being interviewed were considered SMEs, they would be able to provide an understanding of the topic, potential pitfalls, and additional references. Second, they could convey what they valued. Those values could then be used as the basis for the values associated with doctrine, space control, and space control doctrine.

For this thesis, a traditional literature review was impractical. The ideas expressed in the literature were the datum that had to be analyzed. All of the various authors were considered to be interviewees, only without the opportunity for direct questioning. Although it was less direct and more time consuming, the same two previously noted goals remained valid.

Ideas were analyzed from two perspectives. First, they were considered from a historical perspective. This focused on trends, how things developed, and why they happened the way they did. It is important to note, however, that this was not necessarily a traditional approach. This paper is not filled with stories and analysis of those stories.

The expertise of actual historians was relied upon to interpret specific events. Their interpretations were investigated, but those investigations are not provided in this document. Second, a systems engineering perspective was applied. Emphasis was placed on processes and the relationship of parts to the whole. This non-traditional approach coupled with VFT facilitated the formulation of a doctrine development model.

This work was very broad in scope. It avoided the temptation to revert to alternative-focused thinking by not considering alternatives. Since alternatives were excluded, there was no need to seek out classified information. Means to employ space control were only considered under the guise of trying to capture values. Feasibility of technologies was not examined. Political and legal constraints, including treaties, also were not investigated, as they could be very limiting. This is not to suggest that they are not influential, but rather affirms that they could be very influential, even though they are frequently dependent upon the current administration or the thought of the day. If desired, these constraints could be applied later.

Semantics

"That is a matter of semantics" seems to be so oft quoted that it is becoming flippant. It is becoming increasingly frustrating when so much emphasis is placed on the exact meaning of a word. Perhaps, we have reached the point were the nuances of words are becoming "technicalities." In the world of doctrine, semantics are important. As SAAS Professor Dennis Drew has noted, "Throughout the literature concerning military doctrine, semantic problems confuse readers and muddle issues"(31).

Clearly, appropriately defining terms is a necessary and critical step to help reduce the opportunity for debate over terminology. Debate is a rewarding thing, but it needs to be focused on issues and not on mere "technicalities." This is not to suggest that definitions should be established haphazardly; yet, finding the correct definition should not become so overwhelming that it wastes effort.

It seems the more controversial the topic, or the more active the debate, the more apt it is for semantic issues to rise. Both doctrine and space control are topic areas where distinct opinions abound. Defining terms is one of the fundamental elements of this work. Since definitions will be made explicit, the hope is that the debate this work may facilitate will be tied to the concepts built by combining words rather than the nuances of specific words.

Limitations

The biggest limitation for this work was the time frame involved. Addressing issues as complicated as doctrine and space control have been considered individually in theses. Trying to address both, and then bring them together in one work is a challenge. These issues are both current and historical, which creates a wide range of references. Ideas from 40 years ago are just as relevant as those considered today. Covering this broad range is both difficult and time consuming. In no way is the bibliography found at the end of this work exhaustive. Indeed, it could be doubled in length and would still be missing references. With more time, more references could have been investigated.

Additional time would have provided the opportunity to iterate and revise the model. The true test of any doctrine comes with time. To maximize the utility of the

model, it is necessary to use it, apply its products, analyze the results, and then modify the model accordingly. This is subject to the crisis of the day and all of the other influential factors further pursued in this report. Only time will tell how complete the model actually is.

Another time factor is becoming familiar with the ideas central to the issues. The bulk of this work is outside of the realm of the Graduate Space Operations (GSO) program at AFIT. Furthermore, undergraduate work in mechanical engineering is essentially unrelated to doctrinal considerations. Even the space control concepts are fundamentally outside of the technical scope of an engineering program. Although it might be suggested that all Air Force space operators conceptualize the fundamental elements to this thesis, this is a false conjecture. Neither the Air Force's commissioning programs nor the space operations training courses adequately address their respective portions of the space control doctrine dilemma. More time would provide for more research and better understanding.

Navigating the Document

This document consists of eleven chapters. Each chapter begins with a balanced discussion of the issues. This is followed by a "Reflections" section, which provides a summary of the previous information within the chapter, and indicates the author's insights. For Chapter VI, A New Way to Develop Doctrine, and Chapter X, Applying the Development Model to Space Control, the "Reflections" section is a "Summary." In those two cases, this is because the majority of the information within the chapters is based on the author's insights.

This document opens with the state of the Air Force today. The primary motivation for this initial chapter is *The Icarus Syndrome*. Builder has made an excellent case for the decline of the Air Force because of a failure to remain focused on the ends of Air Power. There are others, besides Builder, who feel the Air Force is in tumultuous times. The signs of these times are the declining appreciation for what it means to be an "airman," the rise of occupationalism, and a declining dedication to doctrine. Some believe these factors have resulted in the destruction of Air Force culture. Another cause of conflict is the perception it is a pilot's Air Force. The increasing importance of space assets is challenging this traditional "rated" view of the world. Indeed, some argue Space Command is for the Air Force as the Army Air Corps was for the interwar years Army. The removal of space from the Air Force is a real issue because of recent congressional concern over the stewardship of space. A separate space force is not the only contender, as the Navy suggests space belongs under its domain because space and the seas are more analogous. These issues open the paper, because they set the tone and indicate a need to focus on values.

The third chapter discusses the power of values. Specifically, it addresses Ralph Keeney's concept of value-focused thinking. Initially, background is provided on some decision-making ideas and their connection to the military. The next concept is alternative-focused thinking, which is the traditional way for making decisions. By considering alternative-focused thinking first, it provides more insight into the real power of value-focused thinking. Finally, the issue of the way the Air Force approaches decision-making today is considered. A major point of this section is a reaffirmation of the fundamental premise of value-focused thinking: values come before alternatives.

Given the suggested state of the Air Force and the power of value-focused thinking, it is then possible to consider doctrine. The first step is trying to define doctrine, which also includes the levels and types of doctrine. A more meaningful understanding is possible through consideration of the functions of doctrine. There is no consensus on any of these items. Among scholars, however, there is near unanimity on the importance of doctrine. Solid doctrine is vital to a successful military operation. Doctrine is primarily based on experience, but theory and technology are also influential. Strategy and doctrine share a mutually influential relationship that is almost cyclical. For the US military the principles of war are given foundational status. Some criticize this as potentially dangerous. In their view, judgement is critical to applying doctrine, no matter how authoritative it may appear to be. Although theory is considered a major source of doctrine, there is controversy over how much theory should become doctrine. Indeed, some question whether doctrine is nothing more than just theory. The relationship between technology and doctrine is also unsettled. Does technology pull or is it pushed by doctrine? Most of these issues have no definitive answer, but they are an essential part of understanding doctrine.

With a better understanding of doctrine it is possible to consider how the Air Force develops doctrine. The Air Force has a process for developing doctrine as outlined in AFI 10-1301. This process focuses on timelines over content, which is a cause of dismay for doctrinal scholars. The AFDC is responsible for the process of developing doctrine as well as publishing doctrine. Doctrine publication has become focused on readability and convenience for the user. The ultimate charge against the Air Force

approach to doctrine is that it is controlled by an anti-intellectual sentiment that blankets today's Air Force.

A review of the Air Force's current process provides more perspective on the proposed model. This new approach to doctrine development is based on VFT. Rather than search for specific doctrinal definitions, it focuses on the intended purposes of doctrine and the values the doctrine promotes. A fundamental aspect of this new approach is the iterative nature of development. Doctrine requires research, analysis, and discussion. Feedback is essential to quality development. There are a variety of sources for research, which help to provide support to the values conceived in the development process. This model does not incorporate issues of who should write doctrine, the concept of classifying doctrine, or the need for doctrinal education. They are, however, vital and deserve additional consideration. This chapter concludes the first part of the work, addressing doctrine to formulate a development model.

The second part begins with a look at space thought. Space issues are not new, and the essence of current debate is found in early space thought. This has led to the formalizing of four schools of thought for space: sanctuary, survivability, control, and high-ground. Each of these schools has a distinct philosophy about the use of space. The debate over their convictions continues today. Another debate, which provides insight into the state of affairs in space, is the perceived dilemma over whether space is a place or a mission. Controversy has surrounded the term "aerospace" since its inception. Many feel the aerospace concept is the fundamental fallacy keeping space assets from reaching

their full potential. Others argue the concept is quite sound, especially when considered from a dimensional rather than environmental perspective.

Space thought leads directly into a look at space doctrine. Many, based on their given philosophical outlook, have suggested what they believe should be the foundations of space doctrine. These foundations are very insightful and help with understanding how space doctrine development is perceived. Recently, three authors have addressed two different approaches to space. One approach suggests the need for "space combat power." The other is based on an "infospheric" concept rather than the traditional atmospheric. These new approaches are also very insightful, for they address some of the values of the authors in regards to space.

With an understanding of space thought and elemental space doctrine, it is possible to consider the concept of controlling space. One roadblock for developing space control systems is the question of whether or not a threat exists. This challenge is complicated by the proliferation of space products in conjunction with the commercialization of space. Some feel the military should embrace the potential benefits of commercial space, while others feel this new drive will create an economic impetus for military involvement in space. Many strongly believe there is a threat and the proliferation of space products mandates the need for space control. There is some question as to whether the need is for space control or space superiority. Furthermore, the missions and elements of space control are not standard. One example is the issue of spacelift. Many feel it is not part of space control, while at least one author has made a case for its inclusion. The issue of space control is incomplete without its most

controversial aspect, anti-satellite (ASAT) systems. Some feel it is one more tool, while others view it as the introduction of a weapons race in space.

In Chapter X, all of the space ideas are incorporated into the doctrine development model. The potential doctrinal purposes of a space control doctrine are considered. Then the values of space control themselves are postulated. This leads to the question of whether or not space control is even an appropriate topic. Ultimately, the broader values of aerospace power, as conceived by the dimensional proponents, are discussed.

Finally, Chapter XI takes a look back through the entire document. The focus is on providing a compendium of the author's insights and the key points of the work. In the end, this is a call for the development of aerospace power doctrine using a development model based on value-focused thinking rather than the existing AFDC process. This new doctrine could provide the unity and culture the Air Force desires and needs.

II. The State of the Air Force

Like a child who can sense the slightest favoritism of a parent toward a sibling, the groundlings quickly recognized that the aviators who ran the Air Force were really more faithful to airplanes than they were to the concept of air power which could now be served by alternative means. - Builder (12:34)

Many believe the Air Force is a troubled organization. Carl Builder has suggested it has lost its *"directional bubble"*(11:29). Many in the Air Force believe the same thing, suggesting Air Force "culture" has deteriorated to where it is almost nonexistent (69:18;110). This cultural breakdown is tied to a number of factors, the primary being the disintegration of a common belief, namely, air power theory. Some of the repercussions of this demise are: a lack of a common view of what it means to be an airman; the rise of occupationalism based upon technical specialty; a departure from the sense of being a part of the profession of arms; an inability to articulate airpower's importance and Air Force doctrine; and a rift between the rated community and the rest of the Air Force. At the same time, space is becoming ever more critical to operations. Some criticize the space stewardship of the Air Force, even suggesting the need for a separate space force or incorporation into the other services. These factors combine to make for tumultuous times in the Air Force.

Being an "Airman"

One of the first indicators of the trouble the Air Force is facing was the loss of identity with airpower within the Air Force. Acting on some of the insights from *The Icarus Syndrome,* General Ronald Fogleman, then Chief of Staff of the Air Force (CSAF), set about remedying the situation by directing the creation of the Air and Space

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Basic Course (ASBC) (69:40). This was an attempt to infuse newly commissioned lieutenants with a sense of being an "airman," an effort based on the belief that too many Air Force members were tied to their specialties, rather than the missions of the Air Force they were supposed to serve. These ties resulted in a lack of comprehension of what it meant to belong to the Air Force. Furthermore, the idea of an Air Force culture peculiar to advocates of airpower had all but withered away.

A great deal of effort went into developing the ASBC curriculum. At the Fall 1996 CORONA Conference, Air Force leadership felt a course was needed to remedy five deficiencies in the officer corps:

1) a lack of understanding of the Air Force core values;

2) a lack of appreciation for the Air Force core competencies;

3) the inability to responsibly advocate how 21st Century Aerospace Power can contribute to success in joint operations;

4) the existence of stovepiping and careerism between officers from different commissioning sources and Air Force Specialty Codes (AFSCs); and

5) a misunderstanding of the importance of the teamwork concept within the American military (69:1).

These traits made up what it meant to be an "airman." To help overcome these perceived deficiencies, the developed curriculum focused on four broad areas: Operations and Doctrine (46%), Wargaming (22%), History and Core Competencies (17%), and Core Values/Ethics (9%) (69:50).[1] This was based on a seven week course, where almost 90 hours would be spent on "Operations and Doctrine"(69:48-9).

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[1] Approximately 6% of the time was needed for administrative activities (69:50).

This course was intended to be similar to the Marine Corps Basic Course, where all Marines share a common experience, which helps them to forge their strong bond with one another (69:26). Some, who agree there is a cultural void, have disagreed with the "Marine" approach. Retired Lieutenant Colonel James Smith (USAF) summarizes their position best, "The Air Force cannot be the Marines, and Marine answers may not even begin to address Air Force questions"(110:51).

The appropriate way for making "airmen" may be in question, but the perception of a problem is clearly prevalent, especially among those in Air Force senior leadership. Creating ASBC was not a simple matter when considering the impact it could potentially have on the Air Force Professional Military Education (PME) system.[2] Adding another level of PME is significantly different from the way it has been done in the past. Air Force leadership, however, felt it was worthy enough to push forward.[3]

Institutionalism vs. Occupationalism

One of the signs of a lack of common identity among Air Force personnel is the fact many Air Force members do not view themselves as an "airman" first. The suggestion is: if one asks someone in the Air Force "what they do" they will respond with their specialty (pilot, space operator, engineer, nurse, etc.) rather than with "I am an

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[2] Even the trial course impacted PME. Because of the logistics of billeting the lieutenants and finding classroom space at Maxwell AFB, Alabama, it was necessary to reduce the number of personnel who attended Squadron Officer School during the trial ASBC.

[3] The program was not solely the vision of General Fogleman. After his retirement the program forged ahead. General Michael Ryan, current CSAF, recently decided to continue the program, although he has changed the name to the Aerospace Basic Course (ABC).

airman."[4] This association with specialty engulfing the Air Force suggests members have embraced occupationalism.

Occupationalism is when members of an organization more closely associate themselves with the occupation they hold rather than with the organization they serve. They view themselves as specialists, who share a common bond with fellow specialists. The organization, however, is incidental; it is merely the place where the specialty is practiced. At the opposite extreme of occupationalism is institutionalism.

Institutionalism is where members of the organization feel a strong tie to the organization, and feel a common bond with fellow members of the organization, despite differences in specialty. Indeed, those who demonstrate institutionalism have a true sense of "serving" the institution. Frank Wood and Charles Moskos have done a great deal of research on the issues of occupationalism and institutionalism in the military. They have concluded:

> [There are] three basic conditions of institutionalism in the armed forces. First, people will accept difficulties and hardships if those in charge are seen to be wholly involved in the system and genuinely concerned about it. Second, there must be a clear vision and articulation of what the institution is all about and how the separate parts relate to the core. The third condition, and the one that subsumes the others, is that members of an institution are primarily value-driven, motivated by factors that contrast with the calculative workings assumed to exist in the marketplace. (90:280)

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[4] One problem the Air Force faces is "airman" is a rank. Indeed, all junior enlisted Air Force members are commonly referred to as "airman" for their rank. "Marine," "soldier," and "sailor" are not ranks in the other services, and do not have the same connotation. A challenge for the Air Force is overcoming the association with this junior enlisted rank, for non-commissioned and commissioned officers alike, if it truly desires for all its personnel to answer with "airman."

The perception among leadership in the Air Force is that a shifting from institutionalism to occupationalism exists. The technical nature of the Air Force is considered to be a major contributor to this shift (52;108;110). Lieutenant Colonel Smith has surmised "that in the absence of a shared vision or sense of mission, Air Force officers turn to their occupations and the immediate units built around their occupations for their primary identification"(110:46). He goes on to suggest that "this tendency is symptomatic of a fractionated confederation of subcultures rather than a cohesive military service"(110:46). The implication is clear: the Air Force lacks a common culture.

"In August 1990 the United States Air Force was adrift from its historical moorings, lacking an understanding of its past and present," Colonel Edward Mann III (USAF) has described in *Thunder and Lightning: Desert Storm and the Airpower Debates*. "Consequently, those of us who serve in the Air Force also lacked a common vision of our future. We were a conglomerate of specialists with greater loyalty to machines and sleeve patches than to any single unifying theme or to the Air Force itself"(79:163). Mann has provided an excellent description of occupationalism and its effects.

Another possible cause of the move towards occupationalism is the blending of "blue suiters" with civilians, both civil servants and contractors. Frank Wood conducted research on the Air Force officer corps, concluding, "The issue of 'who is military' and 'what the military does' is no longer clear"(134:30). He further concluded, "This confusion provides the opportunity to replace military expertise and values with more

widely accepted management principles and ethics characteristic of the occupational model"(134:30). This "commercialization" of the Air Force suggests a rise in occupationalism as management becomes emphasized over leadership.

Given the concern among senior Air Force leadership regarding this shift, it would seem apparent that institutionalism is preferred. According to Wood, officers who exhibit institutionalism demonstrate "value oriented, broad based, and long term involvement with the military"(134:33). "They see their military jobs as special, transcending self-interest, and they regard the organization as a closely knit community"(134:33). Also involved with institutional officers is a comprehension of the organization that supersedes those leaning toward occupationalism. According to Moskos and Wood:

> This comprehension is twofold: on one side, the service member ought to understand clearly how an assignment fits into the unit mission, which fits in turn into the military mission. On the other side, and perhaps more difficult to achieve, the service member should understand the civic and historical links to the country at large, which is placed in turn within a contemporary strategic context. (90:287)

In March of 1997, *Air Force Times* printed a letter that was being circulated among the pilot community, commonly referred to as the "Dear Boss Letter"(8). In this letter, an Air Force pilot openly talked about why he was leaving the Air Force. The reaction from the force was mixed. Lieutenant General Michael McGinty, the deputy chief of staff for personnel at the time, was quoted as saying, "I think you're dealing with his personal opinion and it's his perception of how things are"(8:13). What is significant

is many disagreed with the general, including many non-rated Air Force members (8;131). One anonymous pilot was quoted in the article as saying:

> General Fogleman continues to beat the drum on "service before self," hoping that the masses really feel driven to throw themselves before the train to further the good of the service...[But] we, as a group, do not behave as patriotic martyrs as much as we behave like our civilian peers. (8:13)

An examination of the Air Force reaction to the problem is most revealing. Beyond McGinty's denial, the Air Force worked hard in the aftermath to increase pilot retention bonuses and to work on a joint program with commercial airlines to help pilots transition from the Air Force to the commercial arena later in their careers. An editorial in *Air Force Times* supported the idea of increasing pilot incentives, concluding, "Like it or not, money talks"(130). This reaction is clearly occupational. Wood's study of the Air Force officer corps provides more insight:

> Officers [reflecting institutionalism], on the other hand, respond to normative differences. Above a minimum standard of living, they accept and even expect personal cost and hardship, as long as they perceive themselves as working for the collective good of society. When that goal is lost or when they are thrust into a situation in which the normative goal is self-interest or individual economic reward, their commitment decreases or they adopt the economic orientation characteristic of the specialist. (134:34)

If the Air Force truly desires its officers to be institutional, why does it persist in finding occupational solutions to real institutional problems?[5]

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[5] This paper does not want to delve too far into the infamous letter beyond the issue of USAF reaction. Reading the letter, however, makes clear the pilot was discussing issues reflective of an institutional person. He was not asking for more money.

Dedication to the Profession of Arms

Besides technology, another major cause of the shift from institutionalism to occupationalism is the loss of a sense of belonging to the profession of arms. For many, the Air Force is viewed as a technology company rather than a branch of the armed forces. Belonging to the Air Force allows them to be close to cutting edge technology, but the concept of being available 24-7 is lost. They do not see themselves as "warriors," or even part of a profession dedicated to the military arts.

One of the goals of the ASBC was (and still is for ABC) to help instill the sense of being a warrior. Many feel, however, that too few members of the Air Force are actually in warrior roles. Furthermore, some feel only a select few should be made into warriors. When the idea of the ASBC first began, Air University (AU) conducted two surveys to supplement decisions regarding the establishment of the course. The surveys were given to students, faculty, and staff within AU's PME schools and in the Officer Training School (OTS). From these surveys were garnered a list of anonymous comments (88). One of these comments goes directly to the selective "warrior" issue: "The fact is a small percentage of Air Force officers are warfighters and it seems a WASTE of time and dollars to make every officer an airpower expert or 'warrior'"(88). Air Force senior leadership disagreed, and continues to disagree, with this thought.

As Manuel Davenport has noted, "the military profession is unique in being charged with the exercise of ultimate violence"(18:11). Professionals in the arms are to be experts at war, for war is their ultimate professional arena. They are to "promote the safety and welfare of *humanity*, and this duty...takes precedence over duties to clients,

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who as his fellow citizens are but a particular portion of the human race"(18:7-8). Retired Colonel Thomas Fabyanic (USAF) has noted, "The most fundamental and vital task for the professional officer is to understand war; this obligation takes precedence over all others"(41).

Perhaps one of the results of the so-called "peace dividend" is a diminishing of a sense of the significance of war. Charles Moskos and Frank Wood make clear, however, that "First of all, military leaders must be clear in their own minds as to what is distinctive about military forces, namely, their capacity to make war and their utility for foreign policy, which derives from the war capacity"(90:288). The Air Force needs to re-orient itself so members of the organization understand they are members of the profession of arms.

During the Gulf War, there was a rash of incidents where people tried to be excused from service because "they never expected to actually go to war." This attitude was a symptom of moving away from understanding the role of the profession of arms. Understanding may not necessarily equate to acceptance, but it most certainly will promote it. As Carl Builder has said:

> Given that awesome responsibility, the true professional at arms, regardless of position or specialization, regardless of proximity to the hazards, cannot be deflected from the commitment to mission above all else—if necessary, even above personal safety, career, and associations. To be sure, not all military personnel will choose to be professionals at arms, but that choice has nothing to do with their skills, specializations, or assignments; it is about their acceptance of a prior and overriding commitment to mission. (12:282-3)

Attitudes About Doctrine

Along with excusing themselves from the profession of arms, airmen have lost direction relative to doctrine. Major John Fal has described some of his personal experience:

> I have seen Air Force action officers make concessions to other services in the interest of harmony and cooperation. These concessions have been made in the highest spirit of compromise. Unfortunately, they were inconsistent with Air Force doctrine and probably degraded combat power....If action officers do not know the doctrinal positions of the Air Force, how can they be expected to follow current doctrine correctly? (42)

Air Force officers selling out the farm in order to advance compromise in the joint arena is a major concern among some observers. Airmen must be able to articulate airpower theory and Air Force doctrine in order to ensure that in an ever-increasing joint world the Air Force is properly represented in joint doctrine. Otherwise, as Rebecca Grant has stated, "Neglect of doctrine can translate to less than optimal use of airpower and cloud the debate over future forces"(49).

Even though senior leadership is now apparently concerned about doctrine, Colonel Mann has charged leadership with the bulk of the blame for its neglect. In *Thunder and Lightning* he asserts, "Boring or not, when the popes (chiefs of staff), cardinals (four-star generals), and archbishops (three-star generals) disdain doctrine, the faithful will follow suit," and then goes on to highlight that "when the faithful no longer know their doctrinal precepts, the institution is in serious trouble"(79:164-5). Later in the book he ties in Builder's basic thesis when he concludes:

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The pope, cardinals, archbishops, and we parishioners had struck a devil's bargain with our civilian masters and sister services. We denied the concepts upon which we had so painfully forged our independence, in order to retain what we really loved: the air-breathing flying machines that set us free from the bounds of earth. (79:186)

These types of concerns over the decline in doctrinal understanding were very influential in the formulation of the ASBC. In the surveys sent out by AU, they stated one of the proposed ASBC goals to be:

To prepare the junior officer corps to become airpower advocates through a) the study of airpower history and doctrine, b) the study of great Air Force leaders, and c) participation in exercises and simulations that stress the critical nature of support to operation success. (88)

As Cheryl Monday noted in the executive summary of the results of the AU surveys, "A significant number of respondents did not feel the course or this specific goal *can or should* be achieved" (88).

The reasons for these responses varied. Some unintentionally reflected the fact they did not understand doctrine, while others suggested Air Force doctrine was not solid enough to be taught. As one individual noted, "The Air Force can't figure out its own doctrine...how can you teach it to others?"(88). Another critic also had doubts about the Air Force's doctrine noting, "Our doctrine has never been very clear"(88). One individual suggested "doctrine changes throughout history, only current general doctrine is important at this point"(88).

A major misconception among respondents was the relationship between history and doctrine. Many thought of history and doctrine as two separate entities. As will be

discussed in detail later, history is a central element to the development and understanding of doctrine. One person stated, "Don't over-emphasize airpower history. Concentrate on doctrine—that's [the] most important element"(88). Some did recognize the relationship, suggesting, "Teach doctrine and theory, and let the 'history' support the 'common' vision that it produces"(88).

Still, some did question the goal itself. One of those surveyed commented, "Do not overdo! Tendency will be to make this the core curriculum but if allowed, purpose will be lost and course will be boring!"(88). Another of those surveyed reflected the non-warrior sentiment, commenting, "It will be difficult for most students to value this area— a good percent will not be in airpower-related jobs"(88). Still another noted, "Not too much on doctrine. These are 'green' officers who don't have a good understanding of the Air Force as a whole (organization, roles they play)"(88). Another thought on the inexperience of second lieutenants was, "A new Lt. needs to learn their job, not philosophy"(88). Clearly, many respondents were not in-step with the leadership's new emphasis of doctrine.

Most respondents did feel doctrine was important. In fact, sixty-eight percent (68%) thought so (88). One enthusiastically noted, "This is an integral part of officership in the Air Force and should be taught" (88). Even though this was perceived as important, only forty-six percent (46%) felt lieutenants understood doctrine and just twenty percent (20%) felt lieutenants they knew "demonstrated an understanding of their role as Air Force officers and as agents of national security"(88). One of those who

responded to the survey came right out and said, "Most lieutenants and captains have no idea about airpower!"(88).

It's A Pilot's Air Force

Another facet of the "everyone is an airman" debate is the issue of pilots' status within the Air Force. The question of who is a "warrior" is at the heart of the issue. Recall in the previous comment about most Air Force personnel not being in "airpower-related jobs" it was not clearly indicated what those positions might be; however, there was certainly a sense that some are doing "airpower" while others are just employed by the Air Force. To further illustrate this point, consider the following comment from one of the survey respondents relative to the ASBC goal mentioned above:

> This goal can be achieved for aviators and <u>maybe</u> space and missile personnel because they have a sense of an operational mission. Making a contract officer or a CE type, etc. an airpower advocate is extremely difficult if not impossible. The key to this question/goal as well as the one above is the fact that so few of our people are the warriors and most of them are in the officer corps. Once again, own up to this, quit trying to view the USAF as if it is just like the USA or USMC and teach accordingly. (88)

There was also a sense of "us versus them" in responses to the "Dear Boss" letter. Major Julie Howalt (USAF), responded in a letter to *Air Force Times* in which she noted she felt similar feelings to the pilot but questioned the Air Force's reaction, asking, "'Had that letter been written by anyone other than a fighter pilot, would it have received the attention it has?'"(131). One of the problems of the Air Force's reaction to the "Dear Boss" letter was it further promulgated the perception that the sentiments expressed in the letter were reflective of only pilots. By treating it as a potential pilot problem rather than

an overall Air Force problem, the Air Force missed an opportunity to narrow the "rated versus non-rated" chasm.[6]

There is also a question of promotion in the Air Force. Today, it appears that there is a "fighter mafia" running the USAF.[7] Carl Builder speaks of this in *The Icarus Syndrome*, noting a shift in senior Air Force leadership from those who flew bombers to those who flew fighters (12). He goes on to conclude:

> If the leadership rivalry has been limited to pilots mostly in the belief that the prerogatives or preeminence of pilots must be preserved within the institution, then even greater mischief may result, for such self-serving elitism sows the seeds of discontent among those whose contributions to mission have been denigrated and who have been excluded from any hope of leadership. (12:227)

Perhaps the discontent already exists but is accepted as part of the "reality" of the day. Furthermore, a perception that wearing wings on one's uniform is a precursor to promotion may only serve to accelerate the shift to occupationalism as quality officers find themselves focusing on their specialty and its associated relationships, because that is where they are rewarded for excelling. Also, that is where their opportunities for personal and professional development exist. They feel since they are not pilots their realistic promotion cap has been set too low. They feel themselves distanced from the institution because they are not part of "airpower."

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[6] TSgt J.C. Markham responded to the article as well, reflecting that similar sentiments were found in the enlisted corps as those noted in the letter, but that there were no bonuses to alleviate their suffering (131:xx). His response reflects that there was an "Air Force" problem, rather than just a "pilot" problem. Furthermore, it was a great opportunity for the Air Force to strike a blow at the encouragement of occupationalism through giving bonuses.

[7] This work is not intended to delve into the issue of fighter pilots leading the USAF. For more in-depth study of this premise consider Colonel Mike Worden's *Rise of the Fighter Generals* (135) as well as *The Icarus Syndrome*.

Some critics have been even harsher than Builder has. In one of the *2025* white papers Grant Hammond stated, "Few of [the] USAF's best or brightest become general officers"(53:16). He went on to suggest that "Those general officers who know, care, and try and do something about [the] USAF's problems often have to fight their colleagues as well as the defense establishment to succeed"(53:16).

The Emergence of Space

The rift between rated and non-rated is prevalent in the space community. As the role of space becomes increasingly important the clash between the space and air communities increases. Space advocates feel they deserve equal billing with their air brethren, but find they are "not exactly" equal. This is also a major premise of Carl Builder's *The Icarus Syndrome*:

> But the admission of missile and then space advocates into the Air Force was not as full citizens. The aviators dominated the institution; and while they tolerated others pursuing their own interests in different means or specialties, they demonstrated in many ways that aviators and airplanes were the mainstream of the Air Force. This attitude was the beginning of an institutional divisiveness that would be even more destructive than the split between the fighter and bomber pilots. It was destructive because the exhibited discrimination was not in favor of an altruistic mission—striking quickly and decisively at the heart of the enemy— but in favor of an elite class: the pilots. (12:166)

All do not agree with this premise, however. In 1987, General Robert Herres (USAF), while serving as USCINCSPACE, provided his insight that "Missile operations and space operations people are doing fine and getting along well with aviators"(55:43). Perhaps General Herres' perception is dated. His comment was made prior to the merger of missile operations with space operations under one command. After the merger of

missiles with space, the rated versus non-rated rift was complicated by a perceived new division. There exists a definite rift within the "space community" as traditional space operators find themselves being inundated with the "missile-way" of doing business.

In a recent *Airpower Journal*, Dr. Benjamin Lambeth noted that "Shifting the ICBMs from ACC to AFSPC gave the missileers a sense of identity with the space mission and the space technicians a credible claim to war-fighter credentials"(74:8). He also makes the point of distinguishing between space operators and missileers by claiming, "Their [space personnel] career development steeped them not in the warrior arts but in applied science, engineering, and systems management"(74:5). This reflects the question of "who is more Air Force like?" Today there is a major push to make everyone in the space and missile career fields pull missile crew duty to ensure they get a true "operational" understanding. The missile versus space rift is AFSPC's version of the rated versus non-rated conflict found in the rest of the Air Force.

Another interesting item is the result of a survey by Lieutenant Colonel Smith in which he questioned airmen about the importance of space. He concluded that "Most noteworthy, again, was the response of rated officers, which indicated a lower regard for space, thereby creating a distinct gap between them and the rest of the Air Force on this issue"(110:48). Space operations are viewed as services to "war-fighters" in the form of better navigation, more accurate weapons systems, and current weather reports.

There is also a challenge for the leadership of space. The question arises as to whether rated officers should command the top space wings, numbered air forces, and the command itself, or if it should be space and missile operators. Lambeth postulated:

One can chalk up much of the ongoing integration of space with the operational community to the fact that AFSPC and the unified US Space Command have now had three CINCs in a row whose career maturation occurred primarily in the world of combat flying. (74:10)[8]

This observation reflects the conventional wisdom within the Air Force, but does this actually mean that if the commander were not a former fighter pilot this integration would not be possible?

Grant Hammond disagrees with the conventional wisdom, noting, "The problem now may be how long it will take [the] USAF to integrate nonrated missileers into the hierarchy"(53:3). It is important to note that he still makes a distinction between missileers and other space operators. In 1996, while a student at SAAS, then Major Cynthia McKinley (USAF) pointed out:

> Injecting rated personnel into space leadership positions only serves to offer auxiliary leadership opportunities to potential air leaders. Concurrently, this hinders the development of future space strategists and leaders who do not gain the experience offered through those leadership positions. (85:51)

Motivated by thoughts like these, capable space and missile operators may soon vie for increasing leadership as the role of space continues to grow.

The Army Air Corps Analogy

The space leadership challenge is one of the elements motivating the call for a space force separate from the Air Force. In his paper, "The Paths to Extinction: The US

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[8] Since Lambeth wrote this an additional fighter pilot has been added to the roll: Charles A. Horner, Joseph W. Ashy, Howell M. Estes III, and Richard B. Myers.

Air Force in 2025," Grant Hammond claims, "Space Command is to the US Air Force today as the Army Air Corps was to the US Army in 1946"(53:5). He goes on to suggest that "Space is laying claim as a separate domain with different problems and with different vehicles to operate in a different environment"(53:5). In his paper, he suggests there are a variety of "paths to extinction" for the Air Force, the emergence of space being only one. Hammond outlines the reasons for a separate force:

> The combination of divergent technology choices, massive budgetary support for space initiatives, and the political difficulty of trying to control both atmospheric and exoatmospheric to deep space—all suggest that the creation of a separate Space Force may be a matter of common sense and ultimate reality. (53:5)

"The space force may find itself in the same position in which the Air Corps found itself as a part of the US Army," Smith noted in his article, "Air Force Culture and Cohesion: Building an Air and Space Force for the Twenty-First Century," where "independence becomes the only viable alternative unless the Air Force accepts and supports a key space role within the existing force"(110:48). Lieutenant Colonel Paul Bailey (USAFR) wrote an article addressing the idea of space as an area of responsibility (AOR) in which he made similar but less ominous observations:

> Some advocates see the NSF [National Space Force] emerging from the Air Force, just as the Air Force developed its own identity with the Army. Others would argue that it is time to create a separate space force because fast-evolving technology could be best applied only in a separate military service....
>
> Establishment of an NSF could seriously weaken the existing services and question the established force mix. Further, without its space forces and assets, the Air Force could become vulnerable to attempts to dissolve it as a service. (5)

This prognosis is not new. Professor Holley alluded to this analogy in 1983 when he wrote, "The task of formulating doctrine fell largely to the faculty of the old Air Corps Tactical School. In many respects the problem confronting these men was not unlike the problem confronting those who are trying to devise suitable doctrine for space"(61:7). Major Parker Temple (USAF) wrote an article for the March/April 1986 issue of *Air University Review* entitled, "How Dare They Tamper with the Sacred Functions of the Horse Cavalry?" In this piece he also hinted at the analogy remarking, "Today's Air Force is at a similar crossroads: whether to reorganize doctrine to account for the uniqueness of space or whether, instead, to resist until space forces form a separate service"(116:25).

Despite the Army Air Corps analogy having a long standing presence, everyone does not agree with it. In 1991, Major Steven Peterson (USAF) pointed out some practical differences:

> Just as air doctrine was in its formative years in the interwar period, space war-fighting doctrine is in its infancy today. However, the similarity ends there. First, there is no school of space warfare. The space strategists at the Air Force Space Command and US Space Command may form a school later on but none exists today. Second, unlike the Air Corps Tactical School, which did have some airplanes available, the US military today has no offensive space weapons with which to experiment. (96:16)

Major Mike Dickey (USAF) addressed this issue in a research report for Air Command and Staff College (ACSC) entitled, *Are We Ready For Space Control?* "In this regard, the status of space power in general, and space control in particular, are similar to the status of airpower during the interwar period 1918-1941," Dickey notes, "unfortunately,

there is no present day embodiment of the Air Corps Tactical School to make the case for space"(28:30).

Dickey is a strong proponent of the need for something comparable to the Air Corps Tactical School (ACTS) for space. "The professional education of today's Air Force officers provides a strong sense of 'air-mindedness' in the spirit of ACTS but is still lacking in the development of 'space-mindness'"(28:33-4). He describes it as a "space illiteracy" affecting the Air Force. "If the Air Force intends to fully embrace space power and all it can provide," Dickey suggests, "it must equip its future leaders with the intellectual tools to make a difference, just as ACTS did for airpower"(28:34).

In 1987, Herres thought the Army Air Corps analogy was weak, remarking "The differences are enormous and almost no parallel exists between Billy Mitchell's era and now"(55:44). Despite this, he did foretell that space could be the harbinger for the Air Force when he noted, "Without space, it could be argued that the Air Force's atmospheric missions might gradually be absorbed as ancillaries of the land and naval missions"(55:43).

The potential for the Air Force losing space has received a major boost over the past three months. New Hampshire Senator Bob Smith, Chairman of the Armed Services Committee's Strategic Forces Subcommittee and possible 2000 presidential candidate, has been critical of the Air Force approach to space. In a 20 January 1999 interview for *Air Force Times*, Senator Smith stated, "We need money and an Air Force that is willing to be a space force, but I'm not real optimistic about that right now"(132). He feels the Air Force needs to expand the military role in space, including weaponization.

According to *Air Force Times*, Smith has indicated, "Congress also will seriously consider establishing a separate space force"(132).

Retired General Charles Horner (USAF), former USCINCSPACE, has advocated a separate space force for sometime. He does not question Air Force leadership so much as the budgetary process. "The crisis is one of money, and robbing the space budget to make up for drastic shortfalls in the air budget"(132). Horner feels it would be better if space programs competed for funds against aircraft carriers and armor divisions, instead of just air wings. A separate space force would make this possible. According to *Air Force Times*, Horner feels now is not the time for a separate space force, but "it wouldn't be unreasonable to put space in a special program, like special operations"(132).

General Richard Myers (USAF), current USCINCSPACE, thinks the questioning of the Air Force's leadership of space is unfounded. On 4 February 1999, at an Air Force Association (AFA) conference in Orlando, Florida, he reacted to critics like Senator Smith. "I submit that it's time we put the stewardship issue behind us," remarked Myers, "and focus on the real enemies: funding, technology, and I would add, policies that hold spacepower back"(16:1).

The Naval Analogy

The Air Force is not only threatened from within, but also from without, by the sister services starting to lay claims to the space arena. This is not just a matter of service rivalries. Senator Smith makes this issue more than just rhetoric. "If the Air Force is not interested in the space programs," he recently pointed out in the *Air Force Times* interview, "maybe another branch is. They don't have this locked down"(132).

In a brief commentary in the January 1999 issue of *Proceedings*, Commander Sam Tangredi proclaimed, "Space is not just an extension of the air. Space is an ocean, and oceans are where navies go"(115:53). This exemplifies the naval analogy and hints at some of the reasoning of those who suggest a shifting of space from the Air Force to the Navy might be the correct way to go.

Some insinuate the Air Force's failure to fully capitalize on space's potential is partly due to misunderstanding it. Artificially applying an air paradigm constrains space to be what it is not. These critics believe the sea paradigm is more appropriate. The similarity between space and the seas is two-fold: the growing economic dependence on space is comparable to the growth of sea commerce in times past and the operational concepts of space more closely parallel sea concepts.

"At the turn of the century, the United States stood poised on the threshold of a great era: the preeminence of sea power," Lieutenant Colonel Bruce DeBlois (USAF) has observed, "we are again at the turn of a century and again at the threshold of another great era: the preeminence of space power"(19:530). Adding the Navy perspective, Commanders Randall Bowdish and Bruce Woodyard recently wrote in an article in *Proceedings* that "Spacefaring nations will use space as seafaring nations historically have used the sea—as an international arena for unrestricted economic and military activity"(9:51).

The naval-economic argument is used to substantiate the call to space defense. Major General Robert Rosenberg (USAF) concluded in late 1985 that, "On the oceans we have a strong navy to protect American shipping. We need the same kind of protection in

space"(102:53). In 1998, Major Tony Russo (USAF) connected with this reasoning when he commented on the economic expansion of space, "You created a navy because of pirates, or economic reasoning, in order to protect commercial interests"(104).

Major Russo feels the navy paradigm has much more merit than the air paradigm. "Ground systems, or launch sites, could easily be compared to sea ports. Nations have sovereign air space, but in the seas the ships are sovereign, just like in space the satellite is sovereign"(106). He further elaborated on his position, claiming "The seas are international and ships are sovereign, just as in space, but the airspace as well as the airplane are sovereign"(104).

This argument can then be extended specifically to the issue of space control. General Herres made the connection in 1987. "Space control is analogous to sea control," he wrote in "The Future of Military Space Forces" for *Air University Review*:

> It includes ensuring the right of passage through space, ensuring that operations in space can be conducted without interference, and—when necessary and directed—denying an adversary the use of space-based systems that provide support to hostile military forces. (55:45)

Reflections

At this point, it is significant to note the current state of the Air Force is at least one of agitation and confusion. Air Force personnel have lost their sense of being an "airman." This is furthered by a shift away from institutionalism toward occupationalism and a diminished feeling of belonging to the profession of arms. An extension of this is a failure by airmen to understand what Air Force doctrine is or what significance it should

play in their life. These all combine to have a huge impact on the decline of Air Force culture.

Another factor in this destruction of Air Force culture is the perceived significance of the role the pilot plays in the Air Force, or the insignificance of the rest of the force. A disparity exists between those who are perceived as "warriors," actively engaging in airpower, and those who merely support it. There is an "us versus them" mentality, which is only being expanded by the emergence of space. A division within the space community between missileers and space operators has also emerged. So far, Air Force reaction to these dilemmas has been to only further aggravate them by engaging in occupational solutions, limiting space personnel leadership opportunities, and distinguishing between space operators and missileers.

Simultaneously, various forces are challenging the Air Force's dominance of space. Whether from the emergence of a new separate space force or from the pilfering of space missions by the sister services, the very existence of the Air Force is under scrutiny.

The key to solving the Air Force's problems lies in doctrine. Doctrine is the common compass for all airmen to navigate the new world order. The Air Force also needs to capture its values to further the cause of institutionalism.

III. Values First

Values should be the driving force for our decisionmaking.   *- Keeney (72:3)*

Air Force leadership has determined there is a value deficiency in the Air Force. This primarily has been interpreted in the ethical sense of values. As Professor Holley has pointed out, the term "value" has moral overtones for most people (56). There are a variety of other meanings, however. For some, it has a monetary essence, while others see it as a measurement of importance and usefulness. The Air Force "Core Values" are clearly in the moral regard.[9] Given the problems of the Air Force outlined above, perhaps it is time to look beyond moral values and seek out values that capture ideals that lie between ethics and importance.

Ralph L. Keeney is credited with developing the concept of value-focused thinking. He outlined its power in his ground-breaking work, *Value-Focused Thinking: A Path to Creative Decisionmaking.* In the preface of the book, he notes that "Focusing on alternatives is a limited way to think through decision situations. It is reactive, not proactive"(72:viii). Traditionally, decision-making has been based on looking at alternatives first, in what Keeney labels alternative-focused thinking (AFT). This type of thinking is very narrow and reduces the quality and quantity of choices. Ultimately, this leads to poorer decisions than what could be possible.

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[9] The Air Force Core Values are: "Integrity First," "Service Before Self," and "Excellence in All Things We Do."

Currently, the Air Force practices AFT. If Builder's thesis is correct, the Air Force's focus on the airplane is an example of AFT in an extreme sense. Recently, some Air Force reports have suggested they have used VFT, but, as will be demonstrated later, this is an inaccurate assertion. In order to use VFT, the Air Force has to think about its values first, which requires moving away from the means and getting back to the ends.

Decision-Making

Value-focused thinking generally has been associated with decision theory and operational research. Some more traditional doctrine scholars find this approach to be questionable. They perceive the application of the concepts of VFT to be an attempt to turn war into a set of equations where a user can plug in variables and obtain an answer. This is not the way of the military historian, who accurately notes that elements like the fog of war and political considerations of a given period cannot be encompassed in a set of variables (29).

Colonel Fabyanic has pointed out that "war is often cast in simplified molds or equations; such efforts, however, produce not analysis, but the illusion of it"(291). Lieutenant Colonel Barry Watts (USAF) has a similar outlook noting, "While the conduct of war clearly involves engineering, it cannot be reduced to engineering"(126:108). He feels that the friction of war is too important to pass away with mathematical techniques:

> Broadly speaking, the essential import of general friction is that the elemental processes of war are too uncertain, too riddled with chance and the unforeseeable to be wholly, or even mostly, captured by pat formulas and engineering calculations. (126:53)

"My own inclination, therefore," Watts later proclaims, "is to insist that the bedrock error in traditional US air doctrine—the assumption that war's essential processes can be precisely and exhaustively determined—is beyond redemption"(126:110).

This all goes to the issue of whether war is an art or a science. Bevin Alexander has made it clear that "war remains an art rather than a science, despite the immense amount of invention, industry, and technology lavished on war since the beginning of organized society"(3:299). Accepting that Alexander is correct, practicing the art of war still requires decision-making. Ideas from decision-making scholars are appropriate for consideration when thinking about war.

Myron Tribus has described what he calls "PROPOSITION X." It states that "Whether a decision was RIGHT or WRONG is to be decided entirely on the results of the decision and not on the basis of the information available to the decision maker at the time he had to make the decision"(120:1). This is the bottom-line ideology, where success is measured solely by the bottom-line. Following this line of thought, it does not matter how the decision was made, as long as the decision was perceived to be successful.

Following PROPOSITION X makes the element of luck factor too important. There is an old saying "it is better to be lucky than be good," but when looking at the long run it is better to have good people on your team. Luck can run out, but a solid decision-maker will make it through the unlucky periods. More importantly, the thoughtful decision-makers will make their own luck. For those times when the results are not what was desired, "What we may more properly conclude is that you made a good

DECISION but had a bad outcome"(120:2). The military wants its leaders to make good decisions rather than just lucky ones.

Tribus also makes a distinction between decisions and choices. "If there is no risk, we are talking about CHOICE, not DECISION"(120:2). He goes on to define "a DECISION [as] a risk taking selection among alternative actions"(120:329). Risk is central to a decision. "If a decision involves risk, it is always possible that a good decision can lead to a bad outcome and that a bad decision can lead to a good outcome. This is what is meant by *risk*"(120:2). When considering the art of war, risk is cardinal for there is always the opportunity for a bad outcome. In war, bad outcomes can be of the most grievous consequences.

The other element of a decision is a collection of alternatives. "For a decision to be possible there must be more than one alternative available"(120:329). Alternatives are characterized by representing "a set of possible ACTS" that "are supposed to be connected in some way to a set of possible OUTCOMES"(120:329). The connection between the acts and their respective outcomes is uncertain, which brings in the element of risk. "The choice among outcomes reflects a VALUE judgement"(120:329). A decision-maker will try to maximize the value of the decision by placing judgements on each of the outcomes and factoring in the amount of risk associated with each.

A decision, therefore, is a selection among risk bearing alternatives in order to maximize the decision-maker's values. In the case of war, the alternatives are numerous and situational, but there clearly are a plethora of opportunities to select among actions

which carry with them associated risk. The values will vary as well. Some potential values will be examined later.

Keeney provides an additional approach to decision-making. Although it may seem like semantics, he describes times of decision as "decision opportunities" rather than "decision problems"(72:8). Opportunities have a positive connotation, while problems carry a negative one. Problems are associated with crisis management, while opportunities are similar to making your own luck. Most people seek out opportunities, while they avoid problems. Keeney claims a significant benefit of VFT "Is that the decisionmaker can productively create, rather than simply identify, decision opportunities"(72:51). Most decision-makers today, however, still see their decisions as problems interpreted through alternative-focused thinking.

Alternative-Focused Thinking

Traditionally, decision-making is based on what Keeney refers to as "alternative-focused thinking," where the decision-maker first focuses on potential alternatives until there are a sufficient number to force a decision, and only at that time concentrates on objectives (72:vii-viii). His description of this process is best: "It seems as if the alternatives present themselves and the decision problem begins when at least two alternatives have appeared"(72:3). "Since many decisions are characterized by the words 'Choose the best among the alternatives,' the set of alternatives is de facto determined"(72:48). Techniques have been devised to increase the alternative pool, but the point of decision is still limited by the alternatives in that pool. Furthermore, the varieties of methods for concocting alternative lists are focused on means. It is also

difficult to expand alternative lists because "the already-stated alternatives anchor the thought process, stifling creativity and innovation"(72:48).

Keeney has described AFT as too narrow. He feels it has three major shortcomings:

1) viable alternatives, possibly much better than the alternative considered, are not identified;

2) the objectives identified are often only means to the consequences that are of fundamental concern; and

3) there is not a logical match between alternatives and objectives. (72:44)

As previously noted, the alternative pool is shallow because the focus is on fixing the problem of choosing among the best alternatives known. The decision context does consider the values of the decision-maker. The values, however, are also narrowly focused on the immediate concern and do not have a solid connection with the alternatives. In alternative-focused thinking it is easy to make measures of effectiveness (MOEs) meet the set of alternatives, rather than seeking out alternatives which meet the decision-maker's needs.

Value-Focused Thinking

According to Keeney, "Value-focused thinking should lead both to more appealing decision problems and to choices among better alternatives than those generated by happenstance of conventional approaches"(72:8). The absolute key to achieving the power promised by VFT is the fact "Values come before alternatives in value-focused thinking"(72:50). After establishing values, envisioning alternatives to

satisfy them is possible. This is markedly different from AFT in that values are emphasized throughout the process, not just at the time of a decision.

Values are considered outside of the context of any alternatives. Therefore, they are not improperly influenced by a desire to make the requirements meet the product. "Value-focused thinking is value neutral"(72:52). There is no sense of moral judgement attached to the values. Keeney says, "Ethics represent the absolute values that are unalterable"(72:51). The values driving VFT, however, are influenced rather than timeless. This does not depreciate their significance, for they do capture the importance the decision-maker holds at the point in time in which the decision is being made.

Discovering values, in themselves, is not the goal of the value-focused thinking. Making better decisions requires formulation of objectives. Keeney describes an objective simply as "a statement of something that one desires to achieve"(72:34). Value-focused thinking is designed to fashion objectives so that the decision-maker understands "the reasoning for each objective and how it relates to other objectives"(72:23). When considering objectives, the decision-maker needs to "First ask why each objective is important"(72:22).

The objective development process is not simple. It is too easy to make objectives into nothing more than slogans. In order to be beneficial, objectives have to be substantive. Decision-makers must formulate more than a list of statements describing their desires. These desires need to be supported by the values truly driving the decision-maker. The best way to get to the values is through the question "Why?"

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"Why" is a word most grow to loath. About the time children approach the middle of their terrible twos they seem to realize a way to irritate their frazzled parents is to repeatedly ask "why" over and over again. Children, of course, receive much more than the joy of troubling their parents when they ask—it is how they learn. It is also how decision-makers learn. As Keeney notes:

> Thinking about values naturally provides an initial list of your conscious values. This thinking may also provide many keys to identify previous subconscious values. Bringing these values to consciousness allows you to uncover hidden objectives, objectives you didn't realize you had. (72:24).

Value development helps in defining the perceived problem by increasing understanding. Even though this is a most noble goal, many view the question "why?" as a challenge. This defensive association makes value determination difficult, despite its ultimate helpfulness.

Finding values is also helpful for the organization. Often, there appears to be simply an assumption that all members of the organization understand the organizational values. This assumption leads to leaving values as implicit to the so-called shared organizational culture. By making values explicit, the members of the organization can truly come to a common understanding. Understanding and agreement are quite different things. Keeney points out:

> If values are made explicit, the discussion can separate disagreements about possible consequences from disagreements about the relative desirability of those consequences. This should help identify the basis for conflicts. Only when the basis for conflicts is clearly known can a group constructively begin to reduce them. (72:25-6)

Thoughtful debate is valuable for any organization. By explicitly stating values, it is possible to keep the debate from digressing into dissension.

The issue of implicit versus explicit is very important when analyzing organizational behavior. Too often the assumption is made that everyone has an understanding of why something is done. The reason for this is the leaders of the organization believe this understanding is either obvious or common sense. What is obvious to one person may be life's enigma to another, and the term "common sense" may be the world's greatest oxymoron. The assumption of understanding is very dangerous. More often than not, in the process of explicitly stating values, new insight is provided to even the most hardcore advocates of the "obvious" nature of something.

Another benefit of explicitly stating values, and the associated discussion, is it helps all members of the organization feel ownership. Keeney suggests that "without discussion of values, many people are excluded from participation and others are limited to minor contributions"(72:25). By keeping values implicit, the organization is nothing more than a coterie, where the culture is for the "have's."

Current Air Force Thinking

The culture of the Air Force seems to be one for the airplane enthusiast. According to Builder, "The planners of today...are not 'planning for a force that could provide the justification for autonomy' but one that will justify retaining the airplanes, particularly the combat aircraft and most particularly now, the fighters"(12:143). This most definitely is alternative-focused thinking. Indeed, the alternative has been so narrowly defined as to be only some type of "fighter."

Under value-focused thinking values come first (or what Builder calls the "ends") and then a variety of potential alternatives (or the "means"). Depending on the objective, a fighter could be one of the options, but it would not be the only option. Most importantly, it might not be the best means for attaining the ends. With VFT it would be possible to select the best choice for the right reason.

The Air Force, however, has claimed to use VFT in other endeavors. Most notably, it was supposedly used as an "analysis technique" in the *2025* study conducted by Air University in 1995-6 (65:6) and the *Spacecast 2020* study completed by Air University in 1994 (111:Process). This claim is somewhat misleading, for comparison of how they approached the problem with the definition of alternative-focused thinking makes clear that AFT was still the fundamental thought process involved in those endeavors. They applied VFT in an evaluative sense only, and only after they had formulated alternatives. Recall, **values come before alternatives in value-focused thinking**.

Keeney's description is excellent. "Value-focused thinking involves starting at the best and working to make it a reality. Alternative-focused thinking is starting with what is readily available and then taking the best of the lot" (72:6). Just because you have added some futuristic element to your alternatives does not change the fact that you are still thinking about alternatives first. If the Air Force were really practicing VFT, it would place its values first.

Reflections

There seems to be a question as to what the Air Force values. The Core Values have received a great deal of emphasis, but they are ethical. They address a moral decline. As previously stated, VFT is not concerned with morals, but focuses on desires and needs. The Air Force needs to articulate the values that capture why aerospace power is significant and what aerospace power can do for the nation. Emphasis on the Core Values rather than aerospace values is a misguided attempt at reclaiming Air Force culture.[10] A search for aerospace values could be the impetus for the rebirth of Air Force culture and would provide the foundation for Air Force thought.

A recent Air Force buzzword seems to be "thinking outside the box." Indeed, the Air Force has established various Battlelabs to push the thought envelope. The problem with this approach is that the thought process is still tied to alternatives. Devising wildly futuristic concepts is not really thinking outside of the box. To get outside of the box you have to approach your thought process differently. Value-focused thinking is a way to get to the outside.

The Air Force needs to address the "why's" so it can clearly establish its objectives and provide the support for those objectives. An explicit statement will lead to debate, for there will be disagreement over some of the values. This debate will help the

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[10] To suggest the problem with today's Air Force is simply that it has lost its moral bearings is foolish. The three slogans encapsulating the Air Force Core Values are an attempt to address occupationalism. Indeed, it seems a delusive attempt to convert those who have embraced occupationalism to the desired institutionalism. In the opinion of the author, few converts will be garnered, while those who are already institutional in their beliefs will see them as insulting. The cadre of Air Force institutionalism is looking to the leadership for actual signs the institution is worth serving. Occupational reactions, as in the "Dear Boss" letter, raise serious doubts.

Air Force as a whole to understand its *raison d' etre* and will provide the basis for a renewal of Air Force culture. The Air Force needs to move away from AFT, and use VFT in more than an evaluative sense. It should use the battlelabs to seek out decision opportunities. It should find a better way for making decisions. Ralph Keeney summarizes this in an excellent way:

> What is missing in most decisionmaking methodologies is a philosophical approach and methodological help to understand and articulate values and to use them to identify decision opportunities and to create alternatives. The way to remedy that situation is to focus on what matters: on values. (72:8-9)

IV. Doctrine

Doctrine is a compass, not a road map.   - Ehrhart (37:31)

Finding values is no simple task, and neither is understanding doctrine. Doctrine is not an exclusively military concept, but the complicated nature of fighting wars and the high price associated with failure makes military doctrine particularly challenging. One of the fundamental issues is finding a definition for doctrine. "At the outset of any doctrinal foray, our best efforts at formal, abstract definitions are seldom much more than hunches," suggest Watts and Hale, "and even after long study, no one has been able to offer much more than metaphors"(127). Still, the search for *the* definition has not stopped.

Not only is there disparity on the technical definition of doctrine, but scholars also have devised various levels and types of doctrine. Even the perceived functions of doctrine vary. This variation covers branches of the armed forces as well as nationalities. To get a firm grasp on doctrine it is important to consider these differences, yet it is critical to avoid getting caught in a search for the Holy Grail of doctrine.

Although there is no single best answer for doctrine, there are some common threads throughout most military doctrine. One of the cornerstones is the concept of doctrine being "authoritative but requiring judgement." The importance of doctrine is also recognized among scholars, although they who need the faith the most, the airmen, question it. This dissimilarity is very significant, for doctrine is useless if the force does not accept it.

Many things influence doctrine. Experience, theory, and technology are generally accepted as the primary foundations for doctrine. The so-called "principles of war" are also considered to be a major influence on doctrine. Many view this influence as more of a danger than a basis. Another factor is strategy. The doctrine-strategy relationship is cyclical: each influencing the other and then being influenced again.

Although they are commonly considered foundations, both theory and technology are not without controversy. There is debate over the separation between theory and doctrine. At what point does a theory become doctrine? The concern over technology is tied to which influences the other. Does doctrine push technology or does technology pull doctrine?

Definitive answers to most of these questions are nonexistent. They are, nonetheless, very important considerations. To fully comprehend doctrine, if that is even possible, these issues have to be addressed. They all go to the heart of what doctrine is and why it matters so much.

What Is Doctrine?

In 1980, Major Robert Ehrhart (USAF) pointed out that "a fundamental problem with Air Force doctrine is the absence of any real consensus as to what doctrine is and just what it is supposed to do"(37:30). Professor Drew relayed similar thoughts in an interview in October of 1998 when he noted, "No one agrees on what doctrine is.... The first and most fundamental question is what it is and why we do it"(29).

Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, defines air and space doctrine as "a statement of officially sanctioned beliefs and warfighting principles that describe and guide the proper use of air and space forces in military operations"(21:1). Lieutenant Colonel Kurt Cichowski (USAF) has defined aerospace doctrine as "a codified set of beliefs about what has been learned and what is thought to be the best way to use aerospace power"(15:49).

In a letter to *Naval War College Review* SAAS Professor Harold Winton provided a more general description:

> Military doctrine is, in essence, a medium of transmission in which general ideas about the nature, purpose, and employment of military force are given practical expression peculiar to the time and setting of the military institution promulgating the doctrine of the moment. (133:88)

Professor Holley has described doctrine in a variety of ways including, "doctrine is officially approved prescriptions of the best way to do a job"(61:4). Professor Drew feels "Perhaps the best definition of military doctrine, one that is accurate, concise, and yet retains the vitality befitting its importance" is Holley's "*Military doctrine is what is officially believed and taught about the best way to conduct military affairs*"(33:41).

The Royal Australian Air Force (RAAF) recently addressed the issue of developing a doctrine of its own. In one of a series of essays written at that time, Group Captains B.L. Kavanagh and D.J. Schubert provided an Australian airman's view of doctrine:

> Contrary to popular folklore, doctrine is neither some kind of codified law enunciating immutable rules on how to fight war, nor is it a dusty book of commandments kept in an old trunk in a deep, dark cellar, guarded by monks and

brought out only for Kangaroo Exercise washups....Military doctrine is a body of central beliefs about war that guides the application of power in combat: it is authoritative but only a guide and requires judgement in its use. (70:4)

Everyone is not in favor of searching for definitions of doctrine. In an article in the September/October 1984 issue of *Air University Review* entitled, "Doctrine: Mere Words, or a Key to War-Fighting Competence?" Lieutenant Colonel Watts and Major James Hale (USAF) articulated their feelings that the effort placed on defining doctrine is misplaced:

> At the heart of the present authors' misgivings about the health of Air Force doctrine is the suspicion that our service's doctrinal quest has become entangled in abstract questions of definition that lead nowhere, while the practical problems of actual warfighting have been neglected....
>
> Consequently, efforts to ground doctrinal development on an exact account of what doctrine *is* are doomed from the start. (127)

Levels and Types of Doctrine

Endeavoring to find the correct definition of doctrine is not the only on-going pursuit. Various levels and types of doctrine have also been addressed. The Air Force distinguishes among three levels of doctrine. In AFDD 1 they are denoted as basic, operational, and tactical. "Basic doctrine states the most fundamental and enduring beliefs"(21:2). As the title suggests, AFDD 1 is the Air Force's basic doctrine. Operational doctrine is more oriented toward employment by applying "the principles of basic doctrine to military actions"(21:2). This level of doctrine is contained in what is referred to as 2-series publications. Tactical doctrine is concerned with "the proper employment of specific weapon systems"(21:2). These are the 3-series publications,

referred to as Air Force Tactics, Techniques, and Procedures (AFTTP). Dr. James Tritten makes clear his position that "Tactics, techniques, and procedures are not doctrine"(121:33).

Three types of doctrine are also defined in AFDD 1: service, joint, and multinational. Service doctrine "outlines Service competencies and guides the application of Service forces"(21:3). This is then incorporated into joint doctrine, which "describes the best way to integrate and employ air and space forces with land and naval forces in military action"(21:3). Finally, multinational doctrine "describes the best way to integrate and employ air and space forces with forces of our allies in coalition warfare"(21:4). The three levels of doctrine can be applied to each of the three types.

In 1982, in an article in *Air University Review* entitled "Of Trees and Leaves: A New View of Doctrine," Professor Drew proposed three types of doctrine as well: fundamental, environmental, and organizational (33:43). Fundamental doctrine is broad in scope and relatively abstract. "[It] consists of beliefs about the purposes of the military, the nature of war, the relationship of military force to other power instruments, and similar subject matter"(33:43). Fundamental doctrine has two "significant" associated characteristics: it is "timeless" and "relatively insensitive to political philosophy or technological change"(33:44). Environmental doctrine, on the other hand, is narrower in scope and is influenced by technology as well as geography for it focuses on "the employment of military forces within a particular operating medium"(33:44). Organizational doctrine is the narrowest in scope for it "concerns the use of particular

forces in a particular environment at a particular time—today"(33:45). Because of the concern with being "current," this doctrine is subject to frequent changes.

Some are opposed to the idea of trying to define levels of doctrine. "The point here is that to artificially describe levels of doctrine as, say, operational or tactical," explained Group Captain B. J. Espeland at a RAAF symposium, "imparts a bias that may distort the philosophical nature of doctrine and thus obscure some of its enduring concepts"(40:73)

Functions of Doctrine

Perhaps more important than finding a catch phrase to define doctrine or distinguishing among levels is to consider the functions of doctrine. Major Peterson has proposed that "Doctrine provides the underlying rationale for the development, deployment, and employment of military forces"(96:13). Drew has suggested that the four fundamental functions of doctrine are to:

1) provide a tempered analysis of experience and a determination of beliefs,
2) teach those beliefs to each succeeding generation,
3) provide a common basis of knowledge and understanding that can provide guidance for actions, and
4) provide a standard against which to measure our efforts (35:171-3).

The first three functions were initially outlined in "Of Trees and Leaves" in 1982. Over the next 6 years they were refined and the fourth function was added. They were then published in *Making Strategy: An Introduction to National Security Processes and Problems*, a book Drew completed with Donald Snow. Some of the refinements included

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changing the first function from "an analysis of history" to include the broader term "experience," and modifying the third function from simply providing "guidance for actions" to the more revealing "common basis of knowledge and understanding." The new word choice, however, did lose some of the significance for the third function. In the first draft Drew noted that the third function was "particularly important in the heat of combat when direction from superiors may be unavailable"(33:42-3).

Air Force Historian Richard Hallion has implied functions by describing doctrine as being "the binder, the adhesive, *justifying* our future technological research and development, *rationalizing* our planned acquisition strategy, and *governing* our present employment of forces"(51:27). Major Ehrhart feels doctrine performs four functions, it:

1) offers a conceptual framework and way of thinking that provides general guidance to use in specific situations;

2) provides the foundation, the starting point, on which every aspect of the Air Force should be based, including force structure, strategy and tactics, training, and functional procedures;

3) provides guidance for establishing priorities for the employment and development of air forces; and

4) acts as a sounding board, as a frame of reference for testing, evaluating, and employing not only new concepts but also new technological developments and new policies. (37:30-1)

Considering how the other services view doctrine can be very insightful. By using their approach as a benchmark, it offers ideas as well as an ability to evaluate Air Force doctrine through comparison. This provides a better understanding of Air Force doctrine. The best way to start working toward this understanding is by looking for differences and similarities among the other service's doctrine. According to Rebecca

Grant, one of the functions common to both Navy and Army doctrine is it "offers rationale for force roles and missions"(49).

Although the United States Army (USA) has been "doing" doctrine for hundreds of years, the United States Navy (USN) is new to the business of formally writing doctrine. Informal doctrine has ruled the seas. Because of a new drive for formal doctrine by the USN, Dr. James J. Tritten of the Naval War College considered the functions of doctrine in his article "Naval Perspectives on Military Doctrine." He deduced that doctrine:

1) affects how one fights, trains, exercises, and plans, and it organizes what one buys,

2) influences training and education, which in turn influences the development of future doctrine,

3) offers a guide for operations when joint and multinational doctrine are nonexistent or inappropriate,

4) standardizes behavior,

5) offers standardization without loss of freedom of judgement or initiative in battle, and

6) defines, in general terms, the nature of forces, and it establishes a rational basis for their use. (121:31-35)

"It is a commonly understood and shared framework upon which specific operations can be planned and executed," Dr. Tritten has observed, "it represents a carefully considered body of structured thought meant to guide all forces in effective action"(121:35). He goes on to suggest, "In the absence of orders and in the absence of communications, subordinates who act in accordance with military doctrine are very likely to be conforming with their superiors' wishes"(121:35).

"Doctrine is more than simply how we intend to fight," retired General Robert RisCassi (USA) declared in an article for *Military Review* in 1993, "it is also the technical language with which we communicate commander's intent, battlefield missions, control measures, combined arms and joint procedures and command relationships"(102). Although the focus of his article was joint operations, his observations are relevant to all military doctrine. It is possible to glean additional doctrinal functions from them.

Considering foreign approaches to doctrine can also be very insightful. Before looking at the functions others nations envision, it is interesting to reflect on their attitude toward US doctrine. In 1991, the Royal Australian Air Force sponsored a doctrine symposium where Lieutenant Colonel Charles M. Westenhoff (USAF) made the following remarks in regard to Soviet attitudes toward US doctrine:

> A few years ago, a Marshall of the Soviet Union described how hard it is to understand the United States Air Force. He said the doctrine of the American Air Force is a vexing problem. According to him, our manuals say practically nothing, and what little they do say is useless as a guide because no-one in the USAF reads them anyway. (129:77)

As for the Soviet approach to doctrine, Professor Holley recently reflected that "Doctrine for the Soviets was mandatory and carried the sanctions of law. What the Soviets called military art comes closer to what the West called doctrine"(62:595). In 1985, long before the dissolution of the Soviet Union, Jonathan Adelman noted the following "peacetime" functions of Soviet military doctrine:

1) serves as a bureaucratic rationale for extensive development and acquisition of new weapons by the military,

2) serves to enhance the morale of the military by asserting and demonstrating the possibility of victory in a nuclear war,

3) legitimizes the need for a strong Soviet state and military, and

4) intentionally or otherwise, serves to influence Western and Chinese military behavior. (1)

In a debate at the doctrine symposium sponsored by the RAAF, Group Captain Espeland stated, "Doctrine is not just a matter of putting forward what we should do and why, but also bringing into consideration all the advantages and disadvantages and, with the knowledge of that full range of reasons, why to do things and why not to do things"(129:80). Kavanagh and Schubert have suggested some of the things doctrine could do for the RAAF:

1) it is at least a common starting-point from which to educate personnel,

2) it will also provide a common framework for planning, and

3) it will influence the future force structure. (70:9-10)

Once again, a consensus is nowhere to be found. Various scholars and users of doctrine envision it performing different functions. Certainly, some commonality can be found. Educating the organization is a recurring theme, as is guiding both operational and developmental decisions. The idea of serving as a standardization mechanism is also repeated.

The ever elusive, magical, single answer to "what is doctrine" remains unfound. There is no harmony when it comes to defining doctrine. Attempts to break it down into types and levels are also not universally excepted. Even the functions of doctrine vary. Some suggest, the attempts at trying to find answers are quixotic because of its inherent

futility. Still, the hunt continues because the hope is answers will provide understanding. Understanding is thought to be imperative because of doctrine's importance.

Important if Used

Because of the functions it performs, the importance of military doctrine is almost self-evident. "The really decisive successes have come to those who have adopted a new doctrinal concept to which their enemies were unable to respond," Colonel John Warden observed in *The Air Campaign* (124:50). In Holley's monumental *Ideas and Weapons* he makes the point that "the methods used to select and develop new weapons and the doctrines concerning their use will have an important bearing upon the success or failure of armies—and of nations"(60:5-6). Recall Richard Hallion's thoughts from above where doctrine serves to justify, rationalize and govern, its significance is easily discernible from the functions he envisions it fulfilling.

According to AFDD 1, the Air Force teaches doctrine to provide *"a common frame of reference* on the best way to employ air and space forces"(21:1). It goes on to say, "Doctrine prepares us for future uncertainties and, combined with our basic shared core values, *provides a common set of understandings on which airmen base their decisions"*(21:1). Watts and Hale have remarked that "Doctrine can be an overriding determinant of combat outcomes"(127). Furthermore, "Flawed doctrine can cost lives," they emphasize, "and the shortest road to flawed doctrine is to develop it in the abstract, that is, without sufficient attention to the uncompromising realities of battle"(127).

Wing Commander Gary Waters (RAAF) addressed the importance of doctrine in his study of the Gulf War, *Gulf Lesson One—The Value of Air Power: Doctrinal Lessons*

for Australia. "First and foremost, any battle can be regarded as a doctrine versus doctrine contest," Waters proclaims. From his perspective, "War will include a doctrine versus doctrine contest, and the importance of doctrine has been enhanced as a result of the Gulf War"(125:288). He suggests the implication for the military is "There does need to be a concerted effort to understand and learn an enemy's or potential enemy's doctrine long before conflict has been joined"(125:143). Furthermore, from his analysis he has determined, "Military doctrine should recognise the higher war aim which is to create the conditions necessary for peace"(125:288).

"Without a requisite doctrine that fosters broadly based understanding," Kavanagh and Schubert of the RAAF have proclaimed, "a fighting force lacks those shared assumptions among commanders and subordinates that enable them to know intuitively what each is likely to do under the pressures that cause confusion in combat"(127:3). Expanding on this thought, retired Major General John Randerson (USAF) noted, "A lack of doctrine leaves too much open to the individual; doctrine supersedes individual desires and provides continuity"(101).

Doctrine's importance is lost if it is not used. According to Major Ehrhart, "To be of value, doctrine must meet three criteria: it must be understood; it must be valid; and it must be translated into action"(37:35-6). Furthermore, "It is virtually impossible to assign priorities to these three requirements for useful doctrine; each is critical"(37:36). This seems quite reasonable.

In "Of Trees and Leaves," Drew indirectly commented on this issue. "Superior analysis of experience coupled with efforts to teach has little value if no lasting impact is

made on the student," he pointed out. "This implies two things: First, what is analyzed and taught must be useful; and second, the student must be convinced of its utility"(33:43). Ultimately, doctrine that does nothing more than collect dust on a shelf is useless, no matter how loudly and frequently scholars implore its importance.

The first step in understanding the significance and realizing the usefulness of doctrine is reading it. Colonel Mann has commented on the dedication of Air Force people to doctrine in *Thunder and Lightning* recalling experiences after the publication of the 1992 version. He rhetorically asked "But would Air Force warriors read it?"

> Certainly, the structure of the manual encouraged them to do so. Volume 1—the "bare bones" of Air Force doctrine—consisted of fewer than 20 pages, designed for leisurely scanning, and included numerous cross-references to the essays in volume 2, a system which made for easy access to the supporting documentation. (79:189)

Later in the book he described some experiences he had had with junior officers and their reaction to the 1992 version. Very few read any of the volumes. Many of the issued packages went into the round file, still wrapped. His conclusion was, "Despite all this effort to encourage higher-level thinking via white papers and statements of vision and mission, the Air Force appears to have failed in its first post-Desert Storm test of commitment to the profession of arms"(79:189).

Professor Drew was largely responsible for the 1992 version. He headed up the effort with nine other field grade officers. In response to the idea of trying to make doctrine more "readable" he proclaimed, "With the 1992 version we tried to do something for everyone. There were two volumes!...Getting people to read it is the

commander's requirement"(29). Air Force leadership's support of doctrine, or lack thereof, has been previously addressed.

The Foundations of Doctrine

Doctrine is not only very influential, but it is also greatly influenced. Elementary to any military doctrine is an investigation of war. As Colonel Fabyanic has pointed out, "War and doctrine are inseparable, and attempts to understand doctrine by isolating it from war as it occurs on the battlefield is likely to result in formulations that are (to paraphrase Will Rogers) neat, plausible, and wrong"(41).

Dr. Tritten advises doctrine's dedication to war is not the only basis. He feels there are two "essential elements common to all its forms: how the military profession thinks about warfare, and how it acts"(121:23). These elements must both be present. "A doctrine reflecting only thought about   war would be merely the unfilled wishes of the leadership; doctrine that is simply the codification of behavior is ultimately random, and therefore useless"(121:23).

Lieutenant Colonel Cichowski believes history and theory are the primary sources for doctrine (15:2). Major Ehrhart feels doctrine evolves from three sources: historical experience, theory, and technology (37:33). A majority of doctrinal scholars agree with Ehrhart. Furthermore, the overwhelming majority believes experience should be the bedrock for doctrine development.

<u>Experience</u>

Air Force Basic Doctrine states, "Air and space doctrine is an accumulation of knowledge gained primarily from the study and analysis of experience, which may include actual combat or contingency operations as well as equipment tests or exercises"(21:1). Professor Drew says, "The primary source of beliefs about how 'best' to conduct military affairs is the experience of how things were conducted in the past"(33:41). Drew, in his work with Donald Snow, has conceded that an experience base is not always available:

> In such evidential voids as that found in the nuclear arena, we are forced to rely on extrapolations of experience from other areas. We hope that such extrapolations are pertinent, but our standards for judgement can only be logic, intuition, and "gut feelings." This is, obviously, a risky but unavoidable situation. (35:165)

General RisCassi agrees with the import of experience to doctrine, but questions how the military tends to approach history:

> Obviously, the most valid basis we have to form a doctrine is our own historical experience. Yet, for the most part, our historic perspectives tend to analyze the leaders who led victorious coalitions, as if the secrets of success lay in personalities, more than methods. A doctrinal foundation must be based on methods. (102)

Recall that one of the three aspects of the previously noted ASBC goal was "the study of great Air Force leaders." This certainly adds credence to the general's observation. Drew and Snow also caveat the use of history, "The real key is accurate analysis and interpretation of history (experience)—and therein lies the rub"(35:164). The dilemma over what is accurate depends on the interpretation of the analyst. This interpretation

depends on how the world is viewed. They go on to point out that, "*Objective* analysis of experience can be especially difficult"(35:166). Most people are generally too impassioned and too affected by experiences to look back without a great deal of personal baggage.

Since experience is the consensus cornerstone for doctrine, it is important to use it properly. Drew feels "Historical research not only should look at 'what happened' but also should weigh previous interpretations of 'why' and 'how,' as well as the significance of 'what happened'"(32). Ehrhart also points out, "In using history as a basis for validating and implementing our doctrine, we must be wary of the pitfalls of a too facile acceptance of parallels and lessons from the past"(37:37).

This intimates the power and danger that can be found in analogies. For most situations, analogies abound, as this paper has already demonstrated. Richard Neustadt and Ernest May address the use of analogies in their monumental work, *Thinking in Time*. Often analogies are very useful to a decision-maker, providing insight and understanding. Misleading analogies, however, can be very dangerous, leading to bad decisions. When considering experience it is important to look for analogies, but this search should be tempered by a rigorous comparison of "likenesses" and "differences" between the situations (94).

Theory

"Although doctrine's roots are primarily embedded in history, some subjects have no basis in empirical evidence," Professor Drew has noted, "in these areas, the doctrine writer must rely on theory"(32). He has defined theory as "A notion used to explain

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phenomena made plausible by reasoning from accepted facts...[it] provides the framework for future application and is the second major source of doctrine"(33:42).

Former Drew student Cichowski thinks, "Theory should help explain the lessons that history provides while at the same time anticipating the changes that the future will bring"(15:3). Professor Holley points out that "Theories are hypothetical, and they lack the substance of reality—the test of actual trial"(57).

Dr. James Mowbray noted in 1995, "Neglect of airpower theory, from which doctrine should flow, has also impaired the ability of the Air Force to write sound doctrine, particularly operational doctrine"(91:2). He has suggested, "The theory we require should...[be] a theory that evidence suggests can be carried out in the future, but one which is out in front of current capabilities"(91:12).

In proposing space operations doctrine, Major Robert Newberry (USAF) wrote, "Doctrine's primary concern is with applying theory and past experience to maximize the military effectiveness of forces"(95:8). Lieutenant Colonel McKinley adds, "There is folly believing one is writing and applying doctrine when there is no theory upon which to base doctrine"(84). Fellow SAAS graduate Major Robert Hamilton (USAF) has indicated the need to find the "appropriate level of abstraction" for development of theory and doctrine. "If a theory is abstract, it ceases to function as an effective guide for airpower employment. If it is too concrete, a theory becomes prescriptive—valuable only within a narrow set of circumstances"(52:49).

Technology

"Another influence upon military doctrine is current technology," Dr. Tritten acknowledges. He goes on to warn, "immediate intentions must remain firmly rooted in present capabilities"(121:30). Major Peterson disagrees with this position for the space realm. He feels it is a common mistake made by space doctrine writers to "Confuse the role of technology and its proper place in space doctrine. They all closely tie existing unofficial space doctrine to existing space technology"(96:17). Drew professes, "The doctrine writer's research plan must take into account advances in technology that may temper or perhaps even obviate the 'lessons' of the past"(32).

Many doctrinal scholars view technology as a danger. Russel Weigley, in *The American Way of War*, points out, "To seek refuge in technology from hard problems of strategy and policy was already another dangerous American tendency fostered by the pragmatic qualities of the American character and by the complexity of nuclear-age technology"(128:416). Dr. Hallion has also indicated specific dangers for the Air Force associated with technology:

> But because the Air Force as a service is wedded (and rightly so) to technology, there is always the danger that technology will make one's doctrine obsolete, will replace doctrine as a determinant of the future course of the Air Force, and will become merely a convenient shibboleth endowed by advocates with greater significance than it in reality possesses. (51:16-7)

In his SAAS thesis, Major Frank Gallegos (USAF) noted another problem is "The inclination to be on the leading edge of technology often comes with a mutually strong penchant to disregard the teachings of the past"(47).

Drew and Snow point out that "Although modern technology is important to success on the battlefield, its value can be overstated, its risks understated, and its opportunity costs obscured or ignored"(35:159). Just as Holley has suggested, they concur that "Possession of superior technology does not guarantee effective use of that technology"(35:159). They mention five potential dangers associated with technology:

1) given enough time and resources, technology can be equaled by the enemy;

2) technology can be countered—it is particularly frustrating that some countermeasures are simple, inexpensive, and effective;

3) technology may not perform as well as expected;

4) technology may not produce a decisive advantage—weapon systems improvements tend to be evolutionary rather than revolutionary; and

5) technological sophistication produces undesirable side effects that offset the advantages produced by it—high cost is the most obvious example. (35:159-61)

Based on these possible pitfalls they conclude, "Militarily significant technological advantage is a fragile, perishable, and elusive commodity"(35:161).

"What often happens when a new technology is developed is that the anxiety and fear it generates is followed in quick succession by relief and optimism when another technological innovation cuts short the relative advantage of the first," Lieutenant Colonel Larry Grundhauser (USAF) pointed out in the Winter 1998 issue of *Airpower Journal*, "this is the classic measure/countermeasure problem"(50). Jack Miller, responding to the issues of proliferation of space products and technology's effect on the vulnerability of space systems, agreed with Grundhauser, "The counter, counter-counter measure cycle will continue just as it has before, there is nothing new about this"(86).

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Technology, theory, and experience are not the only doctrinal influences. Dr. James Tritten has suggested that "the strategic culture of a nation and a military service" are always influential (121:29). Indeed, sometimes they serve as constraints. "Underlying most apparent influences upon doctrine, and therefore themselves not to be overlooked, are geography, demographics, and government," he adds (121:30). In addition, Tritten proposes that "The major sources of and influences on military doctrine are topical in nature rather than enduring"(121:31). Finally, he caveats "There are topical factors that should *not* influence doctrine: such things as repudiated policies, resources that can never be expected to become available, strategies and concepts deemed outdated, former threats, and obsolete technology"(121:31).

Dr. Richard Hallion's description serves as an excellent summary:

> Doctrine must function in the *present*, be appropriate for the *near-future*, possess *flexibility* and *adaptability* to meet changing conditions, and be rooted in the *past*, in *military history* and *experience*. It must reflect the complete climate in which it is framed, a climate including existing political and economic realities. (51:26)

The Doctrine-Strategy cycle

Doctrine is also influenced by strategy. Drew and Snow address the issue of the relationship between doctrine and strategy in their book *Making Strategy: An Introduction to National Security Processes and Problems*. According to them, "In the simplest terms, *strategy* is a plan of action that organizes efforts to achieve objectives." They go on to suggest, "In the modern era, it is much more accurate and descriptive to consider strategy as a complex *decisionmaking process* that connects the ends sought (objectives) with the ways and means of achieving those ends"(35:13).

They believe that "doctrine has, or should have, an extraordinary impact on the strategy process," but they suggest the reality of the situation is that "doctrine is an ill-defined, poorly understood, and often confusing subject in spite of its considerable importance"(35:163). "As important as doctrine should be at nearly every level of strategy," they go on to point out, "it often does not control strategy or even have a significant influence on strategy decisions, a source of great frustration for the military professional"(35:172). This is true because, "The influence of military doctrine can be negated, modified, or limited by any of the host of other factors that influence strategy decisions"(35:173). From their perspective, ultimately, "The degree to which doctrine influences strategy depends on the relative importance of doctrine in the eyes of the decisionmaker"(35:173).

Drew and Snow imply there exists a doctrine-strategy cycle. Each influences the other and, in turn, is also influenced. "Doctrine influences strategy (or it should) and the results of strategy become the experiences that are the basis for doctrine"(35:174). Cichowski agrees with his former SAAS professor, "Since strategy also influences doctrine, aerospace doctrine shapes and is shaped by national military strategy"(15:35).

The Principles of War

Retired Lieutenant Colonels Gary Endersby and Barry Fullbright (USAF) note in the Winter 1998 *Airpower Journal*, "At the very heart of doctrine lies the principles of war articulated by Antoine-Henri Jomini"(39). *Air Force Basic Doctrine* describes the principles of war as, "Certain 'truths' of war" that *"apply to all of the US armed forces"*(21:11). It goes on to concede, "**Even valid principles are no substitute for**

sound, professional judgement—but to ignore them totally is equally risky"(21:12).[11]

Ultimately, AFDD 1, says *"The art of developing air and space strategies depends upon the airman's ability to view these principles from an aerial perspective and integrate their application with the airman's fundamentals"*(21:12).

Retired Army General RisCassi has said, "The principles of war also offer a way to intellectually massage the elements of an operation to understand its risks and strengths"(102). "Principles of war provide an intellectual framework against which military commanders can question their own processes of logic and decision-making faculties during planning and actual combat," RAAF officers in addressing their service's doctrine have observed, "importantly, principles of war provide a better understanding of warfare; however, mastering the art of warfare requires a depth of knowledge far beyond mere principles"(71:65).

Colonel Fabyanic agrees with his RAAF counterparts, "The principles [of war] are important, but they are not war, and knowing them cannot ensure victory in war" (41). His position is further elaborated:

> Uncertainty, chance and unpredictability, to which one could add danger and exertion, all combine under the rubric of general friction to present conditions other than those expected. Under such circumstances, axioms, rules and principles are of marginal utility, primarily because the confusion and chaos of war frequently are such that insufficient knowledge exists to suggest what to apply. War, in other words, is not a managerial enterprise. (41)

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[11] This text is bold because it is that way in AFDD 1. As throughout this thesis paper, all original emphasis has been retained when sources have been quoted. The reason for AFDD 1 using bold and italic text is discussed in the next chapter, Air Force Doctrine Today.

Retired General Dale Smith (USAF) touched upon this position as early as 1955. He was even more critical, declaring:

> Other doctrines, usually referred to as principles of war, have stood the test of centuries and seem to many students almost as immutable as those laws of natural science which apply in all schools of architecture. Yet war deals largely with people as opposed to things and can never rest on principles as exact as those of physical science. (109:4)

Russel Weigley has expanded on this position a step further, proclaiming:

> The principles of war tended during the 1920s, and still do today, to receive inordinate attention. Amid the harsh pressures of war and combat it is surely helpful to have at hand such straightforward guides to conduct, but the principles are so straightforwardly simple and general that they can lead astray almost as easily as they can assist. (128:214)

Bevin Alexander, in *How Great Generals Win*, suggests the key to success in combat is the ability to balance the potential pitfalls of the principles of war. He proposes this is a trait of the user. His own words make his case best:

> We have seen that although the principles of war are simple and can be learned by anyone, the application of each principle requires much care, skill, and caution. We have seen the great captains recognize when one principle applied in a specific situation can bring victory while another principle, equally valid, can bring disaster. (3:299-300)

"A review of the literature indicates that two diametrically opposed doctrinal schools of thought exist," Colonel Fabyanic has proposed (41). One is an abstract-Jominian view and the other is an operational Clausewitzian view. The abstract view places emphasis on precise doctrinal definitions, categorizes doctrine by type or level of application, believes in a formalized development process, and tends to view war in

mechanistic terms. "By implicitly assuming that war is characterized by structure and continuity," Fabyanic proffers, "one is free to argue that what has worked best in the past is appropriate for the future"(41). The operational view, on the other hand, has as "Its central focus…the reality of war and how professional officers respond to its uncertainty by relying on a set of shared assumptions and beliefs"(41). According to Fabyanic, the Clausewitzian approach seeks to explore rather than explain; "It would not provide answers, rather, it would merely remind those who must fight what questions to ask of the situation, of existing plans, of resources, and—not the least—of themselves"(41).

Fabyanic feels Air Force thinking has a "Jominian, mechanistic bias" that "seems to lack the all-important quality of discernment"(41). In 1986, he propounded that an examination of Air Force doctrine would reveal its basis is the principles of war, which demonstrates its "superficiality." Furthermore, he suggested Air Force doctrine manuals are "not about doctrine but about procedures; they are the military variant of the how-to books that proliferate in the commercial market on every conceivable subject"(41).

Russel Weigley is in agreement with some of Fabyanic's hypothesis. He notes the disparity between Clausewitzian thought and the principles of war:

> A much more striking feature of American military thought than the new popularity of quoting from Clausewitz was a tendency quite different from any that a careful reading of Clausewitz would encourage, the habit of attempting to encapsulate the major ideas of all military philosophy in a handful of terse "principles of war." (128:212)

Clausewitz is not without criticism. In *Ideas and Weapons*, Holley is critical of him, pointing out, "Clausewitz wrote after the Industrial Revolution was well under way, but

his writings show an utter lack of appreciation of the implications for the development of weapons in the new mechanization"(60:11). Professor Drew has criticized the American approach, noting:

> Traditionally, Americans have had considerable difficulty in accepting that war was anything more than battle writ large. The American "principles of war" reflect this attitude. In theory, these principles are axiomatic doctrinal beliefs that offer fundamental guidance for the conduct of America's military crusades. In reality, they are principles of "battle" that present basic factors which military commanders should consider before sending or leading their forces into combat. (30)

The answers to doctrine's questions are not found in the principles of war. They are certainly useful tools, but they are not the Ten Commandments of war. Many doctrine writers feel they are the foundation of doctrine, and thereby spend an inordinate amount of time establishing the link between their doctrine and the principles of war. The principles should be studied, as should both Jomini and Clausewitz, but to treat these thinkers as prophets of war is dangerous. They were theorists, and their ideas are hypotheses, not irrefutable steps in how to be victorious. If they are to be used, judgement is critical in applying the principles.

Authoritative But Requires Judgement

"General Shalikashvili [then Chairman of the Joint Chiefs of Staff] declared joint doctrine to be 'authoritative,'" Rebecca Grant wrote in a piece in the January 1997 *Air Force Magazine*. "He said, 'This doctrine will be followed except when, in the judgment of the commander, exceptional circumstances dictate otherwise'"(49). This comment

was not well received by many doctrinal scholars. The Chairman's intent may have been otherwise, but many saw this as a subtle attack on the "it is authoritative but requires judgement in application" clause which acts as a cornerstone of doctrine. As Professor Holley has written, "Doctrine is not and was never meant to be prescriptive. Doctrine is suggestive. It says, 'This is what has usually worked best in the past,' but this in no way frees decision makers from the need to form their own judgment in any given situation"(59).

Holley has written extensively on the issue of doctrine becoming prescriptive. "Doctrine is never prescriptive, never mandatory, and never rigidly binding on the commander in the field," he wrote in an *Airpower Journal* article in 1995, adding, "if doctrine ever becomes mandatory, it will curb initiative and lead to lockstep performance—if it is not ignored entirely"(57). Judgement is considered a perhaps implied, but elementary part of doctrine:

> Doctrines are not a series of universally valid maxims or positive prescriptions. They are points of departure for the thoughtful decision maker, who must judge each situation individually. When we say doctrine is "authoritative," all we mean is that it is objectively recorded experience that remains worthy of and requires the critical attention of the decision maker. (59).

The uncertain nature of combat is the primary reason for judgement being so critical. As Holley wrote in 1984, "Because there are so many variables and imponderables in any military situation, doctrines must never be regarded as absolutes"(58:92).

Dr. Tritten has provided input on this issue as well. "Properly developed doctrine strengthens the professional aspects of the military calling but does not diminish the

freedom of judgement and individual initiative that commanders and others must exercise in battle"(121:23). From his point-of-view, representing the USN perspective, "Military doctrine is authoritative but not dogmatic—that is, it does not dictate action"(121:34). He describes doctrine as "a bridge from the past and future to the present" providing "a commander the experiences and best professional judgments of others confronted with similar situations"(121:35).

Doctrine or Theory?

"Is it doctrine or theory if it has not been tested? We must have an understanding of these two subjects—they are uniquely different" Lieutenant Colonel McKinley noted the first time she was interviewed (83). In the second interview, she reiterated, "There is a key difference between theory and doctrine"(84). Her point was more than trying to use the Socratic method on an aspiring doctrine writer. The issue of when theory ceases to be hypothetical and becomes doctrine is important. It is especially critical to space, where experience is lacking.

Major Ehrhart has proposed that "to be valid, the fundamental assumptions that comprise doctrine must be grounded in experience….Experience makes doctrine practical rather than merely theoretical"(37:35). Professor Holley has noted that the precedent for doctrine being based on theory goes back to the inter-war years:

> British experience offered a substantial precedent showing that it was perfectly possible to escape the merry-go-round of doctrine influencing production and determining experience in operations which formed the basis of subsequent doctrine. The British projected doctrine beyond experience into the realm of possibilities. (60:159)

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At the RAAF doctrine symposium, Group Captain Vallance (RAAF) remarked on this exact issue:

> So doctrine is not holy writ, and it's not set in tablets of stone, it's our best estimation of the best way to use military forces in general and air forces in particular when we talk about air power doctrine. Over the years we've got better and better at it. In the early days of the formulation of doctrine, doctrine was mainly theory with a little bit of practical experience to leaven it. Doctrine is always a combination of theory and practice. (129:80)

Carl Builder has also addressed the relationship of theory to doctrine in *The Icarus Syndrome*. He describes the evolution of airpower theory into doctrine noting:

> A theory is a supposition or conjecture about the relationship between things. Theories explain why. Air power theory, when it was advanced as theory, supposed that air power could be applied decisively in war if applied to the heart of the enemy. The theory further supposed that such application would require control of the air and that such control would require independent control of air power. Until those suppositions were proven, air power was a theory. (12:206)

Builder also discusses the fallibility of theories. He suggests that they "do not have to be absolutely correct or timeless to serve human enterprise well"(12:290). Theories are susceptible to technology and the new knowledge that comes with it. "Theory provides a basis for directed action that can benefit human enterprise even though it is not quite correct or permanent"(12:290).

Professor Holley recently wrote, "Across the decades from the Wright brothers' first powered flight, theorists have generally promised more than they can deliver"(62:597). William Lind, in a discussion of Army doctrine, addressed this issue, noting that "A lesson of military history is that doctrines and promises are put to the test eventually. The results of failing the test are highly painful; arguably, they are more

painful than the results of saying you cannot do something before the incapability is demonstrated"(75).

Lieutenant Colonel McKinley pointed out the USAF's position on doctrine is that "Doctrine must be codified by the Chief of Staff. This is an official sanctioning process"(83). When asked about the point where theory ceases to be theory and actually becomes doctrine, Professors Drew and Winton agreed it was when the Chief of Staff signed it (36).

There is no mystic conversion between theory and doctrine. Airpower history is riddled with examples of doctrine based on theory rather than experience. In some arenas, as previously pointed out, theory is all there is. So, published doctrine may indeed be nothing more than theory. A reasonable development process, however, should ensure the soundness of theory and limit conjecture's influence. Although it may not be unanimously popular, the line between theory and doctrine, today, is controlled by the passions of the Chief.

The Doctrine-Technology Push-Pull

"It is still not clear to what extent technology drives operations or the reverse," Millet, Murray and Watman noted in an essay entitled, "The Effectiveness of Military Organizations," in the book *Military Effectiveness.* "What is certain is that each have powerfully influenced the other and that the exploitation of technology by military organizations has been of increasing significance"(87:15). The better question, perhaps, is should doctrine push technology or be pulled by it?

According to Dr. Richard Hallion, "Generally speaking, the technology tail has wagged the Air Force dog"(51:23). He makes a connection among technology, doctrine, and space when noting, "Yet again we see a case where the technology is leading our doctrine, for our doctrine with regard to space is imperfect"(292:25). Robert Frank Futrell has considered this issue relative to early Air Force doctrine, pointing out that:

> Although the Air Force had mentioned keeping its doctrine "dynamic," the editions of AFM 1-2 issued in the 1950s were reminiscent of the state of the past or present military art in that technology was driving doctrine rather than doctrine directing technology. (46:714)

General Smith has suggested the reason for this is that "Military doctrine is elusive and can only be pinned down momentarily. It is as dynamic as the technological culture from which it springs, changing with every new invention and each new system of procedure"(109:10).

Major Ehrhart makes a connection between theory and technology when he proposes, "A doctrine founded primarily on vision runs the risk of being irrelevant, even dangerous, if technology has not caught up with it by the time that next war breaks out"(37:33). He feels doctrine must lead technology, but concedes, "There may be times when a technological breakthrough forces a change in doctrine or even the establishment of new doctrine"(37:34). He ultimately advises, "In trying to assess the relationship of technology and doctrine, we should begin by determining where new developments might fit into accepted doctrine; then, if necessary, we should adjust doctrine accordingly"(37:35).

Dr. James Mowbray has emphasized that *"It is important to recognize that basic and operational doctrine properly determine for the service what technology and equipment it should select"*(91:4). Major Dickey, Science and Technology Planner at AFSPC, disagrees with the idea that is the state of affairs today, but believes, "Doctrine *should* lead technology because the engineers and scientists need a direction. We should think where we want to go first and then seek those technologies"(26). Dr. Tritten agrees, "Doctrine can be arranged to capitalize on breakthroughs and it can be used to focus scientific efforts on anticipated requirements"(121:30). Hallion, addressing doctrine in the general sense, affirms:

> We must recognize that both technology and doctrine are dynamic processes, always advancing or receding, and are necessarily adaptive to change lest they stagnate and lose relevance. Neither is independent of the other; rather, each generates a synergistic impulse that encourages and strengthens the other. (51:17)

Professor Drew made very clear in a interview in November of 1998 that doctrine writers should not "Get hung-up on the technology question, for it is an interesting academic argument to consider the push or pull nature, but really it depends on where you enter the argument"(29). As Dr. Tritten has observed, "In reality, of course, both approaches have been used, and doctrine has been pulled along by, as it has also pushed, revolutionary technological advances"(121:30). A solid doctrine, with the explicit desire of driving technology, could provide direction. In many ways, the pull effect is uncontrollable. Doctrine writers and users, however, govern the push.

Reflections

Some of the aerial knights of the Air Force have been in search of doctrine's Holy Grail. They have sought out a single mystical definition to captures doctrine's power. Others have criticized this journey as unsound, for it distracts rather than enlightens. Through it all, doctrine has been defined in a multitude of ways. Various types and levels also have been suggested, but this has also received criticism.

Ultimately, definitions are a necessary part of understanding. Perhaps the most considered definition remains: *military doctrine is what is officially believed and taught about the best way to conduct military affairs.* This definition by Holley is powerful because it captures the fact that doctrine is *official*. For the Air Force, the difference between theory and doctrine is the codification by the CSAF, who thereby makes it official. It is *believed*, which implies faith as well as an element of doubt. The ideas found within doctrine are not unequivocal facts. This definition indicates that doctrine educates, for it is *taught*. "Doctrine is most definitely not absolute," Holley has noted (56). His definition captures this by distinguishing it as the *best* way, not the only way. This also suggests that analysis of experience was part of the process, for determining what is best requires study. *Conduct* connotes leading or guiding. There is also an element of behavior associated with it. Clearly, doctrine is about more than just performing. Finally, *affairs* are not simple, but complex matters. There is the implication of a relationship of disjointed parts interacting synergistically as one. Professor Drew is correct, this definition is best.

More important than the definition, levels or types of doctrine are the functions of doctrine. Even this is without accord, however, for scholars and users alike anticipate doctrine contributing different things. There is some agreement that doctrine educates, guides and standardizes, but a universal list of doctrinal functions is still out of reach. What scholars do not challenge is the importance of doctrine. Users of doctrine, however, are less zealous. The exact reason for disinterest in doctrine is one more elusive element to the doctrine story. Air Force leadership's lack of commitment, the perceived lack of readability, and airmen's failure to read it have all managed to undercut the usefulness of doctrine.

There is near unanimity on the foundations of doctrine. Doctrine is based on experience, theory, and technology. Its primary basis should be experience, but this is not always possible. Sometimes experience is lacking. In these cases, theory serves as the foundation. A dilemma persists as to whether doctrine is nothing more than theory if it has not been tested by history. This argument is grounds for a thesis on its own merits. The precedent has long been established for theory to act as the backbone of doctrine. In the end, experience often leads to revision of doctrine. Then the revised doctrine is nothing more than theory. Doctrine cannot be validated, "When you think of 'validation,' you think of it like a mathematical proof, this is not like that"(56).

Technology's impact on doctrine is not without controversy. The quandary is over whether technology pulls doctrine or is pushed by it. The fact of the matter is that both arguments are true. Historically, there have been examples where doctrine pushed technology, but the overall trend has been for technology to pull doctrine along. This

does not have to be the case. In fact, many scholars and users feel one of doctrine's functions is to push technology. This is possible if doctrine writers keep that idea at the forefront. Even so, there will still be instances when technology gets ahead and doctrine has to catch up.

Doctrine and strategy also share a relationship. Their association is best described as cyclical. Doctrinal ideology influences strategy, which is then tested in battle. The strategy is then influential on doctrine, and then it all starts over again.

A more one-way relationship exists with the so-called principles of war. These "certain truths of war" are viewed by many as the Ten Commandments of military operations. Air Force doctrine, today, is based primarily on these principles. Although they have seemed to pass the test of time, there is a great danger in depending on them too much. Certainty is nonexistent in war, so any approach that looks for absolutes is doomed to failure. Doctrine cannot be established on the basis of notions perceived as irrefutable, for human nature alone makes the future uncertain. The principles of war do deserve study. Surely, they are a part of doctrine development, but they are neither the foundation nor the single answer.

Critical to any use of doctrine is judgement. Indeed, the cornerstone of doctrine is that it is authoritative but requires judgement in application. Without judgement, doctrine is one step from becoming either dogma or another "how-to" manual. Either way, it would be useless if it were even used at all.

V. Air Force Doctrine Today

The Air Force has no doctrine experts.   - Drew (29)

Given the complicated yet important nature of doctrine, the need to develop it is axiomatic. Even so, doctrine development has been oft criticized as haphazard or "ad hoc" at best. Partially to address this issue, the Air Force has established the Air Force Doctrine Center at Maxwell AFB, Alabama. They are tasked with "facilitating the writing of doctrine"(76;117). Air Force Policy Directive (AFPD) 10-13 and Air Force Instruction (AFI) 10-1301 outline the responsibilities of the AFDC as well as the process to follow when developing doctrine.

This process has been criticized as being bureaucratic, rather than intellectual. The focus does seem to be on timelines rather than content. Development is by committee with ample opportunity for coordination. Time and the ability of those on the committee limit the research; however, AFDC personnel do oversee the process and carry it through to publishing.

Doctrine is published in a standardized manner. The emphasis is on making it something users want to read. Quotes, figures, and pictures are found throughout the AFDDs. Color text and various font styles also affect its readability. To make doctrine even better, multimedia is beginning to be incorporated. This, along with the desire to be paperless, has prompted the Air Force to electronically publish most of its doctrine; only AFDDs 1 and 2 are produced in "hard copy" form. This new movement is criticized because it fails to recognize the needs of doctrine users deployed or in the field.

One of the central criticisms levied against the doctrine process is its failure to be intellectual. This disdain of thought is not the sole problem of the AFDC, but symptomatic of the Air Force's anti-intellectualism. Some feel it is characteristic of the airman's inherent outlook. Others suggest this flaw can be traced directly back to senior leadership. Either way, the AFDC's emphasis is "time out the door" rather than ideas.

How the Air Force Develops Doctrine

AFI 10-1301, *Air and Space Doctrine*, describes "the process to be used in developing doctrine"(23:1). The process for developing Air Force doctrine projects is shown in Figure 1 (23:1). A major emphasis of the process is the time required getting doctrine through the process. According to the figure, it is supposed to take less than 360 days, from start to finish, for doctrine to be published. Captain Bill Thomas (USAF), chief of the military operations other than war (MOOTW) branch at the AFDC, confirms this priority. "The Air Force Doctrine Center tries to get it on paper and get it out the door—trying for an eighty-five percent (85%) solution. The attitude is Air Force doctrine development should take a year; you can make it right later"(117). Given the recent rash of doctrine publications, the process must be working.

In reaction to the AFDC's process, Professor Drew remarked, "The Air Force Doctrine Center is bureaucratic and not intellectual"(29). He has long been critical of the Air Force doctrine process. In an article in *Airpower Journal* in 1995 he stated, "Within the established bureaucratic process for producing doctrine, we have no organized system or process for gathering, consolidating, and analyzing historical and theoretical data"(32). He then went on to assert that "Air Force basic doctrine is not the product of serious

research and analysis. More often, it seems to reflect the opinion of the 'senior officer present'"(32). Further investigation of the AFDC process will reveal if Drew's assertions are correct.

MAJCOM - ETC.	AFDWG	AFDC/CC	AFDC
PROPOSAL	DISCUSSION	APPROVAL	PRA & SCOPE
D + 0	D + 0	15 : D + 15	15 : D + 30

AFDC	AFDC	PRA (AFDC)	PRA
RESEARCH & OUTLINE	OUTLINE APPROVAL	WRITE DRAFT	DISTRIBUTE FOR COMMENT
60 : D + 90	15 : D + 105	60 : D + 165	15 : D + 190

AIRSTAFF/MAJCOM	AFDC	AFDC	APPROVAL
REVIEW & COMMENT	INCORPORATE OR RESOLVE	PREPARE FINAL PRODUCT	
60 : D + 240	45 : D + 285	45 : D + 330	30 : D + 360

AFDC
PUBLISH
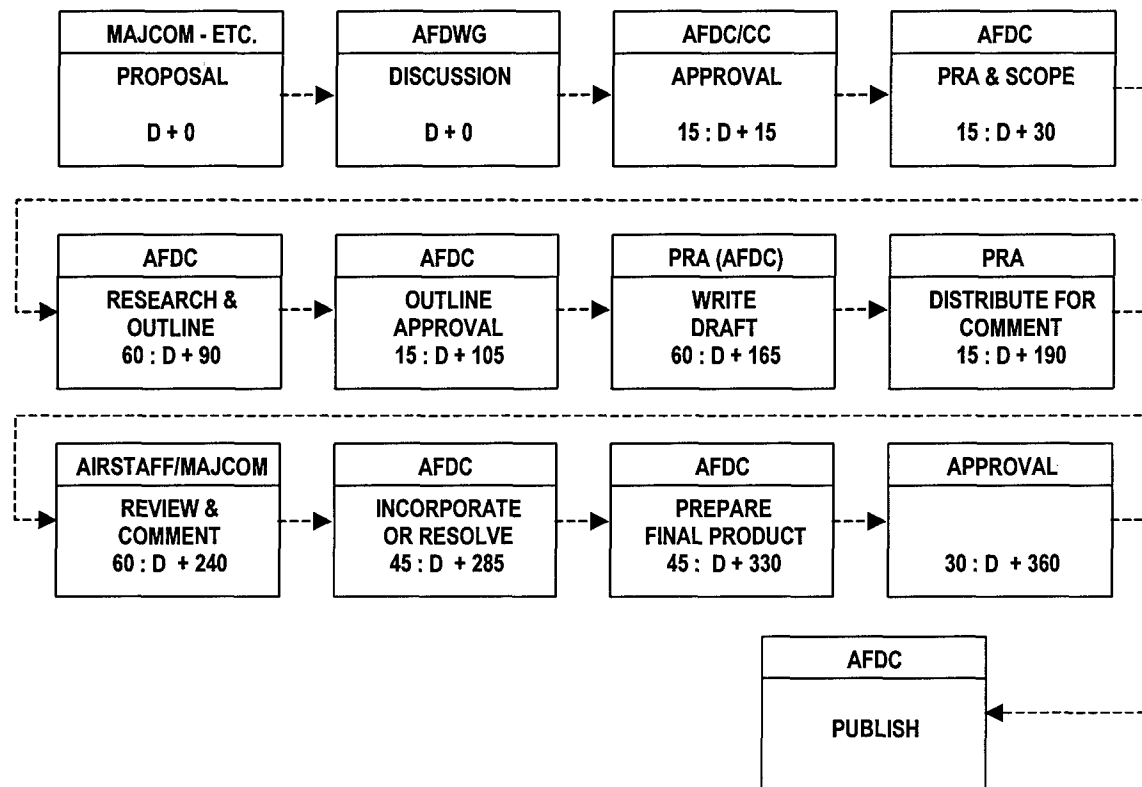
Figure 1. Air Force Doctrine Development Process.

The first step in the process is the *proposal*. "Major commands (MAJCOMs), field operating agencies (FOAs), direct reporting units (DRUs) and Air Force Deputy Chiefs of Staff may propose doctrine requirements"(23:2). Proposals are then considered by the Air Force Doctrine Working Group (AFDWG, referred to as the "af-dog,") in the second step *discussion*. "The AFDWG normally meets twice a year...to validate and make recommendations on proposals for new USAF doctrine projects"(23:2). The

AFDWG is primarily made up of staff officers representing the MAJCOMs (117). *Approval* authority for doctrine project initiation is vested in the commander of the Air Force Doctrine Center. Once approved, a primary review authority (*PRA*) is assigned and the proposed doctrine is detailed so it has the proper *scope* (23:2).

Air Force Doctrine Center personnel, usually the PRA, then conduct preliminary *research* on the topic and propose an *outline* for the document. Once the AFDC gives the *outline approval*, the Air Force Doctrine Working Committee (AFDWC, referred to as the "af-duck,") conducts more in-depth follow-on research. Subject matter experts (SMEs) "from applicable Air Force agencies" make up the AFDWC (23:2). The objective of the AFDWC according to AFI 10-1301 is to develop a more detailed outline and "to ensure all concerned organizations have the opportunity to participate and any contentious issues are raised and worked"(23:2).

The AFDWC meets at the AFDC located at Maxwell AFB, Alabama, to work on doctrine projects. Finding a room with computer resources for the SMEs begins the doctrine writing portion of the process. Generally, individuals or pairs are tasked with chapters or sections of the doctrine document. According to Captain Thomas, "The intent is to have the AFDWC come up with an outline, which the Doctrine Center member [PRA] will then finish, but what you get, in reality, is a draft, which is then coordinated"(117). Completing the *draft* usually takes less than two weeks. It is then *distributed for comment* among the MAJCOMs.

After the MAJCOMs have *reviewed* the document, they submit their *comments* to the PRA. "HQ AFDC incorporates appropriate comments, resolves issues in direct

coordination with the originator of the comments, or identifies these items as unresolved"(23:2). Based on Thomas' experience, "When inputs come back they are incorporated at the Air Force Doctrine Center member's [PRA] discretion" and should a MAJCOM feel strong enough about an issue, their four-star may call the AFDC's two-star to work out the issue (117). Ultimately, MAJCOM comments are either *incorporated or resolved.*

The AFDC then *prepares* the *final product* for *approval*. "CSAF is the final approval authority for capstone and keystone Air Force Doctrine Documents (AFDDs). HQ AFDC/CC is the approval authority for all other operational doctrine"(23:2). Capstone and keystone AFDDs are not defined in AFI 10-1301, but based on Air Force Policy Directive (AFPD)10-13, which the AFI is intended to implement, "HQ AFDC also completes Air Staff doctrine coordination for final approval of the 1- and 2- series Air Force Doctrine Documents (AFDDs) by the Air Force Chief of Staff"(24:2). Based on this, capstone and keystone doctrines are the 1- and 2- series AFDDs. Format guidelines, design and layout, and distribution are the responsibility of AFDC (24:2). After the document is approved it is *published.*

How The Air Force Publishes Doctrine

Since the last publication in 1992, the format of basic doctrine has changed considerably. The 1997 version is contained in one eighty-six (86) page volume. Even this is misleading, for the pages are really half-pages and glossy color pictures with plenty of diagrams abound. Most chapters start with a quote "from someone the reader

will have heard of…or an authority on the subject"(119). These quotes personalize the document, and allow for emphasis of important topics (119).

Blue boldfaced and blue italics text is also found throughout the document, along with the standard black text. "The blue sentences offer a 'Cliff Notes' version of the document" so readers can scan through the doctrine (119). Usually, "the boldfaced sentence is the subject of the paragraph" and those sentences that are in italics are supporting material (119). These measures are intended to make doctrine more user friendly so airmen actually read it.

Those AFDDs that have been published since the AFDC stood up all follow the same format as AFDD 1. "[The AFDC] decided to stick with a single template just for consistency across the pubs…it may improve readability for the student/planner/commander who's reading a large number of AFDDs"(119). Another big push is to electronically publish all of the AFDDs rather than put them out in traditional print. This new methodology allows for multimedia to be incorporated into the documents. The idea, again, is to make it more informational, as well as more exciting. "Let's face it, doctrine is not necessarily the most exciting subject to read about," Thomas has commented, "if we can spice it up with photos, examples, and quotes, and maybe attract or keep a reader's interest, great"(119).

From now on, the Air Force plans to publish only AFDD 1 and 2 in print. All other AFDDs will be strictly electronic. Thomas notes some personal concern about the push toward solely publishing electronically. Based on his experience in deployed areas he has concluded, "If doctrine is to be used, it must be in hand"(117). As he points out,

access to electronic publications in a combat environment is quite different from that found in normal every day work centers. Being purely paperless is potentially perilous.

Standardized doctrine documentation seems like a great idea on the surface, but the danger is, it can lead to a furthering of the "how-to" manual mentality. Copying a previous format merely for the sake of standardization is not wise. Distinct doctrine documentation is indicative of the differences among the issues the military seeks doctrine for. Once again, doctrine should be considered, which requires thought.

Anti-intellectual Sentiment

Professor Drew is critical of the 1997 version of basic doctrine. He professes, "Now we are back to assertions with no evidence"(29). "One thing they cannot take away from the '92 version is the great deal of documentation. In fact, I think a precedent was set which others could not follow," Professor Harold Winton suggests. "Look at the most recent version, they abandoned the documenting aspect because it was too difficult, or at least that is what I think"(36).

Dr. James Mowbray noted before the Doctrine Center moved from Langley AFB, Virginia, to Maxwell that "The Air Force must give up its predilection to 'ad hoc' its doctrine, and it must commit cerebral personnel on a long-term basis to the preparation of doctrine"(91:13). This was based on his conclusion that "The Air Force is writing doctrine once again with no evidence that it is going to be rooted in any theory of aerospace power"(91:12). This goes to the heart of the argument that airmen are not intellectual.

Thomas, based on his experience, has decided, "The Air Force is not an intellectual organization"(117). He suggests, "[The Air Force] may need to bring civilians in to overcome the anti-intellectual sentiment. The Air Force needs to try to help people understand the value of thought"(117). Drew has observed similar sentiments, but characterizes them differently: "Airmen are doers rather than thinkers"(29). Holley agrees, "Traditionally, armed forces have attracted activists, men generally better at 'doing' than 'reflecting'"(61:5).

Professor Holley wrote "Fifty Questions for Doctrine Writers: Means Are as Important as Ends" partially in anticipation of the standing up of the AFDC. The questions he formulated were to help doctrine writers for he felt:

> I have devoted much of my professional life in the Air Force to the quest for suitable air doctrine. I have written books and articles for this purpose. It now appears that my efforts have been without much success, for we are still groping for a better path to sound doctrine. Our procedures for devising doctrine at all echelons are still far from ideal. (59:27)

This feeling was only heightened after seeing what the AFDC actually used for developing doctrine.

After an early visit to the Doctrine Center he felt disappointment. Professor Holley retold the story of an early AFDC commander who was unfamiliar with his work. This disappointment was in no way tied to any personal offense associated with not being recognized, but rather because it reflected the commander was unfamiliar with doctrine

and the work of those who had diligently endeavored to make doctrine better (56).[12] If the commander was, apparently, not truly interested in doctrinal thought, then his underlings would also feel no need to engage in active thought.

Colonel Mann agrees with Thomas, observing that intellectualism has come to be viewed as "unmanly" and "perhaps even detrimental to one's career"(79:164). In his judgment, there is a "disdain held generally by professional fighter pilots (and the people who would emulate them [i.e., most of the rest of us]) for intellectual endeavors"(79:164). He concludes further, "Our bias against intellectualism in our ranks has put us behind the power curve"(79:194).

For all of Builder's criticism of the Air Force, he feels the charge that Air Force officers are anti-intellectual is unfounded:

> Although several institutional observers have described Air Force officers as being less intellectually inclined than those of the other services (some have even used the term "anti-intellectual"), I think the term has been misplaced. Air Force officers may not be any more academically tolerant or broad as those in other services, but I have found them to be intensely intellectual about their business. I define an intellectual as one who likes to play with ideas, who is comfortable with ideas, even radical ideas. (12:23-4)

Even with Builder's definition, he has made the case in his own book that the Air Force, at least as an institution, does not promote thought.

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[12] The point here is important. Today the Air Force has two doctrinal experts: Professor Dennis Drew, who made the remark opening this chapter, and Professor I.B. Holley, who Drew views as a mentor. A first step in researching Air Force doctrine will lead to these two men. So, being unfamiliar with either of their works reflects a lack of research and comprehension of the state of Air Force doctrine. This should go with out needing to be said, but in this world of questionable values, it is essential: Professor Holley is most definitely an officer and a gentleman, and any disappointment he felt was truly reflective of the professional issue and in no way selfishly motivated.

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In the case of the AFDC, an analysis of their development process is most revealing. Sixty days are appropriated to conduct research and outline the draft. Another sixty days are allotted for the writing of the draft. "A major assumption is the members of the AFDWC have expertise"(117). The reality of the situation is that there is no requirement for the MAJCOMs to send "experts." Most likely, the SMEs are frequently staff officers who drew the short stick. "Our doctrine process reflects that we do not do original research," Thomas confesses, "there is not a lot of solid research done here [at AFDC]."(117). A common thread among doctrine scholars is the necessity for solid research.

Professor Winton is probably correct. There is no way the AFDC process can live up to the 1992 version in less than 120 days of research.[13] Documenting requires diligent exploration. According to Professor Drew, "[For the 1992 version] a team of 10 field-grade officers worked nearly full time for almost two years. An estimated 7,000 man-hours were spent on research alone"(32).

Reflections

The doctrine development process outlined in AFI 10-1301 is not focused on ideas, but on time frames. It clearly emphasizes expediting products, but not necessarily in an expeditious manner. Getting a doctrine document published in less than a year is

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[13] This figure is based on 60 days for *research* and 60 days for *writing*, as outlined in the figure.

where the emphasis has been placed in the process the Air Force Doctrine Center has established.

In terms of content, visual appearance seems more important than content. It appears the ideas expressed in the doctrine document are secondary to format. Pictures and diagrams are certainly beneficial if they promote understanding. Color for the sake of using different ink settings is pointless. The same can be said of varying the font type. Although the "Cliff Notes" concept is appealing, current AFDDs are more confused than simplified by some of the stylistic wanderings.

One format for all doctrine does not seem appropriate. Doctrine should be approached in a style befitting the topic being considered. Electronic publication is also a bit misdirected. There is also danger in adding multimedia. This can easily be viewed as another example of format having a higher priority than content. Certainly, additional mediums could convey ideas more thoroughly, but they could also take on their own identity. The content may be poor, but the graphics are neat.

The crux of the problem is the anti-intellectual sentiment engulfing the process. The "experts" writing doctrine today are no more experienced than anyone else in the Air Force. To suggest they are SMEs is insulting. Furthermore, are those individuals selected to go to the AFDC doctrinal experts? Perhaps, they too are nothing more than staff officers who were due for an assignment. Even the best-intended individual would be drowning in the process' commitment to time over ideas. Unquestionably, 120 days is little time for even the most gifted doctrine writer to complete satisfactory research. Doctrine should be about ideas not deadlines and milestones.

VI. A New Way to Develop Doctrine

*The means we employ when we undertake to formulate doctrine are
every bit as important as the ends we seek.* — Holley (59)

Given the grave inadequacies of the current Air Force doctrinal process, it was imperative to find a new way for developing doctrine. Initially, the search focused on finding "the best doctrine." This was, in essence, the hunt for the Holy Grail. Although it could be very insightful to study sister service doctrine and foreign doctrine, this is futile if the desire is to find an example to serve as an exact guide. The futility comes about because doctrine is no more universal than the organizations that require it.

Even the branches of the armed forces have different doctrinal needs, despite their similarity of being military institutions. Army needs are clearly different than Air Force needs. This is true simply because of the differing natures of what they do and how they do it. It would be unwise for the Air Force to model its doctrine after the Army. Some critics contend this is what the Air Force has been doing (52).

Eventually, the realization that the Holy Grail of doctrine did not exist prompted a different approach. Rather than study doctrine for the best model, doctrine was analyzed for its traits. The focus was on the why's rather than the how's. This was also when the idea of value-focused thinking began to stand out. A common theme of doctrine was that it served as a tool for decision-makers. So, a decision-making tool, like VFT, seemed appropriate. Furthermore, value-focused thinking centered on the why's, providing more understanding through its inherent explicit nature. Value-focused thinking would provide reasonable debate about the important issues associated with content.

In researching processes, one clearly stood out as significant. Professor Drew had suggested a process that was based on modeling a research project. His process had a great deal of potential, but seemed to focus on traditional alternative-focused thinking methods. It was tied to the established foundations of doctrine. The issue of space control, however, is severely lacking in experience, theory, and technology. It is being driven by beliefs. These beliefs are based on values. In the end, it was determined that using value-focused thinking would require a different model than Drew's.

The eventual model, however, was influenced by Drew's model. Feedback from Captain Thomas and Professors Drew, Holley, and Winton was instrumental in improving it. This model is driven by values. It includes multiple feedback loops and is a continuous process. The most important loop is the hypothesis-research-analysis loop. This is where objectives are tested and evaluated for their relevance.

There is a multitude of sources for research. They are critical to effective doctrine, for they help establish the support for the hypotheses. In many respects, the research makes the difference between theory and doctrine. The database of research is constantly changing. Likewise, doctrine is continuously changing, so doctrine development is iterative.

There are some important aspects of doctrine development this model does not specifically address. This process will guide doctrine writers, but there are specific characteristics of good doctrine writers the process cannot capture. Although a successful doctrinal education program determines doctrine's ultimate usefulness, this model does

not address any implementation issues. Finally, the idea of classifying doctrine does not belong in the model, but is a relevant topic because of space control's sensitive nature.

Professor Drew's Model

Professor Drew's model provides insight into a different approach from both the Air Force process and the proposed development model. Considering his model helps to better understand the strengths and weaknesses of each.

"A reasonable and proven outline for a systematic approach to the development of doctrine resides in the classic, structured steps of a research project," wrote Professor Drew in "Inventing a Doctrine Process," an article published in the Winter 1995 issue of *Airpower Journal* (32). He felt a new development process was necessary, because the Air Force lacked a "Systematic effort to generate, evaluate, and cast judgment on new concepts based on the ever-changing database of experience, theory, and technology"(32). In his article, Drew outlined a development process, which he said would, "Translate the generalities of a classic research structure into more concrete operational terms"(32). His process is reproduced in Figure 2.

As the circular nature of his process demonstrates, "The publication of doctrine is episodic, but its development should be continuous"(32). The doctrine writer begins in the upper left corner, devising a research plan that "explores the relevant history," considers theory where experience is non-existent, and takes into account advances in technology. Drew warns that "the most common problem is predisposition—gathering only the evidence that supports preconceived concepts about the subject at hand"(32). Objective consolidation and analysis of the data should help to remedy this dilemma.
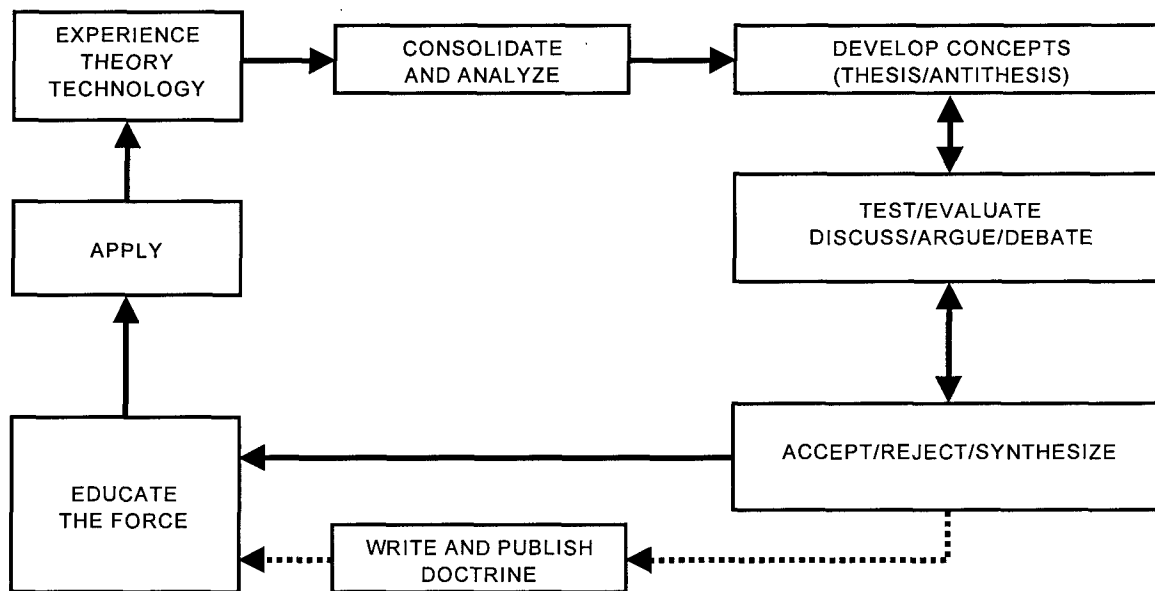
Figure 2. Professor Drew's Doctrine Process.

Through analysis of the data, new concepts are developed or existing concepts are reinforced. "Competing concepts may emerge from analysis of the data," Drew acknowledges, "whether the concepts developed are new and/or competing and/or reinforcing, they need to be tested and evaluated"(32). This should lead to the best answer. "If the process is robust, the evidence and interpretation to support accepted concepts or synthesis should be solid and defensible"(32).

In his process, Drew shows a series of double-headed arrows to demonstrate the iterative nature of the process. Conceptualization leads to evaluation, which leads to rejection, acceptance, or synthesis. If the concept undergoes synthesis, it may require more evaluation. In some cases, the evaluation may illustrate that concepts need further development. In Drew's view, "Although divided into discrete sections...all three sections are part and parcel of the same function"(32).

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Those concepts that are accepted will then be formally written and published in a doctrine manual. According to Drew, planning for publication of the doctrine "must come before the process of doctrine development even begins"(32). "Determining the primary purpose and the primary audience will affect not only how the doctrine is written," he professes, "but to some extent what subjects are covered, how they are approached, and what data is sought"(32).

After doctrine is officially published, the force has to be educated about its relevance. Drew reiterates an important point previously noted, "If no one reads the doctrine manual, no one will understand or apply the doctrine, and the entire venture will have been for naught"(32). Application of the doctrine is an obvious step that establishes a new set of experiences, which restart the doctrine development process.

Drew's depiction of the development process also shows publication of doctrine may not always occur. This reflects the episodic nature of publication. He notes these interim periods might be considered informal doctrine. "We all have personal opinions about the best way to do things, whether or not they are codified in official doctrine"(32).

Drew's model is appropriate for many situations if using traditional AFT. The data, in the form of experience, theory, and technology, appears before any consideration of objectives. This is a thought process focused on alternatives. In his model, values would not come into play until the test/evaluation phase. In the case of space control, Drew's process is very difficult to apply for several reasons. First, there is no database of space control experience to analyze. Next, space theory is severely lacking. Finally, technology is starting to pull, but the impetus is still sometime away from actually

resulting in doctrine. For these reasons and the desire to fully incorporate value-focused thinking, a different model would be required in writing space control doctrine.

Model for Developing Doctrine

Initially, this work approached the doctrine development problem from the traditional AFT outlook. Indeed, the influence of the Air Force interpretation of VFT was overriding. Eventually, the realization that there was no single answer for the best doctrine prompted a reconsideration of VFT. At that point, it became clear that the objective for the doctrine itself needed to precede any other steps in the process. This realization facilitated the creation of a new development model. Because defining the purpose of the doctrine was a major step, this model is flexible, molding to the user's needs, and, thus, applicable to all doctrine writers. The proposed doctrine development model is shown in Figure 3.

Area of Interest

The area of interest is the topic the decision-maker is concerned with, scoped to the desired level. This is given to the doctrine writer, and serves as the initiator of the model. Since the objectives deal specifically with the area of interest, the area of interest directly influences the objectives of the doctrine. The doctrinal purposes are also indirectly influenced, as shown by the dashed arrow.
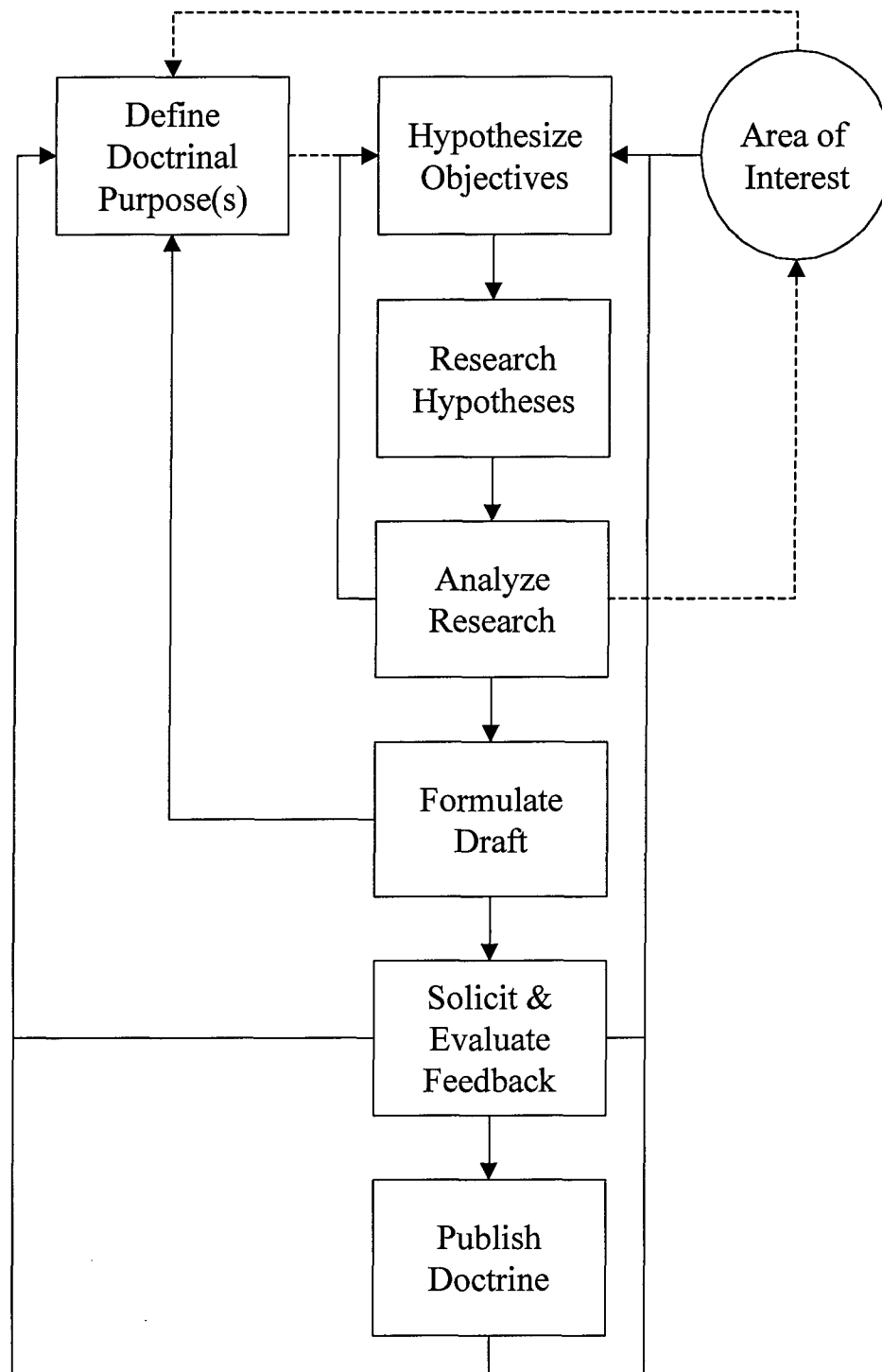
Figure 3. Proposed Doctrine Development Model.

Examples of areas of interest include: aerospace power, airpower, space power, surveillance, intelligence, information warfare, and education. This list demonstrates how varied the topics might be as well as how the area of interest can serve to set limits on the work. For example, aerospace power is very broad so that both airpower and space power could fall under it, while surveillance is more specific. In this example, there is a hierarchical breakout, for surveillance could fall under either airpower or space power, but that does not have to be the case. This list also demonstrates how levels of doctrine can be implied through the area of interest. In the case of aerospace power, it would be a higher level, or basic doctrine, whereas information warfare might be operational doctrine.

Initially, judgements are not placed on the validity of an area of interest. Doctrine writers work with what decision-makers provide them. In time, however, it may be determined that the scope is insufficient, requiring modification. The modification may also be because the topic area is inappropriate for the user's purposes. *The area of interest for this work is space control.*

Define Doctrinal Purpose(s)

Defining doctrinal purposes is the first step for the doctrine writer. Doctrinal purposes address the questions of "why have a doctrine" and "what is the doctrine expected to do." As Captain Thomas has pointed out, "Part of that [doctrinal purpose] is going to be the 'who,' because that gives you an idea of 'how' it's going to be used"(118).

Too much effort has been placed on finding a magical definition for doctrine. Instead of spending energy debating what doctrine is or is not, it would be better to explicitly state what the organization expects to get from doctrine at the outset. This establishes the tone and purpose.

The doctrinal purposes are indirectly influenced by the topic. An example of this influence can be found in a comparison of the levels of doctrine. Basic doctrine may have a different purpose than tactical doctrine. Perhaps basic doctrine is intended to educate, while tactical doctrine is to serve as a decision guide. Actually, these levels of doctrine have both purposes. In the case of basic doctrine the education purpose is at a greater level than the guiding decisions purpose. Tactical doctrine would most likely be more prescriptive than basic doctrine.

The intent at this step in the model is to determine what are the organization's doctrinal needs. Given this is a fundamental step in the model, it should not be discounted as obvious. A good doctrine writer should truly struggle with this. Benchmarking other doctrines used by different organizations helps provide insight into possible doctrinal needs. This should not be approached from a judgmental standpoint. Determining "good" and "bad" is not the goal; the goal is to gain an understanding of what is used and why it is used. An easy cop-out at this juncture is to discount any other documents because of an attitude like "what works for the Army is fine for them, but this is the Air Force." Although there is fundamental truth in the statement, insight can be gained from analyzing why the Army does it a given way and how well it works. Another possible pitfall is to seek out similar organizations with the sole intent of

copying their document. Borrowing ideas is an efficient way of developing something, but only if it is accompanied by an understanding of how these concepts were created and why they work.

An organization must define doctrine for itself through the doctrinal purposes. These purposes capture what the organization values in doctrine. Some possible purposes of doctrine might include: providing a tool for making decisions, establishing a basis for educating the organization, and furnishing the opportunity to analyze past experiences. Note that the purposes are not unique within themselves. Certainly, analyzing the past provides both an educational basis and a decision tool. Even so, the values espoused are different. One implicit value is making better decisions, yet another is education, and still another is analysis.

Based on the doctrinal functions previously noted, a list of some possible doctrinal purposes was drafted to elicit feedback from doctrinal scholars. The following list was postulated:

1) guiding decisions
2) educating the organization
3) analyzing experience
4) defining roles and missions
5) defending budget requirements

As with doctrinal definitions, there is no magical set of doctrinal purposes. Indeed, the list above was certainly not intended to be all-inclusive. Some doctrinal scholars, however, had very specific feelings about this list.

"Roles and missions are defined by public law; doctrine may explain those roles," Professor Drew suggested (36). He went on to add, "Analyzing experience is not a purpose"(36). Professor Winton felt the list needed an addition, "One of the purposes of doctrine is to anticipate future developments"(36). They both agreed the top priority for doctrine is education. Thomas commented on the budget aspect of doctrine, "In the ideal world, doctrine would be used to help DEFINE budget requirements"(118). Later he adjusted his thoughts, "The budget should not be considered in doctrine. Doctrine should be developed separate from budgets and other policies; these, in turn, should be based on doctrine"(118).

Drew and Winton agreed the budget should not be part of doctrinal considerations. They felt the following list embodies *the* purposes of doctrine:

1) educate
2) guide decisions
3) anticipate future developments

This is markedly different from Drew and Snow's four fundamental functions. This is a matter of semantics, but purposes, as implied in this process, are comparable to functions. The premise in this case is that purposes of doctrine encompass the desired functions of doctrine. This model does not pretend to determine absolute doctrinal purposes, nor is it intended to do so, for the purposes are user dependent.

More often than not, there is more than one intended purpose, which requires a tradeoff. Given that these functions may neither all be equal in desirability nor independent of the other purposes, they require some sort of trade analysis to reach a

balance. Fundamental to this process is the ability to determine priorities. Since values are explicit, prioritizing is much easier to do, for there should be no hidden agendas and open debate is possible. Debate should determine the organizational priorities. Furthermore, every member of the organization will have knowledge of what the purposes of the doctrine are, and will be provided a basis on which to judge the success of the doctrine.

Another benefit of explicitly stating the doctrinal purposes is it provides the means to evaluate the doctrine document. If a doctrine document is intended to be more directive, then it should indicate that, or as Tritten has described it, "If it is directive, then its policies govern as written. If it is guidance, it must be so identified"(121:34). Through a definitive description of the doctrinal purposes, this identification takes place. Furthermore, the various doctrinal purposes are achieved differently. If a doctrine is supposed to teach, then the doctrine writer can evaluate the draft with this desire in mind. More so, as Drew has already noted, the purposes drive the direction the document takes. The doctrine development model shows a loop from Formulate Draft to Define Doctrinal Purposes to ensure a review of doctrinal purposes takes place to guarantee the document goes in the right direction.

Hypothesize Objectives

The next step is to hypothesize objectives. They are indirectly driven by the doctrinal purposes and take into consideration the area of interest. Although, from a chronological standpoint, this is the next step in the process, this step is shown in the model as parallel to defining doctrinal purposes. This is to indicate that the doctrinal

purposes are in the background of doctrinal development. Also, their influence on the formulation of the doctrine content is indirect.

Doctrinal purposes establish what doctrine is doing for the organization in the broadest sense. The objectives at this next "level" define the specifics of what the organization values in the area of interest. It is significant enough to note that at this point the objectives are hypotheses. They are based on values and beliefs more than diligent analysis. Even so, values are at least partially based on experience, and, more importantly, determine the outlook of the analyst. As the objectives are researched and analyzed they will become objectives of the doctrine.

Research Hypotheses

Once the objectives are hypothesized, it is time to do research. The research is not focused on finding more objectives, but rather on developing insight into and the means of authentication of the hypothesized objectives. As Professor Holley has noted, the idea is not to validate the objectives, for that connotes absolutes, as in mathematical proofs (56). Drew and Snow put it another way, "Doctrinal beliefs are not immutable physical laws but are interpretations of changing evidence"(35:162-3). This evidence can come from a variety of potential sources. Some of these possible research sources will be discussed in detail later in this chapter.

Authentication, which actually takes place in the next step, confirms the hypothesized objectives are reasonable and rational. The only way to get at the evidence is through research. Some hypothesized objectives may be shown to be invalid. For example, they may be fundamentally flawed in logic or perhaps they are so futuristic that

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it would unreasonable to consider them as part of current doctrine. Other hypothesized objectives will require refinement. Perhaps the objective has failed to capture the true values, or maybe the analysis has shown a variation of the objective would markedly improve it. Objective research will provide the tools to complete a thorough evaluation.

Analyze Research

Research is not conducted to list facts that substantiate individual hypotheses, but to facilitate analysis. Given the body of evidence accumulated through research, the objectives have to be evaluated. If they are found to be completely bankrupt, the objectives should be discarded. In many cases they will require refinement, which means more effort in hypothesizing. Some will be shown to be authentic enough to enter a draft of the doctrine. The analysis may also show that the area of interest is improperly scoped, which would require a reconsideration of the area of interest.

Formulate Draft

Those objectives that seem solid and have strong support from the research are incorporated when the draft doctrine is formulated. The draft should capture the doctrinal purposes; the users need to be told how they are to benefit from the document. By this point, the objectives should be vivid with excellent support from the completed research.

The format of the draft is very important. "I contend that paying more attention to the format in which doctrine is presented," Professor Holley has suggested, "will work toward a wider familiarity with doctrine by Air Force decision makers at all echelons"(57). He believes one of the methods to improve the format is to use illustrative

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examples as a form of support. Another method for improving doctrine is to provide citations throughout the document. "Their mere presence indicates that the people who formulated the doctrinal statement...didn't generalize from a single example but rested the doctrine on a broad range of experience," Holley contends (57). Illustrative examples act as supporting material and citations offer starting points for PME instructors trying to teach doctrine.

The initial draft of the doctrine needs to be reviewed to ensure the format is suitable. This review focuses on meeting the doctrinal purposes. Holley has suggested the means are as important as the ends. Surely, one of the means is the actual style of the document. The techniques for conveying educational material and helping to guide a decision-maker are not the same. A review of the doctrinal purposes and a determination of whether or not the draft is meeting the organizational desires are critical to success. If it is determined that the draft is unsatisfactory, it should be rewritten. The draft should not leave for feedback until it is believed to meet the doctrinal purposes.

Solicit and Evaluate Feedback

Feedback is critical. The members of the organization who are out in the field must provide doctrine writers with their thoughts. It is worthless if the members of the organization who need it, do not understand it, buy into it, or use it. The draft must be circulated, and feedback must to be actively solicited.

Soliciting others' thoughts will require effort. For the Air Force, one way to consolidate the feedback process might be to hold a symposium on the doctrine. This would draw on SMEs to provide their insight into the draft. Another medium for the Air

Force to elicit feedback on its doctrine is *Airpower Journal*. Widespread feedback, from throughout the Air Force and across all ranks, is what is most desired.

Some comments may focus on the doctrine itself; perhaps the theory espoused was incorrect or perhaps they question an analogy. They may even suggest an overlooked objective. Other feedback may focus on the doctrinal purposes. Maybe they feel, as it is written, the doctrine is ineffective as a decision guide. Hopefully, the feedback will produce positive debate resulting in further iterations of the process and better doctrine. Drew has pointed out, "Adequate testing of concepts requires appropriate forums for argumentation and rebuttal"(32). Through the solicitation of feedback this is possible. Feedback, however, cannot be taken at face value; any feedback received must be evaluated for its validity.

Another aspect of this feedback step is coordination. Under ideal conditions the coordination process would naturally fall out of seeking constructive feedback. According to Drew, the reality of the situation is different, "Coordination leads to the lowest common denominator agreed upon. How to handle this 'rush to mush' is a major dilemma. One way you might be able to do this is to document the doctrine"(36). As Holley already suggested, citations within the document provide substantive basis for the objectives, which should limit criticism aimed at merely defending parochial interests.

The desire to limit competing interests, especially from the various MAJCOMs is a key aspect of the current AFDC process. "There is a great deal of compromise in AF doctrine writing as well," Thomas notes, "because a major concern of the Doctrine Center is the Air Force-wide buy-in"(117). One way the Air Force has addressed this

issue is to have a single coordination process, which makes it much timelier, if nothing else. The single coordination process means the doctrine is sent around one time for feedback, and that feedback is then considered. An additional round of coordination, however, does not take place. Of course, this process could also serve to stifle constructive debate.

Professor Winton has noted, "There are three tensions for doctrine: intellectual content and validity, interests of internal constituencies, and external advertisement"(36). Ideally, a balance between all three would serve best. Depending on the interest being served (i.e., doctrine scholar, MAJCOM, or airman), one of these tensions is generally given more consideration than the others. This imbalance ultimately leads to doctrine that is less than what it needs to be.

Publish Doctrine

Once the draft has been coordinated and commented on, it is published. Publishing doctrine does not require a mason, for doctrine is iterative. Drew has suggested it should be in a 3-ring binder to facilitate frequent changes (29). The iterative nature is discussed in more detail later, but it should be a consideration in the publication of doctrine.

Publishing is vital to the success of the doctrine, for this is the way it is distributed to those who need it most, the users. Passing the document off to a bureaucratic organization for a mass paper push is the incorrect way to publish it. Doctrine should be announced and then disseminated to everyone. Furthermore, it should be published with the intent of receiving more feedback.

The Hypothesis-Research-Analysis Loop

The ultimate goal is to publish quality doctrine. For this model, a key to formulating quality doctrine is the relationship among hypothesizing the objectives, researching those hypotheses, and then analyzing the research. This relationship is best viewed as the hypothesis-research-analysis loop. A depiction of this loop is shown in Figure 4.
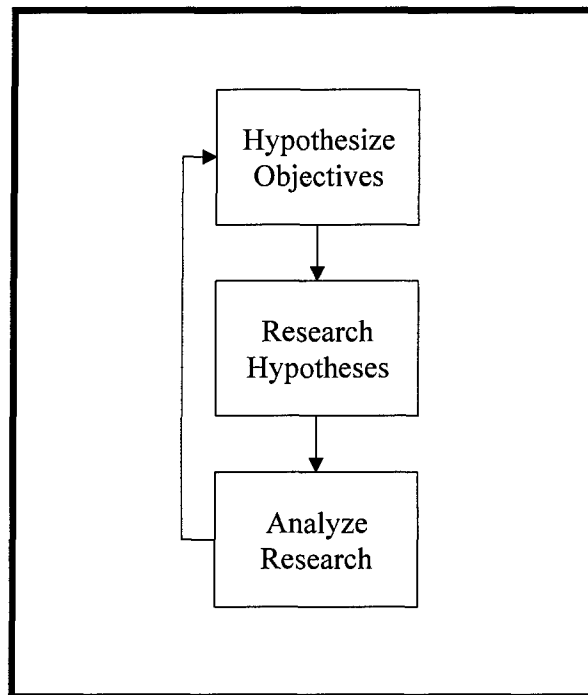
Figure 4. The Hypothesis-Research-Analysis Loop.

Since the objectives are not absolutes, they need to be in a constant state of review. Furthermore, the body of information making up the research pool is also being continuously filled with new data. The new data may make a once reasonable objective unsound. Likewise, analysis of the research may indicate the need for a new objective.

Once the research is completed, and even while it is on going, it is important to continually look back to the objectives. This should keep doctrine writers from following tangents which might be interesting, but which are not fruitful. This is not to say that new objectives may not be formulated. Certainly, in the review, it may become clear that a major objective (or even a minor one) has been neglected.

The objectives-research-review loop should continue until the doctrine writer feels the changes are minor enough that it is time to move on to formulating a draft. This is a judgement call.

Research Sources

Each step in the hypothesis-research-analysis loop is equally important. A majority of time and effort, however, will be spent doing research. The term "research" implies a careful study, which connotes a thoroughness that cannot be expedited.

As with doctrinal definitions and doctrinal purposes, there is no universal list of research sources. Technology may produce new methods for creating data or there may be innovative ways that have yet to be considered. The following sources serve as a starting point.

Recorded Experience

Most doctrine scholars would suggest this is the major source of doctrine. As Holley has pointed out, "Actual experience reveals that which is practical"(57). For this experience to be useful it must be "reflected upon and *recorded*"(57). This experience does not have to recorded in the sense of a history book. An after action report could also

serve as recorded experience. For example, in the aftermath of the most recent attacks in Iraq there is a body of experience available that demands consideration, but it may never actually be documented in a traditional history. "The so-called evidence that becomes available for analysis," Holley proposes, "is all too often partial, fragmentary, and not infrequently a vital portion of evidence is missing"(61:5). He believes the biggest problem with the issue of recorded experience is "The paucity of well-prepared after-action reports"(57).

Theory

Theory has been previously described in detail. It is important to reiterate, however, that in some cases recorded experience does not exist. Furthermore, the influence of theory is overwhelming. Nearly every idea starts as a theory. To discount the ideas available in theory would be a grave mistake. Still, theory should be tempered by sound argument and a deep investigation of the substance that comprises the theory.

Maneuvers and Exercises (Scripted/Unscripted)

"By maneuver, we comprehend two-sided, free-play practice with a panoply of all arms"(63:6). An exercise is a maneuver to a lesser degree, often with a single service and an artificial enemy. Exercises are both scripted and unscripted. In the case of a scripted exercise, the actors follow a predesigned course of action. An unscripted exercise allows for freedom of action, and better simulates the fog of war. "The importance of maneuvers, it is well to remember," Holley points out, "lies less in who 'won' or scored the most points at the hands of the referees than with the insights derived and recorded by informed and thoughtful participants"(63:6). He goes on to note, "In practice, it takes a

good deal of imagination to see the real promise lurking in a decidedly imperfect trial version"(63:7). For him, the problem with exercises and maneuvers is, "Anxiety over pleasing the high command is sometimes greater than zeal for the unvarnished truth"(63:6). Drew also poses some serious questions about using these for doctrine:

> When our doctrinal beliefs are based on exercises, maneuvers, and war gaming rather than on actual combat, do we understand and consider the assumptions, biases, and limitations of those simulations that may have colored the results? Do we recognize that although our exercises have considerable value they are always poor imitations of actual combat—or do we seduce ourselves into thinking that mock combat portrays reality accurately? (31)

Simulations (Wargames/Models)

Although some may mistake wargames for exercises, they are quite different.[14] Wargames are simulations or, as Holley refers to them, "head but not bodies" exercises. The only actors are senior officers who interact with computer models depicting conflicts. Analytical models are another form of simulation that can provide insight. "War games and operations research can identify some likely characteristics of space warfare," Major Peterson has noted. "However, these techniques do not promise 'solutions' to the problems of war, rather they illustrate the impact of various assumptions and decisions in space warfare"(96:25). Grant Hammond also has concerns about the use of wargames as well as exercises:

> If it [the USAF] continues its habit (and that of the American military in general) of always winning and never losing its own war games, of grading exercises on

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[14] This point was made clear to the author when he referred to Global Engagement as an exercise. Lieutenant Colonel David Eiting, deputy director of the Global Engagement series, responded, "First off, it's not an exercise, it's a wargame. That may sound trivial, but it's a major point. We don't exercise current plans or doctrine. Our game is set in the future…to look at how developing capabilities and organizations will add value to joint force commanders in the future"(38).

how smoothly they run rather than what was learned, of being more concerned with demonstrating success than learning from failure—in short, of being more concerned with self-promotion than with serious critical analysis and creative synthesis for future operations, then it is in serious trouble. (53:11)

Informal Doctrine

Professor Drew has described informal doctrine as "the result of repeated experiences that produce similar results and subsequently produce beliefs—sometimes personal, sometimes broadly held—about what usually works best"(31). Given that, historically, doctrine has frequently lagged behind the most appropriate course of the day, Drew suggests, "These informal beliefs are more timely, more accurate, and more useful than officially sanctioned doctrine"(31). He does point out, however, that "Informal doctrine beliefs may not be accurate and useful" as they are just personal beliefs at a given time (31). His overall conclusion is, "The doctrine development process must evaluate informal doctrine and separate the wheat from the chaff"(31).

Analogous Practices

The practices of sister services and foreign armed forces can also be very insightful. Frequently, US forces do not engage in, but provide advisors for, foreign conflicts. Also, although some may dispute it, the US is not engaged in all the conflicts throughout the world. All of these experiences provide more data to be analyzed. Furthermore, the doctrine of others, as has been previously discussed, can be used to help understand issues related to the doctrine being written.

Doctrine Development Is Continuous and Iterative

The common thread for all sources of research is their dynamic nature. Time does not wait for anyone, nor does it stop for doctrine. Doctrine development is iterative and continuous. New information is cause for constant reevaluation and this new information is continually arriving.

AFDD 1 acknowledges the continuous nature of doctrine by noting, "It must be emphasized that doctrine development is never complete"(21:2). Professor Drew agrees, observing that "The intellectual process of developing doctrine should be continuous"(32). He and Snow have pointed out that "Doctrine can become irrelevant if the assumptions that support it are not frequently reexamined for their continuing validity"(35:167).

Historically, the Air Force has failed to keep up with the dynamic nature of doctrine. In 1984, Watts and Hale felt the record showed that "All too often since 1947, the keepers of US air power doctrine have viewed their inheritance as holy writ more in need of protection than of evolution or change"(127). Drew and Snow have noted, "Perhaps the most ubiquitous doctrinal problem is the tendency to let doctrine stagnate." They feel, "Changing circumstances (for example, technological developments) must be constantly evaluated because they can modify beliefs about the important lessons of experience"(35:166).

Air Marshal R. G. Funnell (RAAF) commented on the nature of doctrine at the RAAF sponsored doctrine symposium, "When we set out to write our doctrine in the Royal Australian Air Force, I sought with all the force at my disposal to point out to the

writing team that, too often in the past, doctrine has been a statement, whereas I wanted it to be seen as a process"(129:81). General Smith has commented on how the ever-changing nature of doctrine should temper consideration of absolutes:

> In conceiving doctrine for the future it would be well to keep foremost in mind that doctrinal change is inevitable, and that no past doctrine can be applied again in precisely the same way as before. Reverence for constant principles should be looked upon with suspicion, because such reverence tends to crystallize thought into fixed patterns. Then principles are used to rationalize desires rather than as tools of logic. (109:172)

Professor Holley realizes the continuous and iterative nature of doctrine, but warns that there has to be a point where the iteration stops momentarily. "Once you publish it, it is going to last," he professes, "you need to recognize a pause in the iterative nature. It takes a great deal to publish doctrine, and then there is the education aspect—publishing is a big deal"(56). Thomas has also commented on this, "While doctrine is iterative, I question whether there should be 'frequent changes.' Doctrine is supposed to represent 'broad and enduring' concepts on the use of military power"(118).

As Drew has already pointed out, during lulls in publishing of new doctrine informal doctrine serves as the guide. Still, the point is that the active process needs to continue, despite the infrequency of publication. Professor Holley's comments in the recently published *The Paths of Heaven: The Evolution of Airpower Theory* serve as a good concluding thought on the continuous, iterative nature of doctrine: "The more than nine decades of air-arm thought depicted in this volume lead to one rather obvious conclusion: airpower theory, aerospace power theory, is forever unfinished"(62:599).

Additional Considerations

There are some additional considerations this model does not address. These considerations, however, are very important to successfully developing doctrine. Those who write doctrine and, thereby, use this model are an integral part of the process. The model does not work by itself. Like any other tool, if improperly used, it can result in bad products. Once the doctrine is completed, the force has to be educated on its use. Education, in many ways, will determine the success of a doctrine, but it is only indirectly influential on the development process. Finally, the issue of classifying doctrine is relevant to this work because of the sensitive nature of space control. Considerations of classification would be developed in the early part of the model.

Doctrine Writers

Thomas believes, "Who's developing doctrine is a major issue"(117). Holley agrees, "We must ensure that we build a truly effective organization for formulating doctrine and that it is staffed with the best possible personnel"(61:10). Doctrine writers should not be determined by rank, but by their experience and their approach to their work.

Clearly, doctrine writers need to be experienced. This experience should be two-fold: in matters of doctrine and in the area of interest. This model assumes writers are well versed in doctrine, so they will be able to help the organization properly consider and articulate its doctrinal purposes. Without an understanding of doctrine, the fundamental aspect of the model, determining the organization's doctrinal needs, cannot be applied. Experience in the area of interest is also key. Certainly, this experience can

be gained through the research process, but it will result in a lengthier process. Experience provides writers with insight, which gives them the ability to make an accurate cut at the objectives. One dangerous element of being experienced in the area of interest is it may predispose the writer to a specific position.

To overcome any predisposition, it is vital for writers to be objective. This is on reason why the approach writers take toward their work is so important. Writers must be diligent and willing to go as far as necessary in their research to authenticate and support the objectives. Without support, the objective may be nothing more than a personal belief. Bad beliefs can be exceptionally dangerous and costly. Furthermore, doctrine writers must be willing to challenge conventional wisdom, even if the leadership disagrees. Holley has commented on the relationship between senior leadership and good doctrine writers:

> In short, we need officers who understand that the brash and barely respectful subordinate who is forever making waves by challenging the prevailing posture may prove to be the most valuable man in the organization—if he is listened to and providing his imagination and creativity can be disciplined by the mandate that he present his views dispassionately and objectively. (61:10-11)

He goes on to point out, "Where matters of opinion are concerned, rank certainly has its privileges. Greater rank presumes greater experience and therefore greater respect for its opinions"(61:5). He warns this is just a presumption. Rank should not be an issue for doctrine writers. Indeed, junior officers may be better doctrine writers. "Fifteen to twenty years of parochial ideas may be a bad way of making doctrine," Captain Thomas has pondered, "for their concern is how to attack other services"(117). In the new joint

world this is a major issue. What's more, he indicates the danger of focusing on the wrong thing in setting about to write doctrine.

Education

Simply writing and publishing doctrine is not enough for it to make an impact on the force. Doctrine has to be ingrained into each member of the force; the only way to do that is through education. Education, however, is not a step of the doctrine development model. Outside of new iterations of the model, once doctrine is published the development ceases. Once it is codified, it takes on finality among the users. Through their education, the users may, in turn, impact the doctrine, but the educational process is only indirectly influential.

On the other hand, as has already been implied, the doctrine development process does affect the educational system. Doctrine written with the intent of educating should facilitate the educational process. Doctrine with illustrative examples inherently educates. Doctrine with citations provides educators with points of departure. So, education is part of the development model, but as something influenced by the product rather than influencing the process.

Classifying Doctrine

The idea of classifying doctrine is considered appalling by most doctrinal scholars. "The first principle," according to Group Captain Espeland, "is the need for doctrine to be explicit, and to the greatest extent possible, unclassified"(40:71). To be used, doctrine has to be available. To be successfully produced, it must be debated.

Classifying restricts its availability and limits discussion. Professor Drew points out that "If it is classified you are probably talking bells and whistles"(29). When specifics of a system are being considered, it is indicative of AFTTPs, which some, as has been pointed out, do not consider to be doctrine.

The issue of classification is important to the space control issue because of its sensitive nature. Major Russo feels, "A legitimate concern about sensitive technologies is a good reason to classify programs," but also believes the perception that the American public is not ready for space control is wrong because "they think we are already doing it"(104). Certainly a document addressing the specific "hows" of space control would be sensitive. That information would require classification to keep an adversary from gaining knowledge of specific systems.

This hints at the two drivers of classifying space control doctrine: concern over providing the enemy with damaging information and the political sensitivity of the American public. Certainly, providing the enemy with system specific information could be detrimental to national security. The focus of this doctrine development model, however, is not alternative specific, but covers the values of the ends desired. Indeed, basic and operational doctrine should not consider specific alternatives. Therefore, classifying on the basis of maintaining a close hold on system specifics is a fallacy.

Russo has said, "We need to give the American public more credit."(104). He feels the idea of the political sensitivity to space control is outdated. Recent actions by members of Congress would indicate he is correct. Classifying on the basis of political sensitivity seems unsound. Some suggest the idea of space control is also politically

sensitive to foreign allies and enemies alike. This will be addressed in more depth later, when the schools of space thought are considered. Nicholas Johnson addressed the issue of secrecy in the context of the US-Soviet relationship of the late 1980s in his book *Soviet Military Strategy in Space*. At this juncture, some thoughts from the book are appropriate:

> Secrecy is a double-edged sword. Keeping your opponent in the dark concerning your military posture can limit the enemy's activities due to his uncertainty of your retaliatory capability; and if you can persuade him that your strength is superior to his, you can in effect deter him from aggression at a fraction of the cost of actually building new weapon systems. On the other hand, his perception of your superiority may well stimulate him to invest in new weaponry which may then impede your own military or political goals.(67:25)

Although classifying doctrine seems to be in contrast to this model, this model places no judgements on such things. If the users desire the doctrine to be classified, it would be clear through the area of interest and doctrinal purposes. In fact, one of the purposes would be to keep the doctrine classified.

Summary

A new method for developing doctrine is critical to producing quality documents. Although Drew has proposed a sound process based on modeling a research project, his method is tied to traditional alternative-focused thinking. This model is dependent on experience, theory and technology, all of which are lacking for space control. A new model based on value-focused thinking has been proposed.

One of this model's central themes is there is no single best way for writing doctrine. Rather than seek out masterful definitions, this model suggests defining

doctrine through its purposes, which are the organization's desired doctrinal functions. These purposes serve as the backbone of the doctrine document, providing explicit intentions and serving as the basis for later evaluation.

The objectives of the doctrine are also based on values. The values are formulated outside the context of any alternatives. Initially, they are hypotheses. Through the hypothesis-research-analysis loop they are authenticated and supported. This loop serves as the core of formulating a quality doctrine draft. There is a multitude of possible resource sources. These sources serve as a database for investigating the hypothesized objectives. If objectives are found to be without foundation or bankrupt, they are discarded. For those that require more work, they are further hypothesized, researched, and analyzed.

Once objectives are considered authenticated and supportable they make it into the draft. The draft is formulated with the intent of making it meet the doctrinal purposes. Indeed, ensuring the document sets out to do what it is intended to do is a major priority. The completed draft is then made available for feedback. More so, feedback is so important that is actively solicited. Not all feedback is valid, so the feedback is analyzed. Constructive feedback is then appropriately incorporated into the draft. A major aspect of the feedback process is also the facilitation of coordination. Coordination, however, should not be allowed to water down authenticated objectives because of parochial interests.

Once the document has received feedback, been reviewed, and appropriately adjusted, it is published. Publishing is not the end, however, for doctrine has a

continuous and iterative nature. The publication is a snapshot in time, fulfilling the organization's desired purposes.

This model is only good if it is repeated. It is unreasonable to expect doctrine to be written over night or even within a year. Through this model, critical issues are brought out in the open to facilitate debate within the organization. The debate is over specific issues rather than definitional technicalities. Surely, there are issues of doctrine education and implementation, which this model only indirectly addresses. Even though these issues are important, they are extraneous to development.

Also extraneous to the model, but of vital importance is the doctrine writer. Doctrine writers should be chosen for their experience and their outlook, not for their rank. Writers need to have experience in doctrine and in the area of interest. They also should be objective, diligent, and willing to challenge conventional wisdom. Success for doctrine development is determined by doctrine writers.

Finally, classifying doctrine is counter to the need for being explicit and encouraging feedback. AFTTPs may need to be classified, but basic and operational doctrine, which should not include alternatives, do not have a need to be classified. Should the organization desired classified doctrine, this would be incorporated through the area of interest and the articulation of doctrinal purposes.

VII. Space Thought

*I'm in favor of total destruction... the US never wants to fight a fair
fight, war is not a sporting event.   - Piotrowski (97)*

To understand the objectives of those who desire space control doctrine, it is vital
to have insight into their values. The best way to gain this insight is through
consideration of their thoughts on space. Space thought is quite varied and has a great
deal of history.

The starting point of space thought for this work is the 1950s when the
Eisenhower administration and the Air Force began to consider how to approach space.
Out of this early space thought grew four space schools of thought.

The first school, sanctuary, advocates that space should be free from all
militarization. Those who advocate the second school, survivability, feel space is
important, but too vulnerable to be depended upon in times of war. Third, control school
advocates feel space is comparable to air, where the one who controls space controls the
conflict. Finally, advocates of the high-ground school believe that ballistic missile
defense is the key to achieving the high-ground, where wars will be won and lost. The
philosophy of each of these schools is distinctly different, and the debate over which one
is correct continues today.

Another debate is over the question of whether space is a place or a mission.
Most feel it is a place, but a place different from air. These critics suggest the term
"aerospace" is farcical because of these environmental differences. Actually, the
controversy surrounding "aerospace" goes back to its very inception. Still, some believe

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the concept is sound if considered from a dimensional rather than environmental perspective. They suggest the idea of operating from the third dimension provides a similarity that makes aerospace valid. They focus on the ends of aerospace rather than the means of operating in the "aerospace."

Early Space Thought

For the sake of this work, space thought begins in the 1950s with the Eisenhower Presidency. According to Futrell, the administration was skeptical of space technology, even though "Air Force leaders saw a hopeful relationship between first-generation military missiles and eventual space technology"(45:546). In a 1955 report, the Technological Capabilities Panel of President Eisenhower's Science Advisory Committee recommended, "Top priorities for the development of ICBMs and IRBMs," and it noted that "space satellites would be important in the near future as instruments of reconnaissance, but it believed that no satellite as then conceived could be employed as an offensive weapon"(45:546). According to the report, "If a space vehicle released a bomb, the bomb would not fall to earth but would continue in orbit in the wake of the satellite"(45:546).

By 1956, Air Force personnel were proposing the possibility of space weapons, but questioning the logic of having them. Colonel Martin B. Schofield (USAF) completed a study entitled, "Control of the Use of Outer Space," in which he claimed missile firing satellites could be developed, and "Such an airborne ICBM would be extremely hard to defend against since speed, time, and direction of approach would be in favor of the offensive weapon"(45:548). Futrell cites Schofield as reporting that:

The presence of a variety of devastating military forces, of many sovereign states, constantly deployed throughout international space may not be conducive to peaceful living....It might be more sound for the United States, because it may have an early advantage in the exploration of space, to use its position of influence to the best advantage by strongly advocating a form of international control over the use of space. (45:548-9)

Air Force senior leadership was less than converted to these early "sanctuary" arguments. In February 1957, General Bernard Schriever made a speech in San Diego where he asserted, "The United States ought to move ahead and establish space superiority"(45:549). Futrell quotes General Schriever as commenting:

In the long haul our safety as a nation may depend upon our achieving "space superiority." Several decades from now the important battles may not be sea battles or air battles, but space battles, and we should be spending a certain fraction of our national resources to insure that we do not lag in obtaining space superiority. (45:549-50)

Though he did not outline what was envisioned by space superiority, General Schriever laid out the significance of space through its grand potential. This was in stark disfavor with the administration, which wanted no mention of the military uses of space.

On 4 October 1957, the Soviet Union launched Sputnik. It significantly changed the perception of space and opened the way for Air Force leaders to more openly discuss their beliefs. General Thomas White, CSAF at that time, addressed the National Press Club on 29 November 1957, inaugurating the idea of a unified air and space regime when he stated:

In speaking of the control of air and the control of space, I want to stress that there is no division, per se, between air and space. Air and space are an indivisible field of operations....It is quite obvious that we cannot control the air up to 20

miles above the earth's surface and relinquish control of space above that altitude--and still survive. (45:550)

Later, in February of 1958, General White made a speech before the AFA's Third Jet Age Conference, addressing the idea of space-for-peace. In it, he tried to bring Air Force ideas more in-line with the Eisenhower administration, which continued to temper the thought of using space militarily, but maintain the position of the desirability of space control. Futrell cites much of the text of the speech. A snippet of this speech is quite insightful:

> The United States must win and maintain the capability to control space in order to assure the progress and preeminence of the free nations....
>
> You will note that I stated the United States must win and maintain the capability to control space. I did not say that we should control space. There is an important distinction here. We want all nations to join with us in such measures as are necessary to ensure that outer space shall never be used for any but peaceful purposes. But until effective measures to the end are assured, our possession of such a capability will guarantee the free nations liberty. It does not connote denial of the benefits of space to others.
>
> In the past, when control of the seas was exercised by peaceful nations, people everywhere profited. Likewise, as long as the United States maintains the capability to control space, the entire world will reap the benefits that accrue....
>
> I visualize the control of space as the late twentieth century parallel to the age-old need to control the seas and mid-twentieth century requirement to control the air....
>
> To control space we must not only be able to go through it with vehicles that travel from point to point, but we must be able to stay in space with human beings who can carry out jobs efficiently....
>
> Similarly, ventures into outer space require men who know the air. There are no barriers between air and space. Air and space are an indivisible field of operations.
>
> The Air Force progress toward space has been evolutionary—the natural development and extension of speed, altitude, and sustained flight....

A strong consideration as far as military space operations are concerned will always be the necessity for a failsafe concept. A substantial portion of our forces must maintain the capability to make last-second decisions. This is one reason I am convinced that man in space will be a most important factor....

Before I close, I want to stress that I cannot conceive that mechanical gadgets will control space. Man will develop the equipment, send it off, and bring it back. On many occasions, and probably more than we envision now, man will fly the equipment. The point here is that man's judgement and skills will always be needed. (45:551-2)

"In his address White also pointed out that 'the United States' capability to control space could ultimately approach absolute deterrence'" adds Futrell, "because reconnaissance eyes in outer space would permit 'immediate warning of hostile action on the surface of the Earth' and would allow 'much faster reaction on our part'"(45:553). An element of the deterrence proposition was controlling the enemy's access. Based on the historical debate, Futrell concluded, "It would probably be better to seek to control a hostile nation's access to space than its reentry into the atmosphere"(45:553).

Early space thought was motivated by both dreams and distrust. Those who dreamed in the realms of possibility saw great potential. For those who were guided by distrust of technology and human nature, space was a place for non-military operations. In these early years, the Air Force was where the dreamers resided, but they were governed by a distrustful Eisenhower administration. The Soviet launch of Sputnik provided the impetus for debate. This debate, established in the 1950s, continues today.

Schools of Space Thought

The basis for future space thought was established in those pioneering years of space and missile systems development. They led to the development of four

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philosophical approaches to space. In an article in *Strategic Journal*, retired Lieutenant Colonel David Lupton (USAF) outlined the four "schools of thought" for space. Each school views the military use of space quite differently. This includes employment strategies as well as advocacy organizations. His work is so important, any study of space should begin with these philosophical outlooks. The four schools are classified by their approach to space: sanctuary, survivability, control, and high-ground.

Sanctuary

Those who believe in the sanctuary school feel space should remain a sanctuary, free from militarization and weaponization. "[For them] the primary value of space forces is their capability to see within the boundaries of sovereign states, thereby reducing the ability of nations to make surprise attacks"(78:40). This capability has been instrumental in the formation of arms limitation agreements, for it facilitated verification. An elementary part of building this capability has been the ability to freely overfly other sovereign nations. "These advocates caution that overflight is a granted right which nations have not attempted to deny, and that any proposed military use of space must be weighed against the possible loss of peaceful overflight"(78:40).

Ultimately, space assets "reduce the probability of global nuclear war"(78:41). This of such importance that:

> Space forces (or, more aptly for advocates of this doctrine, space systems) must be not only nonaggressive but also nonbellicose in order to maintain their primary value....Therefore, for advocates of the sanctuary school, nonaggressive and nonbellicose systems are good, and systems that support warfighting capabilities are bad. (78:42)

Furthermore, militarily operationalizing space is one step closer to eliminating its status as a war-free zone. "The sanctuary school, then, sees both operational and military advocacy structures as unnecessary and dangerous"(78:44).

Survivability

The next school feels space assets can help enhance terrestrial forces, but because space forces are so inherently vulnerable it would be foolhardy to depend too greatly upon them. "The basic tenet of this school is that space systems are inherently less survivable than terrestrial forces"(78:40). Space forces, they concede, are quite capable in arenas such as communications and reconnaissance, especially in peacetime. In times of war, however, they just won't survive, no matter how capable. They believe, "Opponents can negate the other's space forces if they are willing to pay the price"(78:41). This conviction is fundamental to their employment strategy:

> Space forces should not be relied upon for critical warfighting capabilities....Similar capabilities must exist in both terrestrial systems and space forces even if space forces can perform the function more effectively, efficiently and economically. (78:42)

Another major facet of their employment strategy is deterrence. "The survivability school sees space wars as tit-for-tat affairs. The only defense is to hold the enemy's space forces at risk"(78:41). Passive security measures, like operating at higher altitude and using single-mission satellites, are preferred. "The criterion to judge whether a system should be deployed is the enemy's cost to destroy it"(78:42). They are proponents of seeking offensive capabilities to help ensure a balance with adversaries.

"In other words, the enemy will be deterred if friendly forces have a better capability to retaliate"(78:42-3).

Survivability school advocates feel that an organization should be charged with space force command and control. "[They] usually favor a unified or specified command as the operator," with an advocacy structure at the "command level where the space mission must be weighed against other Air Force missions"(78:44).

Control

"Control school advocates argue that the capability to deter wars is enhanced by the ability to control space and that space control will be a coequal with air and sea control in future wars"(78:40). They see the world in many ways through airpower lenses. "Control might be established on an as-needed, where-needed or an ultimate control (i.e., space superiority) basis"(78:41).

There are two basic tenets to space control: "the ability to defend friendly forces and to deny the use of the environment to enemy forces"(78:43). This also results in a deterrent effect, for "The uncertainty caused by the mere presence of defensive forces acts as a deterrent"(78:43). Either space-based or terrestrial-based forces can be used to achieve space control. "The primary function of space war is to ensure that friendly terrestrial forces have the benefits derived from the space environment and that enemy forces are denied those benefits"(78:41).

Given the functions of space forces, control advocates feel a single command should exercise centralized control. Traditionally, they believe advocacy for space is

possible from within the Air Force. Lupton, however, points out that "A new generation of space control advocates might lean toward a 'Space Force'"(78:44). He made that point over fifteen years ago.

High-ground

Finally, the high-ground school "harks back to the old military axiom that domination of the high ground ensures domination of the lower-lying areas"(78:40). A key element to their philosophy is ballistic missile defense (BMD). "The high-ground school believes that a nation's military 'center of gravity' will move to space with a BMD system, and that war's focus will also move to space"(78:41-2). Space battle will be of such enormity that it will determine who wins wars. Furthermore, those who lose the space battle "Will be at such a disadvantage that nuclear weapons will not be used"(78:41).

Their employment strategy depends on space-based BMD systems. They envision these systems as being much more than just missile shooters. In a space-to-space role they will be able to provide space control. Lupton goes on to note:

> Many advocates further argue that space-based, directed-energy weapons offer tremendous capabilities against high-flying aircraft and that employment of these weapons leads to control of not only the space environment but also the high-altitude portion of the air environment. (78:43)

"Organizational structures resulting from the control school and the high-ground school are very similar," Lupton observes and then points out, "the major difference between the schools centers on the advocacy organization and on the question of military

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value"(78:44). Because of the importance of space assets and the competition with traditional air systems, high-grounders advocate a separate space force.

Current Debate

Lupton wrote his classic work in 1983. It might seem that in the past 15 years the issues have died away, but the schools of thought are still present. Survivability school advocates are less vocal, perhaps because they currently hold the power. The Air Force appears to follow the control school, although full advocacy for control principles is lacking. This may be indicative of some survivability school tendencies.

Lieutenant Colonel DeBlois, a former SAAS professor and currently a division chief with the National Reconnaissance Office (NRO), wrote an article for the latest *Airpower Journal* in which he proclaimed, "Visions of *massive space superiority* and the touted huge, coercive power advantage they provide will likely prove as bankrupt a notion as that of *massive nuclear retaliation*"(20). He goes on to detail the destabilizing effect of space weaponization. "The idea of putting weapons in space to dominate the globe is simply not compatible with who we are and what we represent in America.[11]"(20). His endnote is quite revealing:

> 11. One may make the case that world domination is not the reason for putting US weapons in space, but, true or not, other nations would perceive it as a US attempt at world domination. Weaker nations have a natural tendency to unite and oppose emerging hegemonies. This would pose a real threat to the United States and the ideals it represents. (20)

"Although this doctrine represents an admirable ideal, in reality it is not valid" Major Jeffery Caton (USAF) notes in reflecting on the sanctuary school approach, "it is

inconceivable that opposing nations would accept the force-multiplying effects of satellites on terrestrial wars and still allow space to remain a benign area"(14:20). Retired General John Piotrowski (USAF), former USCINCSPACE, is more emphatic in this regard, "What is in the way [of space control] is a religion that says space is sanctified and pure. The problem with that is, we are the only ones who believe it"(97).

Later in his article, DeBlois moves from an advocacy of the sanctuary school to showing some survivability school leanings when he notes:

> As space access matures, the survivability issue will become obvious. Nations will not rely on space systems for crisis situations—they will rely on terrestrial systems (perhaps redundant with more efficient but more vulnerable space counterparts). Hence, the value of space weapons to deny those space systems will be moot. (20)

He may be hinting at a new tact for survivability school advocates when he professes, "What can be done with space weapons can also be done from the air, without the political baggage of weaponizing space"(20).

Further on in the article, he advises the US to maintain the "technical ability to deploy coalition space weapons should the need arise"(20). This maintenance should begin with "the lesser provocative earth-to-space weapons (20)," which he suggests in an endnote is "to hedge our sanctuary bets with investment in space-weapons research and development," a part of the historical trend in space policy for the United States (20). "Pursuing space-sanctuary policy does not preclude being prepared to do otherwise;" he adds in the endnote, "in fact, one can make strong arguments that such preparedness

encourages other actors to follow the sanctuary policy, since they could gain no advantage by challenging that policy"(20).

In the end, DeBlois returns to his advocacy of the sanctuary school with some observations about human nature and a pretentious analogy. "Pursuing the national space strategy on the assumption made at the outset," he begins, "that 'space will be weaponized; we only need to decide if the US will take the lead'—can be challenged on a more fundamental level"(20). "This assumption is ultimately founded on a belief that the nature of people—their historical tendency to wage war—cannot change," he proffers, "contrarily, the social nature of people can change. One has only to compare today's global attitudes toward slavery with those of 150 years ago"(20).

Lieutenant General Jay Kelly (USAF) has different thoughts on the nature of man. "Focus also on the thing that will not change—human nature," he counsels, "someone's always going to want the other guy's stuff"(73:101). He continues, pointing out that "Someone will want to achieve leverage and power by denying access to and use of space...and along with it information and thus wealth and power"(73:101). "It seems to me," he concludes, "that it will always be necessary to protect against the high-end threat—that which can bring us to our knees, that which can directly imperil our vital interests"(73:101).

Lieutenant Colonel Michael Mantz (USAF) provided another perspective in 1995. He pointed out that the militarization of space has already happened because of the existence of satellites performing space combat support missions. "This means there are legitimate targets in space," he declared. "If terrestrial-based space denial efforts are not

effective, it may be morally reprehensible not to allow attacks on enemy space-deployed platforms"(80:81).

Space Is a Place

Another debate with historical basis is over the issue of whether space is a place or a mission. In 1981, this debate caused the delay of the first space doctrine manual. Futrell cites Major General John Storrie (USAF), director of space, Air Force deputy chief of staff for plans and operations, explaining the resolution of the problem:

> The bottom line is: space is a place; it is not a mission....We are not going to go out and do those things in space just because the technology is there....We are going to do them because we can do them better from space, or we can do them more cost-effective [sic]. (46:698)

This line of thought is not new. Even at the dawn of the space age, "So-called space systems...would not be developed as a means for exploiting a medium but rather in terms of existing military requirements"(45:594). Futrell quotes the thoughts of Lieutenant General Roscoe Wilson (USAF), Air Force deputy chief of staff for development, from February of 1960, "The major criterion for the choice of a particular system to satisfy a particular military requirement must be the relative effectiveness of that system compared with other methods of doing the same job"(44:594). Space systems were justifiable only if they could perform better than terrestrial alternatives within a reasonable cost or perform adequately at a reduced cost.

During the Reagan Presidency, Defense Department space policy changed, "Stressing the need for a warfighting capability in space, and it had as its major theme the

view of space as a theater of operations rather than a mission"(112:206). According to David Spires, "Begun as early as 1977, the new doctrinal statement for space seemed to solve, once and for all, the issue of whether space should be considered a medium or a mission"(112:206). He goes on to quote General Charles Gabriel, CSAF at the time, as proclaiming, "Space, then, is an operational environment that can be used for conducting Air Force missions"(112:206-7).

In 1986 Major Temple wrote, "We must recognize that space is a place and not a mission—but it is a *different* place than the air"(116:28). The next year General Herres wrote, "*Space is not a mission. It is a place* from and within which military missions are carried out"(55:45).[15] He went on to add, "Our mission is *not* "space." Our mission is to accomplish certain specific tasks *in* space pursuant to national security objectives"(55:45). Ultimately, he concluded, "The Department of the Air Force *is* our space force, and we certainly do not need another"(55:47).

Although the interpretation of the meaning lacks consensus, the overwhelming opinion is that space is a place. As a place, it is the medium in which missions are performed. Environmental considerations make the medium distinct from air. For that reason, the ways in which the missions are performed are quite different. The overall goals of the mission, however, may be the same. Considering the ends rather than environmentally influenced means makes air and space distinctly different mediums with

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[15] General Herres, then serving as USCINCSPACE, also noted, "Ballistic missiles are strategic offensive systems and, as such, belong in the command that bears responsibility for that unique mission, no matter how much time those systems spend in space"(52:42).

perhaps the same perspective. This perspective makes space no more a place than air. The idea of the perspective provided by operating from the third dimension will be considered in further detail later on in this chapter.

"Aerospace"

"By combining the words air and space and describing the earth's atmosphere and the regions beyond it as one operational medium, the Air Force created a term that symbolized a new meaning," retired Lieutenant Colonel Frank Jennings wrote in 1990, "yet, 33 years after the word gave wings to the concept, aerospace is still misunderstood and often misrepresented"(66). Jennings is credited with coining the word "aerospace," an operationally indivisible medium beyond the earth's surface. It first entered the lexicon in 1957 as "aero-space." The unhyphenated term was first published in an Air Force News Service (AFNS) release on 8 July 1958 (66).

"It's been 'common knowledge' for decades that the Air Force invented aerospace as a ploy to massively enlarge its operational responsibilities and jurisdiction," Jennings acknowledges in "Doctrinal Conflict Over the Word Aerospace," an article for *Airpower Journal*. Some critics have viewed the term "aerospace" as farcical since its inception. In the first volume of *Ideas, Concepts, Doctrine*, Futrell cites Congressman Daniel J. Flood's reaction: "Boys, the Air Force has come up with a new phrase,

'Aerospace.' That is a beauty....That means everybody is out of space, and the air except the Air Force....They have now staked out a claim to 'aerospace'"(45:554).[16]

Air Force officers have also had problems with the concept. "The concept of aerospace power is a political artificiality," according to Mantz (80:79). Relative to doctrine, Lieutenant Colonel Charles Friedenstein feels, "The evolution of the term *aerospace doctrine* inappropriately links our air and space doctrine (43:13). Major Newberry agrees, "The argument that space operations is an extension of air operations is a doctrinal convenience"(95:44).

Major Temple also has problems with the concept. "The mutual identity of air, space, and aerospace is fundamentally untrue, both legally and physically," he observed in his piece for *Air University Review*. "Legally, aircraft require a country's permission for overflight, whereas space systems do not. More important, vehicles do not operate in the same physical manner in air and space"(116:25). Specific to doctrine, Lupton feels there are three major pitfalls with the aerospace concept:

1) it places dissimilar forces—air, space, and ballistic missile—under the same doctrinal umbrella,

2) it assigns the characteristics of air forces to space and ballistic missile forces—perpetuating the myth that space forces are merely high-flying aircraft, and

3) it generates a semantic fog which combines with the normal confusion over roles and missions that accompany doctrinal debates to obscure thoroughly the fundamental issues. (74:37)

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[16] During Congressional hearings in 1959, Major General Dwight Beach (USA) while responding to a question about the term aerospace by Congressman John McCormack, stated, "Well, I never heard of that term before. I always heard of 'armospace'"(63:xx).

Prior to his advocacy of the sanctuary school philosophy, then-Major Bruce DeBlois wrote a piece for *The Paths of Heaven: The Evolution of Airpower Theory* entitled, "Ascendant Realms: Characteristics of Airpower and Space Power." In it, he addresses the aerospace issue, "In spite of the potential for some technological mitigation of the vast differences in the characteristics of airpower and space power, one must conclude that *the aerospace conjecture is false*"(19:564). He elaborates further:

> That is, one cannot build space power theory and doctrine in general upon airpower theory and doctrine. Theories and doctrines of airpower, land power, and sea power may contribute significantly to the development of the theory and doctrine of space power, but space power clearly requires fundamental, bottom-up, theoretical and doctrinal development. (19:564-5)

DeBlois then extends his position into a call for a separate space force. "The most conducive environment for such development remains a separate space corps or service," he proclaims (19:565). "The danger of the Air Force's holding on to responsibility for space is that it will lose sight of the very necessary and unique capabilities that airpower, apart from space power provides." From his perspective, based on the characteristics of airpower and space power, they are clearly not identical. He continues, "Segregating airpower and space power is a good move for both, leaving experts in each to decide how best to develop theory and doctrine and subsequently invest in supporting organization, training, and equipment"(19:569).

In 1997, he felt it was time to establish an organizational structure that could plan for the future of space without inhibiting "the unique and necessary development of airpower"(19:570). "For a brief period in the 1960s, President John F. Kennedy provided

that unity, and it propelled us to the Moon," DeBlois begins in his concluding thoughts. "Such unity in the space community is sorely lacking today. The Air Force is the wrong place to focus that unity. To do so constitutes an attempt to force the merger of two unique realms. That is bad for space power and bad for airpower"(19:570-1).

"The Air Force is an aerospace force, and its future is now in space as certainly it was in the air in 1926," notes James Mowbray harking back to the Army Air Corps analogy (91:12). General Schriever addressed the "space is a place" controversy in commenting on aerospace, "Space...is a medium in which many military missions can be accomplished more effectively. Actually, it can be better understood when it is viewed as just what it is, an extension of a medium—aerospace"(45:594).

In the early 1980s, Congressman Ken Kramer from Colorado Springs introduced legislation to firmly root Air Force thinking into the aerospace concept. In House Resolution 5130, he proposed renaming the Air Force to the "Aerospace Force"(112:202). He proposed this force, "Be trained and equipped for prompt and sustained offensive and defensive operations in air and space, including coordination with ground and naval forces and the preservation of free access to space for U.S. spacecraft"(112:202). The Air Force felt threatened by this move. "In mid-May Air Force Secretary [Verne] Orr appeared before Congress to reject Representative Kramer's proposal to rename the Air Force the Aerospace Force"(112:205). Congressional interest, however, did motivate the Air Force to create Space Command.

Some feel the aerospace concept has been detrimental, and that it requires redefinition. David Spires has concluded, "Indeed, the 'aerospace' concept contributed to

the fragmentation of a military space community that seemed more comfortable within the world of research and development than in an operational environment"(112:208). "It represents my explicit intent to integrate air and space operations in the mission of the Air Force; space has been a stepchild too long," Carl Builder begins. "By the word, aerospace, I would avoid any separation or distinction between air and space in priorities, preferences, or budgets—the things people will look to for clues about favoritism"(12:284). Jennings also feels an aerospace concept is valid, "But nothing has invalidated the basic idea of an operational continuum, even though a vehicle operating both in the atmosphere and in orbit must meet different requirements in each realm"(66).

"It seems to me there are two approaches one could take on this," Group Captain Vallance began in addressing the aerospace concept at the RAAF sponsored doctrine symposium. "The first approach argues that space is a natural extension of the third dimension above the surface of the earth, and therefore we can talk about aerospace doctrine as one verified set of guiding principles"(129:81). As he points out the second approach is quite different:

> It argues that air power differs from land power and sea power because the environment in which it operates is very different, and each form of military force—air, land, and sea—therefore has distinct specific characteristics; and if we take that approach then it's a bit difficult to extend air power into space, because space has patently different characteristics from air. (129:81)

Waters goes on to conclude, "Space vehicles operate differently, they don't have the maneuverability and the flexibility of air vehicles. Not yet, not in the foreseeable future"(129:81).

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The Third Dimension Perspective

Perhaps, the strongest argument for the likeness of airpower and space power, advocated by the aerospace concept, is tied to the characteristic they share: both operate from the third dimension. According to Hammond, "The threat from abroad to the US, and the means of greatest surprise, is and always will be from the third dimension"(53:22). For him, "The third dimension represents the ultimate high ground"(53:23). Hammond, however, feels the term "airpower" is satisfactory for addressing air and space:

> Airpower is a unique form of power. It is, thus, one word, not two. Airpower is the term which refers to the third dimension—what is up, vertical and above. It includes space as well as the atmosphere. But it is still called 'airpower" because the attributes of operation in the third dimension are similar, though the vehicles which operate in the arena of air and that of space may be different. Air is not space, but they are part of the realm of the third dimension what is above the earth's surface. The third dimension is the medium of airpower—both air and space. (53:17)

"The advantages of airpower and space power over surface forces result in vastly superior mobility and responsiveness," point out Endersby and Fullbright, "operations in the third dimension allow for speed, range, maneuverability, and a perspective unachievable by surface forces"(39). "Air and space forces are able to respond quickly and worldwide on short notice to counter potential threats to the nation's security interests." They add, "[air and space] competencies allow for detection and analysis of, and reaction to, situations with rapid, lethal, and decisive force regardless of time or location"(39).

Major Temple disagrees with ascribing these characteristics to both air and space forces. He feels they may be "the most significant differences"(116:26). He suggests that speed and range are of "little practical value," while "*Flexibility* of space forces is problematical, since they are mostly oriented toward accomplishing a single mission, with little capability to do anything else"(116:26). For him, "Technologically sophisticated, highly reliable space forces are essentially the antithesis of the flexibility ascribed to aerospace forces in *Basic Aerospace Doctrine*"(116:26). In direct response to Temple, Major Grover Myers (USAF) retorted, "He then makes what I consider to be the critical and unfortunately all too common error of our current space doctrinal thinking—namely, assuming that since the environment is different, then what space forces do in that environment must also be different"(92).

Builder believes there is a bond between airpower and space power. He has made a link between early airpower theory and the third dimension. "Air power theory proposed the unique end of striking at the heart of an enemy—at the sources of the enemy's means for waging war, before they could be used in combat," he opens. He goes on to point out, "Air power theory proposed the unique means of carrying out such strikes through the third dimension, instead of engaging and defeating the enemy's surface forces"(12:214).

John Correl, editor of *Air Force Magazine*, commented on this topic in an editorial, "The Integration of Aerospace," for the January 1999 issue. "More important, air and space share common operational characteristics that include elevation, perspective, speed, range, and freedom from geographic constraints of the Earth's

surface," he suggests, "within this realm, which [General Michael] Ryan calls 'the vertical dimension,' military operations are blended and interdependent"(17:2).[17]

By focusing on the desired ends and operating from the third dimension, regardless of environment, the aerospace concept may not be bankrupt, as critics have charged. DeBlois has conceded, "If an examination of the characteristics of airpower and space power shows great similarity among them, one can accept the aerospace power conjecture"(290:531). Dr. Lambeth agrees, surmising that "Physical differences between space and the atmosphere, such as those that distinguish astrodynamics from aerodynamics, will affect the *mode* of space operations but not their purpose"(294:12).

Reflections

It is amazing how unchanged the space thought debate is. Most issues can be traced directly back to the initial clashes between the Air Force and the Eisenhower administration. Over the years, the administrations of the presidency and the service have changed. With these changes, the positions of each have also changed, but the fundamental ideas remain the same.

Any thoughtful consideration of space should begin with the four schools of thought. Although they appear to be diametrically opposed, the ideas of every school deserves consideration. Fundamentally, those in the high-ground school and those in the

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[17] On the topic of integration of air and space, the CSAF is clear. "Asked at the Air Force Association's annual air and space symposium in Orlando, Florida how the service is doing with the integration of the two missions, Ryan—a former fighterjock—answered, 'It's done.' In his view, he explained, space is just an extension of air and integration has been ongoing"(48:2).

sanctuary school are separated by their interpretation of human nature. Ultimately, they both really desire the same thing, a more peaceful world. Those who believe in sanctuary believe human nature is inherently good, and people's thoughts can be changed. High-grounders are, perhaps, more realist in their inclinations. They feel war is a fact of life, so it is essential to be prepared. Those in the control school and survivability school are also closer in belief than it might appear. The real question for them concerns the vulnerability of space assets.

There are valid points in all four schools and they should be openly considered. The aspects of each school the Air Force chooses to pursue should be explicitly articulated. This will provide, explicitly, the Air Force's values toward space, as well as a forum for debate.

The issue surrounding "space is a place" is really a matter of semantics. Space is indeed a place, but so is the air. Generally, air is described as the "atmosphere" in this regard, but the concept is the same. They are both mediums. The question of whether space is a medium or a mission is moot. What has driven this is the question how important is space? Clearly, it is important and this debate should be left for the histories.

Debating the aerospace concept is really a question of semantics. Better yet, it is an issue of how the term is interpreted. Environmentally, aerospace is preposterous. Dimensionally, aerospace has potential. The argument of operating from the third dimension seems sound. Clearly, astrodynamics and aerodynamics are different. These concepts, however, are environmentally based.

Through more investigation it might be possible to determine if the ends of air and space are the same. If this is true, it is a starting point. The question would then be: are the ends achieved in a similar manner? At that juncture, it would be too easy to bring means into the argument, but the focus must remain on the objectives and values of the ends. Eventually, aerospace power would have to separate into airpower and space power, but this separation would be in the form of AFTTPs, if the values before hand remained the same.

VIII. Space Doctrine

The doctrine should tell how to best employ space. — *Russo/Millan (106)*

The history of space doctrine has been very much influenced by the history of space thought. For more insight into the course space doctrine development has followed, consider either the works of Futrell (45;46) or Spires (112). The research of this thesis work begins with the period of the mid 1980s when there was a need to develop space doctrine. At that time, various authors suggested what they viewed as a proper course for space doctrine development to follow. A recurring theme during this time frame was the need for doctrine to be more futuristic and less encumbered by treaties and policy. Also during this time frame there was a call to develop principles of space warfare.

Eventually, in August of 1998, space doctrine was published in the form of AFDD 2-2, *Space Operations*. This is the only specific space doctrine document considered in this research. Although this doctrine document was much anticipated, its content, or lack thereof, disappointed some. A thorough review of the contents of AFDD 2-2 reveals whether this disappointment is valid. It also shows whether the previous recommendations were actually incorporated.

In the mid 1990s, prior to the release of *Space Operations,* various authors proposed space doctrine. Two of these works stand out as perceptive and require consideration because of their outlook. One suggests the need for space combat power. The other recommends the Air Force shift from an atmospheric orientation to what it

describes as an "infospheric" orientation. Once again, the review makes it possible to recognize how many, if any, of the initial recommendations were incorporated.

Foundations

Throughout the 1980s and into the mid 1990s, the absence of quality space doctrine caused many authors to suggest courses for space doctrine development. "In the formulation of space power doctrine, several fundamental choices should be clearly stated," Lieutenant Colonel Dino Lorenzini observed in an *Air University Review* article, "perhaps the most important choice is to establish the precise purpose space power doctrine is intended to serve"(77:17). He felt the following questions addressed the two possible courses:

1) *Should space power doctrine define military principles and practices for a world as we would like it to be?*

2) *Should it define the art of what is militarily possible, unencumbered by treaty restrictions and self-imposed constraints? (77:17)*

"The greater benefit appears to rest now with an unencumbered version," he suggested, "if the fundamental tenets of space power are not described in a doctrine manual, they are not likely to be stated anywhere"(77:17). Lieutenant Colonel Friedenstein agreed, "When a futurist doctrine is externally constrained in defining principles, it ceases to function as doctrine and becomes merely another statement of national policy"(43:16). Lorenzini also felt a reason for choosing the second path was, "An unencumbered version of space power doctrine has more continuity than one that is constrained by current defense policies"(77:17). He went on to propose, "It is possible to

begin the formulation of fundamental space warfare concepts and doctrine that serve as a primer for the articulation of specific space policy objectives later"(77:17).

In 1985, Friedenstein wrote an article for *Air University Review* entitled, "The Uniqueness of Space Doctrine," in which he addressed what he perceived as the problems with space doctrine at that time. "Our current space doctrine is highly constrained by contemporary national policy and the misapplication of air principles to space," he asserted, "as a result, our present space doctrine contains few, if any, statements of unalterable truths regarding the conduct of military operation in space"(43:21). At that time, he felt, "The next step is to take a full set of fundamental principles, examine them in light of the characteristics of the space medium, and produce the principles of space war"(43:22).

In a recent interview for this work, former USCINCSPACE Piotrowski addressed this same issue. "Perhaps you need to think of this in terms of principles rather than doctrine," he recommended, "doctrine is not a slogan or something you sit down and write without experience"(97). He went on to propose, "We should evolve doctrines from space control principles. You should be working on the 'principles of space warfare'"(97).

In his 1985 article for *Air University Review*, Lieutenant Colonel Lorenzini discussed what he felt were important aspects of space power doctrine. He believed basic space power doctrine should address five elements:

1) the basic principles and practices of warfare,
2) the laws of physics and orbital mechanics,

3) the unique environment of space,

4) the evolving space weapon technology, and

5) our resource limitations. (77:18)

In 1993, Air University's *Space Handbook* noted four fundamental premises for developing space doctrine:

1) the focus of armed conflict will remain on the earth's surface for the foreseeable future,

2) space doctrine must be minimally constrained by current policy,

3) space doctrine must anticipate the future, and

4) the principles of war: mass, objective, surprise, maneuver, the offensive, simplicity, unity of command, economy of force, and security apply fully and completely to space operations. (2:68-9)

Major Peterson also advocates the necessity for space doctrine to "Acknowledge and accommodate the principles of war"(96:25), but it should not be based "on an assumed right of passage in space any more than...other operating doctrines [are based] on the right of free passage in the air or on the sea"(96:20). He also feels, "Launch costs and on-orbit inaccessibility are not appropriate elements of space doctrine"(96:22).

According to Peterson, "To qualify as enduring guidance on military strategy and operations, space doctrine must not be constrained by estimates of current or near-future space system technology"(96:17). He feels that "An untainted doctrine allows one to quickly recognize and coherently exploit opportunities as technology makes them available"(96:17). "The scope of space doctrine must be broad enough to accommodate the opportunities that technology such as SDI presents. Thus, space doctrine cannot ignore space-based weapons"(96:18-9).

In 1996, Major Gallegos addressed space doctrine in his SAAS thesis, noting, "Spacepower doctrine and experience are still significantly lagging behind space technology"(47) "All three of these threads of development—technology, doctrine, and literacy/experience—are crucial," he continued, "but the lack of balance is particularly important because it points to the focus of what should be the next phase of development in military space policy"(47). Gallegos went on to conclude, "The US military space community is dangerously close to completely discarding forward thinking in space doctrine. We must reverse this mindset to ensure doctrine guides the development and employment of future space systems"(47).

Several authors addressed developing joint space doctrine in an article for *Joint Force Quarterly* entitled, "Joint Space Doctrine: Catapulting into the Future." In it, they point out that inexperience necessitates a less traditional doctrine development process for space. They assert, "This fact does not detract from the need for a coherent space doctrine to determine the future functions and force structure with which to carry them out"(89:72). Even so, they point out, "The history of early space doctrine reflects the growing appreciation of the functionality of space forces in modern conflict but is focused on the present rather than the future"(89:74).

To them, a first step in the development process is to define overall goals for military space programs and then develop the operational doctrine to match. A significant issue, they suggest, is "The fact that the distinction between military and civilian space systems is rapidly disappearing," which will mean, "structures and doctrines need to be adjusted"(89:76). Furthermore, they believe, "The final ingredient of a true space

doctrine is an explicit statement by the national leadership that space is no longer a sanctuary but rather the high ground of a global *infonet* which can be used for civil or military purposes"(89:76).

Kenneth Myers and John Tockston wrote an article for *Airpower Journal* entitled, "Real Tenets of Space Doctrine," in which they suggest within basic Air Force doctrine, "Space capabilities are incorrectly derived simply by applying the term *aerospace* to what is an otherwise comprehensive 'air power' doctrine, tried and tested in war many times over"(93:55). They feel the first step towards quality space doctrine is "a realistic space environmental doctrine," which would correct "compromises" made in order to "force fit" space into air doctrinal thinking. "Specifically, the environment, the characteristics of the systems, and the capabilities of space forces differ sharply from those of air forces, just as these elements differ between air, land, and sea forces"(93:56).

They believe, "The relevant characteristics of space forces are *emplacement, pervasiveness*, and *timeliness*"(93:59). Emplacement comes about because, "Satellites are fully operational in peacetime; they execute their mission day and night, and they are inherently ready to support military operations at all times"(93:59). Pervasiveness results from space systems' persistent presence, which "Serves as a strong deterrent, for they can constantly monitor the readiness and status of opposing forces"(93:59). Timeliness comes from the fact that "Satellites, always ready and omnipresent, can provide near-instantaneous response to military commanders anytime, anywhere"(93:59).

Over the years, the approach to space doctrine has varied. There are, however, some consistent themes. Space doctrine should not be constrained by current policy. Furthermore, it must be looking toward the future, anticipating developments.

AFDD 2-2: *Space Operations*

Despite all of the outlines of space doctrine, for many years the Air Force was without a specific document addressing space. A very much-anticipated AFDD 2-2, *Space Operations,* was published 23 August 1998. It consists of six chapters covering the foundation of space power, command of space forces, space force operations, attributes of space power, space employment concepts, and space power for the theater campaign. According to Major Russo, this thirty-one-page document "Provides many descriptions, but very little know-how"(106).

Foundation of Space Power

The opening chapter of the doctrine first describes the aerospace medium. According to AFDD 2-2, **"Although there are physical differences between the atmosphere and space, there is no absolute boundary between them. The same basic military activities can be performed in each, albeit with different platforms and methods"**(22:1). It goes on to describe space power as the capability to employ space forces. "Used effectively, space power enhances America's opportunities to succeed across the broad range of military operations"(22:1).

The document asserts, "At the level of basic aerospace doctrine, the principles that govern aerospace operations are the same for air and space"(22:1). It further asserts:

In addition to supporting terrestrial operations, many military functions previously performed by terrestrial forces may be accomplished by space forces. In some cases, space may be the focus of operations and may be supported by complementary terrestrial-based forces. As space and air forces are fully integrated into a total aerospace force, future space assets may not be only a force multiplier but may be the force of decision itself. (22:3)

Command of Space Forces

AFDD 2-2 next addresses the commanding of space forces. **"Centralized control and decentralized execution are essential to successful and optimal use of aerospace power,"** it maintains, **"since space forces' effects and contributions are global in nature and include critical national assets, they are tasked and assigned from a global perspective"**(22:5). For the theater commander, it points out they "Do not have actual physical control of the satellite, its control systems, or ground control nodes"(22:5).

Space Operations also touches on the issue of military use of commercial satellites from a command and control perspective. **"Assets not assigned to a Service component provide an increasing portion of the space systems capabilities available to the theater commander,"** it points out. Then the document advises commanders that "to obtain the widest range of benefits available from these assets requires flexibility and innovation"(22:6).

Space Force Operations

In the third chapter the doctrine document discusses four aspects of space operations. "Space force operations focus on controlling the space environment,

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applying force, conducting enabling and supporting operations for terrestrial-based forces, and supporting space forces"(22:7). The first operation it discusses is space control. Indeed, nearly five-sixths of the chapter on space operations addresses issues of space superiority and space control, which will be discussed in detail in the following chapter of this work.

AFDD 2-2 next briefly looks at the application of force, noting, "**The application of force would consist of attacks against terrestrial-based targets carried out by military weapon systems operating in space**"(22:11). This portion of the work anticipates future developments as it points out, *"Currently, there are no force application assets operating in space, but technology and national policy could change so force application missions could be performed from platforms operating in space"*(22:11).

The next element it addresses is what most agree space forces actually do today: force enhancement. "**Force enhancement operations consist of those operations conducted from space with the objective of enabling or supporting terrestrial-based forces**"(22:11).

Finally, it looks at spacelift and satellite operations as part of supporting space forces. "**Space force support is carried out by terrestrial-based elements of military space forces to sustain, surge, and reconstitute elements of a military space system or capability**"(22:12).

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<u>Attributes of Space Power</u>

"The Air Force is unique in its ability to capitalize on the contributions of space systems," the next chapter opens, "by being able to integrate and respond with rapid mobility and firepower to the near-real-time information afforded by systems operating in space"(22:15). According to AFDD 2-2, there are five attributes of operating in space: global coverage, flexibility, economy, effectiveness, and robustness.

Global coverage comes from space systems' ability to "**Provide worldwide coverage and frequent access to specific Earth locations, including those denied to terrestrial-based forces**"(22:15). For space systems, flexibility is possible because, "Operationally, they can adapt to new situations through on-orbit, real-time reprogramming. Modifying terrestrial processing operations and modifying replacement satellites being readied for sustainment launches provide further flexibility"(22:16). In terms of economy, the chapter points out that initially costs are high, but that "over time some functions are performed more economically from space"(22:16).

There are two aspects to space systems' ability to provide effectiveness. First, *"The absence of atmosphere and attenuation provides an optimum operating medium for future directed energy weapons"*(22:17). Second, "**Space enhances the simultaneous employment of both dominant maneuver and precision engagement operational concepts**"(22:17). As for robustness, "**Functions accomplished by space-based and terrestrial-based systems, using both air and space assets, provide mutual backup and complicate hostile attempts to neutralize our overall military capability**"(22:18).

<u>Space Employment Concepts</u>

The fifth chapter describes how space can be used in a variety of roles, ranging from peacetime to posthostilities. In fact, it describes the role of space forces as, to support *"Service, joint, and multinational operations across the range of military operations, from peacetime engagement to general war"*(22:21).

In terms of peacetime, deterrence, and MOOTW, "Space forces play a significant part in our ability to characterize threats and identify an adversary's strengths, weaknesses, and vulnerabilities for our national leaders to use in diplomatic, political, and economic efforts"(22:21). **"As crises escalate, space systems provide data and objective information,"** it suggests, **"that can help our leaders accurately appraise the situation and implement appropriate diplomatic, economic, and military measures to defuse or respond to the crisis"**(22:22).

Because of the nature of future conflict, AFDD 2-2 projects an inability to rely on extended mobilization in preparation for war. Therefore, **"Space support for military forces involved in regional conflicts will initially be accomplished using currently deployed space forces"**(22:22). In time, however, **"Additional space forces will be integrated into the theater commensurate with the requirements of the theater commander and available assets"**(22:22).

The chapter then introduces the concept of "information superiority," noting, **"The ability to control an enemy's information can be decisive in military operations.** *This means integrated information superiority becomes a prerequisite*

strategic objective for future combat"(22:23). The doctrine document continues with a further stressing of the importance of information superiority:

> **Failure to attain information superiority early in the crisis or conflict could mean the difference between success or failure of diplomatic initiatives, crisis resolution or war, and the ability to maintain the element of surprise during military operations.** (22:24).

At the end of the chapter, it describes how space can be crucial to providing communication and navigation systems while nations rebuild their critical civil infrastructure. The implication being that in the future, war will still cause major damage to the infrastructure, which could result in chaos and more casualties after the conflict is terminated. Space provides a means for stability.

Space Power for the Theater Campaign

The final chapter discusses how space is integrated at the theater level. **"Commanders must integrate and optimize all available space forces to effectively employ aerospace power"**(22:25). To do so, in planning for counterspace operations, "The theater CINC's ultimate target is the adversary's access to space services, which will be neutralized by whatever means is most effective"(22:25). Furthermore, **"Theater planners need to understand the enabling and supporting capabilities that reside in space forces,"** and they must clearly identify their space requirements, *"so space forces can be effectively, efficiently, and coherently focused on theater planning and integrated into mission execution"*(22:25).

During peacetime, planners should work to ensure forces are prepared to efficiently use space systems should a conflict arise. To achieve this, "Through an

aggressive cross-flow program, space personnel are integrated in staff positions with the unified command staffs and their components"(22:26).

The last chapter concludes with a description of Air Force Space Support Teams (AFSSTs). *"They provide space power expertise to assist in planning and execution function while providing additional liaison channels between USCINCSPACE and the theater CINCs"*(22:27). *Space Operations* ends with the prediction, "As the Air Force moves to more integrated aerospace operations, reliance on theater support teams will diminish as space specialists are assigned to permanent duty on numbered air force staffs"(22:27).

Space Combat Power

Prior to the completion and publication of AFDD 2-2, Air Force officers considered different ways of looking at space doctrine. One officer, Lieutenant Colonel Mantz, completed a report entitled, *The New Sword: A Theory of Space Combat Power*, while serving as the Airpower Research Institute (ARI) research fellow from Air Force Materiel Command (AFMC) for the 1993-94 academic year. In his report, Mantz suggests the idea of "space combat power." "Space combat is the hostile application of destructive or disruptive forces into, through, within, or from space"(80:2). He goes on to outline three missions—space denial, space strike, and space protection—as well as ten axioms that form the basis of space combat theory (80:2).

Space Denial

The first mission of space combat is space denial. "Space denial is the hostile application of destructive or disruptive force against enemy space systems to deny the enemy's use of the space medium"(80:2). Since adversarial possession of space systems serves as a force multiplier, it endangers US forces. "A space denial capability removes the benefits such force enhancement systems provide"(80:3). Thereby, friendly forces are able to operate without being observed and, thus, maintain the advantage of surprise (80:3). "Denying spacelift and space weapons delivery vehicle launch are indirect, but very effective methods of space denial"(80:38). Space denial would also prevent enemy military platforms from using space (80:3). An indirect method of space denial is affecting the enemy's ability to control satellites or payloads on the satellite. Another aspect of space denial is limiting an enemy's ability to track satellites (80:41-2).

Space Strike

The second mission of space combat is space strike. "Space strike is the hostile application of destructive or disruptive force from space against natural-body-based (earth, moon, and asteroid) targets"(80:2). "Space strike systems can provide an increased capability for prompt, intense, lethal and nonlethal, parallel attack against terrestrial (land, sea, and air) targets with minimum risk to allied personnel and minimum collateral damage"(80:3).

Space Protection

The final mission of space combat is space protection. "Space protection is the active, defensive application of destructive or disruptive force to defend friendly space systems"(80:2). "Space protection provides security to space systems beyond traditional passive defense mechanisms"(80:4).

Axioms of Space Combat Theory

Mantz views axioms as building blocks for theory. He suggests ten "preliminary" space combat axioms. Five of them are of note:

1) Axiom 4. Space strike systems can deter hostile actions by holding forces, decision making (leadership and command and control), and infrastructure (industry, transportation, and communications) at risk.

2) Axiom 5. Space denial systems can be employed decisively by denying enemy access to space-derived data.

3) Axiom 6. Space denial systems can be employed decisively by physically denying enemy access to space.

4) Axiom 8. Total space control (the combination of space denial, space protection, and passive space defensive measures) is neither achievable nor necessary.

5) Axiom 10. Space power is not intrinsically linked to air power. (80:74)

According to Mantz, "The threat of equal or bigger retaliation for an attack deters the attack"(80:77). He feels, those nations most dependent on information are more inclined to abide to the deterrence concept, for they have the most to lose. "With information collection and its movement as the current primary mission of space forces, space denial has to be space combat power's job one"(80:77).

However, because of the vastness of space, the growing number of objects in orbit, and the number of resources required for space denial the possibility of achieving total space denial is unlikely. "Space control may be limited to temporary, local control"(79). He sees denying access to space analogous to denying sea or land lines of communication. Mantz recognizes three reasons for denying physical access:

1) friendly forces need to deny space-deployed combat support systems (observation, data collection, and communications) from supporting earth-based forces during hostilities'

2) friendly forces need to defeat enemy space-deployed combat systems to avoid or defeat an attack,

3) if an enemy space system has been attacked, friendly forces need to deny access to prevent repair or replacement. (80:78)

Major Sam McCraw, a graduate of SAAS and currently an AFSPC strategy, policy and doctrine analyst, has also commented on the sea lines of communication analogy. "Space control is similar to sea control, specifically Corbett's theories on sea control"(82). McCraw elaborates further, "He believed that controlling the seas did not require huge fleet on fleet engagement that Mahan pushed for; instead, what was really important was controlling certain, crucial lines of communication"(82). McCraw believes the emphasis for space is force enhancement, and that that will remain true for at least the next 20 years. The space systems all have lines of communication with the terrestrial-based forces they are enhancing. "Then your job as a space control theorist is to determine how to best control those lines of communication. Now keep in mind that, as Corbett points out, to control a line of communication, you don't necessarily have to destroy the enemy's fleet"(82).

Although Mantz's Axiom 10 makes a distinction between space power and airpower, he says, "This doesn't mean the US Air Force is not the best service to apply space power. But space operations do not have to be executed by an air force"(80:79). He notes that the Soviet forces had a separate space force. His point is that it can be done outside of the Air Force, so he feels that should be part of the doctrine. In the end, Lieutenant Colonel Mantz proposes a "candidate" space combat theory:

> Space combat power can be applied decisively (and independently of air power) by striking at the national elements of value of the enemy. Unlike air power, space control may not be a prerequisite for the exploitation of space (e.g. space combat support and space strike). Like air power, space power must be centrally and independently controlled. (80:80)

Infospheric Power

Retired Colonel Richard Szafranski (USAF) and Dr. Martin Libicki suggested another way for the Air Force to go in their article, "...Or Go Down in Flame? Toward an Airpower Manifesto for the Twenty-first Century." This article first appeared in the Fall 1996 issue of *Airpower Journal*.[18] The basic premise of their position is "The Air Force first needs to redefine itself from an atmospheric institution to an infospheric one"(114:66). They believe technology has changed the way wars are fought. "Simply put, if you can see the enemy and the enemy cannot see you, then only modest applications of precisely aimed and correctly timed force suffice to command the battle space"(114:67). Under an infospheric orientation, the Air Force would have three missions: extended information dominance, global transparency, and strategic defense. They also note some implications for the Air Force if it moves to infospheric power.

Extended Information Dominance

The first mission of an infospheric Air Force is to empower allies with information. "Technology both permits and requires that information dominance sought by the United States be extended to its friends"(114:69). They believe technology has created the situation where, "To be present is to risk being sensed by one phenomenology or another; the attendant revolution in precision guidance means that to be sensed is to be killed,"(114:69).

They also point out, "Today's public sensitivity to casualties, suggests that sending large numbers of young men and women overseas to war against secondary enemies (those who cannot directly threaten the United States) need no longer be how the armed services always go to work"(114:69). Technology and public sentiment, Szafranski and Libicki suggest, make it imperative that we tell "Our friends the location of enemy targets to within the blast radius of their ordinance [which] permits them to defend themselves against larger foes tied to ancient parameters of force"(114:69). So, we support and advise our allies by acting as an information conduit, rather than providing troop support.

Global Transparency

According to them, the next mission "naturally follows" the first. "The surest deterrence to any nation aspiring to hostile great-power status may be the certain knowledge that it is under continual watch"(114:69). In their words, this mission is "To

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[18] This piece also appears in *2025 White Papers Volume 4.*

endow the instrumented world with a degree of transparency so clear that no country can challenge us in the dark"(114:70). They go on to add, "The evil that lurks in the hearts of humans may forever hide, but not the means to convert evil thoughts into evil deeds"(114:70). By having a complete awareness of all that is transpiring in the world, the US will be able to intimidate enemies and deter war.

Strategic Defense

The final mission "flows" from the second. "Over 90 percent of trying to stop a ballistic or cruise missile is finding it"(114:70). "The same metasystem that can arm an ally with information and make the entire world transparent to US power," Szafranski and Libicki propose, "can also sweep the skies for air and space threats and dispatch their coordinates to whatever methods are chosen for their engagement"(114:70). As they point out, "Nuclear weapons are no less awesome under a different paint scheme"(114:73). Yet, the rest of the world is starting to catch up. Recent actions in India, Pakistan, and Korea all make the need for strategic defense appear imperative.

Implications

Szafranski and Libicki feel this new focus has implications for airmen and the Air Force alike. "Note that none of these new missions have anything to do with the human mastery of flight," the authors point out. "That was yesterday's problem—and one thoroughly solved. It is time for the Air Force, as America's premier technological agency, to move on"(114:70). They feel three activities "must become the raison d'etre of air and space forces:"

1) operating militarily in a transparent world,

2) understanding space, and

3) defending the American homeland from aerospace threats. (114:71)

"Data need to go to warheads," Szafranski and Libicki pronounce, "not task-saturated humans who also have to worry about staying straight and level, breathing, controlling temperature, urinating, and—more importantly perhaps—being captured and exploited"(114:71). They continue, "Once pilots are understood as information-processing components—the natural tendency of an infospheric Air Force—the rational allocation of these functions between carbon and silicon can proceed apace"(114:71).

Reflections

Even the content of space doctrine is without agreement. Over the past twenty years many people have addressed the issue of what should be in space doctrine, but the themes have varied, and the Air Force has appeared to miss their points.

One common theme is the need to free space doctrine from treaties and self-imposed constraints. Many of these constraints are the result of the political leanings of the day. Because the policy pendulum seems to overly affect space doctrine, some argue it is time to move away from working on doctrine and formulate lasting, universal principles of space warfare. These could then form the basis for space doctrine.

That approach, however, has the same dangers as any principles of war. Namely, human nature keeps anything from being universal or absolute. The better choice is to formulate space doctrine outside of policy and then let the doctrine influence the policy.

This same argument holds for treaty limitations. If the Air Force could clearly articulate its vision for space through its doctrine it would then be able to influence policy makers rather than always playing catch-up. Looking back at VFT, if the Air Force were following its values it may be able to seek out decision opportunities and become the influencer.

Not only should space doctrine be minimally constrained by policy, but it has to anticipate future development. Doctrine should push technology. Space is a realm where technology flourishes, so it is essential to have a space doctrine looking ahead. Major Gallegos is correct; doctrine should guide the development and employment of future space systems.

The apparent "force fit" of space into air doctrine is dangerous. It only serves to drive larger wedges between the two communities. Still, those who wish to focus on differences of environment, capabilities, and characteristics are also misguided. Their dedication to their alternative makes them no better than the airplane enthusiasts. The differences are clearly there, but the real issue is whether that is what space doctrine should being focusing on.

Major Russo is correct about AFDD 2-2. It does offer very little know-how, and some of the descriptions are overly terse. Even the pictures are questionable, as some appear to have no relevance. For example, in the space control section there is a insert description of Global Positioning System (GPS) satellite, but no link is made to the topic being covered. Furthermore, the claim the document makes that the same basic military activities can be performed by both air and space assets are nowhere substantiated.

Perhaps it is a correct statement, but the lack of effort to demonstrate it provides more fodder for the environmental-based critics.

The doctrine document does attempt to be rather bold in its predictions. It predicts of a time when space assets may be the force applier, but it provides no guidance on how that might be achieved, nor thought on why it should be sought. It is merely placed out there to dangle. Another example of a failure to provide any guidance or understanding is when it addresses the issue of commercial satellites. Commanders will need "flexibility and innovation." Isn't that a given in any conflict?

Space control is heavily covered in the document, even though it is not actually performed by anyone in the Air Force today. Those missions that are performed on a daily basis, force enhancement, receive almost no coverage. The little coverage that is included is, again, of no value. Another important aspect of both force enhancement and space control is information superiority. Yet, again, *Space Operations* offers very little in the form of guidance or education. If doctrine is known by its description of the best way to do something, then this is not doctrine.

Finally, the doctrine document touches briefly on the issue of integration of space personnel with the rest of the Air Force. Space personnel appear to be destined to be the next briefer, after intel and weather, at the local fighter wing. At least that is the implication. In many ways it might have been better if AFDD 2-2 was never published, for it is severely lacking in guidance and education.

A great deal more value can be found in Lieutenant Colonel Mantz's report on space combat power. Three of his axioms stand out. The fourth axiom sounds a lot like

the old basic airpower doctrine of times gone by. Space systems will be able to hold the enemy at risk because of an ability to strike at the heart of the enemy without the use of extraneous forces. Axiom 8 presents the idea that total space control is both unachievable and unnecessary. This certainly has implications for space control doctrine. Furthermore, Major McCraw's analogy to sea control provides commentary on the need to totally destroy the enemy's space fleet. Ideas like this should be in *Space Operations*, but are not included. Finally, Axiom 10 makes the point that space power and air power are not intrinsically linked, but backs off actually calling for a separate space force. This axiom appears so obvious it is meaningless just as some of the comments in AFDD 2-2.

The call for the Air Force to shift to an infospheric outlook, rather than an atmospheric is most thought provoking. Szafranski and Libicki make some solid arguments, and present it in the context of war and the American attitude towards war. Thoughts like these belong in doctrinal development. More so, their conclusions seem sound, outside of the Global Transparency concept, which seems more Hollywood than foreseeable in the near future. If the idea they have envisioned is really achievable, then their conclusions are on even firmer footing. Finally, their commentary on manned flight are perhaps harsh, but certainly thought provoking, and given their previous arguments, quite valid. The Air Force needs to seriously consider the infospheric concept.

IX. Control of Space

With control of space, friendly space forces, acting either as a force enhancer or force applier, can help put enemy forces on the defensive, disrupt operations, and even cause enemy forces to suffer significant losses.   — Space Handbook (2:69)

Space control is generally considered an element of basic space doctrine. As previously pointed out, *Space Operations* dedicates a considerable portion of the document to space control. Even so, it is a very confused topic. As with doctrine, consensus is lacking on many issues and definitions. Furthermore, some suggest there really is no need for space control.

The strongest argument for discontinuing the pursuit of space control is that there is no threat to US space dominance. Over the years, however, there have been many, including Air Force leadership, who have suggested threats. Some of these threats seem more Hollywood-like than reality based, yet US dependence on space implies a vulnerability that adversaries will undoubtedly try to exploit. Still, the public perception of whether or not a threat exists is critical to the funding of space control initiatives.

Threat assessment and space control theory, overall, are being complicated by the proliferation of space products. Proliferation increases the threat because it creates the situation where the enemy has the same eyes, ears, and sense of direction as the US. A benefit of this commercialization, however, is that space products are simultaneously becoming increasingly better and cheaper. This state of improvement is prompting many to endorse military use of commercial packages, which only complicates the situation more. If the US is using consortia satellites, it presents political and economic dilemmas

outside of the military's sphere of influence. Another concern over the growth of commercialization is the creation of an economic center of gravity. This new state could result in space conflict over economic concerns rather than military ones.

If the issues surrounding space control are not complicated enough, there are also definitional problems with the terminology. Depending on the manual, the terms associated with space control vary. Three concepts that are most associated with this mission are space control, space superiority, and counterspace. Space superiority is generally considered the goal, while space control is the mission. In an attempt to use "air" terminology, however, counterspace is also used by the Air Force as a reference to the mission.

As with doctrine, it is more insightful to consider the operations, or functions, of the space control mission. Yet again, there is no consensus on the operations making up the space control mission or the terminology to use in defining those operations. Some of the differences are semantics, while other differences deal with distinct outlooks on what is part of the mission of controlling space.

One of those areas not universally accepted is spacelift. Some feel it is simply a support mission, while others indicate it is an integral part of control. Recently, a concept referred to as rapid space force reconstitution (RASFOR) was set forth. To understand the significance of this concept, it is important to look at spacelift as it is currently performed. Then a consideration of the RASFOR approach to spacelift more clearly demonstrates its strengths and weaknesses.

Finally, perhaps the most controversial issue is weaponization of space. Some feel this will have a destabilizing affect on international relations. Still others are concerned with the practical issue of how debris might impact the operation of "innocent" satellites. Advocates believe developing and deploying space-based weapon systems is a critical step in a new era of deterrence. The conflict between the sanctuary school and the high-ground school thought is coming together in discussions of space arms control. Space control is viewed as either a threat to world peace, or the only way to maintain peace in a threatening world.

Where's The Threat?

The first question asked when addressing the issue of space control is "where's the threat?" Lieutenant Colonel DeBlois claims, "What disturbs most foreign powers regarding US space development is the clear absence of motive: there is virtually no threat to US space-ISR dominance"(20). He suggests:

> Further claims of adversarial space weapons are simply unfounded. Military future studies often cite predictions of foreign space-based particle beams and other such technologies, but in reality they merely provide paranoid justification for US space programs....The overwhelming evidence suggests that, unprovoked, the rest of the world is simply *not* interested in space weaponization at this time. (20)

Major Jeffery Caton strongly disagrees. According to him, the limitation on space control planning has resulted because "Two popular perceptions preclude its serious consideration: (1) international law prohibits space weaponry and (2) no country possesses a credible space warfare capability. Both of these perceptions are

false"(14:19). He feels because of US dependence on space assets, "a competent foe can't afford to ignore" this vulnerability.

The debate over a potential space threat is not new. In 1982, retired Major General George J. Keegan, Jr., former Chief, USAF Intelligence, foretold a perilous future in the forward of David Baker's *The Shape of Wars to Come*:

> By mid-decade, the Soviet Union will probably have a deployed capability to destroy all of America's satellites, most of its retaliatory missile forces and, with Russia's existing civil defenses, she will be fully capable of withstanding and surviving any leakage of nuclear weapons fired in retaliation. High energy lasers and particle beam weapons—both pioneered by the Soviets—are the revolutionary new tools of space warfare. They will neutralize America's strategic deterrent and invalidate most of the free world's conventional land, sea, air and logistic forces as currently structured and employed....
>
> The failure to mobilize free world technological potential now—on an urgent basis—is to invite the worst visions of H.G. Wells. The future is at hand as is the survival of freedom. Space is their hand-maiden and the primary area for reversing the potential of Soviet science, technology and hegemonic ambitions. (6:8-10)

His strong views were perceived by many to be nothing more than doom filled delusions, yet this was not the first time Keegan foretold peril at the hands of Soviet space forces.

That same year, James Canan published *War in Space*, in which he provided some historical insight into General Keegan's long time call to arms to fight Soviet space weapons. "Keegan's fellow Pentagonians, including many in the Air Force, began to deny, or ignore, whatever wisdom he too hotly imparted," Canan reflected. "Shunned and beleaguered, Keegan retired in January 1977, just as the Carter administration came to power"(13:155). He goes on to quote one of Keegan's former "chieftains" commenting upon the retirement, "If George had only realized that everyone was always prepared to believe ninety-five percent of what he said, and had let it go at that. It was the last five

percent that killed him"(13:155). In Canan's view, "Soviet work on high-energy weapons had fallen into that 5 percent category"(13:155).

James Canan goes on to describe the course of the debate through the early 1980s. He cites Harold Brown, then Secretary of Defense and former Secretary of the Air Force during the Johnson administration, responding to accusations by Keegan that the Department of Defense was not doing enough in beam-weapons research, especially given the Soviet lead. Brown replied to Keegan:

> I won't go so far as to say that the claim that the Soviets have made a Manhattan Project-type breakthrough in charged-particle-beam weapons is a piece of advance flackery for the new science fiction movie *Star Wars*. That can't be the case because the idea of the Soviet charged-particle weapon is several years old. It is—in my view and in the view of all the technically qualified people whom I know who've looked at the whole thing—without foundation....The laws of physics are the same in the Soviet Union as they are in the U.S. (13:158)

As administrations changed, so did the outlook toward the Soviet threat. By March of 1982, Defense Undersecretary Richard DeLauer informed a Congressional committee that U.S. satellites all the way up to geosynchronous orbits (GEO) might be threatened by a Soviet space-based laser as early as the mid to late 1980s(13:179). Furthermore, the Soviets might be able to launch directed-energy weapons "'capable of effectively attacking ground, sea and air targets' from space" by the early 1990s (13:179).

"Air Force leaders, notably General Burke, said DeLauer may have overstated the imminence and the potential effectiveness of the Soviet space threat," Canan notes, "but Burke conceded that space weapons 'have a transcendental flavor, a little like gunpowder. We ignore them at our peril'"(13:179).

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During the 1980s, ominous warnings were recurrent. The Aspen Strategy Group, a bipartisan committee co-chaired by Dr. William Perry and retired Lieutenant General Brent Scowcroft, predicted, "By the early 1990s both sides could possess high-energy lasers which, with the associated adaptive optics (to correct for atmospheric turbulence), would pose a threat to certain satellites"(4:26). "If their technological developments prove successful," Gregory Radabaugh noted in "Soviet Antisatellite Capabilities" in 1988, "the Soviets may deploy space based lasers for antisatellite purposes in the 1990s"(100:84).

Some of the predictions were not only imminent, but also quite foreboding. David Baker, in his book *The Shape of Wars to Come*, foretold the coming of particle beam weapons of mass destruction. He proclaimed it would be possible to design a weapon of such intense energy, it could kill every living thing, "while retaining, intact, all the physical and non-biological resources of the country," to where only "mutants would emerge from [the] lesser orders of life capable of surviving the irradiation"(6:225). Baker forewarned, with such a weapon, "The entire population of a nation could be destroyed in seconds and the limitations of use for such a device would not prevent the indiscriminate annihilation of all people everywhere"(6:225). He incited grander fears by suggesting a weapon of such devastating power could be harnessed on a "war station" orbiting around the earth. Baker then alleviated some fears by pointing out that, in his opinion, "Such weapons are at least several decades away," and then raised anxieties by suggesting, "the step from a ballistic anti-ballistic missile beam satellite to the projected war station would be less than that which separated conventional high explosives from the Hiroshima bomb"(6:226).

As far as we know, the predictions of the 1980s failed to come to fruition. Perhaps it was because of the collapse of the Soviet Union or perhaps the prophets were simply misguided. Either way, the question of an impending threat is still prevalent.

Commander Wayne Tunick (USN), chief of the space control branch at USSPACECOM, feels, "The big problem with space control is where is the threat?"(122). He believes, before space control can be emphasized, "The enemy has to have the capability [to threaten US assets]"(122). Fellow Commanders Bowdish and Woodyard disagree. They point out, "Potential adversaries certainly recognize our dependence on space as a critical vulnerability central to our combat capability. Consequently, our space-based capabilities must be not only rugged, but also well-defended"(9:50).

Major Russo, Chief of Policy, Doctrine and Strategy for Space Control Team at AFSPC, feels the questioning of a threat in today's world is unfounded. "'No threat' is based on no DIA-validated threat," he asserts, "common sense says there is a threat. Technology and commercial availability have made the threat viable"(104). One argument presented for the lack of a threat is the fact that the bi-polar world no longer exists. Previously, the sole threat was the Soviet Union, and now that the "evil empire" is gone, so too is the threat. "The significance of the space control mission will remain despite the current upheaval in the Commonwealth of Independent States (CIS) and the reduced risk of superpower conflict," Marc Berkowitz wrote in his article, "Future U.S. Security Hinges on Dominant Role in Space," for a 1992 issue of *Signal* magazine (7:71). Mantz also has strong views on the threat perception:

Space is a military medium which has not been exploited for combat. The reasons are largely political and financial. But those barriers are not holding back other nations. They are exploring the fundamentals of space combat systems and operations. The US is behind in thought, debate, and experimentation. Let us not be caught wanting by a space combat Pearl Harbor. (80:61)

Tunick makes the point that the lack of a perception of a threat among the public is the real driver for the failure of support for space control systems (122). In 1982, Lieutenant Colonel Lorenzini reflected similar thoughts as Tunick when he wrote, "Without the obvious presence of an immediate threat from space, it is almost impossible in our democratic society to galvanize sufficient public opinion to support an expensive, long-range effort to secure our freedom for future generations"(77:20).

Although the debate is far from new, the forecasts of those foretelling the growth of space weapons have certainly toned down. Now, the fear is not centered on weapons of unimaginable destructive power, but on the realism that US dependence has created circumstances adversaries cannot possibly overlook. Perhaps the greatest threat to US space assets is apathy. Military planners have to convince the public at large of the threat.

Proliferation of Space Products

Before too long, as more commercial products are made available, the public will become just as dependent on space assets as the military already is. An important threat is being created by the commercialization of space, which is also posing new complications and dilemmas for space control theorists. There is clearly a danger in the proliferation of space products. These products are becoming available to potential

adversaries without their investment in and development of indigenous systems. The capabilities of space systems greatly enhance combatant's abilities to execute war. An American advantage in communications, navigation, meteorology, and reconnaissance is slipping away. Since 1996, three Air Force officers have addressed the specific issue of the proliferation of commercial imagery and the influence it may have on national security.

In her SAAS thesis, *When the Enemy Has Our Eyes*, Lieutenant Colonel McKinley points out, "Satellite imagery is no longer the preserve of major powers and specialized units with top secret clearances"(85:25). Her paper was written in 1996, at which time she noted, "Twenty meter resolution multi-spectral and 10 meter resolution panchromatic imagery is commercially available from SPOT Image Corporation; five meter resolution panchromatic imagery is available from Russia's Soyuzkarta agency"(85:25). She predicted, "By the year 2000, several corporations will provide imagery of one meter resolution quality"(85:25). Based on this, McKinley concluded, "The Gulf War may be the last in which America holds an overwhelming imagery advantage. It appears certain that in future warfare, the enemy will have our eyes"(85:26).

"It is vitally important to move beyond the simplistic notion that spatial resolution is the deciding factor as to whether a particular system may pose a threat to national security," proffered Lieutenant Colonel Larry Grundhauser in his article, "Sentinels Rising: Commercial High-Resolution Satellite Imagery and Its Implications for US National Security," appearing in the latest *Airpower Journal* (50). He points out that with

recent advances in computer technology, the phenomenology from multiple sensors can be combined using low-cost work stations running commercially available software applications. "This approach makes use of the synergistic effect whereby the amount of information obtained by synthesizing data from multiple sensors exceeds that provided by individual sensors"(50).

In his thesis, *The Operational Denial of Commercial Space Imagery*, written while attending Army Command and General Staff College, Major Russo considered the repercussions of the availability of commercial space imagery and the means that might be employed to deny an adversary use of that imagery. From his perspective, "High-resolution imagery is now commercially available from a number of sources and threatens the ability of the U.S. to achieve surprise against potential adversaries"(105:1). Through his education with the Army, he has gained insight that drives home the concern over the availability of imagery. "Deception is a key element in successful Army battle plans," he proclaims, "how do you deceive if all is known?"(104).

Grundhauser tempers the threat posed by adversarial accessibility to imagery, noting, "There is no reason to assume that mere access to satellite imagery automatically confers to the enemy an ability to use that imagery in a manner that substantially alters the balance of power or the endgame"(50). Lieutenant Colonel DeBlois agrees with this point, "It is not simply a matter of what data one can access form space but, more importantly, what one can do with the data that is accessed"(20).

Global Positioning System (GPS) satellites provide another example of why there is growing concern over commercialization. Grundhauser points out how "market forces

provided a unique and thoroughly creative response to government restrictions" by developing differential GPS to compensate for built-in GPS errors known as "selective availability"(50). Today, the issue of the private sector designing work-arounds or counter-counter-measures is a priority for USCINCSPACE. At the already noted AFA symposium in Orlando, General Myers remarked, "By waiting until 2006 [the current planned date] to cut off GPS selective availability, we're just encouraging ways to go around selective availability. I think it should go away sooner than that"(107:2).

Some policy makers are embracing the development of commercial products, and encouraging the military to take advantage of it. In 1996, in a speech before the ARPA Science and Technology Symposium, John Deutch, then Director of Central Intelligence (DCI), noted, "Technology advances now allow commercial suppliers...to provide a greater fraction of intelligence and reconnaissance needs"(25). He further concluded:

> At one level, this means that the NRO, like all other parts of the defense establishment, should seek to rely more on commercial products and services rather than government unique items, because, especially in the areas of information technology and electronics, it is cheaper. But, at a second and potentially more important level, we should be prepared to consider relying on the commercial sector to provide directly some of our information needs, whether maps, pictures, or communications service. (25)

Another reason, some suggest, for shifting to more commercial use is that the market will be able to provide better products. "What this means is that the tables have turned with respect to spin-offs as technology originally developed for the private sector may now serve as the touchstone for government systems," proposes Grundhauser (50). Since corporations are motivated by sales, which result from better products at lower cost, the military would be able to capitalize on a new set of innovations. "Therefore, the

principal dynamic at work in the space reconnaissance business," he contends, "may well result from corporate effort to improve the 'bottom line' for shareholders and not the National Reconnaissance Office"(50).

Jack Miller, chief of the AFSPC military satellite communications (MILSATCOM) division, thinks the military should embrace commercialization with open arms. From his perspective, the military needs to acknowledge that it led the US into space and that now the commercial arena has capitalized on it. Industry is treating space as an economic opportunity, and profits are motivating them to perform better. He notes, "The commercial sector has satellites on orbit in 12-18 months after an order"(86). This is unheard of following normal defense procurement policies. Miller believes, "The military should be proud of what it has done and now enjoy the commercial side"(86).

Others see additional benefits from commercialization and the proliferation of space products. "Many advocates for loosening restrictions on commercial satellite imagery," Grundhauser notes, "have since joined the chorus of those who believe that improved transparency provided by commercial imagery will actually lessen the prospects for conflict"(50). DeBlois points out, "While foreign ISR capability is proliferating, one must perceive it as what it is, for the most part—a stabilizing global pattern of watchfulness"(20).

DeBlois also addressed the complexities created through commercialization. He suggests, "The growing global interconnectedness will blur the distinction between who owns what and for what purpose the asset exists" (20). "Given the multinational commercialization of space that is being pursued far more intensely than a weapons

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program could be," he concludes, "it is very doubtful that the political arm would ever authorize the use of space weapons even if the United States possessed them"(20).

"Certainly, consortia satellites are complicating our policies," McKinley recognizes (83). "Now, more than ever before, denial efforts cannot be executed without considering the political, economic, and physical ramifications of those efforts"(85:31). Russo has similar thoughts. In his work, he suggested four major criteria, or feasibilities, for evaluating proposed solutions to the imagery dilemma: technical, operational, legal, and political (105:41). Both officers illustrate that the focus under these new conditions is on issues outside of the military realm of control. This complicates solutions and frustrates military planners.

Major Newberry points out that commercialization further complicates space doctrine because of the issue of command and control of the system. Commercial agents rather than the military control these systems. This is counter to the long held belief of centralized control. Furthermore, since these systems are designed with profit in mind, they do not require nor receive measures to protect them from a combat environment. Newberry believes, "Space doctrine needs to address the issue of how to achieve unity of command for nonmilitary space systems and how to safeguard these systems from attack"(95:51).

Richard Hansen sees the commercialization of space affecting things in yet a different way. Because of the economic value of space systems, "Our US corporations will…reasonably expect Air Force aerospace forces to provide security for their peaceful space ventures"(54:108). Jack Miller shares this belief. "The value in space is growing at

a staggering rate. We are talking about billions and billions of dollars, from telemedicine to weather," he says, "you can correlate it to World War I and the oceans and international commerce, where the sea lanes had to be protected; now the space lanes need to be protected"(86).

"The increasing importance of space to a growing sector of the American economy portends a vulnerability to attack for economic reasons regardless of any military desires," Major Dickey has noted. "Should such activity occur, American industry will look to their government and military for protection"(28:17). "The military exists to protect our national interests," he adds, "but our ability to protect this growing economic center of gravity is severely limited"(28:2). Dickey concludes, "If significant money is at stake and the US military is slow to come to their aid, history suggests that commercial interests can take security matters into their own hands"(28:17). Once again, commercialization is providing more difficulty for military planners.

Based on the confusion created by geopolitical factors, Grundhauser has concluded, "Ultimately, the existence of high-resolution commercial imagery satellites is simply a fact of life that US policy makers will have to accept"(50). The same complexities of the issue prompted McKinley to ask, "Which organization should have space control responsibilities—the military or some other government agency?"(83).

She has previously noted, "The on-going acquisition of imagery satellites and their products by potential adversaries alters the future warfare equation and thus raises the priority of the space control mission"(85:29). Alluding back to early Army Air Corps history, Dickey forewarns, "We can only hope the trigger event that finally closes the

[space control] capability gap will not be a tragedy like the loss of the mail carriers or, worse, loss of US troops due to an enemy's unchallenged use of space"(28:35).

"Although the current policy approach—to encourage the growth of the domestic remote-sensing market—is a gamble," Grundhauser reflects, "realistically it is the only game in town"(50). Satellite technology is either uncontrollable or already exists well beyond America's grasp. "On the other hand, if American firms eventually dominate the global market, the US government will at least have some measure of control over the availability and distribution of the data from these satellites"(50). He reasons, "Policy makers will simply have to trust in the self-regulating dynamics of the market for high-resolution satellite imagery and hope that it will contribute more to the maintenance of peace than to provoking conflict"(50).

Space Control, Counterspace, and Space Superiority

Given the existence of a threat complicated by the emergence of commercial space systems, it is appropriate to consider space control ideas. Whether this growing threat is the motivation, or it is merely an attempt to mimic airpower theory, *Air Force Basic Doctrine* proclaims, **"Success in air, land, sea and space operations depends upon air and space superiority"**(21:29). Furthermore, **"It is an important first step in military operations"**(21:29). Although *"there will be demands that it be diverted to other tasks before any measure of air and space superiority is secured,"* if superiority is not achieved first, "[it] *is a false economy that ultimately costs more in long term attrition and ineffective sorties"*(21:29).

Basic Air Force Doctrine makes a distinction between superiority and supremacy. Superiority provides for operations *"at a given time and place without prohibitive interference by the opposing force"*(21:29). Supremacy, on the other hand, is much greater in scope so that "opposing air and space forces are incapable of effective interference anywhere in a given theater of operations"(21:29). Commanders would prefer supremacy, but superiority can "provide sufficient freedom of action to accomplish assigned objectives"(21:29).

According to AFDD 1, *"Space superiority provides the freedom to conduct operations without significant interference from enemy forces"*(21:29-30). Specifically, it *"ensure[s] that our forces maintain the ability to operate without being seen, heard, or interfered with from space"*(21:30). AFDD 2-2, *Space Operations*, elaborates further:

> The US cannot permit an adversary access to precision navigation signals, instantaneous communications between leadership and subordinate echelons, situational awareness, accurate weather data, or a host of other services that are, or will be, available from space. In future conflicts the US may have to fight for space superiority.
>
> Adversaries may have imaging and other space systems capable of monitoring operations and the ability to adversely effect US systems. American military leaders cannot afford to have enemy commanders monitor friendly force activities, locate critical command nodes, identify maneuver elements as they deploy for combat, or witness the debarkation of forces and supplies. This information would substantially facilitate an adversary's war planning and execution, which could result in casualties for friendly forces. (22:7)

In the *2025* white paper, "Star Tek—Exploiting the Final Frontier: Counterspace Operations in 2025," the authors suggest, "Space superiority involves a sufficient degree of control to ensure US and allied forces freedom of position, maneuver, employment, and engagement in space, and it involves the ability to deny this freedom to

adversaries"(136:323). They declare, "As we approach the battlefield of 2025, we must recognize that because space is so totally integrated into the fight, we have no choice but to protect friendly space assets"(136:319).

Space superiority is a concept not accepted by all. Lieutenant Colonel McKinley, a member of the AFSPC Commander's Action Group, noted in a personal interview, "We think we need to achieve space superiority because we've learned the importance of gaining air superiority." She continued by pointing out, "We have never been directed to achieve military space superiority during conflict nor do we know if we could if directed to do so"(84). She went on to note, "We have not said how we'll measure space superiority. Do we mean superiority in a broad sense? Is it a national-level issue; is it a military issue?"(84). Still another question she feels is of importance, "When does military space superiority begin to have operational or tactical meaning?"(84).

AFDD 2-2 makes a clear distinction between space control and space superiority. It implies space control is the objective, while space control is the mission area. *Space Operations* presents it this way:

> **Space control is the means by which space superiority is gained and maintained to assure friendly forces can use the space environment while denying its use to the enemy**....*Counterspace is the mission carried out to achieve space control* objectives by gaining and maintaining control of activities conducted in or through the space environment. (22:8).

AU's *Space Handbook* links space superiority with counterspace as well, "The mission is called counterspace and embodies the idea of space superiority over the battlefield"(2:95).

Air Force Basic Doctrine makes still another distinction. In AFDD 1, counterspace is considered one of the seventeen "air and space power functions"(21:45). "Together they [these functions]... represent the means by which Service forces accomplish the missions assigned to joint force commanders by the NCA and combatant commanders"(21:45). It goes on to describe counterspace:

> **Counterspace involves those operations conducted to attain and maintain a desired degree of space superiority by the destruction or neutralization of enemy forces.** *The main objectives of counterspace operations are to allow friendly forces to exploit space capabilities, while negating the enemy's ability to do the same.* (21:47)

The United State Space Command (USSPACECOM) *Long Range Plan* offers yet another interpretation. USSPACECOM sees control of space as one of four operational concepts envisioned to help it reach its vision of *"**dominating** the space dimension of military operations to protect US interests and investment"*(123:10). "Control of Space (CoS)," it goes on to propose, "is the ability to ensure uninterrupted access to space for US forces and our allies, freedom of operations within the space medium and an ability to deny others the use of space, if required"(123:11).

As has been the case before, there is no consensus. Space superiority is clearly a goal, if it is even needed. Control of space also sounds like an end state. The way to achieve that end is through the mission of space control or counterspace, depending on the manual being used.

Space Control Operations

As with the doctrine definitional dilemma, it may be easier to understand the concepts associated with space control by taking a look at its elements. For this work, the elements of the mission are also referred to as the "operations" and "objectives." Once again, there is no standardized set of terminology. To truly get a feel of the spectrum of terms and elements that make up space control, it is necessary to consider four manuals: AU-18, *Space Handbook*; AFDD 2-2, *Space Operations*; USSPACECOM's *Long Range Plan*; and Joint Pub 3-14, *Joint Doctrine*. There are also individual thoughts on the elements of space control deserving of consideration. In the end, through a comparison of the various "systems" it is possible to at least have more insight into the space control operations.

Space Handbook

AU's *Space Handbook* indicates three "mission elements" make up aerospace control:

1) space surveillance, which is necessary to execute one or both of the following two missions;
2) protection, also referred to as defensive counterspace; and
3) negation, also referred to as offensive counterspace. (2:97)

In the future, these elements "may even secure freedom of action for friendly forces in all geographical environments, and preserve for them the advantage of tactical surprise"(2:69). Major Russo has commented, "Offensive and defensive counterspace is an attempt to use air community terminology"(106). Major Winthrop Idle, AFSPC chief

of defensive counterspace, and Craig Lindsay, a project leader within the space control directorate (Colorado division) for Aerospace Corporation, agree with Russo. They note, however, "Because so much of senior [Air Force] leadership is 'air,' we need a gradual change. We need to use their terms now"(64).

Space Operations

Space Operations notes, in order to accomplish space superiority, "Space forces must survey space, protect the ability to use space, prevent adversaries from exploiting US or allied space services, and negate the ability for adversaries to exploit their space forces"(22:8). It later specifically describes the counterspace mission, noting, "Counterspace includes offensive and defensive operations"(22:8).

"Offensive counterspace operations destroy or neutralize an adversary's space systems or the information they provide at a time and place of our choosing through attacks on the space, terrestrial, or link elements of space systems"(22:8). It continues to describe these operations, **"Offensive counterspace operations use lethal or nonlethal means to achieve five major purposes:** *deception, disruption, denial, degradation, and destruction of space assets or capabilities"*(22:8). These terms are defined in the following list:

1) *Deception consists of those measures designed to mislead the adversary.*
2) *Disruption is a temporary impairment of the utility of space systems, usually without physical damage to the space segments.*
3) *Denial is the temporary elimination of the utility of the space systems, usually without physical damage.*
4) *Degradation is the permanent impairment of the utility of space systems, usually with physical damage.*

5) *Destruction is the permanent elimination of the utility of space systems, usually with physical damage.* (22:9)

"Defensive counterspace operations consist of active and passive actions to protect US space-related capabilities from enemy attack or interference"(22:10). *"The objective of active defense is to detect, track, identify, intercept, and destroy or neutralize enemy space and missile forces"*(22:10). *"The objectives of passive defense are to reduce the vulnerabilities and to protect and increase the survivability of friendly space forces and the information they provide"*(22:10).

"Three capabilities are critical to the successful conduct of offensive and defensive counterspace operations"(22:10). These contributing capabilities are:

1) surveillance and reconnaissance[19] of space—to detect and identify space systems and help characterize the space threat environment;

2) ballistic missile warning—to detect, track, and report on ballistic missile launches threatening North America, geographic theaters of operation, and space-based assets; and

3) space environment operations—to overcome impacts of the space environment. (22:10-11)

Figure 5 shows a depiction of the operations that make up the counterspace mission as outlined in AFDD 2-2. The contributing capabilities are shown as dashed boxes. They influence both offensive and defensive counterspace.

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[19] Surveillance is broad area coverage; reconnaissance is close scrutiny (22:10).
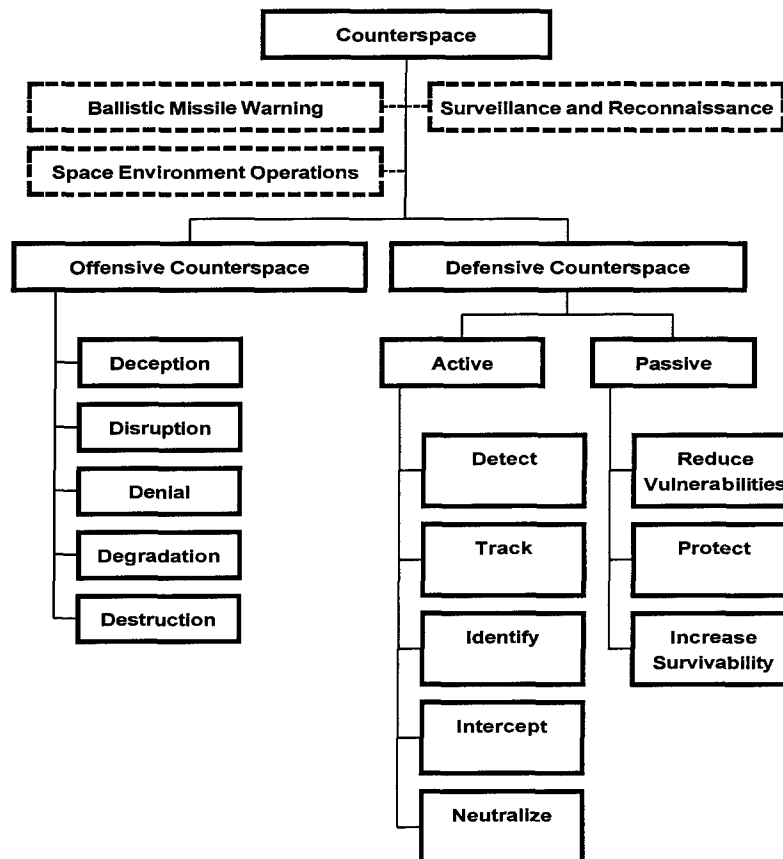
Figure 5. Depiction of the Operations for AFDD 2-2's Counterspace Mission.

Long Range Plan

The *Long Range Plan* from USSPACECOM depicts the elements of space control differently from both AU-18 and AFDD 2-2. "Control of Space requires USCINCSPACE to achieve five interrelated objectives:"

1) *assure* the means to get to space and operate once there;

2) *surveil* the region of space to achieve and maintain situational understanding;

3) *protect* our critical space system from hostile actions;

4) *prevent* unauthorized access to, and exploitation of, US and allied space systems and, when required,

5) *negate* hostile space systems that place US and allied interest at risk. (123:20)

"Assured Access is the 'on-demand use' of space lines of communication to enable unimpeded operations in and through space"(123:22). It will involve Department of Defense, national, civil, and commercial organizations, "with global partnerships developing to build cost-effective, responsive, flexible systems"(123:22). There are three key tasks associated with assured access:

1) *Transporting* mission assets to, through, and from space; must be routine, inexpensive, responsive and readily accessible.

2) *On-orbit Asset Operations* is integrated worldwide.

3) *Service and Recovery* of selected on-orbit assets. (123:23)

"Near real-time space situational awareness, enabled by Surveillance of Space is the key contributor to the Control of Space and enabling freedom of operations within it"(123:28). In the future, space surveillance will serve as the foundation of space superiority. There are six key tasks associated with surveillance of space:

1) *Detect* – every [sic] launch and all objects

2) *Track* – All satellites (all sizes) over entire orbit, for entire orbit lifetime

3) *Characterize* – Every launch, payload, owner, mission, capabilities, size, shape, orientation

4) *Classify* – Threat

5) *Catalog/Monitor* – Characterization data, orbital parameters for all satellites

6) *Disseminate/Distribute* – Products and data (123:29)

"Protecting the US interests in space is critical to our economic, informational, and military welfare"(123:33). When considering the issue of protection, the *Long Range Plan* addresses the sanctuary school and the questioning of a threat, noting, "Although

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the notion of space as a sanctuary appears seductive to many, our increasing reliance on space systems, and information derived from space, creates a center of gravity potential adversaries clearly understand"(123:33). Note, the *Long Range Plan* acknowledges both natural and man-made threat potentials. There are five key tasks associated with protection:

1) *Detect and Report Threats/Attacks* – All threats and attacks to key US/Allied space systems

2) *Withstand and Defend* – Key systems from attack, through selective hardening, maneuvering, and countering

3) *Reconstitute and Repair* – Loss of vital space capabilities in days/hours

4) *Assess Mission Impact* – Of space capabilities and disseminate information in seconds

5) *Identify, Locate and Classify* – Source of threats or attacks (123:34)

"Today's concept of Prevention relies on diplomacy and non-military actions to deny an adversary the benefit of space"(123:38). Prevention and negation are closely linked because "commercial use of space, emerging technologies, and the increased importance of space to the United States and its allies" are driving toward consolidation (123:38). It elaborates further, "As international, civil, governmental, and military systems mingle, we'll need to rely heavily on diplomacy to deny an adversary, but we'll use military actions when vital national interests are challenged and other options can't meet the challenge"(123:38). There are three key tasks associated with prevention:

1) *Detect Use* – Use and exploitation of US and third-party systems

2) *Assess Mission Impact* – To drive course of action development

3) *Timely and Flexible Reaction* – Using all actions short of military force (123:39)

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"Negation is the ability to deny, disrupt, deceive, degrade, or destroy an adversary's space systems and services"(123:42). This can be accomplished through targeting of ground support sites, ground-to-space links, or spacecraft. There are three key tasks associated with negation:

1) *Target Identification* – Complicated by a dynamic, networked environment
2) *Weaponeering* – Must be precise to achieve only desired effects
3) *Operations Cycle* – Includes mission planning, execution and combat assessment (123:43)

For each area, the *Long Range Plan* addresses key capabilities associated with the key tasks. These capabilities are assessed for a variety of things ranging from technology to global partnerships. As the name of the document implies, it is looking out to 2020 to provide a "road-map" for candidate systems.

Joint Doctrine

Although it is still in draft form, Joint Pub 3-14, *Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations*, provides a different approach to space control than the other documents previously discussed. More so, the guidance and education provided by the approach this document takes demands inclusion.[20]

"Space combat operations will provide freedom of action in space for friendly forces, and, when directed, deny the same freedom to the enemy," notes Joint Pub 3-14

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[20] Due to time constraints, the draft of Joint Pub 3-14 was not thoroughly reviewed as part of the research for this work; however, this section of the document was found to be so insightful that its inclusion was required.

(68:III-4). It goes on to denote the operations associated with space combat as "protection, prevention, and negation functions of space control; and force application (attacks from space)"(68:III-5). Figure 6 shows a reproduction of Figure III-1, "Space Combat Operations," from Joint Pub 3-14 (68:III-5). This figure demonstrates how joint doctrine writers have envisioned the elements of space control working together. It also does a nice job of showing a decision-maker how the pieces fit together.

SPACE COMBAT FUNCTIONS

FORCE APPLICATION — FORCE APPLICATION — Attacks from Space

NEGATION — DESTROY / DEGRADE / DENY / DISRUPT / DECEIVE — Limit Enemy Use of Space Systems

Lethality of Action

Political Regulatory Diplomatic — PREVENTION — Military — Preclude Enemy's Hostile Use of Other's Systems

PROTECTION — Active / Passive — Ensure Own Use of Space

Range of Military Operations

Figure 6. Joint Pub 3-14's Space Combat Functions.

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Protection consists of "**Active and Passive defensive measures** to ensure that US and friendly space systems perform as designed by overcoming an adversary's attempts to negate friendly exploitation of space, or **minimize adverse effects** if negation is attempted"(68:III-5). It also notes protection measures are geared toward the effects of the space environment.

Prevention measures are to preclude an enemy using US or third party space systems or services. Joint Pub 3-14 states, "Prevention can include **diplomatic measures** initiated by USCINCSPACE through appropriate political channels, with assistance from the affected regional CINC"(68:III-5).

Negation measures are designed "to deceive, disrupt, deny, degrade, or destroy and adversary's space systems and services:"[21]

1) **Deception** consists of those measures designed to **mislead the enemy** by manipulation, distortion, or falsification of evidence to induce the enemy to react in a manner prejudicial to their interests.

2) **Disruption** is the **temporary impairment** (diminished value or strength) of the utility of space systems, usually without physical damage to the space system.

3) **Denial** is the **temporary elimination** (total removal) of the utility of space systems, usually without physical damage.

4) **Degradation** is the **permanent impairment** of the utility of space systems, usually with physical damage.

5) **Destruction** is the **permanent elimination** of the utility of space systems. (68:III-5/6)

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[21] The following list of definitions is nearly word for word with the definitions from AFDD 2-2; however, they are repeated because of some minor differences, and to show how Joint Pub 3-14 emphasizes certain phrases.

<u>Other Perspectives</u>

Major Peterson has a different approach; he suggests, "Successful space control operations will entail five separate, but interrelated, functions: monitoring space, assessing threats, informing satellite controllers, protecting friendly space systems, and negating hostile threats when directed by the NCA"(96:62). He professes, "Space control is the ability to deny the enemy use of a region of space for a specific period; it does not require absolute control of space"(96:27).

Commanders Bowdish and Woodyard provided the USN perspective in their recent *Proceedings* article, "A Naval Concepts-Based Vision for Space." In order to "ensure critical support reaches combat forces anytime, anywhere" space control must have five elements: surveillance, access, protection, negation, and prevention (9:52). From their standpoint, "Space control is not an end in itself, rather, it is carried out to support operations on earth"(9:53).

As Bowdish and Woodyard see it, "Space surveillance, the tracking of all man-made objects in orbit, is a prerequisite"(9:52). Attaining *access* requires "assured, on-call launch, recovery, repair, reconstitution, and on-orbit operations of space assets"(9:52). "Protection ensures the reliability, availability, and integrity of information that goes to the combat forces"(9:52). Access, surveillance, and protection require interagency cooperation to ensure assured operations, safe systems, and secure and reliable information for the end user. While, "Prevention and negation are crucial to denying adversaries the use of space"(9:52).

The authors of the "Star Tek" white paper addressed space control from the counterspace point-of-view. They agree with the offensive and defensive nature of counterspace noting, "Future commanders will require a variety of counterspace tools to engage various threat scenarios"(136:317). They believe, "Both offensive and defensive space missions are required to fully achieve space superiority"(136:317). In-line with *Space Operations*, they noted the lethal and nonlethal natures of offensive counterspace, but excluded "deceive" from their list of "d" purposes. From their perspective, "Defensive counterspace preserves the ability to operate freely in and through space by reducing or precluding the effectiveness of the adversary's counterspace capabilities"(136:324). As with AFDD 2-2 they noted defensive counterspace can be either active or passive. They predict, "As more and more nations expand commercially and militarily into space, space superiority will make the difference between victory and defeat in future wars"(136:318).

As was suggested in the research sources section, it can be very informative to consider foreign doctrine. Although his analysis is a bit dated because of the collapse of the Soviet Union, Nicholas Johnson provides some insight into the Soviet's approach to space control. "Whereas space control is often viewed as a single element of space operations which is concerned only with protection of national space assets and the denial to the enemy of the like space-based resources," he notes, the Soviets viewed space control "as all actions required to project and employ military power—offensive and defensive—through space while simultaneously denying the enemy similar capabilities"(67:197). He has outlined five Soviet space control objectives:

1) protection of tactical and strategic strike capabilities;

2) support of tactical and strategic operations;

3) protection of Soviet and client state territories from enemy threats;

4) prevention of the use of space by the enemy for military, political or economic gain;

5) unhampered utilization of space assets to further the Soviet system and goals. (67:198)

Major McCraw has noted thoughts similar to Johnson relative to space control not being the ends in itself. "If you believe that controlling space for space's sake is a self-licking ice cream cone objective, then you have to decide why space is important," he begins. "To me, the primary utility of space today and for the next 20 years or so, is going to be force enhancement—allowing other forces to do their jobs better"(82). He continues noting there are currently four mission areas: force enhancement, space support, force application, and space control. "Space control is the enabler of the other three. If you can't control space, then you may not be able to do the other three—depending on the situation"(82). As he suggests, deciding which of the other three missions is most important is critical, because "if our number one task were force application, applying force from or through space, then the type/timing/need for space superiority is different than if force enhancement is our number one job"(82).

Based on his study of the Soviet attitude toward space warfare, Johnson concluded, "The prevention of the use of space by the enemy for military, political, or economic gain embodies one of the central themes of space control: denying the enemy an advantage can be more valuable than possessing that advantage yourself"(67:200). He goes on to point out, "Probably the softest node in any satellite system is the ground

station itself, and almost all installations are highly vulnerable to sabotage from very small commando teams"(67:201).

Myers and Tockston note, "The elements of common doctrine for force employment in the space arena entail, first and foremost, that space forces maintain *control of the space environment*"(93:64). Because control will provide for the denial of enemy space capabilities, friendly forces will be able to derive greater flexibility and effectiveness than their adversaries. "Thus, space control becomes a prerequisite to the success of air, land, and naval forces in battle"(93:64). They feel, "Effective space control requires a global space *surveillance* capability in order to detect, track, and identify enemy targets in space"(93:64). Furthermore, "A robust launch capability, including launch base and support crew, must be maintained for each mission to ensure that satellites may be launched when required"(93:66).

General Piotrowski believes strongly in the need for the US to develop a space-based laser (SBL). Once SBL is developed and deployed, he feels the key operation for space control will be space surveillance. From his perspective, in order to judiciously use the SBL "we need to know what everybody is collecting on all the time"(97). Commander Tunick feels, "The most important mission today is protection"(122). Major McCraw agrees, and speaks for others when he notes, "Job one is protection; it is less important we take away from the other guy"(81;27;104). Major Idle and Craig Lindsay believe protection is important, but feel Piotrowski has a valid point, "You have to have survey, but it can't do it alone; survey is central to all the others"(64).

Major Russo has provided a very different approach; one that is quite simple. He suggests just seven elements to cover the entire space control mission. "Offensive [actions] I do to limit them and defensive [actions] I do to preserve mine. Then, the only difference is irreversible and reversible for offensive and active and passive for defensive"(104). He also emphasizes that survey serves as the base for the whole mission. Survey is in many ways foundational; it helps in determining if any action needs to be taken. Russo does make a distinction about the survey mission, noting, "Historically survey has been to maintain a catalogue [of space objects], we want survey to be situational awareness"(104).

Reversible	Irreversible	Active	Passive

OFFENSIVE
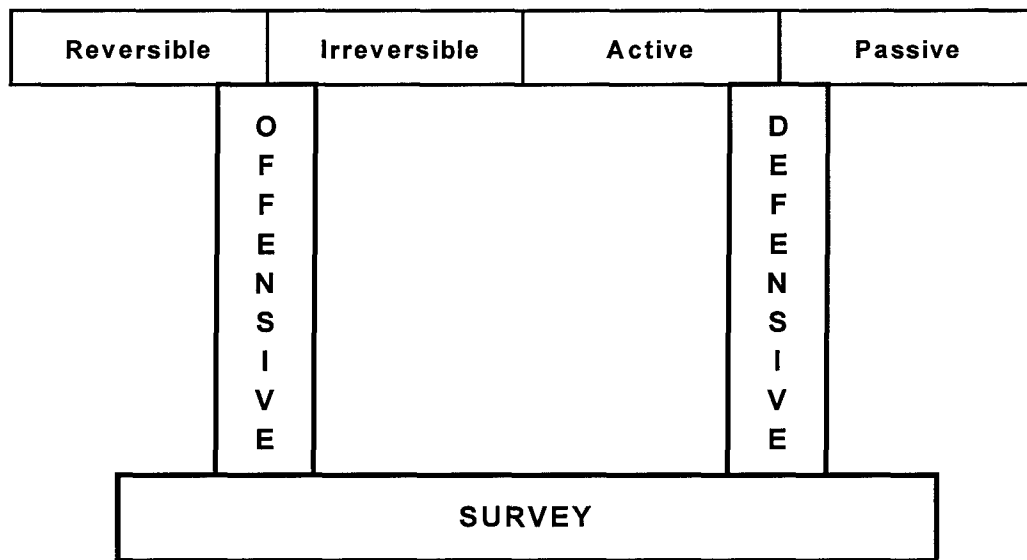
DEFENSIVE

SURVEY

Figure 7. Depiction of Space Control Operations.

Based on his description, Figure 7 shows a depiction of the space control operations.[22] Survey serves as the base, with offensive and defensive acting as the two pillars for the space control mission. Then, the actions are either reversible or irreversible for offensive. Likewise, for defensive actions they are either passive or active. From the bottom, going up, this simplified model demonstrates how the space control mission could be described.

<u>Comparison</u>

There are certainly varied approaches to space control operations. To help understand the similarities and differences, Table 1, on the next page, shows a comparison of the four manuals considered in this work. Although *Space Operations* does describe three contributing capabilities, they are not shown because the doctrine document's presentation implies they are secondary.

The *Space Handbook* is the only one to make the direct connection between offensive counterspace and defensive counterspace with negation and protection, respectively. This connection is reinforced by the description in both AFDD 2-2 and Joint Pub 3-14 of the elements that make those operations. Based on these four manuals, it would appear the accusation that counterspace is an "air" term is justified. Of the four, only *the Long Range Plan* indicates the significance of assured access to space control.

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[22] In case this figure turns out to be offensive, it is important to note Major Russos did not describe this figure, but described a simple relationship among parts that the author then interpreted and placed in this form.

	Space Handbook	Space Operations	Long Range Plan	Joint Doctrine
Goal	Aerospace Control	Space Superiority	Control of Space	SpaceControl/ Space Superiority
Mission	Counterspace	Counterspace		
O p e r a t i o n s / P u r p o s e s	Space Surveillance		Assure Surveil	
	Protection/ Defensive Counterspace	Defensive Counterspace Active Passive	Protect	Protection Active Passive
			Prevent	Prevention
	Negation/ Offensive Counterspace	Offensive Counterspace Deception Disruption Denial Degradation Destruction	Negate Deceive Disrupt Deny Degrade Destroy	Negation Deceive Disrupt Deny Degrade Destroy

Table 1. Comparison of Space Control Goals, Missions, and Operations/Purposes.

Table 1 does not capture all of the beliefs regarding space control operations. Comparison between Bowdish and Woodyard's outlook and the four manuals indicates the *Long Range Plan* captures the Navy vision. *Space Operations*, on the other had, seems to underestimate what Air Force officers feel is the true significance of surveillance to performing the other operations within the space control mission.

The lack of symmetry and consensus with the four systems described in the table, makes a system like the one proposed by Major Russo that much more appealing. The terminology is straightforward and captures the elements of space control operations

succinctly. Perhaps all four manuals should discard their various approaches and use one like that depicted in Figure 7.

Rapid Space Force Reconstitution (RASFOR)

In an interview at headquarters AFSPC, Major Russo expressed his opinion that "[space]lift should not be included [in space control], it should begin once you get there"(106). Major Jeffery Caton disagrees. He wrote a report in 1994 entitled, *Rapid Space Force Reconstitution: Mandate for United States Security*, in which he outlined the significance of the spacelift mission. "To have a superior war-fighting space force, we must be able to place satellites into orbit when and where we want to—we must have control over the space lines of communication," he stresses, "a key element of this control is access, making a rapid-response spacelift system an essential element of future combat forces"(14:6).

Caton defines the concept of rapid space force reconstitution (RASFOR) as "the capability to rapidly replace or augment existing military satellites in a reliable, responsive, and flexible manner to meet short-notice crises or contingencies that cover the full spectrum of military operations"(14:6). "Just as we must ensure US use of space, we must plan to deny that use to any adversary," Caton notes, "certain types of counterspace weapons employed by the US may need to be placed into orbit (or replenished) during hostilities"(14:13).

Bowdish and Woodyard also believe lift plays a significant role in controlling space. They point out some benefits of a RASFOR-like system, "Deployment on demand of space-based weapon systems would ensure U.S. dominance in space and secure our

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interests on the planet without creating the inevitable instability associated with permanently-based orbiting weapons"(9:53). Mantz points out, "Without space access the enemy loses the possibility of exploiting space"(80:38). For his vision of space combat power, "Inexpensive and responsive lift and on-orbit propulsion are required to employ space combat power"(80:11).

To better understand what Caton is proposing in his RASFOR concept, it is important to first have a perspective of how launch is performed today. In a speech before the 1996 AFA awards dinner for the Space and Missile Center (SMC) in Los Angeles, California, Lieutenant General Jay Kelly, AU Commander at the time, made a witty comparison between spacelift and baseball. "If space lift were like baseball, the Air Force would be like the team owner—we've always got a nice seat at the park (the launch), but we don't play third base and we don't bat. We watch"(73:100).

That, however, was not the vision of General Piotrowski, who "spearheaded the effort to achieve a more responsive space launch capability"(112:232). According to David Spires, Piotrowski "advocated an Air Force 'blue suit' launch operation managed by the operational commands"(112:232). He felt the Air Force needed to transition from a force posture of remoteness to one where the warfighters' requirements were integrated. Spires notes that Piotrowski felt the Air Force "should do this by emphasizing the interrelationship among survivable space systems and quick-reaction launch capabilities"(112:233).

Another aspect of the current launch system is the amount of time it takes to get a satellite into orbit. The satellites the US does choose to design are complex systems,

which are expected to remain in orbit for many years. As Johnson has noted, "The United States has repeatedly re-examined the pros and cons of many, simple satellites versus few, complex satellites and consistently selects the latter approach"(67:195). Lupton points out a problem with this approach, "Space forces have to work perfectly the first time and are technologically obsolescent the moment they are launched"(78:38-9). In 1985, Lieutenant Colonel Robert Bowman (USAF) diagnosed still another problem with the way the US conducts spacelift in an analysis of arms controls in space. He noted, "Two World War II submarines (or rowboats for that matter) or even two terrorists with hand grenades or mortars could totally wipe out the country's launch capability in minutes"(10:62).

Once again this system of launch is different than what Piotrowski advocated when he began the push for Space Command to take over launch. According to Spires, "Piotrowski's 'responsive' proposal called for developing many small, low-cost, single-mission satellites that could be launched on short notice and receive early on-orbit checkout"(112:234). He and others felt small satellites would be the mechanism for a transition from a peacetime approach to a more responsive warfighting posture. Thereby, realizing the objective of assured access.

While USCINCSPACE, General Piotrowski wrote of what he felt was an overlooked benefit of assured access: promotion of deterrence. "The advantage of all of these surge actions is that they are essentially nonthreatening and nonescalatory means of improving capability and signaling resolve, both of which can enhance deterrence," he wrote in 1987. "Deterrence is also bolstered by the aggressor's knowledge that an

increased number of opposing surveillance and warning spacecraft can deny him the ability to achieve surprise"(98:57).

Anytime the issue of spacelift is addressed, a comparison is made between the Soviet and American philosophies of spacelift. The Soviets always advocated very simple designs with short lifetimes over the US approach of making their satellites complex with long lives more quality. In essence, it was a quality versus quantity contest. Piotrowski felt the Soviet philosophy of spacelift was better from a combat standpoint. He asserted, "If the entire Soviet satellite force structure were destroyed, it appears they could totally reconstitute it in a matter of months"(99:31). Johnson has also compared Soviet and US spacelift philosophies, and agrees with the Piotrowski's thoughts on deterrence. "In short, the large number of Soviet satellites actually deters attacks and results in graceful decline in capabilities as members are negated, while in many cases replacements can be in orbit in a matter of days"(67:203).

Major Caton also advocates the Soviet approach for RASFOR. "The development of rapid-response spacelift could fundamentally change US space operations," he proclaims, "but only if it is coupled with a parallel change from complex, heavy, long-life satellites to simpler, smaller, shorter-life satellites called lightsats"(14:6). Caton describes the self-perpetuating cycle US spacelift is now caught up in:

> The expense of spacelift helped to fuel a vicious cycle for satellite design. First, high development and launch costs led to the procurement of high-quality (and long-life) satellites in low quantities. In turn, the requirement for long satellite life led to numerous reliability design features, including subsystem redundancies, that added complexity and weight to the satellite. This added weight required more performance from the SLV, which it turn drove up the spacelift costs. The

increased spacelift cost brings us full circle back to the need for high-quality satellites. (14:17)

He proposes a solution to break the cycle that he describes as "de-evolution." Caton contends, "We have an illusion of superiority, thinking that superior technology equates to superior combat capability"(14:62). "The primary goal of the de-evolution approach to RASFOR is to emphasize operational utility in the design of the *system*"(14:63). He believes, "Technology must be seen in its proper light—as a *possible means* to a solution, *not* the solution itself. The technology that offers the greatest simplicity and operational capability must be selected, even if it is not the most 'advanced' of choices"(14:65).

From Major Caton's perspective, "The emergence of space warfare capabilities by other countries seems not to be 'if,' but rather 'when.'(14:19). He feels the system promoted by RASFOR is less vulnerable because of its distributed nature, presenting adversaries with more targets of less value each. "RASFOR must be an integral part of a balanced approach to military spacelift," he concludes, "if the United States is to ensure its control over the ultimate high ground of space"(14:73). Major Gallegos agrees with the need for a more responsive spacelift program, noting, "In terms of technological development, the analysis thus far highlights the need for spacepower leadership to develop a responsive launch capability for the United States"(47).

Weaponization and ASATs

"Although the United States lacks an operational antisatellite system, Soviet space forces clearly are designed to be consumable in warfare," General Piotrowski pointed out

in 1988. "Some people belittle Soviet spacecraft designs because the designs result in systems that are far less sophisticated than those of the United States," he continued, "nonetheless, these simple systems can be produced rapidly, launched quickly and put into operations in a very short period of time. The decided advantages this provides in wartime are only now being realized"(99:33). Indeed, it is the threat of weaponization and ASATs is that makes responsive spacelift a necessity.

Everyone does not agree that mutual weaponization is the correct move to alleviate the threat of adversarial possession of ASATs or force enhancing space-based information. They suggest the pursuit of ASATs is one more step towards a space arms race. Furthermore, an ASAT would serve as more of a destabilizing agent than a provider of peace. In 1985, Lieutenant Colonel Bowman wrote an article entitled "Arms Control in Space," in which he suggested development of ASATs threatened "to negate the beneficial stabilizing influence of surveillance and warning satellites"(10:62).

"Although efforts to counter the threats posed by foreign commercial imagery satellites using ASAT weapons may be legitimate, they nonetheless may threaten the delicate strategic relationship with Russia," Lieutenant Colonel Grundhauser noted in the latest *Airpower Journal* (50). He suggests the use of ASATs could encourage others to target US satellites and/or ground infrastructures. According to Grundhauser, "A better approach would be US sponsorship of legally binding treaty on the rights and obligations of remote-sensing countries with respect to data distribution"(50). He believes a treaty in this regard would require those nations possessing remote sensing capabilities exercise

restraint in distributing images "when the collection and/or dissemination of imagery data could harm another state while not depriving legitimate users of data they require"(50).

"Antisatellite arms control measures are flawed by problems of definition, commonality between civilian and military technologies, information disclosure, verification and enforcement," Marc Berkowitz wrote in 1992 (7:73). "Indeed, placing controls on antisatellite weapons while permitting force enhancement assets to run free," he asserts, "ensures a sanctuary for an adversary's gunsights in space"(7:73). He believes there is one course: "Space systems that support hostile operations against U.S. forces must face a risk"(7:73).

Berkowitz concedes, "Concern about the collision hazard produced by orbital debris and the risk to populated areas form the reentry of spacecraft intercepted at low altitudes may limit the freedom to engage in offensive action"(7:72). From his perspective, however, "The lack of a substantial human population in space, in general, should minimize concerns about collateral damage"(7:72). If ASATs were used, the orbital debris from the aftermath could produce collision hazards, and the clutter could "stress space surveillance capabilities and provide a means of cover, concealment and deception against surface-based antisatellite weapons"(7:73).

Major Newberry believes the concealing effect of debris could be beneficial. "The threat of hosting military packages on debris should create uncertainty and confusion in the mind of the adversary, which should cause him to generally overestimate US capabilities. Such a threat may deter space attacks or cause adversaries to target the

wrong objects"(95:60). Of course, debris schemes could be used against the United States, so "space operators need to be aware of this threat"(95:60).

Newberry has additional thoughts about the necessity for ASATs and the role they play in deterring conflict. "Retaliatory options are needed to ensure that a balance of power can be maintained in space. As space forces become an even greater force multiplier, the temptation grows to deprive an adversary access to space"(95:34). This temptation makes the risk of an attack viable. "The threat of a decisive US response to space attacks may be sufficient to deter an attack"(95:34).

Piotrowski feels there are multiple benefits to ASATs. He has noted, "An operational U.S. ASAT not only could deter the Soviets from attacking U.S. or allied spacecraft by placing Soviet spacecraft at risk, but it could also be employed to deny the Soviets some critical force-enhancing capabilities"(99:61). Three years before Piotrowski made those observations, Major General Rosenberg stated, "If we are truly to deter attacks on our satellites, we need a capability that puts Soviet satellites at risk just as ours are even now endangered"(102:53).

Nicholas Johnson makes the connection between ASATs, deterrence, and the need for RASFOR. "In regard to space, deterrence through denial means that by exhibiting a proven ASAT system, the Soviets have put the US on notice that the latter can no longer conduct and win a war in space"(67:205). At that time, in 1987, he suggested the Soviets had the ability to inflict grave damage on high-value American space systems, but the United States was unable to reply in kind because it lacked an operational ASAT. "Even in the event of an American deployment of a comparable

ASAT," he proclaimed, "the Soviets will be better able to absorb an American attack by virtue of their proliferation of space assets and replenishment capabilities"(67:205).

The theory of ASATs serving as a deterrent has had its critics from the beginning. "The rationale evidently was that if they're going to threaten our satellites, then we'll threaten theirs, Lieutenant Colonel Bowman noted in 1985. "The fact that we are much more dependent on our satellites for command and control of strategic forces than they are did not prevent such a decision from being made"(10:62). General Piotrowski responded to this thought three years later in his article for *Signal*. "Although some will argue that Soviets are less dependent on space based capabilities than the United States and its allies," he begins, "application of the principle for centralized control of strategic forces and even for troop control at the operational level dictates that Soviet space development will increase"(99:32).

Recently, Lieutenant Colonel DeBlois noted the weaponizaton proposition is not the only option. "The point to be made here is the space-weaponization advocate's conception of either defending space assets with space weapons or not defending them at all is a *false dilemma*," DeBlois noted in the latest *Airpower Journal* (20). In his view, there are at least three viable options:

1) diplomatic/political defenses (agreements aimed at building collective security),
2) passive defenses (hide-and-seek), and
3) active defenses (weapons). (20)

Of the three, he sees space weapons, as part of active defense, as the most dangerous course because, "They are another ambiguous step on the slippery slope to escalation"(20). In his opinion, "Because they are remote, they offer plausible deniability; because they are typically unmanned, they are easier to use. As such, the use of space weapons blurs the distinction between peace and war"(20).

"Simply advocating, for example, spacecraft destruction will not answer the question of how to achieve space control," Lieutenant Colonel McKinley has noted (85:35). She points out, "The spectrum of denial ranges from achieving temporary or limited data loss to causing extensive long-term systemic loss"(85:30). Commander Tunick believes multiple options are essential for USCINCSPACE to gain control of space. He speaks for many when he states, "We want a flexible spectrum of actions; in essence we want a flexible response"(122;27;64;104). All, however, do not agree. Recall the quote that opened Chapter VII, Space Thought, this was made by General Piotrowski in a recent interview. He believes destroy is the sole option for space control, and thereby necessitates the development and deployment of space weapons. "It is cute to think you will just degrade over the target area," he professes, "but how will you know it worked?"(97). From his point of view, the cost for failure is too high and the only guarantee is to destroy the enemy's space assets, even if it means destroying consortia systems. He believes, "We should ask what we are willing to pay as an apology when we consider the issue of consortia satellites"(97).

In 1986, the Aspen Strategy Group postulated there were a multitude of uncertainties associated with missile defenses and ASATs that would be influenced by

the changing technologic and strategic circumstances of the 1990s. They felt the interim period between an inability to deploy ASATs and the probable ability to do so was a time for the US military to remain active. They recommended six priorities for space policy:

1) Expand satellite survivability measures,

2) Reduce reliance, wherever possible, on spacecraft that are inherently vulnerable,

3) Maintain capabilities to attack threatening Soviet satellites in low earth orbits,

4) Prevent "quick kill"[23] threat to high altitude satellites,

5) Negotiate rules-of-the-road[24] arrangements, and

6) Improve our spacetracking and surveillance capabilities in space. (4:34-7)

Their emphasis was clearly on survivability measures. "Indeed," they suggested, "survivability measures arguably may play a more decisive role in deterring attacks on our satellites than would the availability of an ASAT to retaliate against the other side's first use"(4:19-20).

In her SAAS paper, Lieutenant Colonel McKinley declares, "The analysis suggests that both space and ground based anti-satellite weapons are less viable in today's multi-polar world"(85:42). She notes the interdependence of today's space assets because of consortia and commercial systems could result in high financial liabilities for American taxpayers. The issue of a debris cloud unintentionally damaging or destroying friendly manned or unmanned spacecraft is also a cause of major concern. Furthermore,

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[23] "Quick kill" is an instantaneous destruct capability.

[24] Rules-of-the-road are agreed upon behavior, aimed at limiting misunderstandings arising from benign activities that could be interpreted as hostile.

the enemy may have already established the desired database so that attacking the spacecraft does not really deny anything. McKinley concludes:

> Thus, spacecraft attack may be an ineffective space control measure in many contemporary warfare scenarios. Their use may escalate the conflict, terminate allied support, and eliminate a resource for American military forces. These facts of space attack are often dismissed or forgotten due to the exotic appeal of space attack weapons. These weapons capture warriors' imagination because they represent scientific discovery's latest breakthroughs in harnessing man's destructive capabilities. Additionally, they induce warriors to prepare for their employment because they promise to destroy inanimate objects hundreds of miles from the natural human domain. This promise allows their sponsors to peddle them as the necessary and sufficient space control solution. Such trappings do not take into account the realities of spacecraft attack that become apparent through analysis of weapons effects. Anti-satellite weapons may have been the only method to achieve space control in the early decades of space exploitation, but they are not as viable in today's information dominated society. Spending vast sums of taxpayer monies to procure Cold War systems for a twenty-first century world may leave America with unusable weapons and ineffective strategy. Space control strategies for the twenty-first century must be based upon more than one option. (85:42-3)

Despite arguments like these, many continue to suggest the need for weaponization. The "Star Tek" authors delcared, "In order to protect vital interests in space and ensure freedom of space navigation, the US will eventually require weapons in space"(136:291). Part of this is based on the perception that operational ASATs already exist. In 1988, Piotrowski proclaimed, "Although full and visible Soviet testing has not occurred, conclusive evidence shows that the Soviets have maintained an operational system through routine testing of antisatellite components and procedures"(99:33). Lieutenant Colonel Mantz has noted the ASAT threat is very viable, even if no current system is actually in place. "If an enemy can launch a satellite, it can certainly launch an elementary antisatellite"(80:8).

" Even the most cursory survey of military history substantiates the premise that superior weapons give their users an advantage favoring victory," Professor Holley noted *in Ideas and Weapons*. It is worth reiterating that it is not merely the development of weapons, but the corresponding doctrine as well, which makes superior weapons war winners. As Holley has written, "Wars, it would appear, are governed not by the development of weapons but by such fractions of that development as have been recognized and incorporated into approved military doctrine"(60:18). Professor Holley recently posed, "One may well ask whether the resistance of so many people to the acceptance of space weapons as a logical extension of the Air Force sphere of operations is yet another manifestation of the lack of rigor in the service's professional education system"(62:598).

Reflections

Space control is in many ways a debate among the four schools of thought. Sanctuary advocates believe space control is unnecessary, for there is no threat to US space dominance. Furthermore, the threat is only going to be the by-product of an American space-based weapons program, which would result in the destabilization of relations between the US and the rest of the world. Survivability, control, and high-ground school believers all feel the threat is already there, so space control is an imperative now.

The call to arms because of the existence of a threat is not new. Some of the charges have even seemed borderline ludicrous. Still, it is significant to consider where some of these charges have come from. Major General Keegan is one of the most

notable figures to make claims of a world in peril at the hands of Soviet space-based weapons. Although hindsight makes it appear that his predictions were merely delusions, both his position in the Air Force and the adamancy of his charges provide some credibility. Furthermore, he was not the only one to predict that space-based systems would be in place by now. All combined, these predictions greatly raise the specter of an impending threat. The collapse of the Soviet Union did change the timing of the development, but in no way could it have set the clock back so far that space-based weapon systems are no longer on the horizon. Waiting until the enemy is first to deploy an operational system is setting-up the US for a space Pearl Harbor.

Major Russo is correct; common sense does indicate a definite threat to US space dominance. American dependence on space is obvious to friends and foes alike, who will soon also embrace space products. The reality for a future world is that space will be just as important to everyone else in the world as it is to the United States. Then as is true now, part of any conflict is gaining as many advantages over your enemy as possible. Future adversaries would be imbecilic to not go after America's dependency on space products, while trying to increase their advantage by enhancing their own forces with space products. The existence of a threat at this very moment may be in doubt, but one in the very near future is not. Convincing the public of this threat is essential to a successful space control program.

Convincing the public is becoming increasingly important because of their growing dependence on space as well. The public at large grossly underestimates the significance of space products. As their dependence increases, they see the benefits of

space, but fail to recognize the significance of the proliferation of space products in a national security context. This is another reason they must be educated.

The commercialization of space is making it increasingly difficult for the United States to maintain its advantage over potential adversaries. Products from imagery, communication, and navigation systems are but an example of the growing dual-use products infiltrating the market today. Dual-use in that they provide force enhancement to the military as well as life enhancement to the general populace. Certainly, having the data from these systems in itself is not enough to make it a military threat. Yet, the jump from data to combat power is becoming increasingly shorter because of technology, especially the power of modern computers and associated software products.

Benefits associated with commercialization are difficult to discard. Truthfully, the products coming out of industry are going to be better and cheaper than those that are from traditional government systems. Innovation, induced by a desire to increase profit margins, is not a trait of a bureaucratic controlled acquisition system, but is a major motivator of business. These new products will also be more timely, as industry has found ways to turn satellites out in a manner closely resembling the automobile manufacturing industry.

Complicating the benefits from commercial space ventures is the fact that many of them are consortia. International companies raise questions of command and control as well as concerns over what are realistic space control options. Destroying a French satellite to keep Iraq from receiving imagery seems extreme, especially if the US is also

depending on the imagery from that satellite. Consortia are making a wide range of space control options critical.

Another complication is emerging because of the value of space products. The growth in the space industry is creating an economic center of gravity. Soon, commercial interest in space will be equal if not greater than that of the military. Their motivations, however, are quite different. Some would argue that all of America's wars have been prompted by economic concerns. Based on this, they suggest economic considerations rather than military events may actually prompt a future war in space. If a threat was non-existent before, then commercialization has created the conditions for a threat. Trusting the market to maintain the peace, as Grundhauser has suggested, is unreasonable and unrealistic.

So, space control is necessary, but there is no consensus on the terminology. Fundamentally, space control is doing whatever one desires in space while limiting an adversary from doing the same. Although the debate in the Air Force over whether to call it space control or counterspace seems trivial, the terminology is quite important. Consistency throughout Air Force and joint documents is essential.

Counterspace is considered to be an attempt to use "air" terminology to help senior Air Force leadership understand the concepts. The danger in this is that they really may not understand the concept. Lieutenant Colonel McKinley brings up an excellent point in pondering if we even know what space superiority is? Do we actually desire to achieve space superiority in the same sense as air superiority, or do we actually wish to gain control of space? What does control of space mean?

As already noted, given that control of space means having the ability to operate freely in space while the enemy does not have that ability, this would indicate control of space is the goal. The mission to achieve that goal is space control. This is a better term than counterspace because it is more open. Counterspace connotes an interaction among space vehicles, but the control of space can be achieved through a variety of methods, many of them terrestrial-based. The desire is not to counter space systems, but to control them.

Even the operations associated with the mission are inconsistent among Air Force and joint publications. By stacking the various systems next to each other it is possible to understand there actually is a closer relationship among the parts than when simply considered separately. Still, the connection does require effort. There is no reason for a single approach to not be used throughout all of the documentation.

Although they are different, both of the joint publications are better than *Space Handbook* and *Space Operations*. The *Long Range Plan* provides a great deal of detail, is forward looking by its very nature, and indicates reasoning for the recommended courses. *Joint Doctrine; Tactics, Techniques, and Procedures (TTP) for Space Operations* is also very insightful, from both an education and decision-making perspective. Comparing the definitions of the five "d" purposes for negation in Joint Pub 3-14 and AFDD 2-2 reveals how emphasis can be very powerful and overemphasis can be distracting. Figure 6 alone is more insightful than the whole of the counterspace section of *Space Operations*.

Through the perspectives beyond the manuals it becomes clear than control of space is not the goal in and of itself. Really, space control is the enabler of force enhancement, force application, and space support. So, as the Soviets approached it and as Major McCraw has indicated, space control really needs to be considered in the context of the other mission areas. At that point, it would be possible to assess which of the operations within the mission are most important.

Major Caton makes an excellent case for the need for RASFOR. Spacelift as he has conceived it, not as it is performed today, is a key part of space control. RASFOR increases the deterrent aspect of space control while simultaneously diminishing US vulnerabilities. Without the ability to get to space, the importance placed on what is already there becomes exponentially more important. Adversaries would be less inclined to use offensive space control methods if they felt their efforts would provide minimal benefit. Under the current US spacelift system, attacks on space assets could be extremely detrimental because of an American inability to replenish its losses. Furthermore, US dependency on a few super satellites over many less capable satellites increases the value in an adversarial investment in capabilities to strike at US space systems. With a few strikes they could entirely cripple US space force enhancement.

Given the simplified approach to space control described by Major Russo and the strength of the argument for RASFOR by Major Caton, a new approach to space control operations is suggested. Figure 8 shows a depiction of this new approach. This figure is the same as Figure 7 with the addition of RASFOR, now serving as the foundation to the

entire space control mission. RASFOR guarantees space assets to survey and perform both offensive and defensive operations.

Reversible	Irreversible	Active	Passive

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SURVEY

RAPID SPACE FORCE RECONSTITUTION
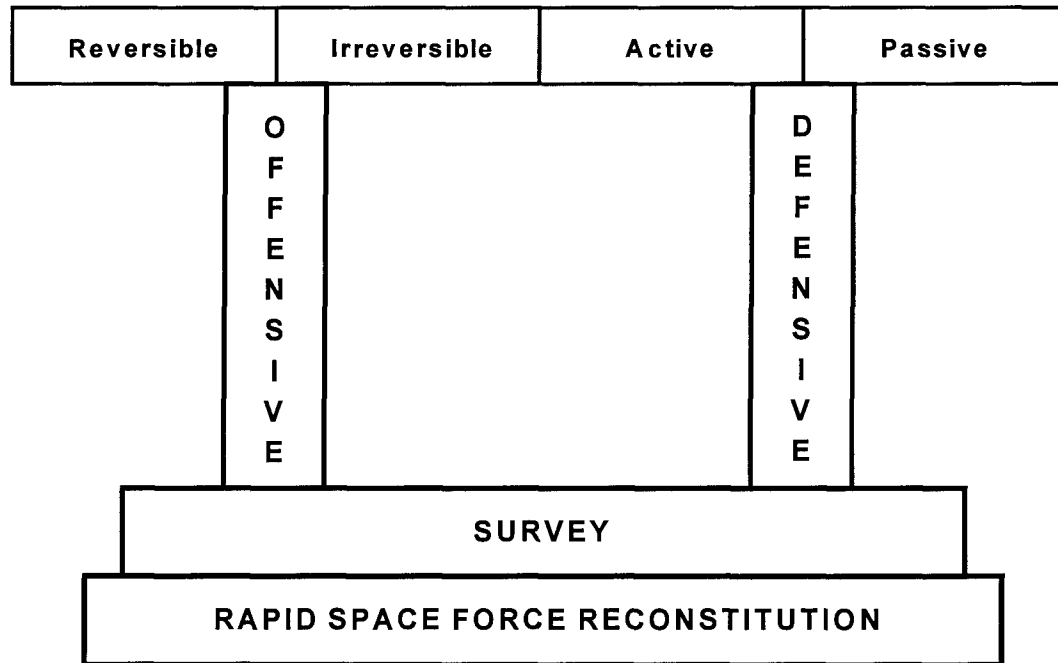
Figure 8. Depiction of Space Control Operations with RASFOR.

The final consideration for the space control mission is the issue of weaponization and ASATS. These systems clearly play a role in deterrence. It may seem like a weak argument to some, but having the ability to strike at the enemy with equal or greater strength prevents an adversary from striking in the first place. Furthermore, some of these systems could be dual-use, in that they could also play a part in a force application role.

Debris created by attacks on satellites is an issue not emphasized in the air arena. The principles of astrodynamics are important when evaluating which types of methods should be considered in achieving control of space. Because of debris and consortia,

depending on ASATs and space-based weapon systems would be a mistake. A wide

range of options is essential to performing the space control mission.

X. Applying the Development Model to Space Control

The underlying theory: if you control space, you control information, and then you control the war. —Idle/Lindsay (64)

At this point it is important to go back to the doctrine development model designed earlier in this work. Figure 9 shows a depiction of the development model and highlights the focus of this paper up to this point. As shown, the majority of the effort has been placed on becoming informed about the area of interest, space control.

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│   │Purpose(s) │        └───────────┘         ╰───────────╯       │
│   └───────────┘              │                                   │
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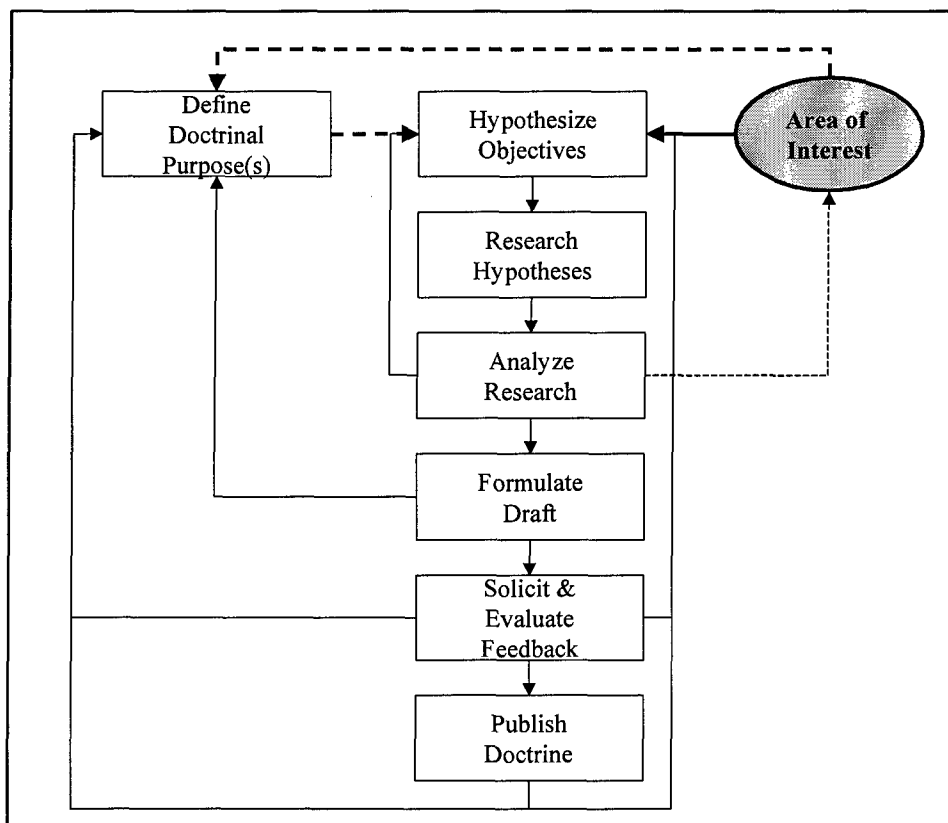
Figure 9. Depiction of Location in the Development Model.

As noted in the earlier discussion of doctrine writers, it is important to have an understanding of doctrine and the area of interest before using the model. Chapters IV

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and V provide insight into doctrine, while Chapters VII-IX enhance understanding of space control. Overriding the entire process is value-focused thinking, looking for the "why's" in every action to help determine what is important and why it is important.

The area of interest has indirect influence on the doctrinal purposes and is directly related to hypothesizing objectives for the doctrine. This is indicated by the dashed and solid lines, respectively.

The next step in the model is to consider the space control doctrinal purposes. Before a draft of the doctrine is written, the doctrinal purposes should be completely considered and established. A major part of this is considering the values associated with those purposes. These doctrinal purposes are closely related to the overriding doctrinal values, but they address the need for the doctrine, rather than the internal workings, which come out in the objectives. For the sake of this work, the doctrinal purposes are suggestions to help promote thought and debate. Various members of AFSPC contemplated six potential purposes. Their feedback demonstrated a consensus was lacking, and that considerable effort would be required to definitively determine space control doctrinal purposes.

The following step in the model is to hypothesize objectives for the doctrine. This initiates the hypothesis-research-analysis loop, which results in those objectives that serve as the basis of the doctrine document. In this case, the loop was only iterated several times due to time constraints. The initial cut at hypothesizing objectives was based on descriptions of the need for space control found in the literature and articulated

by the members of AFSPC interviewed for this work. These objectives were researched and analyzed, again, in a restricted fashion because of time constraints.

According to the model, one possibility when conducting the analysis of the research and the hypothesized objectives is that it may be determined that the area of interest is incorrect. In this case, a series of factors resulted in that determination. The ideas presented in Chapter II, The State of the Air Force, combined with comments from Professor Drew and issues of space control, brought into question the issue of drafting space control doctrine. More so, it became apparent that a better choice for the Air Force was to consider an integrated aerospace power doctrine rather than a specific space control doctrine.

Based on this conclusion, it is necessary to restart the model with the new area of interest, aerospace power, in mind. Time constraints, however, make it impossible to do so within the boundaries of this work. The first step would be to consider doctrinal purposes, which would probably vary from those considered for space control. Even so, there would most likely be a similarity in the lack of a consensus and the need for debate. Some aerospace power values, nevertheless, were considered and are indicated.

Space Control Doctrinal Purposes

The first step in the model, after developing a background in the area of interest, is to define the doctrinal purposes. Figure 10, on the next page, shows a depiction of the current location within the model where this occurs. In the case of space control, a set of six space control doctrinal purposes was recommended. They were:

1) Guide decisions

2) Educate: Air Force/public

3) Define budget requirements

4) Analyze experience

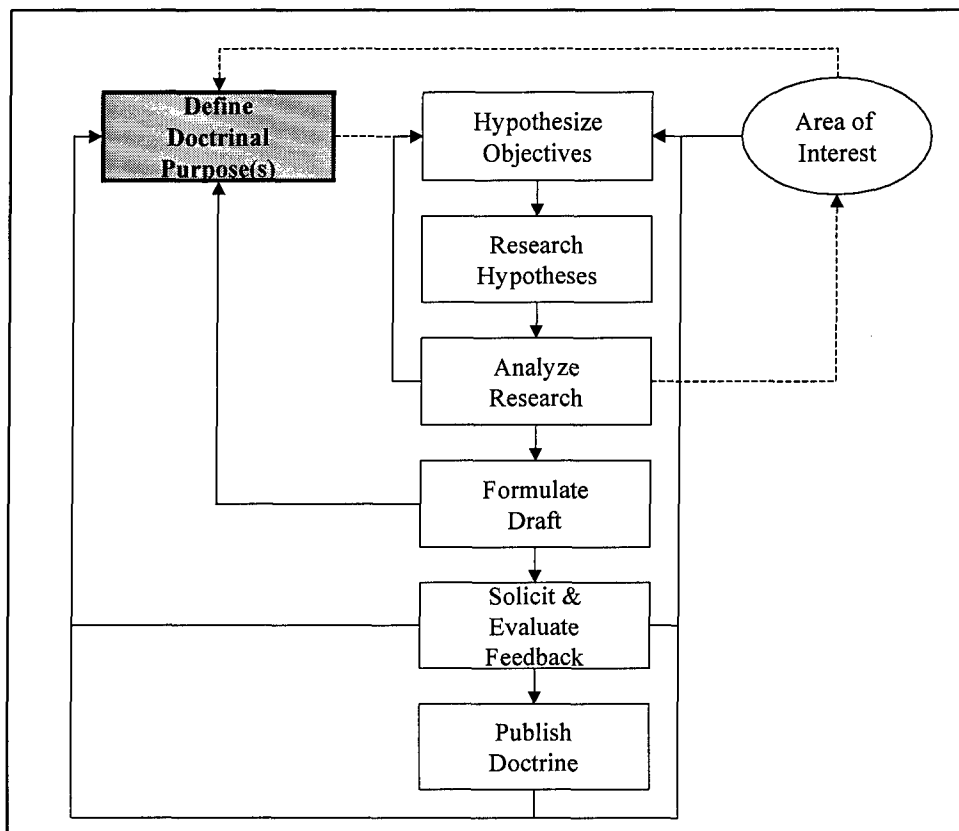5) Anticipate future developments

6) Legitimize space operations

Figure 10. Depiction of Current Location in the Development Model.

This list is neither exhaustive, nor intended to be. Although the doctrinal purposes would have to be clearly articulated prior to drafting the doctrine, this list was intended to instigate thoughtful debate, which would facilitate the articulation of an exhaustive list.

Note that some of these proposed purposes were discussed in Chapter VI, A New Way to Develop Doctrine. Captain Thomas and Professors Drew and Winton have provided their comments and thoughts, in a general sense not specific to space control, on the first five proposed purposes. Some of the purposes they felt were wrong have been repeated. This is in no way to indicate specific disagreement with their thoughts or to imply any disinterest in their beliefs. As previously noted, however, the goal is to capture what the organization believes are the doctrinal purposes, not a universal list of the correct scholarly purposes. More so, it is critical to bring any hidden agendas out into the open.

As a former SAAS graduate, Lieutenant Colonel McKinley should make her former professors proud. Without knowing what they had said, she reiterated their positions. She noted, "Besides 'education' and 'guide decisions,' the others are side benefits"(84). She elaborated further, "I don't like the last four, they are not at the same level as first two"(84). Ultimately, she believes, as her former professors did, that education and guiding decisions are the most important purposes for doctrine.

Some of her additional comments and those of other SMEs will be noted as each of the purposes is considered individually. The list above was not ordered for any specific reason. That point was made to those who reviewed it. They were, however, asked for their opinion as to what they felt was most important.

Guide Decisions

Very little was said about this purpose, as most agreed it belonged on the list. Major Dickey did distinguish it from the others, noting that "Guide decisions is the

number one purpose, absolutely"(27). He went on to also note that "guidance is a mix of analysis and anticipating future developments," so he questioned whether the other two belonged on the list (27).

Educate: Air Force/Public

This one caused discussion because of the inclusion of educating the public. McKinley suggested, "Get rid of the words 'public' and 'Air Force.' Doctrine is intended for military people who need an understanding of what we've learned over the years"(84). Dickey noted that "educating the public is questionable because nobody in the public reads doctrine. That is not the place to educate them"(27). Major Idle and Craig Lindsay agreed with removing "public" for a different reason. "We want to keep the enemy in the dark, so do we want it to be open in the public?"(64)

Major Gallegos made a distinction of who to educate in his thesis. He felt his analysis suggested the need for senior leadership to "develop forward-looking spacepower doctrine to guide and educate warfighters"(47). Major General Rosenberg noted in 1985 that, "it is important for the future of our space efforts that the American people understand what we are doing and why"(102:52). Perhaps there is no better vehicle than a well articulated doctrine. Major Russo agreed, noting that "we need to convince people it's a priority looking at military operations in space"(104).

Define Budget Requirements

General Piotrowski had a great deal of difficulty with this purpose. "Doctrine does not help the budget," he began, "it is a false premise; military worth is what supports

budget requirements"(97). He went on to define military worth, noting that "Worth is: does this thing shorten war, provide less friendly casualties with less collateral damage, and does it move the FEBA faster?"(97). In defense of an SBL, he later noted, "There will always be conflict within the AF because there is a finite budget. We buy weapon systems because of military worth; we do not not buy them because of their limitations"(97). This was in reference to the charge an SBL would not be able to work in all atmospheric environments.

Dickey noted problems with this purpose when he asked, "How does doctrine define the budget?"(27). He later elaborated, "There is a thread, but not a direct link. Doctrine should be more visionary and not concept specific"(27). Russo, however, felt, "Finite budgets constrain requirements a lot. You never have enough money, so how do you make tough choices?"(104). The argument could be made that this is actually the "guide decisions" purpose, reworded where the focus is specific.

Analyze Experience

There was not a lot of commentary on this purpose. McKinley stated similar thoughts to those previously noted by Dickey, "'Analyze experience' is subordinate; it is part of the process"(84).

Anticipate Future Developments

Once again, there was limited commentary on this purpose. Idle and Lindsay felt some modification was in order. "Doctrine should allow you to plan for the future, not

just anticipate it"(64). They went on to recommend it be changed to "anticipate the need for space control"(64).

Legitimize Space Operations

This was the most discussed purpose. Initially, it was motivated by a comment from Captain Thomas. Based on his experience at AFDC, he had noted, "There is a perception that a doctrine document provides validity"(117). His comment was not specific to the space arena, nor even made during a discussion of space operations. Recalling some of the rifts between the air and space communities that were noted in Chapter II, this purpose seemed to be a possible hidden agenda for some space advocates.

Piotrowski was the first to respond, stating, "There is no question about the legitimacy of space operations"(97). He later suggested changing "legitimize" to "explore the boundaries"(97). Russo agreed that space operations were already legitimate, noting that "it really has a peacetime focus, and we want a warfighting mentality"(104). Dickey noted in passing that it was "true but unfortunate about legitimize"(26).[25] Idle and Lindsay felt the "key is not 'space operations,' but 'space control.' We really want to legitimize the end products"(64). Finally, McKinley pointed out that "'legitimize' makes it sound as if we're trying to justify a need for space operations. There's no need for that—our nation has been active in orbital space for 40 years"(84).

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[25] It is important to note that Dickey was the only one to express a thought similar to this. Although his first assignment was in support of analyzing ASATs, he is a navigator, who is "broadening" in AFSPC.

<u>Summary</u>

The thoughts on the list of possible space control doctrinal purposes were far from consistent. All of the feedback, however, was sincere and carefully thought about prior to being made. Each individual interviewed had a genuine concern about space control issues. With the exception of General Piotrowski's already noted advocacy of principles over doctrine and a concern by Lieutenant Colonel McKinley that without space control theory and experience it would be impossible to write doctrine, all advocated the need for space control doctrine. The consensus was that space control doctrine should at least:

    1) educate the Air Force and
    2) guide decisions.

Analyzing experience, however, was merely a part of the process, not deserving of being a purpose on its own.

Hypothesized Space Control Objectives

Once the doctrinal purposes were considered, the next step was to hypothesize objectives. Figure 11 shows a depiction of the next location in the doctrine development model. The basic way for establishing a first cut at the objectives was to ask "why is space control important?" From the answers to this question, it would be possible to hypothesize objectives. Furthermore, it would help establish the values associated with those objectives.
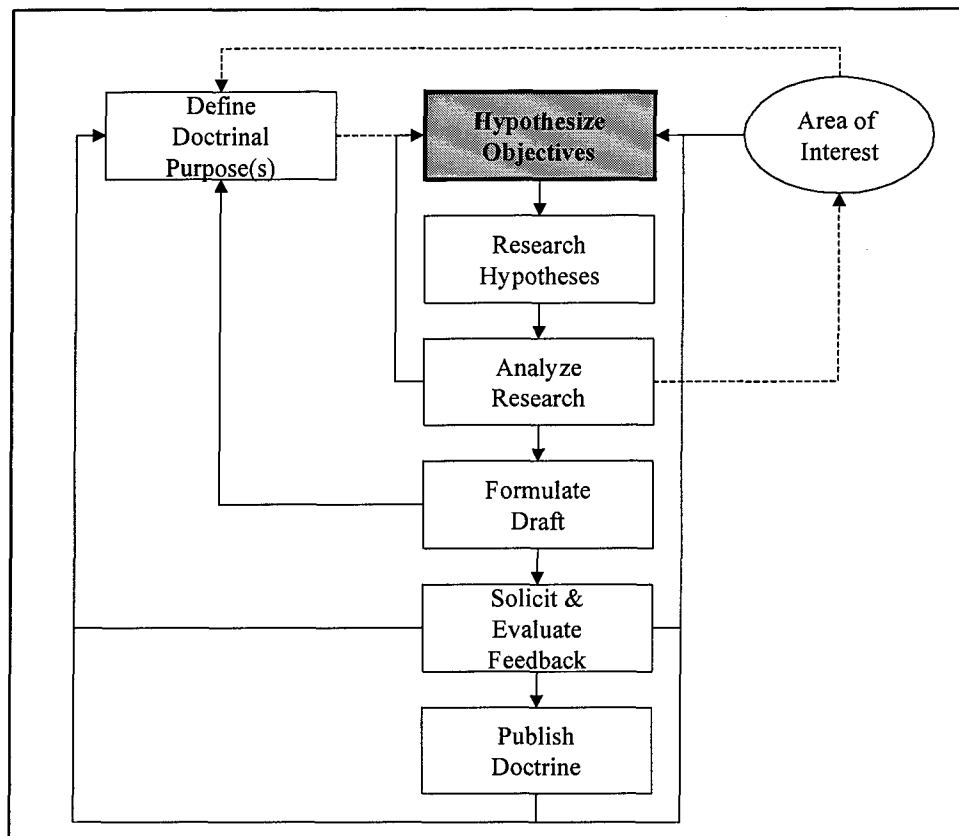
Figure 11. Depiction of Next Location in the Development Model.

Based on the SMEs' feedback, ten potential objectives were hypothesized. The wording of these objectives has not been closely scrutinized, but they are supported by the thoughts that initiated their introduction. Note that these objectives are only hypotheses in the earliest stages of consideration. The ten hypothesized objectives are:

1) To guarantee national prestige

2) To achieve and maintain information superiority[26]

3) To deter war

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[26] With this objective, as with many of the objectives, there is a dual-nature, where the US wants to achieve the objective while denying the enemy the same. For the sake of this work, the denying of the enemy is implied through "superiority."

4) To protect US commercial interests and a new economic center of gravity

5) To protect US space assets from environmental and man made threats

6) To be able to destroy satellites anywhere, anytime

7) To have flexibility in responding to threats

8) To be the first to attain total control of space

9) To reduce friendly fog of war[27]

10) To win wars fast

To Guarantee National Prestige

On 26 March 1958, the President's Science Advisory Committee released a brief report, "Introduction to Outer Space," which distinguished four factors that gave "importance, urgency, and inevitability" to the advancement of space technology. One of theses factors was "the factor of national prestige"(45:596).

Major General Randerson agrees. He believes there is a "larger purpose than economic and military needs, it is a national 'feeling'"(101). "There is a national dominance aspect of controlling space," he continues, "it is part of the 'super power syndrome'"(101). From his perspective, the US needs "to advance the frontiers" as it has throughout its history. Today, "Space is the great area for future exploration"(101).

Additionally, there is what he calls the "shadow effect." "It is how the US felt when Russia launched Sputnik, or how Russia felt when the US had the atomic bomb and they didn't, or how other nations feel about the US in space"(101). He asserts, the public would not like "the idea of other countries' satellites flying overhead" gathering

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[27] Once again the desire would be to reduce friendly fog of war, but increase the enemy's fog.

intelligence, providing a "shadow" over the United States. This feeling of national dominance and prestige, in his view, is the primary reason for needing space control.

To Achieve and Maintain Information Superiority

"Why do we want space control?" Major Russo pondered. "Information superiority, we want the best situational awareness for us and to deny it to them"(104). Major McCraw agrees; "We are reaching the point where information is the key to winning"(81). Major Idle and Craig Lindsay also note that "currently information is key" because the US "needs space superiority to gain information superiority"(64). Even well into the next century, information will serve as a key aspect, if not the central element, to space superiority. Agreeing that information superiority is important, Commander Tunick points out a distinction to help avoid any confusion with information warfare, "Information warfare is not space control; space control is a weapon in information warfare"(122).

To Deter War

General Piotrowski asserted, "Why do we want space control? To deter war"(97). As has already been noted, he is an advocate of an SBL. He believes space control, through an SBL, would provide deterrence. According to him, "It is what I like to refer to as the 'burning bush,'" which he describes as the ability to demonstrate to an adversary a show of force of such magnitude, timing, and control that it helps the enemy realize the power of the US (97). As he puts it, "Effective systems are a deterrence"(97).

Specific to doctrine, Russo feels there is a "deterrent value to demonstrating your will through your doctrine"(104). Through a descriptive and unencumbered space control doctrine, adversaries would know how the US intends to respond if her space assets are threatened or attacked. This would serve as a deterrent to those who might consider exploiting the perceived vulnerability created by US dependence on space. Of course this would require the doctrine to be unclassified, for, as Russo notes, "It is worse to leave it ambiguous"(104).

To Protect US Commercial Interests and a New Economic Center of Gravity

According to Jack Miller, "The reason for needing space control is intuitively obvious. Soon, if not already, there will be more commercial than military value in space"(86). He believes this requires the US to actively work to guarantee that nothing disrupts the space lines of communication. This need supersedes all others because it effects the lives of every American, and the world as a whole, through the financial markets. Russo also noted that "logic and intuition say space will be an economic center of gravity"(104).

To Protect US Space Assets from Environmental and Man Made Threats

Piotrowski points out, "The reality is you cannot always deter; some [adversaries] are just irrational"(97). He describes a scenario where a nation, like Iraq, develops one or two nuclear weapons. Rather than use the weapon on US forces, it would be fired into space to detonate so the electromagnetic pulse (EMP) could take out all of the US satellites. This would then take away the American advantage and make the playing field even. Piotowski's thought on war being a sporting event is noted at the top of Chapter

VII, Space Thought. He feels with an SBL, this potential nuclear ASAT could be stopped, thereby, making the connection between SBL and space control.

Tunick believes that "using a nuke to take out satellites is a bit extreme. That is not a sound scenario"(122). Miller adjusts the scenario a bit, but feels the issue of protecting from EMP is important. "As rogue nations develop nuclear power," he comments, "one will use it against another country, and EMP will not be selective"(86). He notes this would then pose serious threats to "innocent" commercial and military satellites. The potential gravity of such a mishap is immeasurable. "Perhaps someday we can convince the commercial sector of their need for some 'war' features"(86).

Idle and Lindsay believe an SBL would alter the objective of space control in some ways. "With an SBL, space control is defending our assets," they begin, "but, even with an SBL, protecting information would be important"(64). They continue, pointing out that "space control is necessary to do the mission. Communications, navigation, weather, and intelligence all heavily depend on space. Our ability would be so degraded without it we would be at risk"(64). Russo agrees with them, noting that "there is a big advantage to being there [in space]"(104). McCraw emphasizes the point even more, "The US is so heavily dependent on space, including precision weapons, navigation, communications, and environmental monitoring, which all help us to overwhelm the enemy"(81). Idle and Lindsay conclude, "The US is so reliant, and people don't realize this reliance could cause us to lose the edge"(64). They also note the environment can pose as big a threat as any adversary, especially because the space environment is not well understand as a whole.

To Be Able to Destroy Satellites Anywhere, Anytime

Piotrowski proclaims, "We want to be able to kill satellites in a global sense. For an enemy, the greatest shock would be to instantly lose everything"(97). He continues, "If we really want to fight to win quickly, then it is imperative to take it all out as quickly as possible"(97). Miller tempers the need for a destruction capability by noting that "destroying a space vehicle would be a last resort, but there is no such thing as survivable anymore, so there may be a need for lethality"(86).

"Why would we want irreversible," Russo ponders, "because of having to counter a pure military asset where there are high stakes and no room for error"(104). Idle and Lindsay agree, "If a lot of lives are on the line, destroy is more than just deterrence." They also note, "We try to prepare faster and better than the enemy, but you can't assume that is a done deal. There is a diminishing return on faster, which may lead to delay"(64). Dickey agrees, pointing out that "you need the capability to negate even if the future consortia issue will hinder its use"(27).

To Have Flexibility in Responding to Threats

"We need to be able to make a conscious choice between reversible and irreversible effects," Russo points out. "We desire reversible because of consortia and US commercial products which the US military uses. These are geopolitical issues, and in a police action destroy seems a bit extreme"(104). From Tunick's perspective, "There are obviously much greater political repercussions with destroy. In most cases, we would want to temporarily halt their capabilities"(122). Idle and Lindsay note that the "line muddles between prevent and negate as we grow with more consortia." As they see it,

"With consortia we may move away from space attacks. It probably will decrease to almost zero the destroy option"(64). They do note, however, they "don't think consortia will do away with indigenous systems," so the need for destroy persists (64).

To Be the First to Attain Total Control of Space

According to Piotrowski, "If we are not there first, we may not be there second"(97). "The nation that is able to achieve a space-based global defense system first has the potential for freezing other nations out of the high ground of space," Lieutenant Colonel Lorenzini wrote in 1982, "thus achieving total military dominance. Space power doctrine should address these fundamental possibilities for space warfare now in the hope that we can plan more deliberately for the uncertain events that lie ahead"(77:21). Lieutenant Colonel McKinley points out dangers in this argument:

> Turning to the world dominance and planetary protection problems, these two concerns stem from the fact that an entity in charge of space weapons is capable of threatening any spot on the planet. An America in charge of space weapons could be in a position to dominate the world or claim that it is her destiny to become the protector of the planet and its peoples. In either case, an adversary who disagrees with these roles may attack the United States homeland or assets abroad. An entity who does not want America to dominate the world or act as its police force may be encouraged to execute preemptive strikes, perhaps through the use of nuclear, chemical, biological, or genetic weapons. (85:44)

Major General Randerson and Colonel Marv Kramer note an additional benefit to being the first to achieve control of the realm, "He who is first sets the standard"(101).

To Reduce Friendly Fog of War

"Because the medium of space provides the vantagepoint of the ultimate 'high ground,'" General Piotrowski wrote in 1988, "space forces have a particular potential for

extending to the national leadership and combatant commanders a comprehensive understanding of the multidimensional battlefield." He continues, "The degree to which this potential is realized—and once realized, exploited—largely determines the degree to which "the fog of war" is dissipated"(97:56). Russo has expressed similar thoughts, "The center of gravity or command and control aspect that space allows you is important. By controlling space you are able to cut-off leadership"(104). This does run very close to reasoning for gaining information superiority, while denying it to the enemy. Indeed, this could be considered as a "why" for information superiority.

To Win Wars Fast

Piotrowski states it simply, "We want overwhelming advantage because if we are forced to fight we want to win quickly"(97). The force enhancement benefits of space systems makes this possible.

Summary

As with the list of space control doctrinal purposes, this list of hypothesized space control objectives is incomplete. A significant point is that more that one was considered to be the main or primary objective. The issue of trade-offs was touched upon briefly in Chapter VI, A New Way to Develop Doctrine, and this list demonstrates that need. There are multiple scenarios, where trying to maintain information superiority and protect US commercial interests may come into conflict. In situations like this, it becomes increasingly important to understand why the objectives are important. Some of these objectives could be broken into smaller pieces. As was noted, reducing friendly fog of

war is a reason for information superiority being a necessity. Each of these objectives requires further analysis.

The Appropriate Area of Interest

Through the use of the doctrine development model, it became clear there was a need for reviewing the area of interest. In some cases, the doctrine writer may receive a topic that is poorly scoped or insufficient for doctrine development. This is not to suggest that some topics are not worthy of doctrine development, but depending on the doctrinal purposes, which go directly to the organizations needs, the area of interest may simply be incorrect. The only way to determine the appropriateness of the area of interest is by evaluating it after several iterations of the hypothesis-research-analysis loop.

In the case of this work, the area of interest was space control. After researching the area of interest and hypothesizing some objectives it became clear the area of interest might not be correct. More so, thorough review of the state of the Air Force, the potential power of value-focused thinking, and the need for properly addressing space revealed the area of interest needed to be broadened to serve the best interest of the Air Force.

The possibility of addressing the area of interest was initially broached the first time the author met Professor Drew, the professor immediately posed a series of questions, which continuously replayed in the subconscious as if they were on a broken record player. In the beginning, they were discounted as possible obstacles that could not be overcome in the given time frame of the work, but, in time, they turned out to help change the development model and the project in a fundamental way. He asked:

1) Are we going to treat space as something different and separate from air?

2) Is it fundamentally different?

3) If airpower's uniqueness is it operates above the surface of the earth, how is there a difference?

4) Why can't we just transfer air theory to space theory? (29)

Many authors have tried to answer some of these questions. Their arguments, however, have been less than convincing. The most common differences cited surround the issue of the environmental differences. Really, those differences do not address these questions, especially the first three. The fourth question is a hindrance, because as was indicated in Chapter II, The State of the Air Force, there is some question today about what air theory actually is.

The next piece of evidence indicating the need to review the area of interest was Carl Builder's *The Icarus Syndrome*. Chapter II was motivated by this book, because it tied together the problems of the Air Force with the absence of airpower theory and an extreme form of alternative-focused thinking, the worship of technology and the devotion to the airplane. The problems the Air Force faces are due to a dearth of values. Furthermore, the worship of the airplane and the lack of explicitly stated values have created a rift between air and space. Their attempted union has been tainted by a historical belief that "aerospace" is nothing more than a ploy by the Air Force to increase its holdings. Builder has indicated that in the Air Force space was not equal with air.

The significance of space, however, is growing at a phenomenal rate. This has resulted in a dire need for space control. Even the terminology, however, has been confused by a conflict between air and space advocates. This confusion, as well as a

focus on supporting the warfighter, has stifled the development of space control thought.[28] Space has been, and is still, viewed as merely a force enhancer. Although many have suggested space operations is already legitimate, an unspoken motivator for space control has to be to get out from under the feet of the airplane advocates. Certainly, the need for space control is there, but as Thomas has noted, a doctrine would provide validity. With an active space control mission, which is but a small step from a force application mission, the space advocates would no longer be "just supporting the warfighter," but warfighters in their own right. At that point, space would surely be equal to air.

The final indicator of the need to reconsider the area of interest was the realization that space control was meaningless on its own. Space control is a necessity for force enhancement, force application, and space support, but without the others provides little usefulness. Controlling space enables the others, which is most definitely a significant mission, but be able to claim control of space without the other missions is a waste of resources. To consider space control outside of the other missions would be wrong.

Which of the other missions is most important at a given time would greatly influence the direction the space commander would wish to go in choosing space control operations. For example, if the mission space control is supporting for a specific operation is force enhancement, than the operations would need to focus on protecting US interests, which may require defensive actions over offensive actions. If, on the other

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[28] It would be easy to lay the problems at the foot of treaties and policies, but this would be wrong. When Air Force leadership first set about promoting space, they were going against the current policies and discouraging the treaties.

hand, the other space operations mission being supported is force application, the space control actions would be designed to protect the weapon system, which may require more aggressive defensive actions. Furthermore, the line between force application and offensive space control is very fuzzy because force application is an offensive action.

The only way to address space control is in the proper context of and in conjunction with the other mission areas. Just as RASFOR and survey serve as the foundation of space control, it is space control that serves as the foundation of the whole of space operation. Also, there is a synergistic effect of the four missions working in conjunction which provides for the real value of space. Each of the individual missions is out of place if considered individually, as in a separate doctrine. Furthermore, from a value-focused standpoint, some of the terminology, like the four missions, may go away. Under a value-focused system, space operations thought is centered on what is desired overall and what is the best way to achieve it. Mission break-outs are a management convenience.

Discovering that space control doctrine was really not needed led to a reconsideration of the problem. Perhaps the wrong area of interest was being considered. Initially, the development model was designed without feedback to the area of interest. It appeared this was in actuality a mistake, for it surely was possible that the area of interest had been poorly scoped or misunderstood. Based on this, the model was redesigned to its current configuration, shown in Figure 12, with feedback from the hypothesis-research-analysis loop to the area of interest.

It was a review of the area of interest for space control that had revealed the need

to change the model. Even so, before making the conclusion definite, it was necessary to

review some other issues associated with the possible development of space control

doctrine. First, the proper level of doctrine was considered. If the intention was to write

space control doctrine, at what level did it belong? The Air Force was not ready for

space control AFTTPs since the basic understanding of space control was deficient.

Furthermore, Doctor Tritten may be correct in that TTPs are not doctrine in the first

place. It also was not basic doctrine, for that was supposed to be captured by AFDD 1.

By default, under the Air Force system, space control would be operational doctrine.
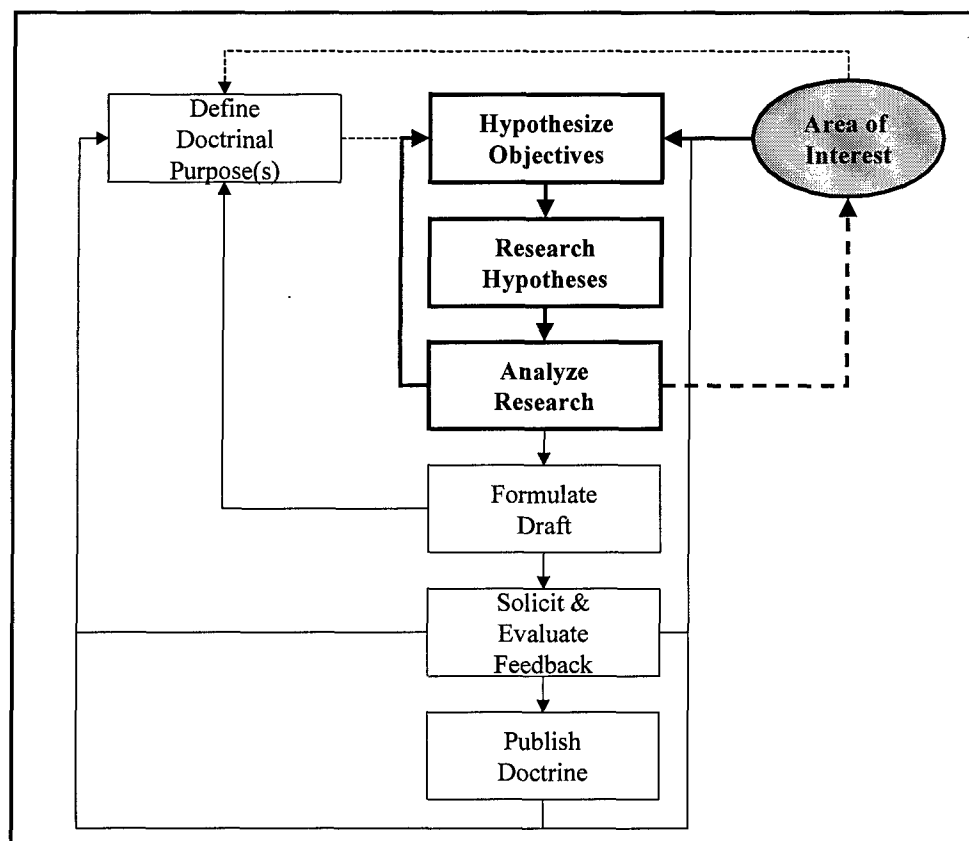

Figure 12. Depiction of Final Location in the Development Model.

Once the level was established, the question as to whether or not space control doctrine specifically was needed. The space control mission already received a great deal of coverage in AFDD 2-2. This coverage appeared to be insufficient, but so was the coverage for the other three missions. Another problem with the doctrine document was it failed to make clear the synergistic relationship among the parts. Perhaps what really needed to be written was a better *Space Operations* doctrine document. The Air Force Space Battlelab was rightfully concerned with the lack of space control coverage, but a separate doctrine might not be the right way of attaining their goal. Given the need for space control to be considered in the context of and in conjunction with the other three missions and the obvious weakness in AFDD 2-2, it seems the correct choice is to rewrite space operations doctrine, not to write space control doctrine.

Yet, Drew's questions and Builder's thesis still played in the subconscious. It became clear that a value-focused system made "aerospace" a reasonable concept. From the third dimension, thinking in terms of the ends and not the means, air and space were fundamentally the same. Unquestionably, astrodynamics and aerodynamics are different, but those are critical to the means employed, not the ends desired. At some level of documentation, such as AFTTPs, the concept of aerospace would have to be divided, but at the foundational level, where commanders and subordinates alike were educated and guided, it was a single belief. At least, it could be.

There are values held by society, and thus an aerospace force, some of which are discussed in the next section, Apparent Aerospace Values, which directly result in objectives for an aerospace force. The key to the desired ends is that the third dimension

enables them to happen. Recall that through the third dimension it is possible to be responsive, which keeps potential adversaries wary of trying "to get away with something." The third dimension provides perspective, so it is possible to know adversarial intentions, which keeps enemies on guard. Furthermore, the ability to act rapidly without geographic constraints provides for decisiveness.[29] The NCA can use the amount of lethality they deem necessary at any given point. Ultimately, these factors put potential enemies at enough risk that it deters war and helps to maintain peace. For those adversaries who "are not rational," aerospace power, acting through the third dimension, allows for fewer US servicemen to be placed in harm's way, while simultaneously limiting civilian casualties and collateral damage, all of which are American values.

Ultimately, the review of the area of interest revealed that space control was incorrect. The Air Force does not need space control doctrine. Better space operations doctrine would better address space control and the other three missions of space operations. Thus, space operations would be an appropriate area of interest. More importantly, the Air Force needs to completely rethink its basic doctrine, and actually develop a true aerospace power doctrine. This doctrine should be developed using values and should not try to "force fit" into traditional air or space concepts. Let the concepts develop from the values. In the end, the review revealed aerospace power would be the best area of interest.

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[29] It is a valid point that space systems have to be already in place to be responsive, to provide perspective, and to be decisive, but an airplane has to be built, maintained, loaded, and manned as well.

Apparent Aerospace Values

Restarting the model requires reconsideration of the doctrinal purposes. Time constraints, however, make it impossible to try to do that within the confines of this work. It seems apparent, however, based on scholarly advice and from the feedback on the list of possible space control doctrinal purposes, that education and guidance would most certainly be two doctrinal purposes for an aerospace power doctrine. Once again, an argument that the doctrine should help educate the public, which includes Congress and other civilian policy makers, seems valid.

After the doctrinal purposes were clearly articulated, the objectives could be hypothesized. Through multiple iterations of the hypothesis-research-analysis loop, these objectives could be properly evaluated. Finally, the draft of the doctrine could be formulated. Because aerospace power needs to essentially start with a completely clean slate, unaffected by traditional air or space terminology, this process would take considerable time.

It is significant to note that the suggestion being made here is not to totally discard airpower theory without any regard to its usefulness, but to limit its constraining effects. The temptation is too great to fall into the same mode as the past, and merely use the old ideology with a couple of minor changes to formulate a new draft. Clearly, that would neither be aerospace nor value-focused. Indeed, there is an underlying assumption that needs to be, and will be, addressed through the model: air and space are linked by the similarity of operating from the third dimension.

For the sake of this work, nine possible aerospace values are proffered for consideration. These values are introduced to provide a stimulus for debate and to help in uncovering some potential hidden values, which must be made clear to the whole organization. Most of them have been indirectly covered throughout the work. Some were considered as part of the hypothesized space control objectives. These values are not objectives, but clearly could be translated into objectives with minor changes. In the following section, they are each specifically considered individually. The nine possible aerospace values are:

1) Peace
2) Man in the loop
3) Man out of the field
4) Leadership from like kind
5) Limited collateral damage
6) Distant engagement
7) Rapid reaction
8) Information dominance
9) Psychological motivation

Maintaining Peace

The idea of deterring war has already been touched on in considering the benefits of spacelift and space-based weapon systems. One of the hypothesized objectives for space control doctrine was to deter war. The fundamental desire in deterring conflict is to maintain peace. It has been suggested that the primary objective of war is a more perfect

peace. A great deal of value is placed on peace. Certainly, an objective of aerospace power doctrine will be to deter war.

Lieutenant Colonels Endersby and Fullbright noted two important ideas associated with what they described as "airpower." "First, airpower is the preeminent means for preventing and deterring war; second, if a conflict arises, then airpower in the form of air and space superiority is the prerequisite for all other operations"(39). As their comments indicate, they believe airpower includes both air and space assets. Given that "aerospace power" is more inclusive than "airpower," this term should receive full use. Nevertheless, they make the point that aerospace power is the means for preventing war and, thus, maintaining peace.

The ways in which aerospace power promotes peace are numerous. Conflict can be prevented because of an awareness gained by the perspective provided by the third dimension. Wars are deterred because potential adversaries are placed in a threatened position, to where an act on their part can result in swift and strong retaliation. Aerospace power provides the perspective and the ability to act swiftly and strongly. This, in turn, helps promote peace, which is the primary value of the United States.

Man in the Loop

It appears that advocates of aerospace power value having man in the loop. Machines alone cannot implement aerospace power. A consideration of the historical debate for having man in the loop in the space arena will provide insight into the role man plays, and why it is so valued. The same arguments would hold in the air arena,

where unmanned aerial vehicles (UAVs) are emerging as a significant player. This value is apparently an aerospace value, rather than just a space or air value.

In May of 1961, Lieutenant General James Ferguson, Air Force deputy chief of staff for research and development, noted special qualities of man that machines could not duplicate. "He is unique in his ability to make on-the spot judgments. He can discriminate and select from alternatives which have not been anticipated. He is adaptable to rapidly changing situations"(46:216). In his view, "By including man in military space systems, we significantly increase the flexibility of the systems, as well as increase the probability of mission success"(46:216).

In 1963, Ferguson noted some more reasons for advocating man in the loop. He believed equipment was more flexible, capable, and at the same time "less complex with a human operator aboard." "Finally, we can think of no way," he proclaimed, "to build into automated military equipment the determination of a military man to perform his missions in spite of unforeseen obstacles or national deficiencies"(46:223). Secretary of Defense Robert McNamara disagreed with Ferguson by noting that "A man greatly complicates the operation in space. You have to put so much in space just to allow a man to exist that it greatly adds to the complexity of the operation" (46:223). McNamara went on to conclude, "Today it appears to us we can achieve military capabilities in space more quickly without a man than with a man"(46:223).

In June of 1969, Secretary of Defense Melvin Laird made some comments regarding the talents of man in space upon canceling the Manned Orbital Laboratory

(MOL).[30] "We were and are still confident that man's presence in orbit can enhance the effectiveness of equipment and speed its development for both manned and unmanned use in future systems," he began. "Man is unique in his talents, ability, and adaptiveness, as recent NASA flights have clearly demonstrated," he acknowledged, "but the cost of putting and sustaining him in space is very high"(46:683). The MOL was cancelled because he concluded the unmanned satellite experiences "have given us confidence that the most essential Department of Defense space missions can be accomplished with lower cost unmanned spacecraft"(46:683).

When the Space Shuttle was reaching the final stages of its development, Doctor Hans Mark, former Under Secretary of the Air Force during the Carter Administration, noted its significance to keeping the man in the loop. "The really important and unique feature of the Space Shuttle," he professed, "is that it requires people. The flight crews will be very much more intimately involved in the operation of the flights than crews have ever been in the past"(13:172). From his point of view, "The presence of people in space is very important, because imagination and judgement are important. When people are there, they'll always learn something they didn't expect"(13:172).

In "Ascendant Realms," Lieutenant Colonel DeBlois considers the issues of keeping man in the loop when he compares what he perceives to be the characteristics of air and space. "In the future, the role of humans will remain essential, but their primary value will lie in the preparation and orchestration of assets before the fight—not in a fight

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[30] "The MOL project was to be directed specifically to determine one's [man's] utility in performing military functions in space"(46:225).

that will occur at speeds beyond human comprehension"(19:543). He continues by noting that "the operating medium of space differs dramatically from the air realm. People cannot live in the medium and cannot 'fly' in it"(19:553). "If humans are to realize the advantages offered by space," he suggests, "they must continue to develop technological solutions that accommodate them and their systems in that hostile environment"(19:553). He goes on to conclude, "Those solutions, along with the nature of the environment, will dictate the need for unique operations and corresponding doctrine"(19:553). DeBlois also notes that "unmanned systems inherently lack autonomy and critically depend on secure, high-transmission data links," which he considers a disadvantage (19:556).

Hollywood has made a fortune by making movies about this consideration of man in the loop, especially in regards to military systems. There is a great deal of fear associated with removing man too far from the loop. This fear, as well as attributes noted above, has made having man in the loop a value of aerospace power. Note that some of attributes described above are values within this value.

Man out of the Field

As much as there is a desire to have man in the loop, there is an equal desire to keep man out of the field. "Politically, airpower is the answer to a democracy's prayers. It offers a way to fight wars with fewer casualties than if it had to be done the old fashioned way—on the ground," Grant Hammond believes, "we husband our blood, not our treasure"(53:22). Recall that Hammond describes airpower as an encompassing term that captures both air and space. He notes more benefits, "Airpower gives us the

capability to project force, to commit far less manpower in favor of high-technology assets to defeat our adversaries"(53:22).

Air Marshall R. G. Funnel (RAF) has also remarked on this, "Above all other types of combat power, air power has the ability to wreak enormous damage on your opponent while committing very few of your own combat troops. It is a characteristic which is of increasing importance in modern warfare"(44:16). Jack Miller has described the value of aerospace power differently, "Again, this is just my impression, but I don't know how much longer we need a pilot in the cockpit. With a UAV you might lose the aircraft, but the man will still return to his family"(86).

These last two values conflict with each other. The UAV really brings this to light. There are attributes to keeping man in the loop that must be weighed against the desire to keep man out of the field. Perhaps, the desire is to keep casualties limited but not necessarily eliminate them. This may mean it is better to loose ten pilots rather than ten infantry platoons. Yet, as Miller suggests, the real trade may be between ten UAVs and ten pilots or ten platoons. Clearly, keeping man out of the field is a value that should be promoted by aerospace power.

Leadership from Like Kind

As indicated in the opening chapter, in 1996 while still a major at SAAS, Lieutenant Colonel McKinley addressed the issue of space leadership in the endnotes of her thesis paper. It is extensively quoted here, for it provides a great deal of insight:

> Regarding the leadership responsibilities for space forces, only a person with space systems experience is fully qualified to lead space forces. This follows the

exact same reasoning that has been used since the inception of America's independent Air Force to justify that its leadership be restricted to its small set of rated personnel. Air and space are uniquely different media, just as are land, sea, and air. The contributions space systems give to warfare are similarly unique. Just as a much shorter period of time was sufficient to provide justification for the argument that only airmen lead air forces, forty years of evolutionary history is sufficient to justify that only space systems personnel lead space forces.

America's four decades of military space exploitation has created a large pool of space experts from which to groom and summon the future's space leaders. Many possess the cognitive faculties as well as other critical leadership traits; what they may lack is training in the art of warfare. This is a systemic problem that can be overcome. (85:51)

She notes three steps Air Force leadership could take to remedy the situation:

1) immediately and significantly reduce the number of rated officers in its space commands,

2) open more space systems positions at its warrior training schools, and

3) reserve its space leadership positions for those with space systems expertise.

McKinley then concludes, "Failing this will perpetuate many of the problems that have stymied the maturation of military space doctrine, policy, and strategy during America's first forty years of military space activity"(85:51).

The dilemma for an aerospace force is what is the "kind" from which to draw leadership. A fully integrated force would require space personnel to receive leadership positions comparable to fighter pilots. What is more, those who command UAVs, given that they would be an integral part of aerospace power, would also stake a claim to the leadership. The desire to draw leadership from like kind appears to be valued by aerospace power. How to interpret the "aerospace kind" will create serious problems for an aerospace force if it continues with the outlook the Air Force has followed for the past 50 years. Either this value has to be reconsidered, or the definition of the aerospace kind has to be expanded. No matter which the Air Force chooses to do, the Air Force has to

explicitly state what in values in leadership, and where those leaders might come from, so the entire organization can try to understand it.

Limited Collateral Damage

In his analysis of the Gulf War, Wing Commander Waters noted that "the incredible precision of weapons used showed that air power could be an affordably-effective element of military power through the consequent reductions in numbers of aircraft and aircrew needed to destroy a target"(125:143). Furthermore, such precision showed "the value of air power as a useful political element, as it could selectively destroy a target with minimal civilian casualties or collateral damage"(125:143). He believes, "This ability to remove a hostile or threatening capability without destroying everything around it underscores the importance of using military power as a form of national power in cases short of war"(125:143).

Democracies do not only husband their own blood, but they also value the blood of their "innocent" counterparts. There is a perceived need to make war as "clean" as possible, which requires minimizing collateral damage. "We believe it is better to serve as an example for others to emulate than to conquer the world and make it conform to our preferences," Hammond has noted. "Destroying key parts of adversary's strategic calculus or his capability is better than destroying his capital. And any of these are preferable to fighting our way to it on the ground so we can then occupy the territory of a defeated enemy"(53:25). Aerospace power provides for the value of limited collateral damage.

Distant Engagement

"It is *toward* space that we are headed because it is *from* space where we are relatively advantaged," Hammond has also suggested. "It is *in* space that we can have even greater leverage of our technological advantage, best offset our concern for casualties, accomplish our urge to be responsive, and achieve our need to project force against adversaries as far from our homeland as possible"(53:26).

Few wars against foreign enemies have been fought on US soil. The infrastructure destruction associated with war has not been visited upon the US since the Civil War, and there is a strong belief that is how it should remain. Aerospace power provides for the ability to keep the conflict at the adversary's home rather than on the American homeland. This enables fulfillment of the value of distant engagement.

Rapid Reaction

"An air force has the power of bringing direct pressure to bear on the people of an enemy nation and of attacking the enemy centres of government," RAAF officers have noted. Furthermore, an aerospace force can act "far quicker than the other two services, in fact, at the very commencement of a war before fleets have left harbours or armies their mobilization centres"(113:10).

Aerospace power enables rapid reaction by the NCA. As already noted, this helps to maintain peace for adversaries are cautioned to take hostile actions knowing the punishment will be swift. For those who are not deterred, aerospace power provides for

the capability to minimize enemy advancement and entrenchment. This highlights the value of rapid reaction.

Information Dominance

The idea of information superiority has already been discussed. Information dominance is valued. Hammond has suggested the primary emphasis for an aerospace force should be on "surveillance and force projection, on knowing what others know that we know. Information dominance—controlling the content and flow of information when necessary—should become increasingly important"(53:27). Aerospace power is the enabler and provider of information dominance.

Psychological Motivation

"Air forces, however, can act more directly on the morale of the enemy nation than either armies or navies, and may be able to bring home the fear of personal injury to the people soon after the commencement of a war," note the same RAAF officers. "Air power, therefore, is a further means at the disposal of a nation for imposing its will upon that of its enemy, and it affords a method of waging war additional to the traditional methods afforded by naval and military power"(113:40).

The psychological motivation induced by airpower is not clear. History has shown that it can act both for and against the user. In World War II, airpower failed to break the will of those being bombed. Indeed, it motivated them. Some have argued that bombing in Vietnam brought the enemy to the table for peace negotiations. A better example may be the devastating effect constant coalition bombing had on the Iraqi forces

in the field. Aerospace power's ability to effect psychological motivation is a value, but it is potentially dangerous in application.

Summary

Applying the development model to space control turned out to fundamentally change the model, by creating feedback between the hypothesis-research-analysis loop and the area of interest. This feedback created the situation where a review of the area of interest might determine it was the incorrect choice.

In this case, the model revealed that space control was the wrong area of interest. Developing space control doctrine is not in the best interest of the Air Force. Space control is an integral part of the other missions, meaningless in and of itself. A better consideration would be to redo *Space Operations*.

This, however, would only serve to continue to promote the difficulties outlined in Chapter II. Ultimately, the best thing for the Air Force would be to finally consider a true aerospace power doctrine. This doctrine should be based on values, focusing on the ends of aerospace power. It is through the ends that air and space share a common bond. The way to develop this doctrine is by applying this model.

Before the revelation was made that space control doctrine would be wrong for the Air Force, various potential doctrinal purposes were considered. As has been true throughout the paper, a consensus for what belongs on the list was not found. Agreement was reached on the need for doctrine to educate the Air Force and to guide decisions, and

that a by-product, but not a purpose, of doctrine was that it facilitated an analysis of experience.

A list of hypothesized objectives for a space control doctrine was also established. This list received only cursory review and brief analysis due to time constraints and the ultimate decision that the area of interest was incorrect. This list, however, provides insight into what some consider to be the values of having space control. Furthermore, it provides an initial cut of what the priorities of space control might be once the concept is incorporated into aerospace power doctrine.

Finally, some possible values of aerospace power have been postulated. They are intended to promote debate and consideration of the some ideas that seem to serve as cornerstones of current Air Force doctrine. At the same time, these values present problems for the Air Force, and require trade-offs to maximize the overall value of aerospace power. In developing aerospace power doctrine nothing can be assumed away.

XI. A Call for Aerospace Power Doctrine

If aerospace integration succeeds, it will overcome the fractionalization of air and space.   — *Correll (17:2)*

When this work began, the desire was to write space control doctrine. This required finding a method for developing doctrine. At the outset, given the perceived need for and the apparent significance of doctrine, it appeared finding a development process would be as simple as conducting a literature review. The review, however, revealed nothing was simple when it came to doctrine, especially its development. Within very little time, it became clear there was a need to formulate a new model for developing doctrine. Once the model was established, it would be possible to write space control doctrine.

Along the way to formulating a doctrine development model, this author made many new discoveries and had a few previously held beliefs reinforced. After the model was established, its employment resulted in even more realization. Finally, through the use of the model, it became clear that the questions being asked might not be the correct ones. Desires are not always needs, and sometimes the thought that you shouldn't ask a question if you can't stand the answer is appropriate. In this case, the research has shown the Air Force does not need to write a specific space control doctrine; the Air Force needs to write an integrated aerospace power doctrine.

This conclusion becomes clearer by reviewing the discoveries, reinforced beliefs, and realizations that resulted from the research. The accumulated insight from this research are summarized in the twenty-five declarations, which came out of the research.

These declarations indicate the sub-conclusions that ultimately led to the overall conclusion of a need for a new integrated aerospace power doctrine. Finally, based on the research the author presents five recommendations for the Air Force to consider.

Review

The first belief that was reconfirmed through completing the research was that there was trouble brewing within the Air Force; the first discovery was how recognized it is, and how bad it actually is. There seems to be a major deficiency in explicitly stated values guiding the Air Force. This point is really brought into the light in Carl Builder's *The Icarus Syndrome*. He is certainly not the only one to address the decline of Air Force culture and the troubles developing within the Air Force, but Builder is the one to connect all of the pieces together.

According to his thesis, the Air Force has lost its vision because it has focused on means rather than ends. Those in the Air Force who are outside of the flying business are alienated by virtue of not wearing wings on their uniforms. Furthermore, doctrine has lost its significance because airpower theory has been abandoned to guarantee procurement of new flying machines. Simultaneously, space assets have never been fully accepted because they initially served as a threat to traditional strategic means and later seemed to be nothing more than support for pilots, who many believe, are the sole performers of "airpower." Ultimately, any reasonable concept of "aerospace" has been diminished by the fact space and air are truly co-equal in very few minds.

The next discovery made was the potential power value-focused thinking, as Ralph Keeney first outlined it, holds for those who choose to use it. Essential to this way

of thinking is considering values before any alternatives. Traditional thought for nearly all decision-makers is to first consider alternatives. Then realizing a decision problem exists once there is more than one alternative present. Finally, values are first consciously considered perhaps to evaluate the best among the alternatives. This is known as alternative-focused thinking, which is similar to today's Air Force thinking and is frequently narrow and reactive. It places alternatives before values, and then tries to find the best among the available choices. In the case of the Air Force, it seems as if the choice is ultra-narrow, so that the only alternative is some form of airplane. Air Force thinking may best be described as airplane-focused thinking.

Value-focused thinking could provide the Air Force with more decision opportunities and help it to overcome some of its cultural problems. A proposed relationship between the Air Force and value-focused thinking, however, is not new. Some Air Force studies have claimed to use value-focused thinking as an analysis tool. Actually, value-focused thinking has not really been used. The values have been considered as part of the evaluation process for already existing alternatives. Alternatives were not developed through value-focused thinking since values were not placed first. A major problem with promoting this Air Force version of value-focused thinking is it promulgates the perception that value-focused thinking is merely a way to develop measures for evaluating alternatives. This Air Force way of value-focused thinking seems to be fundamentally different from Keeney's vision, and fails to achieve the potential power value-focused thinking promises.

First thinking about values guarantees they will be explicitly stated. This induces debate and discussion, which leads to a thorough understanding by everyone within the organization of what the organization believes, why it believes that way, and why the organization acts as it does. Furthermore, it helps everyone within the organization to feel ownership in the organization. It promotes an institutional essence that binds the entire organization. Through the articulation of values a culture forms.

With values at the forefront, the next discovery the research revealed is the import of doctrine, but how misunderstood and maligned it is within many circles of the Air Force. In 1980, Major Robert Ehrhart declared, "The Air Force must put more emphasis on doctrine. It should be, after all, the foundation for everything the Air Force does; and every member should be aware of the basis of the profession to which he or she belongs"(37:36). Nearly twenty years later, this statement is just as accurate in every way. Recently, the Air Force seems to have had a renewed interest in doctrine. This is symbolized by the publication of multiple AFDDs and the creation of the ASBC. The promotion of doctrine, however, still remains strongest within scholarly circles, and the scholars belittle the Air Force process.

Analysis of this process led to the next belief to be reinforced—the Air Force does not have a systematic process for developing quality doctrine. Currently, the process the Air Force uses is governed by the Air Force Doctrine Center at Maxwell AFB in Alabama. Unquestionably, the focus of this process is time. Within 360 days of the acceptance of an idea, the doctrine is supposed to be published. To complete the work within a year is amazing, and only validates the point that the Air Force process is not

intellectually based. Content seems to take a third seat to time required to publish and style required to make it more appealing to the eyes. It appears the Air Force thinks that as long as it is coordinated with all of the MAJCOMs and out the door within a year, it is adequate.

This system definitely raises serious doubts about the significance of doctrine to those leading the Air Force. Quality content requires consideration, which demands research. The most recent changes to *Air Force Basic Doctrine* have not provided any more insight than the previous document. Indeed, it could be forcefully argued that the newest addition has resulted in less insight. Since there are no new ideas of major significance within the newest document, the question really becomes why was it even published? Furthermore, what happened to all of the ideas in the previous addition? Were they shown to be invalid, and if so, shouldn't that case be made within the doctrine? Understanding requires consideration, which demands presentation of conclusions and the support that led to them being made. Doctrine development is certainly iterative and continuous, but this does not mandate tossing the baby out with the bath water. In the case of the Air Force, the part it has abandoned is airpower theory.

It would be better to have no doctrine than to have bad doctrine. This may seem blasphemous in some scholarly circles, but the publication of bad doctrine does more harm than good. First, doctrine that is fundamentally flawed can result in disastrous conclusions. Second, given the introduction of the ASBC and its focus on doctrine, young airmen are learning about the so-called importance of doctrine. Yet, the doctrine that they are to depend on is of little substance, and the new doctrine coming out is

bureaucratic at best. Since it provides them with little insight, they will learn to do without it. In the end, once they are in a leadership position, they will conclude doctrine is unnecessary. The Air Force should place a moratorium on any new doctrine before it fixes its broken development process.

During that time the Air Force should work to develop quality doctrine through a doctrine development model like the one that has been formulated through this Space Battlelab sponsored work. This new model emphasizes, through research and analysis based on a value-focused approach, content, which makes it conceivable to develop quality doctrine. Unlike the Air Force process, this model requires multiple iterations of the hypothesis-research-analysis loop, which requires time to complete. As with the Air Force process, this model believes the style and format of the doctrine document is significant. The approach, however, is different. Because doctrinal purposes vary and the ideas of different areas of interest require presentation appropriate to the topics being considered, one style does not fit all.

The first step in this model is to determine the doctrinal purposes, which can be established by answering the questions why is doctrine desired, what is it expected to do, and who is going to use it. For any given doctrine document, the doctrinal purposes serve as the foundation for the style and format of the draft. Another important element of the model is trying to formulate objectives, which are developed through the hypothesis-research-analysis loop. Work in this loop provides authentication and support for the objectives, which ensures quality content. Another aspect of this loop is it provides

insight into the possibility that the area of interest may not be correct. Just as dangerous as writing bad doctrine is writing wrong doctrine.

One of the basic ideas associated with using this new model is that the doctrine writer must have an understanding of both doctrine and the area of interest. In trying to develop the model, doctrinal understanding was established. Now that the model was going to be utilized to draft space control doctrine, the issues surrounding space control, the area of interest, had to be investigated. This required considerable effort.

Through this investigation, the next discovery to be made was how long the debate surrounding space issues had been going on. Indeed, the arguments over space issues today are similar to those raged in the 1950s, when the thought of using space militarily first began. Over the next forty plus years, as presidential administrations and Air Force senior leadership have changed, the intensity of the advocacy of each side's position has varied, and new technology has created more possibilities; however, the debate has fundamentally remained the same. The debate essentially surrounds the philosophies of the four schools of thought for space. The differences among the schools comes down to a question of human nature and trust.

Sanctuary advocates believe human nature is inherently good, that people can change, even those who are bad, if the good choose to set the example. High-grounders believe evil will always lurk somewhere among the good, so the only option is to be ready when they try to strike, and at some point they will try. From their perspective, the power associated with being first, especially in regards to space-based weapon systems, cannot be relinquished. For advocates of the survivability school, their mistrust of

technology leads them to believe satellites can be effective, but are inherently vulnerable. To put full faith in them in a combat environment would be too dangerous. Other means have to be incorporated to serve as a back-up for space systems. The control school, on the other hand, believes satellites can be made survivable and must be trusted to carry the day in the next conflict, for he who controls space, controls the information, and, thereby, controls the war.

It may seem like trying to be too accommodating, but all of the schools are correct in someway. An over zealous pursuit of space weapon systems would certainly bring into question the current arms control agreements. Just as a terrestrial-based arms race was precarious, the same would be true of a space-based arms race. At the same time, to not prepare for the future is to toss out some major historical lessons. It is worth reiterating that those who do not learn from the past are bound to repeat it. The best weapons, with the appropriate doctrine accompanying their proper employment, can determine the difference between defeat and victory. For wars that would call upon space-based weapon systems, the stakes are too high to not actively pursue development of such systems. Furthermore, space systems are vulnerable, which means there is a need to make them more survivable. Simultaneously, there is a need to reevaluate the way the US does spacelift. Depending on a single super satellite with a lethargic lift capability introduces a vulnerability that invites adversaries to try to take advantage of. Also, having terrestrial-based back-ups is as much common sense as the need to control space. Space is the place where future wars will be won and lost, not necessarily because of space combat, per se, but because of the information that space provides as both a

collector and a conduit. Some may view this force enhancement role as "merely support," but it will be the maker and the breaker in a society so information dependent.

Another historical debate has revolved around the term "aerospace." Consideration of the arguments of this debate through value-focused thinking resulted in the first realization, which was that an aerospace concept was not quite as bankrupt as it might first appear. Its worth is greatly determined by how it is approached. An environmental approach to aerospace is ludicrous. Even with the introduction of some kind of "space plane" there would still be fundamental differences between astrodynamics and aerodynamics that make the environmental aerospace concept seem to be truly nothing more than a ploy by the Air Force to gain control of space assets. From a perspective based on acting from the third dimension, however, there seems to be validity in the aerospace concept. When considering the military worth associated with a third dimension aerospace concept, it appears the ends sought are quite similar. The ends are based on values, so it is a true value-focused approach that enables aerospace power to be a viable concept.

The desired ends possible through aerospace power are not static. Changes in technology have created scenarios where the value of information is immeasurable in the outcomes of conflicts. Ideas about shifting from an atmospheric to an infospheric basis are with merit. Viewing aerospace power from the traditional Air Force doctrinal paradigm is dangerous. The times have created new technology and changed the geopolitical world enough to require new approaches be considered in the development of aerospace power doctrine. By articulating the doctrinal purposes, considering the

values of aerospace power, and opening thought to new approaches, it will be possible to formulate an entirely new aerospace power doctrine.

One of the elements of the new doctrine will have to be concepts associated with controlling space, but this may not be in the same sense as current beliefs for controlling air. Space control is essentially ensuring the ability of friendly forces to do anything they desire relative to space while restricting the enemy from gaining that same ability. The operations associated with this mission are very simple. First, there is a definite need to be able to have assured access to space. The only way to be there is to get there via a responsive spacelift program. Once there, the first need is to be able to survey the environment. Both environmental and man-made threats are lurking, waiting for the opportunity to seize the initiative and act on a weakness. It is essential to know where those threats are to avoid or halt the attack. If the attack is undetected or effective enough to be successful, it is critical to know that it has happened so that friendly forces can compensate for any impact it might have on the mission. In order to protect space assets, it is necessary to have the ability to act defensively. This could be either passive or active, depending on the threat. Passive defense can be built into the system, while active defense may require other systems. To restrict enemy use, it is necessary to have an offensive capability. Based on the increasingly complicated relationships associated with space systems, especially the growing use of consortia, it is essential to have the ability to act offensively in a reversible way. So, when the conflict is over, or when the adversary is not using it, the system works with its full potential. In times of war, when the stakes are too high and there is no room for failure, the ability to act offensively in an irreversible manner may be demanded.

The next realization was that space control was not of great value on its own. Having control of space is meaningless, unless there is a desire to do something with it. Furthermore, the approach you take to space control varies with your objectives, which depend on which of the other missions you are focusing on. Space control has to be considered in the context of and in conjunction with the other space missions. To understand the need for space control, it is critical to understand the need for space, which requires an understanding of all space operations. Space operations need to be considered as a composite function. The parts combine synergistically to provide the products and opportunities that ensure national security. The Air Force does not need a separate space control doctrine, it needs doctrine which adequately addresses space control with the other three mission areas.

The ultimate realization was the result of all the discoveries, the reinforced beliefs, and other realizations. To solve the dilemmas the Air Force is facing, it has to reconsider its very foundation. Airpower theory is currently deficient and mishandles space. It promotes a confused idea of aerospace that does not lead to complete integration of air and space. Aerospace is viable if the ends made possible by acting through the third dimension are the tie that binds air and space. In order to get to the ends, it is necessary to focus on values rather than alternatives. Eventually, alternatives will come into play, but basic doctrine should not be concerned with the specifics of the means, but with the concepts associated with the ends. Ultimately, air and space are just alternatives to be used in achieving the values promoted by aerospace power. An integrated aerospace power doctrine requires starting over with a focus on values. This is

possible through the use of the doctrine development model formulated through the research for this work.

Twenty-five Declarations

Throughout this research, many conclusions have been made. All of these conclusions have led to the final recommendation of rethinking Air Force doctrine through value-focused thought. All of the previous conclusions to the ultimate determination can be considered as sub-conclusions. They provide the support for the final suggestions. Review of the sub-conclusions provides insight into the flow of thought leading to the concluding recommendation and makes clear any possible assumptions. There are twenty-five sub-conclusions, which are declared in the following list:

1) Air Force culture is in decline to the point of non-existence.
2) Airmen see themselves as specialists rather than members of the profession of arms.
3) Airmen have lost knowledge and understanding of Air Force doctrine.
4) Air Force thought is dominated by the worship of the airplane.
5) Stewardship of space is threatening traditional Air Force leadership.
6) Values should be the driver for all decision-making.
7) Articulation of values comes before any consideration of alternatives.
8) The Air Force has not used value-focused thinking, and the claims otherwise have promoted a perception that undercuts its potential power.
9) The Air Force does not have a systematic, analytical, intellectually based process for developing doctrine.
10) War and military doctrine are inseparable; war is an art not a science; military doctrine contains no absolutes; and the Air Force places too much emphasis on the "principles of war."

11) Military doctrine should be based on the values of the organization and the nation it serves.

12) Doctrine is pulled by and pushes technology; doctrine should be written with the pushing effect in mind, which demands it look to the future, unencumbered by present day policies and treaties.

13) All doctrine is ultimately theory; experience is of great value to doctrine, but a lack of it is not a valid reason to not write doctrine.

14) A doctrine development model utilizing value-focused thinking will help produce quality doctrine.

15) To be useful, doctrine has to be written with the doctrinal purposes in mind.

16) The importance of space assets is growing exponentially both militarily and commercially.

17) Maintaining our ability to freely operate in space while limiting an adversary's ability is critical to national security.

18) The Air Force does not have doctrine adequately addressing space control issues.

19) Achieving control of space is meaningless in and of itself; space control has to be considered within the context of the other missions.

20) The Air Force does not need space control doctrine specifically; it needs better space operations doctrine.

21) An environmentally based aerospace concept is bankrupt.

22) Space and air can be merged into an aerospace concept based on the fundamental objectives of operating from the third dimension.

23) Doctrine developed using values as the foundation can provide the Air Force with an aerospace power vision.

24) The Air Force needs to develop aerospace power doctrine.

25) Aerospace power leadership does not have to come from the rated, missile, or space operations communities; any airman who understands aerospace power can effectively lead an aerospace force.

Recommendations

Based on the research of this work, there are five recommendations for the Air Force. Two of the recommendations are a call for the Air Force to write better doctrine. Another of the recommendations promotes the way to accomplish this. The next

recommendation is an appeal to the Air Force to stop producing doctrine until it is ready to actually develop quality doctrine. The final recommendation advocates the reconsideration of one of the apparent aerospace values. It is believed implementing these recommendations would serve to create an integrated aerospace force.

Write Aerospace Power Doctrine

"The Air Force 'establishment' needs to recognize officially the differences of the space environment and the advantages that space forces provide in accomplishing traditional Air Force missions," Major Grover Myers noted in 1986. "At the same time, space force advocates must recognize the disadvantages of space forces," he continued, "and realize that missions of air forces also apply to space systems—that we are an aerospace force and that system characteristics do not imply separateness"(92). In January 1999, in an editorial in *Air Force Magazine* John Correll stated that "Airpower and space power are complementary rather than competitive. The sensible direction is to integrate them, not to pit one against the other"(17:2). The conclusions appear to be the same, but the implication is that the Air Force has wasted the past thirteen years by not writing a truly integrated aerospace power doctrine.

To develop an integrated aerospace power doctrine the Air Force will have to rethink the way it approaches air and space. Trying to use old ideas without seriously considering new innovative thought, present day realities, and future possibilities is doomed to the same fate that has led the Air Force into the position it is in today. To put it another way, Carl Builder has noted that the Air Force should not base itself on airpower theory "as originally conceived more than 70 years ago, but [on] air power

theory as it should have been *reconceived* 30 years ago"(12:205). Value-focused thinking and the doctrine development model within this work provide the tools for the Air Force. Tools, however, are not enough. It takes a serious commitment and a great deal of effort to draft quality doctrine.

This new aerospace power doctrine needs to be futuristic in its outlook. "The original theory of air power was about more than airplanes and air forces; it was every bit as much about the way the world and war were widely expected to work in the future," Carl Builder has commented (12:230). To be effective, aerospace power theory must also be concerned with the war of the future. Just as the original airpower "theory was motivated and rationalized on a perspective of the future" the same must be true for aerospace power theory and doctrine (12:230).

As part of a futuristic approach, the Air Force needs to be cognizant of some important factors. Lieutenant Colonel Cynthia McKinley has pondered, "Over time, the nature of war has changed, going into the next century what is the nature of warfare?"(84). She has also pointed out that "not every adversary will be the same, nor the same as us"(84). The implication is that our theory and, ultimately, our doctrine need to be flexible and concerned with more than old Cold War ideology. "My concern is whether the evolution of air and space doctrine will be mostly in the mainstream—with the traditional roles and missions we have come to associate with fighting and winning the nation's wars," Carl Builder has noted, "or out on the frontiers, in now or long-forgotten roles and missions for air and space power"(11:3).

Major Mike Dickey has noted his belief that "there is a link between doctrine and the institutionalization of ideas"(26). This thought seems very appropriate to the position in which the Air Force finds itself. Air Force culture is nearly extinct and the organization is divided between sects promoting the characteristics of environmental mediums. Truly integrated aerospace power doctrine would provide the institutionalized ideas that could facilitate a renaissance in Air Force culture and establish a clear bond between air and space advocates. This requires aerospace power doctrine.

Reconsider Space Operations Doctrine

Space Operations is short on guidance and education. Rather than write specific space control doctrine to address the need and the best way for conducting space control operations, it is more imperative for the Air Force to demonstrate the synergy of all of the space operations missions. This can only be accomplished through reconsideration of space operations doctrine.

Force enhancement is a critical aspect of aerospace power, but it receives very little emphasis in the AFDD 2-2. The most discussed topic is space control, and even then this is lacking in substance. Force application is predicted, but left as an open possibility to be considered after it happens. This half-hearted attempt at looking to the future, once again, provides little education and almost no guidance. Space support is also given very little import based on its coverage.

Specific to space control, the Air Force needs to work with the other services to work on clear terminology. The complicated space control/counterspace operations envisioned by current publications serve to confuse. Realistically, the terminology does

not need to be treated as some great complexity. Perhaps the problem is the Air Force is attempting to impose air terminology on space concepts, or perhaps the other services are working to avoid the use of air terminology. It makes no difference which is the case, the fact is that USSPACECOM needs to set the standard, and all others should follow it.

This standard should be based on the values of controlling space. Trying to come up with a catchy list of words that start with the same letter is unnecessary. A simple system, which captures the needs of space control, is best. One that meets these criteria has been proposed within this work. Whichever system USSPACECOM and the Air Force choose to implement does not change the fact that space operations doctrine needs to be reconsidered.

Use the Doctrine Development Model

The doctrine development model should be used. The Air Force needs a systematic, analytical, intellectually based development model, and this work provides one. Through this model, the Air Force will be able to clearly and explicitly articulate its purposes for having doctrine and the values its doctrine promotes. This model also facilitates debate because of its focus on constructive feedback. Feedback and debate provide aerospace force proponents the opportunity to bond together and buy stock in the Air Force. In 1982, Lieutenant Colonel Dino Lorenzini made the same connection, "The development and articulation of doctrine serve as a focal point for discussion, challenge, and group consensus-building. Thus, when new concepts are being formulated, the process of doctrinal development may be more valuable that the product that is finally

produced"(77:16). The current Air Force doctrine development process does not do this, but use of this new doctrine development model will.

Place A Moratorium on Publication of New Doctrine

Because the current Air Force doctrine development process is so flawed, the Air Force needs to place a moratorium on publication of all new doctrine. Truthfully, it would be better to have no doctrine than bad doctrine. Trying for an 85% solution is the wrong approach for publishing doctrine. It would be better to take more time and get closer to a 100% solution. There probably is no perfect solution. If there were a perfect solution, it would be an absolute, and, as noted so many times before, doctrine is not absolute.

It is easy to concede that some doctrine ready for publication might have excellent content, so it would be dangerous to be too reactive. The danger, however, associated with bad doctrine, and the associated waste of resources associated with its publication is too great to not be a little bit reactive. All doctrine needs serious consideration before being put out on the street.

Captain Thomas has noted that "there is a lot of fear in starting at ground zero—no one will be around to see it"(117). The Air Force cannot allow fear to determine the course it follows. Sometimes doing the right thing requires accepting more risk and discomfort than doing the easy thing. The Air Force needs to place a moratorium on all new doctrine.

Reconsider the Aerospace Power Leadership Values

"An atmospheric Air Force that seeks a personalized 'right stuff' but limits its attainment to rated officers," Colonel Richard Szafranski and Doctor Martin Libicki have noted, "risks an exploitation schism among its various communities—especially as those of us in Nomex are surrounded by those of "them" in battle-dress uniforms or hospital whites or office uniforms"(114:74). Limiting the opportunities for leadership to rated officers, missileers, and space operators is no better of a solution. There is a grave danger in continuing with the apparent aerospace value that leadership must come from the perceived employers of aerospace power.

The divisions within the Air Force and the growing rift in the space community is promoted by misconceptions about what is "operational" and who is a "warrior." An aerospace force should be concerned with who is an aerospace power advocate. Perhaps there is validity in the idea that those with the most experience employing aerospace power have the best understanding. At the same time, those who have spent their lives doing and taken no time for thinking may be confused by personal perceptions of the way the world works. A space mafia would be no better than a fighter mafia, which is no better than a bomber mafia. Ideally, every aerospace power advocate should have the opportunity to lead an aerospace force.

If the Air Force truly desires a cohesive aerospace force with a common culture, it needs to provide all members with an understanding of the part they play. This includes insight into their leadership potential, and the reasoning for their potential being what it is. If leadership is truly an aerospace value, it needs to be explicitly stated and supported

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so everyone in an aerospace force has the opportunity to understand it. In the interest of a truly integrated aerospace force, however, the Air Force should reconsider the aerospace power leadership values.

Concluding Thoughts

"In the future, a separate U.S. Space Force (with all the associated 'empires' and bureaucratic competition) could exist," Grover Myers predicted in 1986, "simply because the U.S. Air Force refused to integrate space forces and doctrine fully into its operations and the all-important budget process—because it failed to make the logical and natural step to a truly aerospace force"(92). In 1999, various forces are working to make this a prediction come true. Congressional interest in the Air Force's stewardship of space is serious. Historically, the Air Force has reacted to Congressional pressure when it came to space. The reactions, however, have frequently been slow. Now is the time for the Air Force to take the lead, and do the right thing.

Colonel Edward Mann wrote in 1995 he believed that "in nearly every way, the United States Air Force is better prepared to face the future than any other military organization in the world"(79:193). He added, however, "if we should lose this birthright, it will be because we failed to commit ourselves faithfully to the profession of arms and failed to understand and develop our own history, experience and theory"(79:193). It has been nearly five years and the birthright appears to be slipping away. From the top looking down, it may seem that an integrated aerospace force already exists. Looking at it from the bottom up, the force is not integrated, but truly fractionalized.

"Unless or until the USAF is seriously concerned with doctrine, with the uniqueness of airpower, with the understanding of the men and women in blue suits about what they contribute as a service and what makes that special," Grant Hammond wrote for the *2025* study, "then there is no real identity, no real self-confidence, and no vision for the future"(53:12). He is exactly correct, and, recall, he considers air and space to be one concept under the term "airpower." Because of the associations made with the term "airpower" and its inherent prejudice, Hammond is incorrect in suggesting it is the right term to use. Aerospace power has to be the term to truly capture the concept of what the Air Force envisions itself being.

In his work on the potential avenues of extinction for the Air Force, Hammond concluded, *"The only element common to all the paths of extinction is the failure to understand the significant attributes of airpower"*(53:17). These attributes are really captured through articulation of aerospace power values. Value-focused thinking and the doctrine development model established in this work provide the tools for achieving the needed understanding.

"A redefined theory of air power need not be perfect or permanent, but it should inspire people to join in a directed human enterprise that they can and want to believe in," Builder has declared in *The Icarus Syndrome*. "One that is worthy of the profession of arms and, if called upon, the risking of lives. That is the most important legacy of air power theory. When redefined, that will be its greatest promise"(12:291). This is the same conclusion the author has drawn from this work.

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It needs to be made clear that value-focused thinking and the use of the proposed doctrine development model are not the panacea for all of the Air Force's ills. One of Builder's concluding thoughts serves to reinforce this idea and provides an excellent conclusion to this project:

> Redefining air power won't ensure the institutional health of the Air Force; but its health can't be recovered without it. Thus, fixing air power theory is a necessary, but not a sufficient, prerequisite to fixing the Air Force. The question now is how to redefine air power theory to meet the needs of the Air Force as an institution and the nation's security for the future. (12:205)

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Vita

First Lieutenant Toby Glen Doran was born 11 November 1969 in Salem, Oregon. He spent his entire youth in the Willamette Valley, graduating from North Salem High School in 1987. Upon graduation, he enlisted in the Air Force. He served as an airman and non-commissioned officer (NCO) as an Airborne Arabic Cryptologic Linguist, flying over 1000 hours aboard RC-135 aircraft in support of Operations Desert Shield, Desert Storm, and Provide Comfort. After assignments at Hellenikon AB, Greece, and RAF Mildenhall, UK, he was entered into the Airman Scholarship and Commissioning Program (ASCP) at Oregon State University (OSU) in Corvallis, Oregon. He is a Distinguished Graduate of the OSU Air Force Reserve Officer Training Corps (AFROTC) program. Having been commissioned a Second Lieutenant in the United States Air Force (USAF) in 1995, his first assignment was to Undergraduate Space and Missile Training (USMT) at Vandenberg AFB, California. While awaiting the start of USMT he was assigned to the Environmental Compliance Office, 30th Civil Engineering Squadron, at Vandenberg AFB, California. Upon completion of USMT and a technical course in Colorado Springs, Colorado, he was assigned to the 12th Space Warning Squadron (SWS), Thule AB, Greenland. While there, he was selected to attend the Air Force Institute of Technology (AFIT) School of Engineering to receive a Masters of Science Degree in Space Operations. His follow-on assignment after AFIT is to the 17th Test Squadron (TS) at Schriever AFB, Colorado. First Lieutenant Doran is married to the former Heide A. Knaak of Modesto, California. They have two daughters, Rachel and Renee.

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