STEALTH EMPLOYMENT IN THE TACTICAL AIR FORCE (TAF) - A PRIMER ON ITS DOCTRINE AND OPERATIONAL USE -

BY

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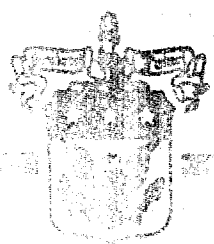

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AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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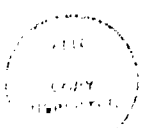

INTRODUCTION

Just as the longbow and gunpowder revolutionized warfare in their time, the past century has witnessed many equally significant technological breakthroughs that have changed the nature and lethality of armed conflict. The advent of aviation, development of radar, and the subsequent use of stealth technology to render radar detection ineffective have changed the nature of warfare, which was clearly illustrated by the unqualified success the F-117A stealth fighter enjoyed during Operation Desert Storm.

Prior to the disclosure in November 1988 that the stealth fighter existed, very little was publicly discussed or known about the capability of stealth technology. Since then the conflict in the Persian Gulf has made it a household word. However, even after the war, its mission is not fully understood and little has been done to formally define its doctrine and operational capabilities for the joint planner to use when developing contingency plans.

The purpose of this paper is to help the joint planner understand the value of stealth at the operational and tactical levels of conflict. It will accomplish this by providing a brief history of the development of the stealth fighter program and a look at stealth's capabilities in the form of missions and roles as seen through the Desert Storm experience. The paper will then relate stealth to aerospace doctrine and what the future of stealth portends for the F-22 Advanced Tactical Fighter (ATF) and the B-2 stealth bomber. And finally, it will

discuss how stealth fits into Air Force Doctrine along with future implications in the changing world order. Hopefully, this approach will give the joint planner a more realistic and timely appreciation of stealth capabilities for operational contingency planning -- a facet that was not readily available prior to the F-117A's public disclosure, its first use during Operation Just Cause in Panama, and during the buildup for the Persian Gulf War.

BACKGROUND

Stealth Development

The use of the concept of stealth to hide aircraft did not start with the F-117A stealth fighter development program. Experiments with stealth capabilities occurred as far back as the early part of the 1900s when Germany tested an aircraft with a transparent wing, designed to make it difficult to spot by observers on the ground.[1] Later, in World War II, the snorkel was developed by Germany to allow its diesel powered U-boats to operate submerged when recharging their batteries. This enabled them to avoid detection by long range maritime patrol aircraft. When the Allies developed air-borne radars to detect the snorkels, the Germans countered by putting a rubber coating over the snorkels which degraded the radar's effectiveness.[2] Thus, an early forerunner of radar absorbent material (RAM) was used on submarines which today depend to a large degree on stealth for their survival.

The natural reaction to the advent of radar was to develop a technology that would render it ineffective. It became inevitable that stealth technology would be pursued. And, just as sonar and nuclear propulsion have made stealth a way of life for submarines, stealth technology has enabled aircraft to be built with low observability and has restored the element of surprise to aerial operations.[3]

Efforts at making an airplane stealthy revolve around reducing its signature, either by reductions in radar cross section (RCS), infrared, electronic emissions, visual, or acoustic signatures. Radar signature control has focused on the shaping of the vehicle, transparency, and developing radar absorbing materials. The unique shapes of the F-117A stealth fighter, F-22 ATF, and B-2 stealth bomber were designed to control the direction of reflected radar energy, and the function of their RAM coating is to minimize the reflected energy.[4]

Low observables, as a serious design discipline, began in the late 1970s.[5] The mission need for a stealth fighter emerged after the 1973 Arab Israeli War. The war illustrated the lethality of new surface to air missiles (SAMs), operating in new frequency bands with increased capabilities, in an Integrated Air Defense System (IADS).[6] This was the impetus for the HAVE BLUE technology demonstration program which took place between November 1975 and July 1979. HAVE BLUE was a jointly sponsored program by the Defense Advanced Research Project

Agency (DARPA) and the United States Air Force to demonstrate the feasibility of low observables (LO) or stealth technology. Its objectives were to validate LO concepts, demonstrate that the concept was flyable, and to validate very low observable (VLO) modeling and ground test results.[7]

The first of two aircraft was designed and flew by December 1977, and the program's success convinced senior Department of Defense officials that stealth was viable.[8] Although both demonstration aircraft were lost during flight testing, neither aircraft accident was related to the VLO design. The flight test program met all its objectives and satisfied the risk assessment for the SENIOR TREND program -- the classified name for the development, procurement, and operational fielding of the F-117A.[9]

F-117A Program

As the follow-on to the HAVE BLUE program, SENIOR TREND became a highly concurrent flight test and development program. Its objectives were to develop an aircraft with VLO as its primary design goal, field the system as rapidly as possible, and conduct the entire program in total secrecy.[10] The early positive assessment of the HAVE BLUE program resulted in the production decision for the F-117A being made almost two years prior to its first flight which occurred in June 1981. In addition, an early decision to increase the total buy from 25 to 59 aircraft was also made prior to the first flight.[11] The first F-117A production aircraft was delivered to the Air Force

in September 1982 and the unit declared its Initial Operational Capability (IOC) with a small number of aircraft only thirteen months later. Deliveries continued until July 1990 as the wing grew to two operational and one training squadron.[12]

The result of this highly successful program was the first operational aircraft conceived and built to exploit low observable stealth technology. The F-117A was designed to penetrate dense threat environments and attack high-value targets with pinpoint accuracy. Its overall performance during Operation Desert Storm validated the program's many successes and milestones.

CAPABILITIES

Mission/Roles

Actual combat employment of the F-117A includes close-in strikes in support of Operation Just Cause and attacks against key strategic targets during Desert Storm. Its Mission Employment Tactics Manual, MCM 3-1, Volume XVIII, Tactical Employment of the F-117A, states that it is well suited to conduct offensive counter air (OCA) and suppression of enemy air defense (SEAD) missions.[13] It can accomplish these missions by using a variety of conventional munitions, such as unguided Mk-82 and MK-84 bombs, and laser guided bombs such as the GBU-10, -12 and -27 precision guided munitions (PGMs). In addition, it can employ cluster munitions and tactical nuclear weapons.[14]

In reality, however, stealth employment should not be limited to a narrow definition of OCA and SEAD. The tactical situation often dictates innovative employment concepts as seen during Desert Storm when A-10s were used to destroy Scud missiles and F-111s bombed tanks during the battlefield preparation phase of the war. The F-117A was also used in a more flexible manner than originally envisioned when it was given a last minute mission to destroy medium range bombers being loaded with chemical munitions at Al Taqaddum airfield.[15]

The key to the stealth fighter's success comes from its ability to penetrate further into a heavily defended radar network and survive while employing precision munitions. The combination of reduced radar cross section, detailed mission planning, and creative tactics enable it to deliver PGMs against high value, point targets.[16] This means the war fighter and planner can change the strategic landscape to suit his needs and gain the tactical advantage. The use of stealth aircraft directly impacts employment concepts and the deterrence equation while decreasing the force structure and logistics support required to accomplish an operational objective.

A common misconception is that stealth aircraft require support aircraft such as F-15s flying combat air patrol to sweep the skies of enemy fighters, and F-4G Wild Weasel and EF-111 defense suppression aircraft to reduce the electronic threat. While these types of aircraft can certainly be used to enhance survivability when the situation requires it, one of the major

advantages of stealth is that it can be a force multiplier because it requires less airborne support. Although stealth costs more than conventional systems, it puts fewer people at risk in combat. Two separate strike operations during the first day of Desert Storm illustrate this point. A strike package of 8 non-stealth attack aircraft and 30 escort aircraft was sent against one target. At the same time, 21 F-117As were attacking 37 targets without dedicated protection or electronic combat support.[17] The value of stealth technology was best summed up by Lt Gen Charles A. Horner, the commander of U.S. and coalition air forces during Desert Storm, when he wrote:

> "Stealth technology is worth every penny. Operating night after night against targets protected by 3,000 antiaircraft guns and 60 surface-to-air missile sites without a single loss or even taking a hit is positive proof of the protection this technology offers. In addition, the stealth aircraft does not need extensive electronic combat support. This frees these assets to support other missions."[18]

Another common misconception is that stealth aircraft are totally invisible. Although not invisible, stealth's low observability allows it to penetrate an integrated air defense system (IADS) by reducing the effectiveness of the three basic air defense functions -- surveillance, fire control, and target destruction.[19] Its reduced radar return weakens the defensive system's ability to consistently detect, track, and engage stealth aircraft, thereby enhancing their survivability. This was also validated during Desert Storm when the F-117A was the

only fighter to strike targets in Baghdad, which was protected by a defensive array of surface-to-air missiles sites (SAMs) and antiaircraft artillery guns (AAA) more dense than the most heavily defended Eastern European target at the height of the Cold War.[20]

Deterrent Value

Stealth's deterrent value stems from two key factors -- surprise and its ability to deliver precision guided munitions with unprecedented accuracy. It can take the war directly to an adversary's centers of gravity from day one. Its implications for deterrence were clearly explained by Lt Gen Charles G. Boyd, Commander of the Air University:

> "The capability to put any feature of the enemy at risk -- which includes the ability to threaten every asset an enemy possesses with unprecedented probability of target engagement and low risk of interference, loss, or capture -- provides not just tactical but strategic leverage."[21]

This threat of direct application of force is a critical part of the U.S. Air Force's Global Reach-Global Power -- the ability to provide a force presence or put ordnance on a target anywhere in the world in a matter of hours.[22] As the size of the military is reduced in the 1990s and fewer fighter wings are based overseas, stealth as represented by the F-117A provides the force planner more options as both a deterrent and warfighting capability because of its deployability and smaller logistics requirements.

DESERT STORM PERFORMANCE

Employment

A single stealth fighter was one of the first aircraft to commence attacking Iraq during Desert Storm. Prior to H-Hour at 0300 on 17 January 1991, an F-117A destroyed a hardened air defense operations control center in Southern Iraq, paving the way for the strategic, operational, and tactical surprise that allowed coalition air forces to conduct unrelenting air strikes for the next 43 days.[23] The tactical surprise stealth provided enabled the coalition to achieve air superiority early in the war by destroying command and control capabilities, the Iraqi IADS system, aircraft shelters, and valuable strategic targets in Baghdad and throughout Iraq.[24] And, the F-117A was able to accomplish this by penetrating enemy defenses without the large force packages required to protect non-stealthy aircraft.

During the early days of the war, the F-117A was primarily used against Iraqi command and control, and radar detection systems. By day three the Iraqi command and control capability was in disarray, and emphasis eventually shifted to destroying hardened aircraft shelters.[25] Throughout the war it was the only manned aircraft to attack targets in Baghdad. By the time the ceasefire went into effect, the stealth fighter had been successfully targeted against the following major target sets:

- Command and Control installations
- Key communication buildings

- Headquarters for the internal security and intelligence organizations

- Research, development, production, and storage facilities for nuclear and chemical weapons

- Hardened aircraft shelters

- Key resupply lines -- bridges, railroads, and highways

- A variety of other targets such as pumping stations and distribution networks designed to feed oil into anti-personnel fire trenches[26]

The F-117A was one of several aircraft types to attack strategic targets during the war. What they accomplished through a systematic bombing campaign was the elimination of Iraq's offensive warfighting capability and the destruction of its war-supporting infrastructure. This was best summed up in An Interim Report to Congress on "Conduct of the Persian Gulf Conflict":

> "The strategic bombing campaign had the effect of virtually isolating and immobilizing the Iraqi army in the field. The F-117 stealth fighter was a major factor in this effort."[27]

Results

The combination of tactical surprise offered by stealth technology and the exceptional accuracy of the precision guided munitions employed by the F-117A resulted in impressive statistics. The stealth fighter was able to accomplish more destruction in a shorter period of time with greater accuracy than ever imagined in the history of aerial warfare. Its

ability to identify and attack targets before surface threats became active allowed a handful of aircraft to inflict heavy damage on the enemy.

The 42 stealth fighters deployed to the war flew almost 1300 combat sorties, yet they only represented approximately 2.5% of the allied fighter and attack aircraft in theater.[28] During the first 24 hours of the war alone, they struck over 31% of the strategic target list.[29] And, by the end of the war, they had attacked over 40% of the strategic targets while only flying approximately 2% of the total attack sorties of the war.[30] This was made possible by their ability to safely penetrate the IADS system and by having weapons delivery accuracy that virtually assured target destruction on the first pass. Stealth technology allowed a larger portion of the target list to be attacked with fewer aircraft thus reducing overall munition, manpower and support requirements.

STEALTH'S IMPLICATION FOR DOCTRINE

Relationship to Current Air Force Doctrine

Before analyzing how stealth technology fits into Air Force doctrine, it is useful to start with the basic definition of aerospace doctrine found in Air Force Manual 1-1, Basic Aerospace Doctrine of the United States Air Force. Basic Air Force doctrine can be broken into four elements:

> "Aerospace doctrine is, simply defined, what we hold true about aerospace power and the best way to do the job in the Air Force.

> It is based on experience, our own and the experience of others. Doctrine is what we have learned about aerospace power and its application since the dawn of powered flight.
>
> ...doctrine is a guide for the exercise of professional judgment rather than a set of rules to be followed blindly.
>
> Doctrine should be alive -- growing, evolving and maturing.
>
> If we allow our thinking about aerospace power to stagnate, our doctrine will become dogma."[31]

These statements illustrate the fluid nature of aerospace power and the requirement for leaders to be flexible and constantly reassess how air power should be structured and employed. Whenever a new weapon system, munition, or technology comes along, it must be evaluated against this backdrop to insure its successful integration into force structure and warfighting plans.

Early pioneers of air power made predictions and promises about its capabilities based on the limited experiences of World War I. Many of these predictions did not come true. However, these air power advocates did not allow their vision to be clouded by not having the technology to fulfill their predictions.[32] In the short 80 year history of aerial warfare, it took time for experience and technology to develop to the point reached in the Persian Gulf War. There, air power was able to rapidly achieve air superiority and play a dominant role in bringing the war to a rapid end on our terms. Air power finally accomplished what the early visionaries said it could.

To illustrate by comparison, in World War II it could take 9000 bombs to destroy an aircraft shelter; in Vietnam it could take 300; and in Desert Storm, one laser guided bomb (LGB) from an F-117A was all that was required to destroy the most hardened shelter.[33]

There are many reasons for the success of the coalition air forces. Stealth technology, being one of them, raises the question of just how it fits into doctrine -- is it another tool to be employed or does it add a new chapter to doctrine? This can be answered by a review of the roles and missions of the Air Force and how stealth relates to the principles of war.

Relationship to Air Force Roles and Missions

The roles and missions of the Air Force fall into four categories: (1) aerospace control, (2) force application, (3) force enhancement, and (4) force support.[34] When you assess what stealth technology is capable of contributing to each of these areas it becomes apparent that it does not warrant a change in basic aerospace doctrine. Rather, it offers added capability for the air campaign planner to employ, either directly or indirectly in each role and in most missions.

Aerospace Control: Aerospace control is normally the first priority of aerospace forces and basically entails controlling the combat environment through control of the air.[35] Stealth technology and the F-117A support this role in the offensive counterair mission, where strategic attack is used to destroy enemy aerospace forces and ground-based defenses. Achieving air

superiority was a major objective of the Desert Storm air campaign, and the stealth fighter was instrumental in that many of the targets it struck were defined as OCA targets. Stealth provided another option to the air component commander, not a new mission.

Force Application: The role of force application involves those missions that apply combat power, and are considered to be strategic attack, interdiction and close air support.[36] The success of the stealth fighter and its use against strategic targets have already been discussed. Many of the missions flown were air interdiction missions designed to delay, disrupt, divert, or destroy the enemy's military potential and prevent it from engaging friendly forces.[37] In essence, this is the ultimate form of close air support, as it prevents the enemy from bringing overwhelming forces to bear by destroying them early.

Force Enhancement: Stealth's contribution to force enhancement, the ability to multiply combat effectiveness, comes from the reduction in effort required in several missions such as airlift and air refueling.[38] Since the F-117A was able to conduct many missions with a smaller number of aircraft and fewer munitions, it reduced the requirement for theater airlift support. In addition, the smaller number of stealth aircraft required fewer air refueling sorties. This made more air refueling sorties available to support larger strike packages

consisting of non-stealthy fighters and their dedicated electronic warfare support aircraft.

Force Support: The success of any campaign is dependent on timely and sufficient logistical support to sustain forces. It controls the size, and effectiveness of a military operation.[39] Again, stealth supports this role through the reduction in aircraft, personnel, supplies, equipment, and airlift support required to sustain combat operations.

As AFM 1-1 states, aerospace forces are not limited to any particular role or mission.[40] Desert Storm showed this to be true as various fighters and bombers performed missions not normally associated with them, i.e. A-10s hunting Scuds, B-52s attacking tactical battlefield targets, and fighter aircraft going after strategic command and control targets. Although the stereotype roles and missions are blurring, what this points out is the requirement for aerospace doctrine to be flexible and ever maturing as new technologies are developed. The advent of the F-117A and stealth technology has heralded a new dimension in warfighting. However, it brings to the battlefield another capability that supports current doctrinal thinking, not a requirement to redefine doctrine. If anything, the performance and application of stealth in Desert Storm helps validate current aerospace doctrine.

Relationship to Army AirLand Battle Doctrine

Another area where the United States Air Force's stealth capabilities are important is its relationship to the four basic

Army tenets for achieving success on the battlefield: (1) initiative, (2) agility, (3) depth, and (4) synchronization.[41] Their counterparts in aerospace doctrine are speed, range, flexibility, precision, and lethality. These tenets support each other and together they form the basis for success in AirLand Operations.[42]

Initiative: Stealth capability is ideally suited to support the tenet of initiative. Army Field Manual 100-5, Operations, states that initiative means never allowing the enemy to recover from the initial shock of the attack through concentration, speed, violence in execution, and exploitation.[43] The air campaign accomplished this in Desert Storm where the F-117A was a key participant in forcing the enemy to lose its cohesiveness by cutting off Iraq's command and control capability and destroying critical strategic targets. It allowed the coalition to seize the initiative through basic principles of war such as surprise, mass, and economy of force against the enemy's centers of gravity.

Agility: Stealth technology also supports agility -- the ability of friendly forces to act and react faster than the enemy while seizing the initiative.[44] The ability of stealth to be employed against a changing target base to keep pressure on enemy vulnerabilities has been previously mentioned. Initially, air attacks were directed against key communications and command and control installations. Later, they were expanded to include hardened aircraft shelters and resupply lines such as bridges.

Air power, especially as enhanced by stealth can respond rapidly and with flexibility as requirements change. This trait is required by both land and aerospace forces to successfully prosecute the war.

Depth: FM 100-5 defines depth as the extension of operations in space, time, and resources.[45] Stealth capability directly supported this tenet through devastating attacks against Iraq's command and control facilities. Stealth fighters significantly extended the battlefield in depth by conducting deep interdiction strikes against key strategic targets which prevented the Iraqis from mounting a coherent defense and counterattack.

Synchronization: The tenet of synchronization is the method by which activities are arranged in space, time, and purpose to provide maximum combat power at an enemy's vulnerable points.[46] Stealth technology's support of synchronization with the ground campaign is more indirect in nature. It disrupted the synchronization of the Iraqi Army more than it contributed to synchronization with coalition ground forces. By initially attacking command and control targets and subsequently destroying bridges during the latter part of the air campaign, the stealth fighter was able to reduce the ability of the Iraqi army to deploy its resources where they could have made their greatest contribution to fighting the coalition ground forces.

In summary, while stealth technology and the F-117A have demonstrated a tremendous warfighting capability, they are not

an impetus for changing doctrine. Rather, stealth offers the commander-in-chief (CINC) another highly effective tool to use in conducting military operations. Its relationship to doctrine is one of a maturing capability which meets the test of being flexible and lethal.

FUTURE OF STEALTH

The importance of stealth was summed up by General John M. Loh, the Commander of Tactical Air Command, in his statement to Congress shortly after Desert Storm. He testified that stealth provides four major advantages in air operations: (1) it restores the critically important element of surprise; (2) it provides freedom of action and allows the pilot to concentrate on targets rather than threat avoidance; (3) it allows force structure to be used more efficiently by attacking more targets with fewer fighter and support aircraft; and (4) it provides a high degree of confidence in achieving desired mission results due to the increased survivability of stealth aircraft.[47]

The success of stealth in Desert Storm has virtually dictated that future weapon systems will be procured with stealth technology as a fundamental baseline requirement. The U.S. Air Force envisions a future force structure containing a mixture of stealth and non-stealth aircraft. High leverage weapon systems such as the F-117A, F-22, and B-2 will be the stealth force while systems such as the F-15, F-16, B-1, and B-52 will be tasked against less heavily defended areas.[48]

F-22 Advanced Tactical Fighter

The F-22 Advanced Tactical Fighter (ATF) is programmed to become operational after the year 2000. By then the current front line air superiority fighter, the F-15, will be 25 years old. Upgrades to the F-15 will not be capable of giving it the combination of speed, stealth, and reliability required to defeat the next generation of fighters and air defenses.[49] As its replacement, the F-22 will be the fourth generation of stealth technology designed around a combination of stealth, the ability to cruise supersonically without afterburner (supercruise), advanced avionics, and a tremendous increase in maneuverability over current fighters.[50]

Translated into capability, this means the pilot will have the ability to achieve first look and first kill over an adversary, have increased survivability and lethality, and be able to operate over a larger radius of action than current and projected threat fighters.[51] Stealth gives him a first strike capability against the most difficult targets, the psychological advantage of sudden undetected attacks, and the advantages that come from increased survivability. This reduces the enemy's reaction time and ability to respond during all phases of the defensive engagement cycle.[52] In essence, the ATF will ensure the U.S. has the ability to control the air and provide air superiority for another generation of fighters.

B-2 Stealth Bomber

The B-52 has been used for decades in a wide variety of roles. The most recent was its use in attacks against battlefield targets during Desert Storm. However, it is an old weapon system, and B-52s equipped to carry air launched cruise missiles (ALCM) will be retired at an accelerated rate due to the age of the B-52's engines and airframe.[53] As a replacement for the B-52, the B-2 stealth bomber is a long range aircraft designed to provide both nuclear and conventional deterrence as our force structure shrinks and the number of overseas bases decreases, putting more reliance on continental U.S. (CONUS) basing.[54]

The U.S. Air Force emphasized the need for procuring the B-2 in a recent assessment of the Gulf War. Arguments for the B-2 included the inherent survivability of stealth assets, the extraordinary precision of modern weapons, its long range, and the large payload the stealth bomber would be able to carry.[55] Although not widely known, the original B-2 mission statement included nuclear and conventional capability for peacetime and crisis situation resolution, with a baseline capability to deliver conventional munitions.[56] Currently, the stealth bomber is projected to carr· ten times the payload of the F-117A at five times the unrefueled range of the F-117A.[57] This provides a conventional warfighting capability which combines the F-117A's survivability with the range and payload of the B-52.[58] The importance of the conventional role for the stealth bomber

was underscored by General Lee Butler, the Commander-in-Chief of Strategic Air Command, in his statement to Congress in April 1991:

> "...[the] role of the bomber in future warfare can not be overstated. Its unparalleled responsiveness, payload, and flexibility, coupled with a capability to range the globe from the United States without enroute or host nation support, make the bomber a unique and irreplaceable instrument of national power."[59]

The B-2 will provide a balance between changing future requirements for nuclear deterrence and the need to respond globally to regional crises with a conventional capability that incorporates the advantages offered by a low observable platform.

CONCLUSIONS

The maturing of stealth technology, as evidenced in the lethal performance of the F-117A during Desert Storm, has allowed a long standing desire of air campaign planners to come true -- the ability to effectively penetrate dense radar defense networks and successfully employ aerospace forces in a heavily defended SAM and AAA environment. The stealth fighter was able to repeatedly accomplish precision strikes against heavily defended targets. This was a critical factor in the successful prosecution of the Persian Gulf War. The fact that the F-117A accomplished so much while remaining unscathed stems from air campaign planners understanding its capabilities and making the

right decisions to employ it in the manner for which it was designed.

Stealth's relationship to aerospace doctrine is one of a force multiplier. It requires less support in the form of logistics, strike package sizes, and inflight refueling than more traditional non-stealthy aircraft. But, it does not rewrite doctrine. Stealth provides another capability to the war planner. It is a proven deterrent whose presence in a region indicates a serious intent to support national strategy. As a combat capability, stealth helps achieve air superiority and supports land forces through attacks on the enemy's key strategic targets and his centers of gravity.

Stealth is a characteristic that cannot be ignored on future weapon systems. The F-22 ATF and B-2 stealth bomber are designed to make optimum use of the lessons learned from the F-117A program. Just as every generation of a weapon system incorporates improvements in technology, these systems represent great improvements for the next generation of stealth capability. Understanding how stealth was employed in Desert Storm is the first step in planning for its use in the next conflict. Employing the next generation of stealth aircraft in consonance with aerospace doctrine, which will continue to grow and mature, will guarantee success for the air and land campaigns. Hopefully this paper will provide joint planners with insights into how to effectively employ stealth aircraft when developing contingency plans for the next conflict.

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