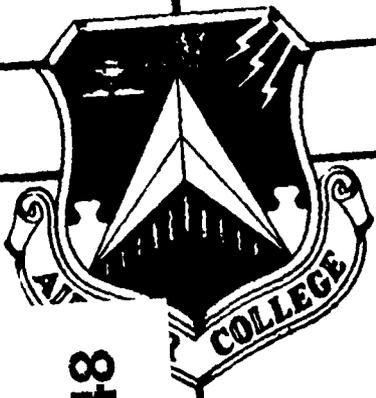


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RESEARCH REPORT

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ASSESSING THE MORALITY OF USING THE SPACE ENVIRONMENT AS A PLATFORM FOR WEAPONS

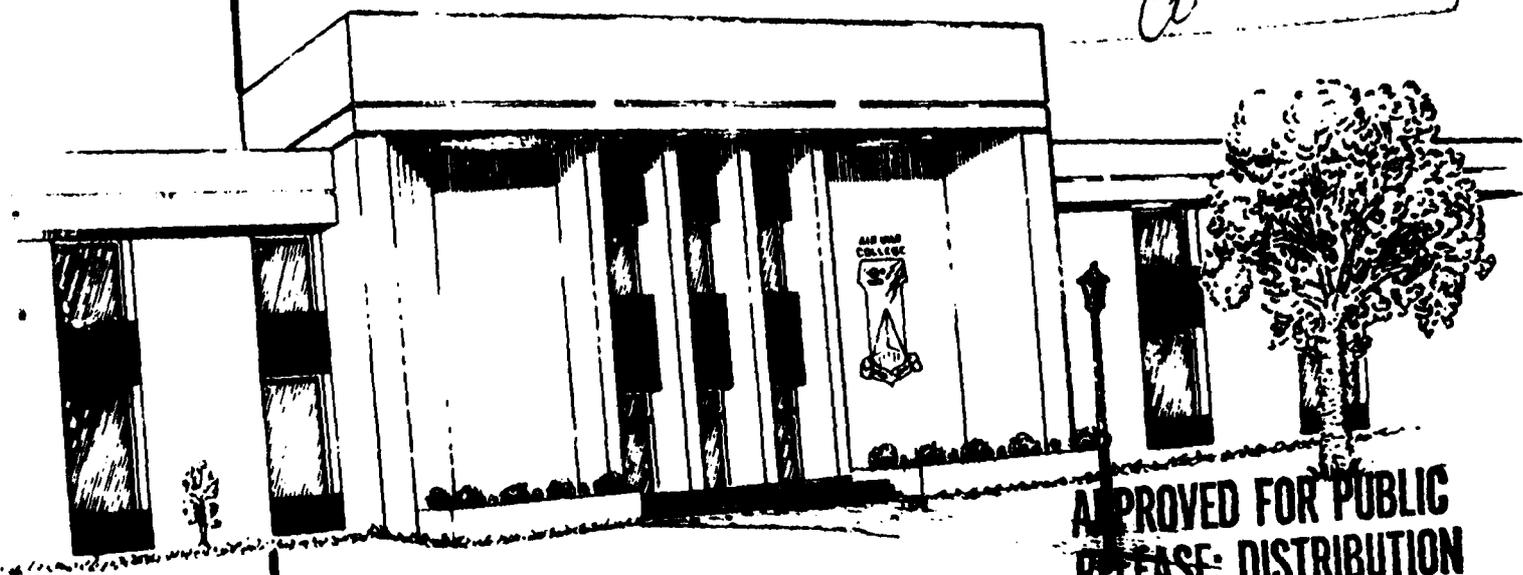
LT COL WILLIAM E. CAFFALL

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COLONEL RUSSELL G. STAFFORD

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UNITED STATES AIR FORCE
MAXWELL AIR FORCE BASE, ALABAMA

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ASSESSING THE MORALITY OF USING THE SPACE
ENVIRONMENT AS A PLATFORM FOR WEAPONS

by

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A DEFENSE ANALYTICAL STUDY SUBMITTED TO THE FACULTY
IN
FULFILLMENT OF THE CURRICULUM
REQUIREMENT

Advisor: Colonel Eric E. Sundberg

MAXWELL AIR FORCE BASE, ALABAMA
May 1989

DISCLAIMER

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EXECUTIVE SUMMARY

TITLE: Assessing the Morality of Using the Space Environment
as a Platform for Weapons

AUTHORS: William E. Caffall, Lieutenant Colonel, USAF
Russell G. Stafford, Colonel (Select), USAF

Remarks about President Ronald Reagan's hope of developing a system of national defense which does not rest on the reliance on nuclear weapons introduces the discussion on how US citizens expect their military to conduct war. A description of the Just War Theory and the Law of Armed Conflict completes the background for the authors' views of how space weapons could significantly change US employment of the Principles of War. The dramatic enhancements to the Principles of War available through space weapons apply to the full spectrum of conflict and promote the very real possibility of truly limiting war. The analysis of the Just War Theory, the Law of Armed Conflict, and the space-enhanced Principles of War resulted in the conclusion that a more moral means of warfighting does exist than reliance on weapons of mass destruction and indiscriminate killing. The space environment offers that hopeful solution.



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BIOGRAPHICAL SKETCH

Lieutenant Colonel William E. Caffall has served in the space business since the creation of Space Command in 1982. Immediately prior to his assignment to Air War College, he was commander of a satellite tracking and data relay site in northern Maine. During his career he has filled several executive officer and administrative positions, including Aide-de-Camp to CINCNORAD and Commander, Space Command, Peterson AFB, CO, and Chief of Personnel and Administration, HQ AIRSOUTH (NATO), Naples, Italy. He was the distinguished graduate of his Missile Operations course and worked with the Minuteman II missile system as a combat crew deputy and commander, and then as a missile staff officer. His awards include the Defense Meritorious Service Medal (1 OLC), the Meritorious Service Medal (1 OLC), and the AF Commendation Medal (2 OLC). In addition, he shares many organizational awards including his unit's selection as the AF Space Command Satellite Control Facility of the Year (1987). He received his BA at the University of Maryland, College Park, MD, and his MS from Central Missouri State University, Warrensburg, MO. Lt Col Caffall is a graduate of the Air War College, class of 1989.

BIOGRAPHICAL SKETCH

Colonel (select) Russell G. Stafford (MBA, North Carolina State University) has been in logistics throughout his Air Force career. He has served as a commander and staff officer at both wing and MAJCOM level. His bases of assignment include MacDill, Thule, Pope, Scott (two tours), Lajes Field, Charleston, and Maxwell. He has won several MAJCOM awards for his job performance and futuristic approach in inspiring logistical support. With a continuing eye to the future, he has long been interested in space and the evolving technologies it offers. He holds the meritorious service medal with four oak leaf clusters. Colonel Stafford is a graduate of the Air War College, class of 1989.

TABLE OF CONTENTS

CHAPTER		PAGE
	DISCLAIMER.	11
	EXECUTIVE SUMMARY	111
	BIOGRAPHICAL SKETCHES	iv
	INTRODUCTION.	1
I	IN SEARCH OF AN AMERICAN MORALITY ON WAR: NATIONAL VALUES, THE JUST WAR THEORY, AND THE LAW OF ARMED CONFLICT	3
	The Just War Theory	7
	The Law of Armed Conflict	16
II	SPACE TECHNOLOGY AND THE PRINCIPLES OF WAR. .	22
	Evolving Technologies and Space Weapons . .	27
	The Principles of War	33
III	SPACE IS THE PLACE.	46
	NOTES	58
	BIBLIOGRAPHY.	64

INTRODUCTION

On March 23, 1983, President Ronald Reagan addressed the United States in what became known as his "Star Wars" speech. In that address he offered a vision ". . . to counter the awesome Soviet missile threat with measures that are defensive. . . ." ¹ Less than two months later a national conference of leading religious authorities published their findings which discussed at great length war, but specifically the moral aspects and implications of nuclear war. In the portion of their report titled "Efforts to Develop Non-violent Means of Conflict Resolution," they apparently concur with President Reagan's voice of a growing part of our population, and state:

We affirm a nation's right to defend itself, its citizens, and its values. Security is the right of all, but that right, like everything else, must be subject to divine law and the limits defined by that law. We must find means of defending peoples that do not depend upon the threat of annihilation. Immoral means can never be justified by the end sought; no objective, however worthy of good in itself, can justify sinful acts or policies. ²

Much has been written and debated since the development of nuclear weapons concerning man's ability (and inability) to control the force he discovered. More specifically, and certainly more recently, many theologians have studied the morality of the use of nuclear weapons. Some contest on moral grounds this Nation's policy of deterrence based on nuclear weapons. Some even continue

that discussion to include the immorality of the notion of a strategic defense initiative.

In this paper, we explore what this nation recognizes as moral justification for war. We then look at the evolving technologies available as a result of the advances in space technology to ascertain whether or not space may offer a viable alternative in future warfighting, including the possibility of truly limited conflict far below the level of nuclear confrontation.

The first chapter of this paper addresses the morality issue, or the method the leaders of the United States employ to justify and conduct war. We look at National Interest and Objectives, the Just War Theory, and the Law of Armed Conflict. The second chapter of the paper discusses space technologies and applications to enhance the military employment of force vis-a-vis the Principles of War. The third chapter integrates the first two to show that a medium does exist which allows future war making on a more moral basis than the current reliance on nuclear weapons and the threat of mass retaliation and annihilation. That arena is space.

CHAPTER I
IN SEARCH OF AN AMERICAN MORALITY ON WAR:
NATIONAL VALUES, THE JUST WAR THEORY,
AND THE LAW OF ARMED CONFLICT

If we must defend our homes, let us defend them as well as we can in the direct sense, but let us have no part in making millions of women and children and non-combatants hostages of the behavior of their governments.¹

George F. Kennan, May 1959

In his article, "The Church and the Ideology of National Security," Major General Stuart Barstad, former US Air Force Chief of Chaplains, observed, "Whenever religious leaders speak or write on subjects of national security or national policy, there are those who question the propriety of the Church's voice; and at another level, those who blatantly criticize what the church has to say." Yet, the principles of morality and religious freedom loomed large at the foundation of this nation. Have we placed so much emphasis on the separation of church and state that our national decisions no longer reflect those same convictions? Do we no longer consider moral values in the way we reach our conclusions? Does ethics have no place, as Major General Kermit Johnson, then US Army Chief of Chaplains, reflected in his speech to the National Defense University in August 1985:

I once heard a general officer declare assuredly before a War College class that "ethics never won a battle." The implication was that nothing as "soft" as ethics could or should have much relevance to the tough "bottom-line" of the military, which is to win battles.³

Apparently the War College students felt differently: "Needless to say, that general officer was dismantled, piece by piece by that War College class."⁴ What, then, serves as an American morality model, something more substantial than "apple pie and Mom," which would reflect why Americans might go to war?

Perhaps one cannot establish an American morality for there exists at least one morality for every American. Looking to some theological models for decision making often leads to "situational ethics"--four columns wide, twenty series deep, read like a roadmap and the situation and moral conclusion intersect. This approach is not helpful in assessing war! In addition to the different situational moralities, there are also countless methods of describing and defining those moralities, and probably even subsets of those methods. Unfortunately, accepting the notion that the US has too many moralities and too many ways of discussing them leads to the tarred-and-feathered general's approach, or to an attitude of, "That's why we let the theologians worry about morality."

A beginning of a meaningful approach to the morality question exists in President Reagan's National Security

Strategy of the United States, published in January 1988.

This short booklet contains the goals, aspirations, and directions of the Nation. It outlines what we prize as a Nation, and specifically ". . . human dignity, personal freedom, individual rights, the pursuit of happiness, peace and prosperity."⁵ Our Constitution outlines all of these values. The booklet further identifies these values in terms of the following US interests:

1. The survival of the United States as a free and independent nation, with its fundamental values intact and its institutions and people secure.
2. A healthy and growing U.S. economy to provide opportunity for individual prosperity and a resource base for national endeavors.
3. A stable and secure world, free of major threats to U.S. interests.
4. The growth of human freedom, democratic institutions, and free market economies throughout the world, linked by a fair and open international trading system.
5. Healthy and vigorous alliance relationships.⁶

From the broad scope of U.S. interests, the booklet turns to breaking down the five major themes into objectives, policies, and strategies in pursuit of national security. Air Force Manual 1-1, Basic Aerospace Doctrine, comprehensively describes the role of the US Air Force to support those interests. Of particular note here, however, is the "Introduction" of the manual regarding the actual employment of US military force:

The decision to commit US military forces in the conduct of war must consider the desired objectives, the capabilities of our forces, and the will of the people. The fabric of our society and the character of our national values suggest that the decision to employ

US military forces depends on a clear declaration of objectives and the support of the American people. In every sense, US Armed Forces belong to the people, and the ultimate success in committing these armed forces to achieve an objective will rely on the support of the people.⁷

The values, interests, policies, and strategies of this Nation give a clear understanding of what could persuade Americans to go to war and how they should fight if war becomes necessary. Although not yet defining a moral framework for war, the support of the people, as introduced above, is a very key element of that framework. American political and military leaders know that this Nation cannot be successful in war without the backing of the American people. This appears as an idea basic in design, Clausewitzian in definition, and demonstrated throughout the history of this Country. Also apparent in the will of the people of the United States is that they will not go to war without substantial provocation and then only if our national security or interests become jeopardized.

The common thread running through the fabric of every sector of the United States leads to a justification of war that goes back hundreds of years in Christian and Jewish theology. Depending on which version one now reads, the "Just War Theory" may have between six and eleven tenets or rules which must be fulfilled before a war can be morally fought. Particularly interesting about the Just War Theory is that the rules do not appear religious in

content except for the basic concept that, as a very general rule, killing is not a moral action. Certain circumstances, however, may overrule that concept.

If properly considered, the tenets of the Just War Theory justify a conflict before it occurs. One should not try to justify a past excursion by trying to squeeze past events into the theory. Again, as written soon after President Reagan's "Star Wars" speech and as cited above, "Immoral means can never be justified by the end sought; no objective, however worthy of good in itself, can justify sinful acts or policies."*

THE JUST WAR THEORY

Some consider the Just War Theory a Christian philosophy; others find its history dating to ancient Jewish literature. Despite its origination, it serves to identify those conditions which must be met before intentional violence occurs, if that violence stands a chance of moral justification. The Just War Theory

. . . presupposes that killing is not the only wrong, and no single moral commitment can account for the variety of norms that must be brought to bear on matters of statecraft. Man does have the obligation to preserve human life, but that also implies protecting the weak against the exploitation by the strong. And there is also the obligation to preserve a quality of life that sustains and extends that life. And when the destructive forces are loosed in the human arena that destroy either the 'esse' or the 'bene esse' of human existence they must be opposed realistically. In these cases, it is morally possible that intentional killing may be the lesser wrong or a positive obligation even though it is intrinsically evil.*

Professor Max Stackhouse, the Herbert Gezork Professor of Christian Social Ethics at Andover Newton Theological School, described what he felt to be the ten conditions most useful in discussing the Just War Theory. Although many other versions exist, they all revolve around the same basic ideas. Dr. Stackhouse's ten rules seem more comprehensive than some others, and are the basis for the following discussion. He states, "Intentional violence is evil, but justifiable use of war and the instruments of war may occur when and if . . ." ¹⁰ then outlines his ten conditions of the theory:

1. **An action of last resort.** Carl von Clausewitz devotes a great deal of his book, On War, to this particular concept, and he wrote, ". . . that war is simply a continuation of political intercourse, with the addition of other means." ¹¹ Important in Clausewitz's writing is that he does not believe that once war occurs, politics becomes suspended. To the contrary, he discusses politics continuing specifically to provide rules and logic to the war. Dr. Stackhouse suggests that when all other attempts to prevent destruction and the continuation of the observed evil have failed, force may be required to halt that destructive evil. A Presbyterian ethicist's book states, "All other means to the morally just solution of a conflict must be exhausted before resort to arms can be regarded as legitimate." ¹²

2. An action of just cause. This condition is one of motivation and purpose, for a nation trying to prevent an evil or establish a greater good than currently exists must show its cause as real, right, and credible, and not merely claimed. The cause must show the intention to advance an important good, or disable or avoid something grievous. The Presbyterian ethicist wrote, "War can only be justified if employed to defend a stable order or morally preferable cause against threats of destruction or the rise of injustice."¹³ Dr. Stackhouse notes that, in making the case for just cause, one must demonstrate that the proposed war will prevent any further degradation or erosion of ". . . freedom, equity, and order . . . being undercut by a potential enemy."¹⁴

3. An action carried out by legitimate authority. "Just War norms are political norms and are to be carried out by legally constituted offices of government. . . ."¹⁵ Dr. Stackhouse stated this condition as precisely as did Clausewitz, who wrote, ". . . war cannot be divorced from political life. . . ."¹⁶ In his commentary section of On War, Bernard Brodie suggests that a war does not have its own inherent logic, but rather that war gets its logic from political aims. Further, if, as Clausewitz discusses, war is a part of policy, then policy will specify the nature of the war. The condition of legitimate authority requires that the people who make or represent policy must adequately

represent the will of an informed population, or "the will of the people." Another important implication of this condition is that it does not allow a justifiable war by unauthorized groups, for conceivably those groups might not actually represent the will of the people. While terrorists and certain revolutionary groups may fall into this category, countering those elements does not necessarily. In fact, defending against them might be morally required.

4. **An action with the hope of success.** The ethicist wrote that military means must promise a high probability of attaining the particular moral and political objectives before a nation may employ those forces in a just war. The argument for probability of success seems almost too basic to bear much thought. However, one should understand that a nation could begin a conflict in full knowledge of overwhelming odds against it and accept the subsequent defeat with the sole original intent focused on the outcome after it loses. Clearly, as such an adventure would not have as its basis the displacement of some existing evil, the use of a killing force could not be justified. Whenever a nation's moral responsibility dictates the destruction of people, clear-headed logical thinking aimed at winning (overcoming the evil) must prevail.

5. **An action where more good than harm will result.** While each of the conditions for a just war works in

harmony with all of the others, the tenet of "more good than harm" plays much stronger with "just cause" and "hope of success." Fundamentally, a nation's people understand that a conflict will result in some harm to their nation. This will likely appear as loss of lives, and assuredly will include some expenditure of resources and material which could possibly affect the nation more positively if used differently. Still, the people perceive the evil facing them as so great that their nation must not allow it to continue, and they opt for the conflict, knowing that their cause is just, and that they have a high probability of success. The hope of success of their cause warrants the lesser harm they will encounter.

6. Use of a force proportionate to the power of the evil. This tenet suggests that no nation of people will become so base as to render it totally evil with no redeeming features. One does not burn a house down to eliminate termites, nor destroy an apartment complex where criminal activities have headquartered! The power of the weapons employed must not, therefore, totally eliminate a people, but only the evil that that nation or society represents. Because more good than harm will flow from a just war, one expects the remaining good in a nation to envelop the fallen evil.

7. Announce the conditions under which war would occur. Because the people of a nation put their trust in a

legitimate authority, that authority has the requirement to keep its people knowledgeable of its policies. (Remember that a "legitimate authority" has its base in a knowledgeable society.) Further, the authority must declare hostilities publicly. If, as Clausewitz suggests, war continues political intercourse, the enemy must be appraised of the intent for conflict. Dr. Stackhouse states, "A due regard for the moral sentiment of mankind, including the enemy, requires that public business be conducted publicly."¹⁷

8. Match an attack on an evil force with an attack on the conditions that permit that evil. Dr. Stackhouse suggests that the traditional just war theory might not include this condition. However, technology now allows the world a great opportunity to view the inner workings of nearly all nations. Consequently, nations today probably have sufficient insight to allow them to know not only that they face conflict from an evil opponent, but also what the inherent nature of that evil represents. Dr. Stackhouse notes ". . .injustice and want breed greater injustice and destruction."¹⁸ Necessarily then, in overcoming the evil, thereby bringing a great good to the forefront, a just war must serve to rout the social, economic, or political situations that allow the perceived evil. Because the goal of such a conflict demands total eradication of the evil, the victorious nation must accept as a precondition of their imposed destruction on their enemy the commitment to

reconstruct. This particular condition for a just war ties in closely with the use of force proportionate to the power of the evil and the expectations of success.

9. **Treat the enemy with mercy.** Stated above, no nation is so totally bankrupt that it contains nothing of positive value. Therefore, once the war successfully eliminates the evil, the defeated people--part of humanity and no longer capable of continuing evil purposes and destruction--must have the opportunity to rebuild, hopefully in the spirit of the victorious good. Because imposed destruction accepts as a precondition a commitment to reconstruct, the victor must demonstrate the willingness and ability to allow the remaining good features of the defeated enemy to rise and assist in the final rebuilding.

10. **Discriminate between combatants and noncombatants.** Perhaps more than any of the other conditions for a just war, this one serves as the major source of debate centered on whether modern warfare with the constant threat of escalating to nuclear confrontation could ever be categorized as "just." No one fact rings louder in the debate than that nuclear weapons cannot discriminate between good and evil, combatants and noncombatants. Because a nation must resolve all of the conditions of a just war, and because all of the conditions tightly intertwine, many theorists dismiss the application of Just War Theory for modern war almost out of hand because of nuclear weapons. Dr. Stackhouse points out that the men,

women, and children trying to create a "just peace" in the midst of open confrontation must be allowed that opportunity. They must not be included in the conflict as they do not represent the perceived evil. Indeed, to fulfill other just war conditions, noncombatants must be protected so that they may assist in the eventual defeat of the evil and necessary reconstruction at the conclusion of the conflict. Neither the evil force nor the force employed to overcome the evil can include or involve noncombatants.¹⁰

Having reviewed the conditions of the Just War Theory, we offer a very serious caution to those who seek to justify war by the Theory: that is a backward concept! The conditions of the Theory must be fulfilled before a war can be just. Stated above, a past excursion cannot be explained away, after the fact, by seeing how well it fits the theory. A significant counterargument to the theory holds that modern man has done exactly that, or as Dr. David Hollenbach, Associate Professor of Moral Theology, Weston School of Theology, writes in his book, Nuclear Ethics: A Christian Moral Argument, ". . . as the [Just War] theory evolved historically, the presumption against the use of violence was replaced by a presumption of the justice of warfare conducted by legitimate authority."¹⁰ People and nations have sought to moralize and legitimize wars in the context of how well those wars fit the theory. But nearly every knowledgeable writer reveals the same

basic axiom: "The original just war question implies that nonviolence is the Christian norm and that the use of force can only be moral by way of exception, if at all. Violent force should be 'presumed' to be incompatible with a fundamental Christian moral orientation."¹

To overlook the severity of the above caution is to negate the proper understanding and application of the theory, for one too easily finds ways to war and doesn't seek ways to prevent war. (A consequence of that, logically, is that one finds himself on the "evil" side rather than the "good.") Moreover, without a comprehensive recognition of the caution, one cannot properly evaluate a proposed action in terms of the theory. If one realizes the Just War Theory's foundation is not violence, and one can demonstrate positive fulfillment of all of the outlined conditions, then he can begin to answer the question posed by Thomas Aquinas in his discussion on the topic of warfare: "Is it always a sin to fight in war?"²

The above discussion of the conditions for a just war may appear short or incomplete to students of the Theory. Certainly, much debate centers on each rule. Just as certainly, the debate intensifies many-fold when one evaluates all of the conditions together. The purpose here, however, is to find some basic value or system of values which most Americans believe in, and which identifies why and how Americans might go to war. Without

specifying any particular religious persuasion, the Just War Theory seems to fulfill that obligation.

THE LAW OF ARMED CONFLICT

. . . the behavior of nations over a long period of time is the most reliable, though not the only index of their national interests. For though their interests are not eternal, they are remarkably persistent. . . . There is no great mystery why this should be: the facts of geography are permanent . . . thus successive generations of men tend to face the same recurrent problems and to react to them in more or less habitual ways.²³

President Reagan included the above Walter Lippmann quotation in his 1988 National Security Strategy of the United States publication. Mr. Lippmann's inclusion of the United States in the statement is obvious, whether specifically intended or not. Despite possible language and rhetorical changes, this nation has maintained its fundamental interests since its early inception. While the Just War Theory outlines the conditions necessary before US citizens should allow their military services to wage war in support of our national objectives, the Law of Armed Conflict goes a step further as it binds the United States to other nations of the world through international laws established to ". . . regulate the conduct of armed hostilities."²⁴

The Law of Armed Conflict usually applies only to conflicts between nations, not riots or other internal confrontations. Actions regarding terrorism and terrorist

acts are also not generally covered under the Law. Particular laws of individual nations suffice to deal with those types of situations. Rather, the Law speaks to war, and if followed,

". . . the law of armed conflict will keep war in its proper channel and prevent it from needlessly affecting persons and things of little military value. By preventing needless cruelty, the bitterness and hatred arising from war is lessened, and thus it is easier to restore peace."**

The Law puts into legal terms the tenets of the Just War Theory! The Law and the Theory both specify the requirement to concentrate forces only against critical targets while not otherwise adversely affecting portions of the enemy's nation which do not contain military objectives.

Air Force Pamphlet 110-34, Commander's Handbook on the Law of Armed Conflict, devotes several sections to the separation of a nation's war fighting capabilities from its noncombatants. Paragraph 2-1 states that only objectives of military importance may be targetted for attack while all unnecessary collateral destruction must be avoided. Paragraph 2-3 identifies more specifically a nation's assets which must show absolute applicability to an enemy's capability to conduct war before they may be proposed as targets for attack. Included are: indirect economic support; civil aircraft; dams, dikes, and nuclear power stations; and food and other objects indispensable to noncombatant survival. Under the Law, such targets must not be attacked unless they

contribute to an enemy's military action and their destruction provides a consequent definite military advantage.

Paragraph 2-4 states that populated areas should generally not be attacked as area targets, but rather that specific military objectives within the populations should be selectively pinpointed. (Obviously, this may not always be possible, and the Law allows for those circumstances.) Similarly, wounded people and forces preparing to surrender must not face continuing hostile activities (paragraphs 3-2 and 2-9). Chapter 3 of AFP 110-34 carries the title "Noncombatant Persons," and begins:

Attacks should not be carried out for the primary purpose of killing, injuring, or terrorizing civilians, nor should weapons, methods, or means of attack be changed simply to increase civilian casualties. The same rules apply to civilian property and objects.■●

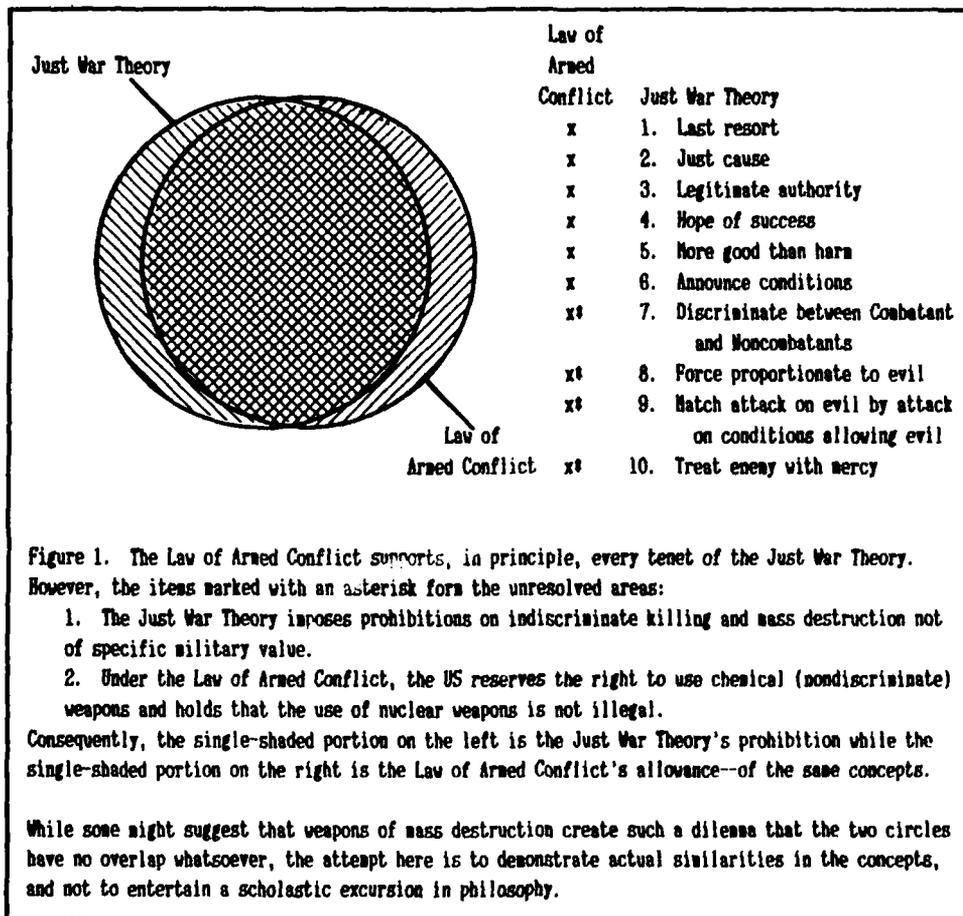
The Law of Armed Conflict clearly specifies the conduct of war, although allowing for circumstances where the particular situation may dictate deviation from the norm. Further, the Law incorporates the tenets of the Just War Theory, highlighted most specifically in the areas of discriminating between combatants and noncombatants, matching an attack on an evil force with an attack on the forces or conditions that allow the evil, and treating the enemy with mercy. However, scholars of the Just War Theory may argue that a divergent point between the Theory and the Law prohibits a total interrelationship--chemical warfare and the availability of and reliance on nuclear weapons.

Chapter Six of AFP 110-34 discusses legal and illegal weapons. Specifically, it addresses weapons resulting in unnecessary suffering, chemical and biological weapons, and nuclear weapons. The 1925 Geneva protocol, agreed to by most nations of the world, prohibits the use of chemical and biological weapons. The United States agrees in principle with this provision, and forbids the possession or use of bacteriological weapons. However, the US reserves the right to use chemical agents if an adversary uses them on us or our allies first. The existence of chemical and biological weapons sets the stage for the use of non-nuclear--yet still wholly indiscriminate--weapons of mass destruction and widespread killing.

Chapter Six also reveals that, "The United States takes the position that the use of nuclear weapons is not unlawful."⁷ This one sentence serves as the focal point for considerable debate on our national security policy, our deterrent strategy, and indeed as the point at which the Just War Theory may cease its applicability in today's world.

The figure below shows the striking similarities and the considerable overlapping of the Just War Theory and the Law of Armed Conflict. While the two are nearly mutually enveloping, the unresolved areas (dealing with indiscriminate killing and mass destruction) preclude total agreement. Consequently, while war can certainly be justified (the

Theory), and methods of fighting the war can be specified (the Law), we should try to find ways to close the gap remaining between the two.



Reflecting again on Mr. Lippmann's comment that a nation's history reflects its interests and the inseparability of the Theory and the Law, one rapidly concludes that the United States first and foremost does not want

war, but will fight to protect its interests against hostile evils. Further, the US seeks to end such a confrontation as rapidly as possible with the least amount of collateral damage and noncombatant involvement.

If, then, civilized people do not put prisoners to death or sack cities and lay countries to waste, it is because intelligence plays a greater part in their conduct of war and has taught them more effective ways of applying force than these crude manifestations of instinct. ■■

von Clausewitz, On War, 1831

CHAPTER II

SPACE TECHNOLOGY AND THE PRINCIPLES OF WAR

Wilbur Wright has made the statement that in his opinion--the use of the aeroplane for dropping bombs or explosives into a hostile army is impracticable, as the machines must rise 1,000 or 1,500 feet above the ground to escape shell fire. At that height accuracy would be impossible in dropping explosives when moving at 40 to 50 miles an hour. We believe their only use in war will be as scouts and messengers.

Popular Mechanics, July 1909¹

In a September 1988 article for Signal, the journal of the Armed Forces Communications and Electronics Association, General John L. Piotrowski, USCINCSpace, wrote that, "Current space systems bear little resemblance to their predecessors in terms of capability and reliability."² He stressed that while past developments focused on the capability and capacity of space systems, ". . . the evolutionary process must now move toward applying the four pillars--readiness, sustainability, force structure, and modernization--which are applied to all military forces."³ Gen Piotrowski ended his article by restating the goal of the use of space in the same terms President Reagan used in discussing our national objectives, ". . . to ensure our security and the security of our Allies and our friends. . . . We are moving toward that goal in a measured, evolutionary way."⁴

Secretary of the Air Force, E. C. Aldridge, Jr., and Air Force Chief of Staff, General Larry D. Welch, both

signed a 2 December 1988 "Memorandum for ALMAJCOM-SOA." The subject of the memo was "Air Force Space Policy," and states, in part:

We have recently completed an intensive review of the role of the Air Force in space. That review concluded that space operations can have a decisive influence on the future terrestrial conflict. Therefore, we must make a corporate commitment to integrate spacepower throughout the full spectrum of Air Force capabilities.⁶

The policy statement attached to and forwarded via their memo had as its foundation the text of "The President's National Space Policy Directive," which President Reagan approved on 5 January 1988. A message dated 21 April 1988 and transmitting the unclassified text of the relatively new national space policy discussed at considerable length the many and varied aspects of the US space program. Relating specifically to the National Security Policy, the President's directive outlined the space activities necessary for national defense:

"1) deterring, or if necessary, defending against enemy attack; 2) assuring that forces of hostile nations cannot prevent our own use of space; 3) negating, if necessary, hostile space systems; and 4) enhancing operations of the United States and Allied forces."⁷

The message directed all agencies to thoroughly evaluate the directive and prepare replies by 1 Jun 1988. That completed comprehensive review resulted in Secretary Aldridge's and General Welch's memorandum.

Outlining the tenets of the Air Force Space Policy, the memorandum lists:

--Spacepower will be as decisive in future combat as airpower is today.

--We must be prepared for the evolution of spacepower from combat support to the full spectrum of military capabilities.

--The Air Force will make a solid corporate commitment to integrate space throughout the Air Force.⁷

The Air Force and the Department of Defense have published many documents concerning the use of space. Some people less familiar with historical developments regarding the space environment may argue that this recent flurry of activity means that the United States is embarking on another new arms race--in space. More specifically, the rhetoric of the uninformed would have one believe that the United States seeks to "militarize" space. Past Commander in Chief, US Space Command, General Robert T. Herres has spoken repeatedly to that comment. In the December 1986 issue of Signal, he wrote, "For nearly 30 years, space has been used for military purposes."⁸ He then discusses how both the USSR and the United States use the space environment for such military missions as communications, navigational aids, surveillance, warning, and weather observations. Secretary Aldridge, in a speech to the National Strategy Forum Luncheon on 15 May 1987 also addressed the issue:

One final note, many of our critics argue that we are trying to militarize space--whatever that term means. The fact is that the military has been involved in the

national space program for three decades. Military rockets were the first boosters. Military spacecraft were among the very first artificial satellites launched by our country. And, military men were among the first astronauts.®

Clearly, technological advances have permitted significant enhancements in the capabilities of military systems which have orbited the earth since the late-1950's. Secretary Aldridge points out (in the same article cited above) that the Soviet Union has the only operational anti-satellite (ASAT) system in the world. That system (a "shot gun" type of weapon) is a "space weapon" in every sense of the term. On the very basic question of "Weapons in Space," the Soviet Union already possesses the capability, and, as many experts point out, they are not slowing their research and development efforts, specifically in the area of directed-energy technology.

The United States, in its space policy, is not starting anything new. It is not prompting another arms race, nor is it "militarizing space." Rather, the response by political and military leaders seems to be one of logical consequence. Just as technology proved Wilbur Wright wrong in his assessment that aircraft would only serve as scouts or messengers, US leadership has determined that space is yet another area--like land, sea, and air--which must not be surrendered to an adversary.

To preclude our adversaries from gaining any superiority in the space arena, the United States must

continue its research efforts. In On War, von Clausewitz reflects on the inconceivability of the outcome of any battle resting on a decisive technological superiority.¹⁰ Today, however, through comprehensive inclusion of space assets into military affairs (the Principles of War), ". . . terrestrial forces--Army, Navy, Air Force, and Marines--have grown increasingly dependant upon space systems to help them support national security objectives."¹¹ Application of and reliance on quantum technological developments have therefore taken on a critically important superiority which von Clausewitz could not begin to understand.

Since President Reagan's SDI speech, much has been written and spoken on the pros and cons of the SDI concept. Perhaps every element has been debated, from actual and physical possibilities, to the cost factors, to its effect on future political negotiations. While this paper does not attempt to further that debate, some of the scientific advancements associated with the SDI program do have applicability here, particularly in the area of potential weaponry. Because of their inherent physical properties, space weapons could dramatically enhance the way the United States military applies the Principles of War in doctrine and war planning.

EVOLVING TECHNOLOGIES AND SPACE WEAPONS

The two concepts of space weapons most widely discussed and publicized are Directed-Energy Weapons (DEW) and Kinetic-Energy Weapons (KEW). From the beginning of the SDI debate, many "experts" held the view that cost, size requirements, and accuracy would all serve as factors which limit the applicability of space weapons so dramatically as to render the notion futile. However, since the 1983 SDI speech, researchers have made great strides in reducing the size of proposed vehicles and in proving that accurate delivery is feasible despite being technically difficult. Further, the recent projected cost of a successful SDI "brilliant pebbles" network is approximately one-half of the nay-sayers original projection. Consequently, advances in the area of space weaponry offer the command authorities the possibility of radically enhancing this Nation's defensive posture and ability to win any future war, should deterrence fail.

Directed-energy weapons include several types of laser and particle beam weapons with destructive energy that can be delivered at the speed of light. At this velocity, only very minimal "lead" of the target need be calculated. Simplistically and practically, if a target is visible, it can be immobilized or destroyed at the speed of light.

Lasers are the most frequent kind of directed-energy weapons. Using any of a variety of external sources, a lasing medium is excited, resulting in energy being given to atoms and molecules. This energy stimulates other excited atoms and molecules causing the end-phase beam of light.¹²

For a laser to be effective as a weapon, sufficient energy must be transmitted and focused on the target. How this energy is produced dictates the type or class of laser. There are four major types:

1. Chemical lasers use energy from a chemical reaction between two fuels, usually hydrogen and fluorine.
2. Exciter lasers use a chemical compound of an inert gas in unstable excited stages.
3. Free-electron lasers use a beam of monoenergetic electrons produced by linear accelerators.
4. X-ray lasers use an intense source of gamma radiation (nuclear explosion) to "pump" the lasant material to an excited state.¹³

Los Alamos National Laboratory physicist, Gregory Canavan, stated in a recently published technical paper:

. . . directed-energy weapons can be based on smaller platforms and made available earlier than generally thought. Earlier analysis had theorized that directed-energy systems had to be much brighter to be effective. But more recent studies have concluded that moderate-brightness lasers can be effective . . .¹⁴

The chemical laser is currently in an advanced stage of development. The Navy successfully tested a mid-infrared

advanced chemical laser on 8 September 1986, when it destroyed a ground-based Titan I missile casing pressurized to simulate flight conditions of an operational Soviet missile. If deployed and based in space, such a laser weapon could interdict an adversary's missiles in boost-phase, post-boost phase, and in mid-course flight.¹⁵

Regardless of the type of laser, to be an effective long distance weapon, a space platform should be used, because a ground-based laser cannot beam around the curve of the earth. The beam must either be produced in space or mirrors in orbit must be used to reflect the ground-based laser beam to the target.¹⁶

The second type of directed-energy weapon is the particle beam. A particle beam is created when bits of matter (protons, electrons, atoms, and ions) are accelerated to velocities approaching the speed of light by electric fields in particle accelerators.¹⁷

An accelerator at the Los Alamos Meson Physics Facility has produced some hydrogen atoms having energies of 800 million electron volts that penetrate aluminum shielding one meter thick. A particle beam of this type could disable the electronics of an unhardened target 40,000 kilometers away.¹⁸ Used from a space platform, neutral particle beams show promise as nonnuclear directed energy weapons ". . . because of the maturity and demonstrated performance of their component technologies

and the relative diseconomy of hardening targets against neutral particle beams."¹⁰

The Lawrence Livermore National Laboratory in California has also made advancements in the free electron laser, producing a laser beam at a peak power of one billion watts--far greater than the 20 million watts calculated as necessary to destroy an ICBM in flight.¹¹ Technology is turning laser theory and space applications into potential space weapons realities which offer instantaneous, absolute accuracy, with a capability range from merely disrupting to totally destroying the chosen target.

Turning to kinetic-energy weapons, early cavemen created the first such weapons by throwing rocks. Now we discuss "smart rocks," or small projectiles designed to crash into enemy missiles. In 1986, a smart rock launched on one Delta rocket successfully targetted, maneuvered, and collided with another rocket.¹² Officials now believe that based on the smart rock concept, an ICBM defensive system consisting of hundreds of satellites, each able to launch a dozen or more of the smart rocks, could be deployed in the mid-1990's.¹³

Because of the weight of such a system (six million pounds) and an apparent lack of capability to discriminate targets, critics became concerned. Lowell L. Wood, a senior staff physicist at Lawrence Livermore National Laboratory, conceived what he called "Brilliant Pebbles,"

a weapon of the future built primarily from commercial technology available today. Mr. Wood bases his theory on the concept that approximately half an ounce of almost any structural material can destroy a ballistic missile when the impact approaches the 10 km/sec closing speed characteristic of space engagements.™

In his June 1988 article for Aviation Week and Space Technology, Mr. Wood states that the brilliant pebble consists of one or more "eyes" to look for targets, a "brain" to recognize the target and calculate positioning, and "legs" to execute the command to seek the target. Using modern transistors and imaging chips currently used in high-performance microprocessors and video cameras, and a CRAY-1-level supercomputer, the eye and brain of the pebble would only weigh approximately 100 grams. Adding structural and propulsion masses, the total weight would be between 1.5 and 2.5 kilograms. Each pebble could carry enough stored knowledge, detailed battle strategy and tactics that it would perform its mission while requiring no external supervision.™

Testing on the brilliant pebbles concept is proceeding at an accelerated pace. Livermore Laboratory is developing the sensing device--basically a high-resolution, wide-angle camera with an electronic real-time imaging capability. In an article in Aviation Week and Space Technology, T. M. Foley wrote ". . . such a camera could image a land area the size of

Virginia and resolve individual buildings."** Some classified testing of the sensor has already been completed. Livermore scientists propose that the pebbles could be housed in small, environmentally controlled platforms covered with solar cells which provide housekeeping power. When needed, the pebbles would be expelled from the housing in space and fired toward their targets.

"Brilliant Pebbles" is a concept which results in a kinetic-energy weapon possessing speed and unprecedented accuracy for extended distances. Consequently, applications for the "pebbles" and other KEW range from selective destruction of a small target to the possibility of area coverage. Significantly, however, they are not weapons of mass destruction.

Although the technologies of directed-energy and kinetic-energy weapons show up most often in SDI studies and literature, the concepts do have other applications. Just as the United States landed on the moon by virtue of successive advances on Wilbur Wright's "scouts and messengers," given the national security need for space development, today's notion of space-to-space "brilliant pebbles" SDI technology may be tomorrow's highly advanced, non-nuclear, specifically targetable re-entry "bullet."

Whereas the "brilliant pebbles" would disintegrate upon re-entry into the earth's atmosphere (and consequently would only have use in the space environment proper), one

could develop a notion of a high density material with a protective coating and a homing device which would survive re-entry and proceed directly to its target. The incoming speed could be in excess of mach 10, and, as it would have no explosive warhead, the destructiveness of the "bullet" would rest solely in its kinetic energy. (By including an explosive warhead, the destruction capability would increase. Also, by fragmenting the "bullet" prior to impact, the area of destruction would increase.) And, although this concept is treated almost parenthetically here, it defines very specifically the possibility of a nonnuclear discriminating deterrent to future wars, which offers a capability not available, nor even possible, in any terrestrial system. The accuracy and time-to-target of such a system and the range of weapon possibilities of other KEW and DEW concepts would significantly enhance our employing of the Principles of War.

THE PRINCIPLES OF WAR

The first five of "Major Objectives in Support of US Interests" described in President Reagan's January 1988 pamphlet, National Security Strategy of the United States, reads:

To maintain the security of our nation and our allies. The United States, in cooperation with its allies must seek to deter any aggression that could threaten that security and, should deterrence fail, must be prepared to repel or defeat any enemy attack and end the conflict on terms favorable to the United States, its interests, and its allies.***

This brief paragraph provides the general guidance by which the military services develop doctrine and strategy. Air Force Manual 1-1, Basic Aerospace Doctrine, paragraph 1-3 begins, "US Military forces must be capable of achieving our national military objectives." Those objectives, outlined in President Reagan's pamphlet and reflected in doctrinal statements are:

1. Deter attacks against U.S., its allies, and against vital U.S. worldwide interests.
2. Prevent an enemy from politically coercing the U.S., its allies and friends.
3. If deterrence fails, fight at the level of intensity and duration necessary to attain U.S. political objectives.*7

The doctrines of the US military services have as their cornerstones the Principles of War. Although each service employs the Principles differently, the tenets remain relatively constant. As the Air Force today has the greatest share of the military missions in space (space surveillance, missile warning, weather, communications, command and control, and intelligence, all already incorporated into the Principles of War), the discussion below focuses primarily on the Air Force view of the Principles of War, with an added aspect of how the principles apply to the space environment. Incorporating the technological advances of space systems and concepts into the Principles will hasten the application of the full range of military capabilities, as specified in the Aldridge-Welch memorandum.

1. **Objective.** A clear, concise statement of realistic objectives defines what military actions should accomplish and normally describes the nature and scope of military operations. Usually, military objectives seek to destroy or neutralize an enemy's will and ability to continue a conflict. Outlined in AFM 1-8, Military Space Doctrine, the primary military objectives in space include:

a. Maintaining the freedom of space to increase the welfare and security of the United States.

b. Increasing the effectiveness, readiness, and survivability of all military forces through more integration into and with those forces.

c. Protecting our nation's resources from threats in, through, and from space.

d. Preventing space from being a haven for aggressors or hostile powers.

e. Exploiting space as required by further military objectives.**

2. **Offensive.** Without some offensive action, victory rarely comes. Clausewitz spoke to seizing the initiative after appropriate defense proved successful.** The principle of the offensive demands action rather than reaction, and sets the stage for implementation of such other principles as surprise, security, and timing. Today's space systems serve in roles which support terrestrial forces in such areas as communications, weather, warning,

surveillance, and navigation. These support roles assist the rapid integration of all terrestrial forces. Space weapons would offer the command authorities an additional capability in the principle of the offensive because such systems could strike anywhere within an enemy's area of operation, including "deep" targets (those well into the geographical interior of a country) quickly and with precision. The ability to strike any target--even deep--immediately upon a determination of such a requirement would dramatically enhance the offensive effort in support of the objective and deny the enemy its own offensive opportunity.

3. **Surprise.** Surprise, achieved through security, timing, and sometimes audacity, creates a situation favorable for a shift in the balance of the conflict. Viewing surprise only as "total unawareness" is too restrictive an approach. Rather, the principle of surprise demands that the enemy learns of an activity too late to effectively respond. Although satellite orbits provide an enemy with a very specific and predictable path of the space vehicle, the space environment nonetheless provides an exceptional medium for achieving surprise by means of rapid recall, instantaneous communications to and from ground forces, and strategic positioning of space assets. Because directed- and kinetic-energy weapons could be deployed across a global spectrum of targets, such weapons hold promise for enhancing

the principle of surprise by putting an enemy's war-making abilities at risk with such speed and accuracy that he would have no time to respond to the initiative. "Surprise is the most powerful influence in aerospace operations, and commanders must make every effort to attain it."^{oo}

4. Security. The principle of security involves continuous actions taken to prevent surprise from the enemy and to preserve the ability to continue other actions. Security protects friendly forces from the enemy, and is achieved through disguise, deception, dispersal, maneuver, timing, and positioning of assets and forces. Space assets require protection from enemy activities which may destroy or exploit them, and intelligence efforts regarding potential threats assist in the security of space assets. The role of the space environment in communications, weather, surveillance, intelligence, and command and control systems helps provide security for terrestrial forces.

5. Mass and Economy of Force. The Air Force specifies a necessary and proper balance of the principles of mass and economy of force, for their correct application can overwhelm an enemy's defenses and secure victory. These principles involve several other concepts, such as security, timing, and surprise. Some experts might argue that massing high technology space vehicles may prove counterproductive, and that their much greater importance lies in the ability to have a few vehicles widely positioned, thereby economizing

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the force structure. In either case, the support for ground, air, and sea forces provided by space assets complements those forces and the methods in which mass and economy apply. The proposed "brilliant pebbles," weighing less than five pounds, demonstrate how this principle of war applies to a weapon system, for that "pebble" could negate a target thousands of times its weight. The economizing of force through the proper massing of space assets (by strategically orbiting them), improves the overall ability to defeat an adversary. Further, proper understanding of the necessity to economize force--and the ability to do so--reduces the possibility of an inadvertent overuse of resources.

6. **Maneuver.** Strictly speaking, maneuver involves the movement of force relative to the enemy. The Army's definition of maneuver includes ". . . three interrelated dimensions: flexibility, mobility, and maneuverability."²¹ Orbital mechanics may prove to limit space vehicles in these terms, for certain changes or "maneuvering" of orbiting craft may require tremendous energy. (We shall not concern ourselves here with the "fuel vs. payload" discussion which obviously differs for every vehicle and every objective.) Maneuver today contributes to sustaining the initiative by assisting in the massing and the security of forces. Some may suggest that the principle of maneuver cannot be applied to spacecraft because of some orbital difficulties. However, although spacecraft orbits are very

predictable, the ability of a space weapon to strike targets globally and quickly would provide the command authorities a great flexibility not available through most terrestrial-based systems. Further, an essential aspect of this principle is that maneuver also enables and permits disengagement from the enemy. "Disengagement," for space systems, could mean simply "flipping a switch" to stop deployments or emissions.

7. **Timing and Tempo.** This principle involves using the proper amount of force at the proper time at the appropriate rate to ensure enemy forces cannot be effective. The space environment may have one of its best applications in this principle as the velocities involved and the immediacy of communications capabilities allow for a faster pace of activity than the enemy can respond to. Security, mass, surprise, and timing and tempo combine to successfully attain the objective.

8. **Unity of Command.** This principle puts the entire military operation in the control of the proper single authority which can assign forces to achieve the objective. The relatively small size of the space force, coupled with its many mission requirements, using agencies, and potential applications indicate economy of force is best achieved when a single authority controls space assets.

9. **Simplicity.** Simplicity of the command structure, strategies, plans, tactics, and procedures reduces confusion

and eases the execution of operational activities. This principle does not speak to the obvious technical complexity of space systems but rather to the requirement to apply them simply. From a command and control perspective, could anything be simpler than knowing exactly where a force is, how it will respond, when it will be available, and how long it will take to reach its objective? Simplicity could stand as the hallmark of space system application.

10. **Logistics.** Sustaining men and equipment during a conflict defines the principle of logistics. The Air Force specifies that a "simple, secure, and flexible" logistics system must support aerospace operations. Within the space environment, such a system relies on the long life of highly technical systems rather than an on-location logistics team. However, the first of the military objectives in space deals with access to space in support of the security of the US. The Air Force, then, accepts as a consequence of its policies the requirement to provide space logistics--sustaining men and machines in space so that they will be at the right place at the right time.

11. **Cohesion.** Cohesion binds a national military structure together by maintaining spirit and providing impetus to win, and depends upon the leaders and their ability to properly employ available forces. The realm of space assets supports all earthborne forces and links them worldwide. Senior leaders, cognizant of the capabilities

of all combined forces, provide the common identity and shared purposes of the human resources available to resolve a military conflict. A particular value of space may be its role in denying or disrupting an enemy's attempts at utilizing the principle of cohesion."²²

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Some may argue that the past interpretation of the Principles of War requires expansion to include space. Others feel that the definitions remain farsighted enough as written. Despite the semantics controversy, space offers a medium through which several of the principles combine, almost automatically, perhaps as never before. Distance, difficulty in monitoring space-borne assets, speed, and instantaneous communications provide excellent opportunities for security, cohesion, unity of command, some aspects of maneuver, surprise, and of course all combine for the objective. Of particular significance here, however, are the principles of surprise, mass and economy of force, and timing and tempo, because of the often-proven maxim that the more rapid and accurate the ability to hit the target, the less energy need be expended.

In Book Four, Chapter Six of his book On War, von Clausewitz discusses the "Duration of the Engagement." He writes, "A victory is greater for having been gained quickly. . ."²³ In Book Eight, Chapter Four, he continues that thought by stating:

. . . no conquest can be carried out too quickly, and that to spread it over a longer period than the minimum needed to complete it makes it not less difficult, but more. If that assertion is correct, it follows equally that if one's strength in general is great enough to make certain a conquest one must also have the strength to do so in a single operation, not by stages.²⁴

Through his book, von Clausewitz reveals that a lesser force can overcome a greater force through the proper application of secrecy, timing, and the accuracy of force employment. Today, this relationship can be described in terms of accuracy of the weapons employment, time-to-target, and the energy required to achieve the objective. Simply stated, as accuracy of the employment improves, or time-to-target decreases, or both, less energy is needed. The US realized a painful example of this on 7 Dec 1941 at Pearl Harbor when, in only a few hours, a relatively small force employed secrecy, speed, and accuracy to temporarily cripple the US Navy. Had the Navy been dispersed and not in harbor, Japanese targetting accuracy would have been complicated, the action would have taken longer, and greater energy would have been expended. Additionally, and important to remember, the accuracy with which Japan struck, and which allowed them a good application of the principle of economy of force, also resulted in very little collateral damage.

Current and future technologies for space indicate pin-point accuracies and instantaneous (in the case of lasers) to merely hours (for some kinetic energy designs) response times regarding time-to-target. The rather

obvious consequence of the ability to respond secretly and instantly with minimum essential force on a specific target is the dramatic decrease of energy required to achieve the objective; i.e., economy of force. Speaking about the "smart rocks" research of the Strategic Defense Initiative (SDI) in particular, Lowell L. Wood of Lawrence Livermore National Laboratory, makes a nonetheless valid overall "economy of force" comment by stating, "Recall, then, that a modern ballistic missile weighs dozens of tons, millions of times more than the amount of mass needed to assuredly destroy it, during hypervelocity impact."²²

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The Principles of War serve as the cornerstone of military doctrine by establishing the overall guiding objectives in fighting a war. Doctrine, then, determines how the military services will train, equip, and employ their forces. Training on equipment and methods stand here without explanation as an inherent responsibility of the military services. Further, the discussion above describes, generally, the military's desires in force employment. However, a brief comment about equipment--in this case, weapons--is necessary.

Militarily, a weapon should fulfill the tenets outlined in the Principles of War--logistically supportable, simple weapon, deployable quickly and precisely, affording flexibility while using minimal resources,

employable with surprise and secrecy by a single controlling command authority to enhance the offensive in pursuit of the objective. Key to understanding weaponry is that death is not necessarily a prerequisite of an effective weapon. The accomplishment of the objective, however, is. Consequently, "effectiveness" and "mortality" need not be the same word! The ultimate objective under the Principles of War is to destroy the enemy's ability to continue the war, and weapons are the tools of that objective. The responsibility of the military services to equip themselves carries with it the requirement to acquire the weapons which can best enhance the ability to accomplish that same objective.

Space weapons should be considered as viable and necessary advancements to terrestrial systems. They do fulfill the Principles of War, probably more efficiently than some of today's systems. Further, a particular humanitarian aspect exists because of the characteristics achievable in space weapons. The ability to strike an enemy's war making efforts, including deep targets, quickly and with pinpoint accuracy results in a consequent reduction in destructive or lethal force necessary to achieve the desired outcome. A reduced amount of force (energy) precisely put on a military objective produces only minimum collateral damage and associated casualties.

If fulfilling the Principles of War results in a militarily "good" weapon, perhaps fulfilling the tenets of

the Just War Theory results in a "moral" weapon. Space weapons can do both! Nuclear weapons of mass destruction need not be negated by other nuclear weapons! That is a dramatic first result of space technology. Much smaller, even inert weapons hold great promise in their ability to strike their prescribed target quickly and decisively, without huge collateral damage.

The Principles of War, through which military services develop equipment, troops, and tactics to enable successful achievement of military objectives, combine remarkably through understanding and application of the space environment. Further, the Principles of War apply to weapons as the tools of doctrine. Space, as a medium of national security, must not be denied to the United States. On this point, Secretary Aldridge ended a May 1987 speech with these words:

But my question to our critics, taking into account what I have told you today about our space program is: What would they have us give up?

Should we give up the attack warning capability?

Should we give up our capability to monitor arms control compliance?

Should we give up our space-based capability for weather tracking, or navigation, or communication?

Should we allow the Soviets to continue unchallenged in their ability to target our forces using their own space systems?

And finally, should we stop investigating the technology that may give up an alternative to nuclear offensive weapons?

To those critics, I say: Every element of our space program contributes to deterrence. Abandoning any element of existing or emerging military capability in space would be a sinister act--abandoning our country to dominance by those pursuing more active roles in space.™

CHAPTER III

SPACE IS THE PLACE

The considerable power which commanders exert over the lives of people on a day to day basis reaches its zenith in time of war, when our society expects leaders to use the appropriate amount of force to accomplish the mission with the least loss of life. In other words, the ethical basis of the profession of arms lies in restraint in the use of power.¹

Kermit D. Johnson
Chaplain, Maj Gen, US Army (ret)
14 Aug 1985

. . . what if free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack; . . . Would it not be better to save lives than to avenge them?²

President Ronald Reagan
23 March 1983

The United States and the Soviet Union have long recognized the requirement to remain competitive in space. Both major nations entered the study of the space environment at approximately the same time at the end of World War II. Perhaps ironically, and certainly worthy of deep reflection, neither nation was first to "militarize space." Germany, in 1944, culminated over ten years of army-funded research with its first V-2 rocket, launched into the "threshold of space," and which landed on British soil.³ The German V-2 rocket marked the beginning of the militarization of space and held particular significance in that a combative nation, deemed ruthless and evil by most

of the rest of the world, had a vast technological advantage. Leaders in the United States and the Soviet Union understood the dramatic consequences of that situation, and embarked on a course that would prevent that situation's recurrence.

In his article, "Soviet Military Use of Space," General Robert T. Herres states that as early as 1945, the Soviets viewed space superiority as an offset against their disadvantageous geography and their inferior air force and navy. He wrote, "Control of space became a top Soviet military priority, and there is little evidence today that its priority has been displaced."⁴ Soviet technological advances allowed the deploying and successful testing of their ASAT well ahead of the United States' efforts. Considerable work and expense have gone into Soviet directed-energy weapons development. No knowledgeable person would debate the existence of Soviet kinetic-energy weaponry, deployable in space today!

In the Soviet Union's Dictionary of Basic Military Terms of 1965, military space systems were defined as:

. . . systems used for military purposes in space, namely to carry nuclear weapons, to conduct reconnaissance, to organize radio countermeasures, to effect communications and control and to destroy space vehicles. Military space systems will include various types of artificial Earth satellites and space ships, such as missile armed satellite bombers, manned space bombers, etc.⁵

Twenty-two years after the publication of the above definition, President Reagan approved an updated national

space policy, which necessarily took the concerted Soviet efforts into account. Those efforts clearly view space weapons as an obvious consequence of evolving technology. Further, they indicate that space will serve as the environment in, through, or from which future wars will be fought. Of alarming significance in the above definition is the Soviets' inclusion of nuclear weapons carried by space systems. Chaplain (Major General) Stuart Barstad wrote in a 1984 article,

"It is generally agreed that a sovereign nation has a right and duty to defend itself against aggression or oppression by another nation. This right and duty also provides the support for a strong military defense to include. . .military parity or superiority in relation to a potential aggressor."⁶

The United States accepts that responsibility in light of the on-going Soviet research, development, and build-up of their military force structure--including space weapons.

After World War II, Chaplain Barstad notes, the Soviet Union began its takeover of the nations in Central Europe. The leaders of the West decided on the course of nuclear superiority to prevent further Soviet expansion. The Chaplain stated this action, ". . . to be the most moral course."⁷ However, the moral convictions attached to that course started to disappear as the Soviets, with their constant attention to the offensive use of weapons and domination, reached nuclear parity with the West. The race for more, bigger, and more accurate weapons continued

through the often discussed ability to "destroy the world many times over." This, then, led to President Reagan's pursuit of a strategy of strategic defense (SDI).

In his speech, President Reagan suggested developing SDI technology and sharing it with the Soviets. Additionally, various signs such as the INF treaty and restarted strategic arms reduction talks hold the hope of progress in arms limitations in the future. However, a lesson of long historical demonstration is that nothing can be un-invented; no technology can be un-discovered. Nations must have a successful defense against an aggressor's projected offense.

One of the best known writers on Christian thought as it pertains to public affairs and national policy is Dr. John C. Bennett. In a personal letter, Dr. Bennett wrote, "I do believe that there have been times when the use of lethal force may be morally justified as in the case of the defeat of Hitler's Germany."⁶ When asked if that phrase might be used in this paper, Dr. Bennett replied:

Yes, you may quote my statement about using lethal force against Hitler's Germany. I do not mean by that that Germany as a whole people was evil.⁶

In his single brief passage, ". . .defeat of Hitler's Germany," Dr. Bennett squarely hit the intent and true rationale of the Just War Theory. One easily assesses the elimination of that hideous evil as just. However, tens of millions of people died before that defeat. A case has

been made that, at least in the early stages of Hitler's reign, his Germany consisted of only a handful of supporters. Suppose a method had existed to singularly target and eliminate that small band of evil before it enveloped the world. Or suppose that a method had been developed in the later years of World War II whereby Hitler and his senior staff could have been destroyed, severing the head from the monster. In retrospect, very few would deny the morality of any action to halt Hitler.

What Dr. Bennett also captured in his phrase were the humanitarian aspects of the Just War Theory. Specifically, he noted that the whole of Germany (and its people) was not evil. Under Just War, those portions not evil must not suffer, but must instead survive to promote the victorious good. Dr. Bennett continued his letter, "The president of the West German republic has been a wonderful representative of this redemption and has spoken with full honesty about the past for which Hitlerism was responsible."¹⁰

Today's space technology has progressed to the point whereby a precisely targetted smart bullet could have put at risk the head of the monster Hitler with very little, if any, collateral damage. A dense, inbound space rock weighing no more than a few hundred pounds could do that, at very little risk to the force seeking to overcome the Hitler evil, and perhaps with no loss of life other than that at the site of target.

The US raid on Lybia in an attempt to halt terrorist activity may serve as a modern example. The same targets could have suffered the same fate, but with no loss of American life, with practically none of the logistical cost of the operation, and within only a few hours of the decision to employ a weapon from space. Despite one's particular persuasion, very few would argue that terrorism is a moral approach to a nation's foreign policy. Further, few would debate the success of the Lybian raid in stemming that nation's state sponsored terrorism.

The Lybian raid also serves as an example of a type of low-intensity conflict, probably the most likely type of action the US will see in the future. Reflecting on the von Clausewitz concept of terminating any conflict as rapidly as possibly, one understands the benefit of denying any offensive action by the adversary, thereby limiting the battlefield and the scope of the conflict. Some suggest that the notion of limited conflict holds little credibility once the first nuclear weapon is used. They would argue that the conflict escalates automatically to total nuclear involvement. It seems clear, from a Clausewitzian viewpoint and that of the critics of a limited war theory, that the best way to end a conflict is to do so very quickly, very precisely, and very decisively. Space offers that possibility.

The ability to selectively target a belligerent with an absolutely precise weapon permits an almost surgical

removal of a perceived evil. Beyond that, it gives the opportunity to strike at the heart of the sources allowing that evil. Von Clausewitz wrote, "The outcome of a major battle has a greater psychological effect on the loser than the winner."¹¹ The quantum enhancements of the Principles of War available by virtue of space dictate, militarily, that space must serve as a platform for future weaponry.

But the question of this paper is not one of the military's use of space, but rather the moral use of space as a platform for weaponry. The figure on page 20 of this report show the link between the Law of Armed Conflict and the Just War Theory. However, the difficulty in that link comes when one includes nuclear, chemical, biological, or, indeed, any weapons of mass destruction.

Figures 2 and 3 on the following page depict the interrelationship of the space-enhanced Principles of War, the Just War Theory, and the Law of Armed Conflict. Significantly, the enhanced Principles close the remaining gap between the Just War Theory and the Law of Armed Conflict. Weapons of the space arena eliminate the need to rely on weapons of mass destruction and can be discriminating between combatants and noncombatants. Consequently, we foresee a more moral way to defend ourselves and to preserve our way of life.

Law of Armed Conflict	Just War Theory	Principles Of War
x	1. Last resort	Objective, maneuver, security, cohesion
x	2. Just cause	Objective, security
x	3. Legitimate authority	Objective, unity of command, cohesion
x	4. Hope of success	Objective, surprise, security, mass, timing/tempo, logistics, cohesion
x	5. More good than harm	Objective, security
x	6. Announce conditions	Objective, offensive, security, simplicity
xt	7. Combatants/Noncombatants	Objective, economy of force, maneuver, security
xt	8. Force proportionate to evil	Objective, mass, economy of force
xt	9. Match attack on evil by attack on conditions allowing evil	Objective, security, timing/tempo, maneuver
xt	10. Treat enemy with mercy	Objective, economy of force, logistics, mass

Figure 2. The Law of Armed Conflict agrees, in principle, item-by-item with the tenets of the Just War Theory. Further, the Principles of War act in accordance with the Just War Theory as shown. Note the involvement of the objective in every condition of the Theory. The asterisks indicate the four conditions where the Law of Armed Conflict has the greatest impact vis-a-vis the Just War Theory.

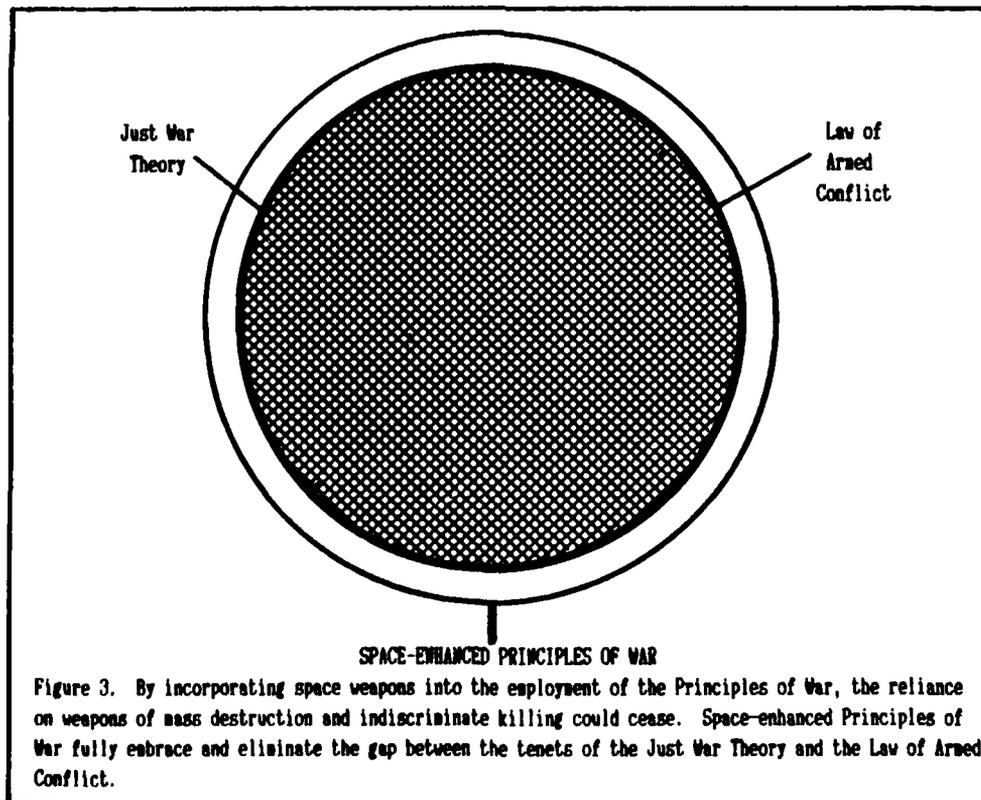


Figure 3. By incorporating space weapons into the employment of the Principles of War, the reliance on weapons of mass destruction and indiscriminate killing could cease. Space-enhanced Principles of War fully embrace and eliminate the gap between the tenets of the Just War Theory and the Law of Armed Conflict.

President Reagan and supporters of the Strategic Defense Initiative have publicly defined the need to find an alternative to the reliance on weapons of mass, indiscriminate destruction. The SDI may offer a hope to counter the ever-present nuclear intercontinental ballistic missile threat. But SDI stops well short of any impact on limited conflicts. Indeed, having to resort to an SDI system presupposes that attempts to keep a conflict limited have failed!

Space weapons offer an excellent alternative to nuclear threats, and carry with them the very real probability of truly limiting war. The ultimate, probably naive panacea is two satellites fighting each other in space. A far more realistic application of space weapons would be the elimination of an evil such as "Hitler's Germany," Hitler in his Germany, Gadhafy's terrorist training facilities, or command centers waging limited war on the US or its allies. And the moral benefit of using space weapons to accomplish those objectives is found in the Just War Theory's requirements of using a force proportionate to the evil, matching that force with a commensurate attack on the conditions which allowed the evil, and discriminating between combatants and noncombatants.

Beyond the obvious enhancements in warfighting--and war limiting--capabilities space weapons offer the US military, one must not neglect the fact that Soviet scientists proceed with their research on space weapons and will likely

continue. Further, these efforts will continue despite the possibility of a reduced Soviet reliance on its military, and the announced drawdown of Soviet conventional forces. In light of that research, one final aspect of the morality of space weapons must be addressed. It is the question of intent! General John W. Vessey, then Chairman of the Joint Chiefs of Staff, wrote in The National Security Newsletter, in July 1984, of the question, "How much defense is enough?":

That's the wrong question. The real question we need to ask ourselves is: What must we do to provide for our security and for that of our posterity. We start to answer the question by recognizing we're committed to the defensive use of force. Our strategy is to prevent war, not start war. We and our allies want to protect our peace and liberty, and our way of life. We want to prevent war by having everyone know that we have the strength to stop our potential enemies from achieving their objectives by force. If that's understood and if we have that strength, we have a good chance of not having a war.¹

As one contemplates General Vessey's words, President Reagan's inclusion of Walter Lippmann's comment in the National Security Strategy pamphlet also seems apropos. Paraphrasing, he stated that a nation's demonstrated past behavior serves as the best predictor of future interests. Based on the defensive role of the American military and the analysis of the Just War Theory, the Law of Armed Conflict, and the Principles of War, the United States will only engage its military forces in a morally justifiable war in defense of itself and its allies. That such a conflict could remain truly limited is the hope of our leaders. Future

weapons, on platforms utilizing the space environment, hold a great possibility in that regard, preventing escalation and consequently serving as moral alternatives to nuclear and other weapons of mass destruction. Weapons of space have the capability to defeat the opposing evil while allowing the positive aspects of a defeated nation the opportunity to survive.

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In dealing with some questions of national policy or interests, one often needs to take a discussion of moral grounds and apply it in a pragmatic approach. We tried to do that with this paper. As we stated, much debate continues regarding the tenets of the Just War Theory. Some people suggest that past US conflicts have not followed the theory, others contest particular rules as applied to specific circumstances. On the other hand, war fighters might have wished we had delved deeper into actual applications of space weaponry. However, our intent was neither to develop a morality of past wars (in fact, one's suggestion that past wars might not have been just should not stand as an indictment that future wars can not be), nor to itemize the equipment of future conflicts. Rather, we sought to provide a general framework for war which acts in concert with our laws and national spirit, and then to ascertain whether a more moral method than reliance on nuclear weapons could be developed. Quick, precise, accurate, decisive weapons,

deployed through, to, in, or from space are far more moral than prolonged confrontations and chemical, biological, and nuclear mass destruction.

Upon this point a page of history is worth a volume of logic.¹⁰

Oliver Wendell Holmes, Jr., 1921

NOTES

INTRODUCTION (PAGES 1-2)

1. Daniel O. Graham, We Must Defend America (Falls Church, VA: Conservative Press, Inc., 1983), cover.
2. National Conference of Catholic Bishops, The Challenge of Peace: God's Promise and Our Response, A Pastoral Letter on War and Peace (Washington, D.C.: United States Catholic Conference, 1983), 69. This report came out very strongly against reliance on nuclear weapons. Consequently, it also argued against deterrence as a national policy. It went further to suggest that US deployment of a strategic defense system would destabilize super power relations regarding nuclear weapons. However, the report does indicate that the US could continue research into such a system. We feel that as with many of the debates on what may "destabilize" the nuclear balance of forces and intentions, the Bishop's report does not adequately address the Soviets' stated objectives and their SDI development and deployment likelihood.

CHAPTER I (Pages 3-21)

1. George F. Kennan, "Foreign Policy and Christian Conscience," The Atlantic Monthly, May 1959; quoted in John C. Bennett and Harvey Seifert, United States Foreign Policy and Christian Ethics (Philadelphia: The Westminster Press, 1977), 30, n. 11.
2. Stuart E. Barstad, "The Church and the Ideology of National Security," Military Chaplains' Review 15, no. 2 (Spring 1986): 12.
3. Kermit D. Johnson, "Military Ethics," Military Chaplains' Review 14, no. 3 (Summer 1985): 5.
4. Ibid.
5. The White House, National Security Strategy of the United States (Washington, D.C.: The White House, January 1988), 3.
6. Ibid.

7. US Air Force, Basic Aerospace Doctrine of the United States Air Force, AFM 1-1 (Washington, D.C.: Department of the Air Force, 16 March 1984), 1-1.

8. NCCB, 69.

9. Max L. Stackhouse, The Ethics of Necropolis (Boston: Beacon Press, 1971), 19. In a personal letter from Dr. Stackhouse about the subject of this research effort, he wrote that he had taught at the Naval War College, linking themes from what he called his "Just Peace Theory" to the Just War Theory he outlines in The Ethics of Necropolis. His biography lists many books and articles and states that he lectured at the Harvard Divinity School from 1968-1968, before going to Andover-Newton Theological School.

10. Ibid., 20. Dr. Stackhouse dates the history of the Just War Theory to ancient Jewish literature, and suggests the theory has been discussed in many forms since the days of Constantine. We found literally dozens of descriptions and discussions of the theory, all very nearly the same in content and clearly the same in intent. Dr. Stackhouse suggests Ralph Potter's Biographical Essay in War and Moral Discourse as a guide to the basic literature on this topic.

11. Carl von Clausewitz, On War, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984), 605.

12. Ronald H. Stone and Dana Wilbanks, ed., The Peacemaking Struggle: Militarism and Resistance (Lanham, MD: University Press of America, Inc., 1985), 191.

13. Ibid.

14. Stackhouse, 20.

15. Ibid.

16. von Clausewitz, 605.

17. Stackhouse, 21.

18. Ibid.

19. Ibid., 19-22.

20. David Hollenbach, Nuclear Ethics, A Christian Moral Argument (New York/Ramsey: Paulist Press, 1983), 15.

21. Ibid.

22. Ibid., 14.

23. The White House, 1. Walter Lippmann was born in 1889 and was one of the authors of President Wilson's Fourteen Points. Contemporary Authors, Volume 6 (1982) lists a full page of his written works, including essays on politics-and-crises, Far East policies, socialism, and communism. He received many literary awards and was a member of many literary clubs, guilds, and associations. He was an avid believer in freedom who some people felt showed the spirit of the leaders of the American Revolution. He died in 1974.

24. US Air Force, Commander's Handbook on the Law of Armed Conflict, AFP 110-34 (Washington, D.C.: Department of the Air Force, July 1980); in Military Strategy and Force Employment Readings: Book 1, General Purpose Forces--DS 612, ed. Air War College (Maxwell AFB: Air University, September 1988), 19.

25. Ibid.

26. Ibid., 22.

27. Ibid., 29.

28. Ibid., 19.

CHAPTER II (Pages 22-45)

1. James Canan, War in Space (New York: Harper & Row, 1982), 76.

2. John L. Piotrowski, "Space Evolution," Signal (Sep 88); in SPACE The Fourth Military Arena, Supplement to Volume 7, ed. Air Command and Staff College (Maxwell AFB: Air University, November 1988), 26.

3. Ibid.

4. Ibid.

5. Edward C. Aldridge, Jr. and Larry D. Welch, "Memorandum for ALMAJCOM-SOA, Subj: Air Force Space Policy-- Information Memorandum" (Washington, D.C.: Department of the Air Force, 2 December 1988), 1.

6. "National Space Policy," OSAF Wash DC//SAF/AX// message, 211400z Apr 88, section 2 of 7, 2.

7. Aldridge and Welch, "Memorandum," 2.

8. Robert T. Herres, "Soviet Military Use of Space," Signal 14, no. 4, (December 1986); in Department of Aerospace Doctrine and Strategy Readings, SPACE-DS614, ed. Air War College (Maxwell AFB: Air University, April 1988), 45.

9. Edward C. Aldridge, Jr., "Space and National Strategy," speech delivered to National Strategy Forum Luncheon in Chicago, 15 May 87; in SPACE The Fourth Military Arena, Supplement to Volume 7, ed. Air Command and Staff College (Maxwell AFB: Air University, November 1988), 29.

10. von Clausewitz, 111.

11. Aldridge, "Space and National Strategy," 29.

12. Canan, 148.

13. Yevgeni Velikhov, ed., Weaponry in Space: The Dilemma of Security (Moscow: Mir Publishers, 1986), 27-40.

14. Theresa M. Foley, "Pentagon Prepares Options for Reagan to Guide Near-Term SDI Activities," Aviation Week and Space Technology, 11 Jul 88, 37.

15. United States Department of Defense, Anti-Missile and Anti-Satellite Technologies and Programs (Park Ridge: Noyes Publications, 1986), 15.

16. George C. Church, "Exploring the High-Tech Frontier," Time, 11 March 1985, 21.

17. US Department of Defense, 17.

18. Ibid., 255.

19. Ibid., 258.

20. Ibid., 16.

21. Bruce Van Voorst, "From Star Wars to Smart Rocks," Time, 23 February 1987, 27.
22. Ibid.
23. Lowell L. Wood, "Brilliant Pebbles Missile Defense Concept Advocated by Livermore Scientist," Aviation Week and Space Technology, 13 June 1988, 151.
24. Ibid., 151-152, 155.
25. Theresa M. Foley, "Brilliant Pebbles Testing Proceeds at Rapid Pace," Aviation Week and Space Technology, 14 November 1988, 33.
26. The White House, 3.
27. US Air Force, AFM 1-1, 1-2.
28. United States Air Force, Military Space Doctrine, AFM 1-6 (Washington, D.C.: Department of the Air Force, 15 October 1982), 5.
29. von Clausewitz, 523.
30. US Air Force, AFM 1-1, 2-6.
31. US Army Forces, AU-8 (Maxwell AFB, AL: Air University Press, May 1985), A-3.
32. US Air Force, AFM 1-1, 2-4 to 2-10.
33. von Clausewitz, 238.
34. Ibid., 598.
35. Wood, 152.
36. Aldridge, "Space and National Strategy," 29.

CHAPTER III (Pages 46-57)

1. Johnson, 14.
2. Graham, cover.
3. Herres, 45.

4. Ibid.
5. Ibid., 46.
6. Barstad, 23.
7. Ibid., 21.

8. John C. Bennett, letter to William E. Caffall, Montgomery, AL, 2 October 1988. Dr. John C. Bennett was born in 1902, became one of the premier theological writers in this country, and has filled many chairs in many universities, including Emeritus President in Union Theological Seminary, N.Y., and assistant to associate professor at Auburn Theological Seminary, and the Pacific School of Religion. He was a participant in the World Conference & Churches Society, Geneva (1966). He was the first to hold the Reinold Neibuhr Professorship of Social Ethics at Union Theological Seminary. Dr. Bennett corresponded with us on several occasions during our research on this paper, and he allowed us to cite the contents of one of those personal letters.

9. John C. Bennett, letter to William E. Caffall, Montgomery, AL, 24 November 1988.

10. Ibid.
11. von Clausewitz, 253.
12. Barstad, 23.

13. Oliver Wendell Holmes, Jr., New York Trust Co. vs. Eisner, 256 US 345, 349 [1921]; quoted in John Bartlett, Familiar Quotations, 14th ed., ed. Emily Morison Beck (Boston: Little, Brown, and Company, 1968), 788.

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