

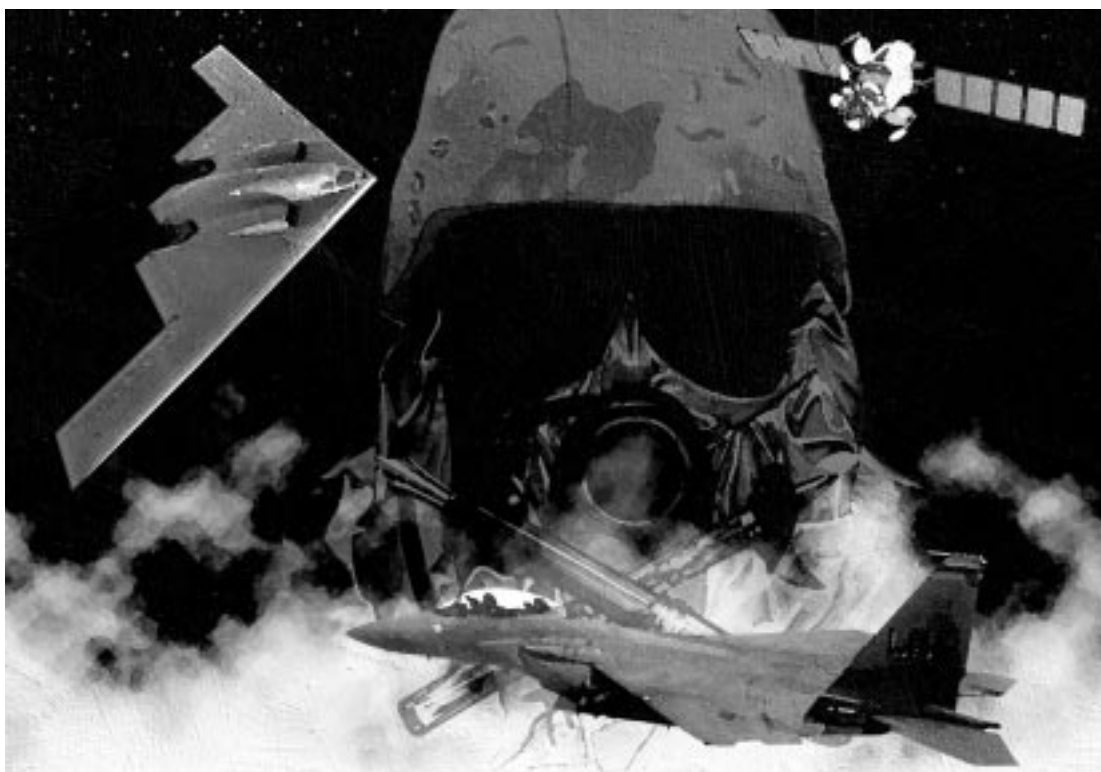
The Role of Aerospace Power in US Counterproliferation Strategy

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THE PROLIFERATION OF nuclear, biological, and chemical (NBC) weapons combined with the spread of ballistic and cruise missile technology is a significant threat to US foreign policy interests. In particular, this proliferation may significantly limit the ability of the United States to project power abroad, intervene in regional conflicts, and support American allies in crises and conflicts. The potential use of NBC weapons in a future conflict raises the possibility of increased US casualties and greatly complicates American use-of-

force decisions. This article examines the role of aerospace power in US counterproliferation strategy.

The US government's response to proliferation is multifaceted. The intelligence community, the Federal Bureau of Investigation (FBI), the Department of State (DOS), and the Department of Defense (DOD) all have significant nonproliferation and counterproliferation programs in place.¹ DOD, in particular, has focused on counterproliferation, developing efforts to prevent and reverse



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proliferation through active and passive damage-limitation efforts.²

Although aerospace power will not be foolproof, in the absence of a comprehensive inspection regime it will form the best hope for avoiding the surprise use of WMDs.

Counterproliferation is different from nonproliferation. Nonproliferation focuses on trying to prevent proliferation directly through such means as export controls, multilateral regimes and treaties, and inducements to cooperation.³ Counterproliferation, by contrast, seeks to prevent proliferation by neutralizing the benefits of proliferation and to reverse proliferation through active military means. As such, counterproliferation can occur both concurrently with nonproliferation and as the basis for policy once proliferation has occurred.

Although nonproliferation and counterproliferation require the cooperation of many different agencies and departments in the US government, there is a special role for aerospace power. Aerospace power, as the name suggests, is the use of instruments of statecraft that rely upon travel through the air and space.⁴ Among the major elements of aerospace power are surveillance satellites, aerial sensors, space- and air-based missile defense systems, and air- and space-based military power including Air Force fighters, strike and standoff aircraft, Navy carrier aviation, and sea-based cruise missiles. Aerospace power has a number of specific attributes that make it an especially potent tool for counterproliferation policy. We can examine its utility by examining six major aspects of counterproliferation. This article also considers some of the limitations on aerospace power by considering its use in three situations: pre-crisis, crisis, and intrawar.

Six Aspects of Counterproliferation

Counterproliferation involves six major distinct activities, the first occurring before weapons or technology proliferate, and the remaining five occurring after proliferation has taken place. Counterproliferation is made up of the following elements:

1. Attempting to prevent proliferation through engagement activities such as extending security guarantees, supporting confidence-building measures such as increasing transparency, and helping support multilateral nonproliferation regimes;
2. Detecting the possession of weapons of mass destruction (WMD) by states and their intention to use them;
3. Preemptively destroying WMDs before they can be used;
4. Deterring the use of WMDs, particularly once a crisis has escalated to actual combat;
5. Protecting forces, logistical infrastructure, and civilians from WMDs through active and passive defense measures; and
6. Restoring contaminated areas after WMD use.⁵

An examination of these six goals in turn will help establish the importance of aerospace power to counterproliferation policy.

Engagement Activities

Aerospace power plays a critical role in sustaining the sort of engagement activities that might help prevent proliferation. First, it is important to consider that states often seek WMDs because of regional security concerns. The Indo-Pakistani nuclear competition is a prime example of this dynamic, as is the Israeli nuclear program and the now-dismantled South African nuclear program.⁶ Given that fact, there is some possibility that the United States could help prevent WMD pro-

liferation by judiciously extending security guarantees to insecure actors.⁷ The problem with extending security guarantees for non-proliferation purposes rather than narrow national interest is that the recipient of the guarantees may not believe the guarantees are credible.⁸ Furthermore, the American public may resist extending security guarantees if it believes that doing so will significantly increase the likelihood that US soldiers may be called up to defend these guarantees and hence be exposed to the possibility of casualties. Because aerospace power is able to strike at a distance and with great precision, the recipient of security guarantees may find them more credible.

US cold war security guarantees, both implicit and explicit, seem to have been very successful in preventing South Korea, Japan, and Taiwan from proliferating. These successes, not surprisingly, occurred in cases where US aerospace power was an especially potent threat given the geographical situation of these three countries. By contrast, Israel, France, and Great Britain decided to build nuclear weapons despite implicit and explicit security guarantees, perhaps because they wanted to bolster their own deterrence capabilities rather than rely completely on the US ground forces that a war would have required.⁹ Of course, all of these countries faced unique security challenges, historical legacies, and domestic constraints, but it does seem plausible to suggest that American security guarantees are more likely to be credible where American intervention can be accomplished exclusively or largely through relative low-casualty means such as aerospace power.

Second, aerospace power is crucial to building increased transparency in either bilateral relations or in support of an international regime.¹⁰ Since we might expect that counterproliferation in the future will rely at least in part on bilateral or multilateral regional arms control agreements, the United States will almost certainly be called upon to help guarantee that none of the parties cheat. Aerospace power in the form of unmanned aerial vehicles (UAV), satellites, and other sensor platforms will play an important role.

More generally, international regimes which rely on inspection systems, such as the Non-proliferation Treaty (NPT), Chemical Weapons Convention (CWC), and hopefully a strengthened Biological Weapons Convention (BWC) will be bolstered by aerospace-based transparency systems.¹¹

Detecting WMDs

In terms of detecting the possession of WMDs and the intention to use them, aerospace power will be similarly important. Aerospace-based sensors will be crucial in detecting WMD manufacturing facilities and stockpiles. Furthermore, aerospace-based sensors will be crucial in developing timely warning about WMD stores being dispersed to combat units or fitted on long-range delivery systems. Although aerospace power will not be fool-proof, in the absence of a comprehensive inspection regime it will form the best hope for avoiding the surprise use of WMDs.

Ultimately, of course, aerospace power is only one part of a comprehensive transparency-building system. While aerospace assets can significantly increase the amount of information available, the difficult task is in interpretation and analysis.¹² The human element is thus crucial. Aerospace assets might thus be seen as a necessary but not sufficient element in a strategy based on transparency.

Preemptive Attacks

Aerospace power is also a potent tool if the United States chooses to destroy WMDs before they can be used. This sort of military preemption will require four basic characteristics. It will have to be (1) flexible, (2) capable of rapid response, (3) precise, and (4) able to strike targets deep within an enemy's territory. These characteristics are also the strengths of aerospace power.

However, preemption is also an inherently limited option. Preemption involves escalating a conflict or crisis and may not be politically possible for the United States. In addition, the requirements of preemption differ depending on whether it occurs in peace-



Airpower played a key role in the Cuban missile crisis. U-2 photo reconnaissance detected the site for initial preparations for surface-to-air missiles and medium-range ballistic missiles in Cuba, and aircraft monitored activities throughout the crisis (note the RF-101's shadow in the photograph on the opposite page).

time, crisis, or war. Furthermore, there is a fundamental difference between preempting WMD manufacturing plants and actual WMD munitions. While plants make visible, concentrated, high-value targets, WMD stores could be dispersed, hidden, and may (in the case of items such as chemical artillery shells) be too small and cheap to warrant the use of expensive platforms and munitions to eliminate them.

Deterrence

The process of deterring WMD use is also likely to rely heavily on aerospace power.¹³

There are two forms of deterrence: deterrence by punishment and deterrence by denial.¹⁴ Although the former is more obviously within the realm of aerospace power, aerospace power can also play a role in deterrence by denial. The important thing to remember about deterring the use of WMDs is that WMDs are not primarily military weapons but rather terror weapons. WMDs are probably not particularly effective in achieving traditional military goals such as the destruction of enemy military capabilities and the conquest and control of territory.

To deter the use of WMDs, deterrence by punishment requires the ability to threaten



credibly to inflict severe pain on a potential adversary. Fundamentally, given US power-projection capabilities, this sort of punishment will rely on aerospace power in its various forms—from aircraft to cruise missiles. However, the United States's ability to punish an adversary by airpower is variable. The key to punishment is to destroy assets the opponent particularly values. Are these assets targetable through aerospace power? The answer is not clear. Ultimately, many hostile regimes may only value their own leadership.¹⁵ Aerospace power may be able to undermine some of the bases of an adversary's leadership, but as the case of Iraq suggests, it

is difficult to bring down a regime with airpower alone.¹⁶ Even adjusting for the equivocal commitment to bringing down the regime in the Bush and Clinton administrations, it is difficult to conceive of an alternate target set that could have finished off the regime without some sort of intervention on the ground. It is difficult to undermine a regime by bombing it. Numerous studies have shown that civilians usually either rally around a leader or respond to bombings by becoming passive.¹⁷ The North Atlantic Treaty Organization (NATO) bombing of Serbia over the Kosovo situation has apparently weakened the regime of Slobodan Milosevic; however,

virtually all the large-scale demonstrations against Milosevic occurred after the bombing stopped and are as much a response to the failure of his policies as the suffering inflicted by the bombing.

Deterrence by denial is also more difficult than it might seem on the surface. Deterring the use of WMDs by denial does not only mean preventing an adversary from achieving military goals since WMDs are most likely to be used for political effect rather than narrow military missions. Rather, deterrence by denial in this context refers to steps which nullify the effects of WMDs. Since these effects are both military and political, the deterrence calculus is difficult to examine simply and precisely. That said, the inherent passive defense capabilities of aerospace power seem to make it an ideal basis for denying an adversary the ability to constrain US use-of-force decisions. Aerospace assets are difficult to target and hence can be used without exposing American soldiers to the effects of terror weapons. Certainly, the passive defense capability of aerospace assets does not prevent the use of WMDs against civilian targets, but it does limit the forward-deploying military assets that can be targeted. In this sense, the ability to fly high and fast is itself a form of deterrence by denial.

Force Protection and Active and Passive Defenses

This point about passive defense also speaks to the fifth element of counterproliferation policy—protecting forces, logistical infrastructure, and civilians from WMDs through active and passive defense measures. Aerospace power has an inherent advantage in passive defense, since its instruments are harder to target. This is especially the case as the Air Force moves forward on the concepts demonstrated in Expeditionary Force Experiment (EFX) '98.¹⁸ EFX '98 demonstrated a force deployment concept based on the use of a small forward logistical footprint. This approach effectively robs adversaries of valuable targets for their WMDs. Clearly, the Air Force needs to continue to work on this concept. Current Air Force plans to purchase

large numbers of F-22s, while allowing the longer-range bomber force to stagnate, will raise questions about the sustainability of extended small forward footprint campaigns because of the relative short range of small payloads.

Active defense initiatives will almost certainly rely on aerospace power. First, aerospace power will be crucial in tracking WMD assets before they are used. Second, aerospace power will be a necessary part of any attempt to destroy WMDs loaded on airplanes and missiles. Many theater missile defenses (TMD) rely heavily on aerospace assets in both the sensor and shooter phases.¹⁹

Restoring Contaminated Areas

The final aspect of counterproliferation policy, that of decontaminating affected areas, is the one area in which aerospace power is likely to play a minimal role. Although aerospace assets might be useful in spreading solvents or antidotes as well as tracking affected areas, on the whole, the unique role of aerospace power is limited. Indeed, civilian rather than military agencies, most notably the Environmental Protection Agency (EPA), Department of Energy, and the Centers for Disease Control (CDC) are likely to bear the brunt of restoration efforts.²⁰

In order to examine the role of aerospace power, it is also useful to consider three general scenarios for WMD counterproliferation. These are pre-crisis, crisis, and wartime situations, each of which raises a different set of objectives and constraints.

Counterproliferation in Peacetime

The vast majority of counterproliferation efforts occur prior to crisis or conflict with a proliferator. At this stage, the goal of counterproliferation policy is simply to prevent the proliferation of WMDs.

There are three basic processes inherent to counterproliferation at this stage. The first is to try to convince potential adversaries they do not need WMDs and cannot use WMDs.

This goal involves the positive aspect of engaging countries so that they feel secure enough to eschew WMDs. However, convincing states that they cannot use WMDs may involve the more confrontational posture of threatening to destroy WMD stores before they can be deployed and demonstrating the capability to intercept and destroy WMD delivery vehicles.

The second core process to counterproliferation in the pre-crisis phase is to convince potential suppliers they should not proliferate WMDs. This involves both positive and negative policies. Positive inducement includes appealing to norms, while holding out the possibility of extending benefits to non-proliferators. Negative inducements include sanctions and possibly even threats of retaliation should a state's activities lead directly to WMD development and use by another state. In other words, counterproliferation could include, for instance, striking North Korea if Iran uses North Korean missiles against the United States or a US ally.

The third core process in pre-crisis counterproliferation is the preventive use of force against a potential adversaries' WMD production facilities and stockpiles. This process seems self-explanatory, but as will be discussed later, it represents a much more complex task than most observers realize.

The role of aerospace power in effecting these three processes is significant. As mentioned earlier, aerospace power will play a critical role in efforts to detect WMD programs and capabilities. Successful detection efforts may allow the United States to use preventive diplomacy—against both suppliers and proliferators—aimed at preventing the spread of WMDs. Clearly, satellites, UAVs, and manned reconnaissance aircraft will play a major role. However, the effectiveness of this sort of counterproliferation is very reliant on weak tools of statecraft. Diplomatic measures and sanctions are often ineffective against determined regimes.²¹

The involuntary reversal of WMD programs or the preventive use of airpower to destroy WMDs also suggests a strong role for aerospace power. In particular, the use of

precision-strike capabilities against WMD targets seems, on the surface, a likely role for aerospace power. However, when we consider the issue more carefully, it seems very unlikely that the United States would pursue such a course in a pre-crisis situation.

First, the United States should expect significant resistance from allies to this sort of military counterproliferation. Some US allies, particularly Japan and France, have historically been reticent about supporting American military actions. Indeed, the only two countries that have supported strong US military actions have been Israel and Great Britain. Ultimately, this represents an insufficient consensus for a broad-based counterproliferation initiative.

Second, the use of American military power in a pre-crisis counterproliferation role would hurt US standing and legitimacy in world opinion and in the United Nations. The lukewarm attitude of US allies mirrors the general unease in the international community with the notion of unprovoked military actions even in the counterproliferation area. Indeed, even when the provocation is great, the international community has been reticent to sanction the use of force. For instance, despite Iraq's clear violations of UN resolutions and evidence of its WMD facilities, the United States still had trouble building a coalition around the use of force. Indeed, in December 1998, when the United States and Britain finally responded to months of provocations with four days of air strikes, the People's Republic of China and Russia both reacted strongly, and most other countries were critical of the use of force.²² This response is especially chilling when we consider that Iraq is an extreme case: a brutal regime, guilty of violating UN resolutions, with a history of using WMDs against its neighbors and its own people.

Furthermore, there are also technical problems in targeting WMDs in a pre-crisis situation. First, striking production facilities is difficult because of the risk of collateral damage. Although the United States has made great strides in weapons accuracy, WMD facilities raise particular problems. Destroying a

biological weapons site may release infectious diseases, and attacks on chemical and nuclear weapons sites are similarly liable to contami-

Indeed, the use of military force in a counterproliferation role is a losing strategy in the medium to long term because the political effects of using force will tend to limit the possibility of using force in the future.

nate the surrounding areas. In some cases, WMD sites might be far enough removed from civilian areas to make such an attack possible, but in cases where WMD sites are tightly integrated into residential or even inhabited industrial areas, it may not be politically viable to risk contaminating innocent civilians. In addition, although the United States is developing the means of neutralizing biological and chemical agents as part of the attack—perhaps by using fuel-air devices capable of incinerating toxins—this sort of attack can have localized effects comparable to small nuclear weapons.²³ In other words, the heat and blast effects of fuel-air devices are such that they render the phrase “precise and limited” moot.

Targeting production facilities is also difficult because of the dual-use problem. This is especially true for chemical and biological weapons sites. Virtually any chemical plant can be converted to weapons production. Indeed, plants might be partially converted in such a way as to leave a plausible cover for the plant’s operation. Similarly, virtually any pharmaceutical plant can be used to develop and produce agents for biological weapons. Identifying these facilities is thus very difficult from an intelligence standpoint, and the fact that the plants may be producing legitimate civilian goods as well as WMDs exacerbates the political problem with targeting such facilities. This problem was clearly visible in the strikes on the chemical plant in Sudan purportedly manufacturing VX gas for Osama

bin Laden. The legitimacy of this target is still being debated.²⁴

In any case, targeting WMD production facilities is at best a short-term solution. Although it may be possible to delay significantly the production of capital intensive weapons such as nuclear devices, most states, including rogue actors, have the technological know-how and the existing infrastructure to ramp up chemical and biological weapons programs very quickly.²⁵ Unless the United States can find ways to eliminate knowledge and skills as well, military counterproliferation may be at best a short-term solution. Indeed, the use of military force in a counterproliferation role is a losing strategy in the medium to long term because the political effects of using force will tend to limit the possibility of using force in the future. Seen in this light, the US and British attacks on Iraq in December were probably a victory for Saddam Hussein since the response of the international community would seem to virtually rule out future large-scale attacks. At the very least, Saddam Hussein has been able to eliminate the UNSCOM (United Nations Special Commission) inspection regime at a cost that he may judge tolerable.

The final role for aerospace power in a pre-crisis scenario involves establishing as a concept that WMDs will not deter the United States from intervening in local conflicts, nor will it limit US will. This goal represents a form of strategic control in that the intent is to prevent an opponent from determining the arena of conflict. As long as the United States is able to convincingly leave open the possibility of military action, US diplomacy is likely to be more successful. In short, the threat of force is significant even if it is not used.

This concept, however, is difficult to establish in practice. Even if the United States is able to demonstrate this willingness to use force, it is not clear that potential adversaries will learn the right lessons. Saddam Hussein, for instance, seemed to believe in 1990–91 that the United States would not go to war to liberate Kuwait. He held tenaciously to this belief despite the best efforts of the Bush administration, partly because he seems to have

been misled by the lessons of Vietnam.²⁶ Misperceptions of this sort are very common in international affairs, and it is naive to assume that American policy will be able to communicate credibility with any sort of consistency.²⁷

Finally, it is important to remember that countries may have incentives to develop WMDs apart from trying to influence the United States. Ultimately India and Pakistan developed their WMD programs in response to regional security dynamics, including India's tense relations with China. And even if Iraq had no desire to prevent US interventions in the Persian Gulf, it would probably develop WMDs to balance against Iran and Israel. Prestige, domestic politics, and local security threats all play a large role in the calculus states face when considering whether to develop WMDs.²⁸ Thus, whether the United States is able to claim convincingly that it is undeterrable by WMDs may ultimately not be sufficient to prevent states from proliferating. The problem, of course, is that weapons developed against a regional adversary might still be used either politically or militarily against the United States in the case of a regional conflict.

Although at one level, pre-crisis counterproliferation seems especially promising, there are numerous political and military challenges to making this policy successful. Aerospace power will play a large role in any effective pre-crisis strategy, but ultimately counterproliferation will be a success or failure for broader reasons than simply the effective application of aerospace power.

Counterproliferation during Crises

Once a confrontation with a proliferator moves into a crisis, the dynamics of counterproliferation change significantly. The US goals once a crisis begins are to try to prevent the escalation of the crisis while preparing to intervene if necessary. These goals are partially contradictory, since preparation for war can often be interpreted as a hostile sign. Tension is particularly visible in the case of crises involving states with WMDs, since the



DOD photo (released).

The degrading of the infrastructure of Iraqi weapons of mass destruction during Operation Desert Fox is seen in this bomb damage assessment photo of the Shahiyat Liquid Engine Research, Development, and Testing Facility in Iraq. Gen Henry H. Shelton, chairman of the Joint Chiefs of Staff, made use of this photo on television on 20 December 1998.

incentives to preemption are high in the absence of deterrence based on the existence of secure second-strike forces.

There are several key processes involved in managing a crisis while preparing for the possibility of escalation. The first is that in such a situation, the United States must work effectively to signal the seriousness of the US commitment and interest in the issue at stake. International crises typically involve an element of communication. As states edge toward confrontation, they test one another's willingness to fight and the depth of their commitments.²⁹ They signal credibility through a combination of diplomatic and military moves.³⁰ The latter include increasing the visible activity and readiness of military forces, deploying troops and equipment closer to the area of battle, and perhaps even employing the exemplary use of force including demonstrations of live fire and challenges to the airspace and territory of the other state.

In this sense, efforts to signal credibility also serve to prepare for war. Assets deployed

to signal credibility may also be put in position to act if combat begins. Of course, these two processes are not identical. Actions designed to signal credibility may involve the deployment and movement of highly visible symbolic assets into dangerous, rather than militarily relevant, locations. Since the beginning of the cold war, the United States has used aircraft carriers often on this sort of mission. Examples are the confrontation with Libya over the status of the Gulf of Sidra in the 1980s and the passage of a carrier battle group into the Taiwan Strait during the 1996 crisis over the People's Republic of China's missile launches near Taiwanese ports.³¹ Neither of these deployments made *military* sense. There was no obvious military mission that would have required the United States to deploy assets that close to enemy capabilities.

Aerospace power, though well suited to military interventions against WMD states, may not be the most effective diplomatic and signaling tool. Ultimately, the very characteristics that make aerospace power militarily effective—standoff capabilities, long-range strike, precision, speed, and stealth—also limit its effectiveness as a signaling tool because it is less visible.

In addition to signaling, another key element of dealing with a crisis is to prepare for conflict by reviewing and expanding target sets against the potential adversary. Although many targets will already have been identified, the number of targets multiplies drastically once a crisis begins. Because a crisis implies a relatively short time frame to resolution or conflict, it makes sense to begin expanding the target set to include mobile assets, including military units, dispersed WMD stores, WMD delivery capabilities, and so on. This is a task well suited to aerospace-based sensors.

The role of US aerospace power during a crisis is significant. First, aerospace assets may be able to detect signs that an adversary has plans to use WMDs. For instance, aerospace assets may be able to spot the dispersal of WMD stores to field commands and may be able to spot the preparation of WMD launchers.

Second, given this potential to detect preparation for imminent use of WMDs, it

may be possible to strike preemptively at an adversary's WMDs. Unlike the pre-crisis situation, once a crisis begins the credibility of such a course of action increases dramatically. If the United States can develop clear evidence that an adversary is preparing to use WMDs, it will be much easier to convince the international community of the need and legitimacy to strike first.

Unfortunately, the task of preemption is likely to be more difficult. Prior to a crisis, the main targets for counterproliferation are WMD manufacturing facilities and WMD storage areas. Once a crisis begins, the adversary may disperse his WMDs. The result is that instead of striking fixed facilities, it may be necessary to target an ever-increasing number of sites as well as mobile assets. Dispersal dramatically complicates the counterproliferation task.

Furthermore, there is still a political tension in adopting a counterproliferation strategy in a crisis. In particular, there is the danger of striking too soon. Preemption effectively means giving up on crisis limitation. In other words, the tension between crisis management and preparing for conflict is reflected in the crosscutting pressures on preemption.

In addition, it is also important to consider the broader effects of planning for and executing preemptive strikes. The more the United States makes preemption a part of its policy, the more likely adversaries are to disperse early and grant use authority to lower-level commanders. Is it in the US interest to have WMD decisions being made at battalion level? Clearly, the answer is no.

Aerospace power is a credible way to signal commitment, since it is less vulnerable to WMDs on the whole. But, on the other hand, especially if the United States relies on deep strike, and small forward presence, the signaling effects will be limited. Furthermore, aerospace power does not eliminate the tension between crisis management and preparing for conflict.

Counterproliferation and Conflict

Finally, aerospace power has a role in counterproliferation policy once a conflict begins.

Although American strategists have considered the role of counter-WMD operations in a conflict, thinking on this issue has failed to consider fully the insights of the nuclear counterforce debates during the cold war.³²

Once a conflict begins, American goals are clear: Win the war while preventing use of WMDs against US forces. These goals can be accomplished through three core processes. The first core process is the establishment of an intrawar deterrent relationship. The second is to engage in both active and passive damage-limitation activities. The third is to destroy the enemy's ability and will to resist so as to end the conflict as quickly as possible.

Aerospace power plays a central role in all three of these processes. Although as in the pre-crisis and crisis situations, there are significant limitations on what aerospace power can achieve. The problems are not purely technical but also political and doctrinal.

Since aerospace power can strike deep into an adversary's territory, it can be used to hold enemy assets hostage. This capability is crucial in developing an intrawar deterrence relationship. The tension, however, is that the requirements of successful war fighting may conflict with those of building intrawar deterrence.

For example, should the United States strike at enemy leadership targets? Certainly, from a war-fighting perspective, it may make sense to do so—especially when dealing with centralized, developing countries. The leadership is probably the key target since in the absence of continued central control, the armed forces may simply cease fighting. However, from a deterrence standpoint, it may be wiser to hold the enemy leadership "hostage." Indeed, it may even make sense to allow them to keep a certain level of command and control so that they can maintain control over WMD use.

This "hostage holding" is, however, contrary to emerging US doctrine on information dominance, which holds that one of the keys to success in future conflicts is the rapid and total destruction of an adversary's command, control, communications, computers, intelligence, sensor, and reconnaissance (C⁴ISR) infrastructure.³³ With WMD-armed states, this sort of approach seems to under-

mine the possibility of intrawar deterrence; if the enemy does not know what has been hit, he does not know what has not and hence what is still being held hostage. Furthermore, with WMD-armed states, the real danger may come precisely when the other side is desperate from being blind and paralyzed.

That said, another problem arises: How can the United States let them know they are hostages? Demonstration strikes on some leadership assets combined with direct communication may be sufficient. But in the end, US policy will rely upon adversaries to understand the nature of the threat. They have to believe that they have a great deal still to lose by using WMDs, but this perception is difficult to establish.

Although intrawar deterrence is difficult to establish due to the communicative and perceptual aspects involved, there are more direct counterproliferation strategies available in conflict. The United States can use aerospace assets to engage in damage-limitation attacks. The first task would be to disable an adversary's ability to strike the United States with WMDs. In particular, US forces will need to destroy ballistic missiles before they can be launched and to develop active defense capabilities (ballistic missile defense), which will most likely be aerospace based. Ultimately, it should be possible to eradicate the short-term WMD threat to the US mainland since most countries are likely to have few intercontinental ballistic missiles (ICBM) capable of delivering WMDs to US territory.

However, pursuing this sort of damage limitation may be difficult for theater assets. At the theater level, an enemy will be able to deliver WMDs with shorter-range missiles, artillery shells, bombs, and even lower-technology systems. These are small and mobile and are likely to be dispersed. As the Scud hunts in the Gulf War demonstrated, even theater-range ballistic missiles can be hard to target, much less artillery shells. Furthermore, in discussing theater assets, it is likely that a damage-limitation campaign will be a time-consuming endeavor. Although we might be able to imagine a lightning campaign against an enemy's nascent ICBM force that could elimi-

nate the threat before it can develop, it will be much more difficult to preempt theater assets.

Perhaps the biggest danger in thinking about counterproliferation policy is to assume that the challenge is a puzzle to be solved once and for all.

The United States also needs to worry about the possibility of pushing an adversary into a “use-it-or-lose-it” situation.³⁴ If opponents rely on WMDs to limit losses in a conflict and the United States begins to degrade their WMD capabilities, then the adversaries may use WMDs as a form of damage limitation against the United States. In short, although the outcome is unpleasant to contemplate, it may be necessary to accept that WMD possession by an adversary does, in fact, limit US options.

Ultimately a future war with a WMD-armed adversary will need to rely on aerospace power. In a WMD environment, the combination of precision, speed, destructiveness, and greater inherent passive defense capabilities of aerospace power—including land-based strike fighters, long-range bombers, carrier-based aircraft, and cruise missiles—will probably ensure that aerospace power remains at the center of future conflicts.

Conclusions

With good information, aerospace power could be an ideal tool of involuntary counterproliferation. However, for political reasons, it seems unlikely that the United States will be able to use force against countries just for developing WMDs. In crisis or war the problem becomes more difficult because of the need to target WMD weapons systems rather than production facilities. Systems may be dispersed, and there may be tension among counterproliferation, crisis management, and intra-war deterrence. Regardless, however, because aerospace power can maintain a sustained cam-

paign from a distance, with an increasingly small footprint, it will play a crucial role in future conflicts against WMD states.

However, it is important to be careful when thinking about the future. In the United States currently, a particular threat model dominates strategic thinking. This model involves medium-sized developing states that are building a combination of WMDs and ballistic missiles. This model is relevant to such countries as North Korea, Iraq, Iran, and Libya. However, this is not the only possible model. If, by some combination of counterproliferation initiatives—including ballistic missile defense systems, prevention, preemption, and deterrence—the United States eliminates this model of threat, then another will arise. Perhaps the biggest danger in thinking about counterproliferation policy is to assume that the challenge is a puzzle to be solved once and for all. The United States should not base policy on the fallacy of the last move—that is, that adversaries will not be able to develop counterstrategies to US policies.

Consider, for example, cold war South African nuclear strategy that was based on internationalizing any conflict by demonstrating nuclear capability. The South Africans never intended to use their nuclear weapons in a military role. Instead, they simply planned to demonstrate a nuclear capability as a way of forcing the international community to intervene to stop whatever conflict was affecting South African security.³⁵ How would a nuclear demonstration in the midst of a crisis or conflict affect US strategy? Does an adversary need to actually threaten the continental United States or US forces to be effective?

There are no good answers to this sort of question. Certainly, the United States must consider itself vulnerable to political manipulation by WMD-armed opponents as much as to military intimidation. In the short term, a carefully considered policy based on the capabilities of aerospace assets may form the backbone of counterproliferation strategy. But in the future, the United States will have to remain wary and careful about the capabilities of adversaries. □

Notes

1. Report of the Counterproliferation Program Review Committee (CPRC) (Washington, D.C.: Government Printing Office, 1997).
2. Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, D.C.: Government Printing Office, 1997); and Peter L. Hays, Vincent J. Jodoin, and Alan R. Van Tassel, eds., *Countering the Proliferation and Use of Weapons of Mass Destruction* (New York: McGraw-Hill, 1998), 8–11.
3. Randall Forsberg et al., *Nonproliferation Primer: Preventing the Spread of Nuclear, Chemical, and Biological Weapons* (Cambridge, Mass.: Massachusetts Institute of Technology Press, 1995).
4. Daniel Goure and Christopher M. Szara, eds., *Air and Space Power in the New Millennium* (Washington, D.C.: Center for Strategic and International Studies, 1997); and Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, 1997.
5. These categories are derived from the discussion in Hays, Jodoin, and Van Tassel, 9–10; and Joint Chiefs of Staff, *National Military Strategy of the United States of America* (Washington, D.C.: Government Printing Office, 1997), 26.
6. Seymour M. Hersh, *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy* (New York: Random House, 1991); Waldo Stumpf, "South Africa's Nuclear Weapons Program: From Deterrence to Dismantlement," *Arms Control Today* 25, no. 10 (December 1995/January 1996): 3–8; Thomas Graham Jr., "South Asia and the Future of Nuclear Non-Proliferation," *Arms Control Today* 28, no. 4 (May 1998): 3–6.
7. Brad Roberts, "From Nonproliferation to Anti-Proliferation," *International Security* 18, no. 1 (Summer 1993): 168–69.
8. For a discussion of the importance of credibility in extended deterrence relationships, see Paul K. Huth, *Extended Deterrence and the Prevention of War* (New Haven: Yale University Press, 1988), 1–6; and Alexander L. George and Richard Smoke, *Deterrence in American Foreign Policy: Theory and Practice* (New York: Columbia University Press, 1974), 558–61.
9. The French, in particular, expressed doubts about the credibility of US commitments. Lawrence Freedman, *The Evolution of Nuclear Strategy* (New York: St. Martin's Press, 1983), 314–15.
10. Ann Florini, "The End of Secrecy," *Foreign Policy* 111 (Summer 1998); and Ronald B. Mitchell, "Sources of Transparency: Information Systems in International Regimes," *International Studies Quarterly* 42, no. 1 (March 1998): 109–30.
11. Amy E. Smithson and Michael Krepon, "Strengthening the Chemical Weapons Convention through Aerial Inspections," *Occasional Paper 4* (Washington, D.C.: Stimson Center, April 1991).
12. Bernard I. Finel and Kristin M. Lord, "The Surprising Logic of Transparency," *International Studies Quarterly* 43, no. 2 (June 1999): 315–39.
13. For an extended discussion of adapting deterrence to WMD threats, see Paul I. Bernstein and Lewis A. Dunn, "Adapting Deterrence to the WMD Threat," in Hays et al., 147–69.
14. George and Smoke, 46–55.
15. Many analysts argued that this was the case for the Soviet Union during the cold war. See Colin Gray, "Nuclear Strategy: A Case for a Theory of Victory," in Steven E. Miller, ed., *Strategy and Nuclear Deterrence: An International Security Reader* (Princeton, N.J.: Princeton University Press, 1984), 36–38. This argument may be even stronger in the case of "rogue regimes" whose leadership is often very narrow and rests on familial or clannish bases. See Raymond Tanter, *Rogue Regimes: Terrorism and Proliferation*, revised edition (New York: St. Martin's Press, 1999).
16. Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, N.Y.: Cornell University Press, 1996), especially 250–53.
17. Ibid., 24.
18. Capt Tammie Grevin, HQ AFSPC Public Affairs, "Space Plays Major Role in EFX 98," Air Force News Service, 10 September 1998, Peterson AFB, Colo.; on-line, Internet, available from http://www.af.mil/news/Sep1998/n19980910_981370.html.
19. Office of the Secretary of Defense, *Annual Report to the President and Congress, 1998* (Washington, D.C.: Government Printing Office, 1998), 63–66.
20. Report of the Counterproliferation Program Review Commission (1997), appendix C.
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22. "Russia enraged over Iraq strikes, says relations with U.S. could deteriorate," Cable News Network, 19 December 1998; on-line, Internet, available from <http://www.cnn.com/WORLD/meast/9812/19/iraq.russia.01/>.
23. Paul F. Walker and Eric Stambler, "... And the Dirty Little Weapons," *Bulletin of Atomic Scientists* 47, no. 4 (May 1991); on-line, Internet, available from <http://www.bullatomsci.org/issues/1991/may91/may91walker.html>.
24. Tim Weiner and James Risen, "Decision to Strike Factory in Sudan Based on Surmise," *New York Times*, 21 September 1998, A3.
25. Julian Perry Robinson, "The Supply-Side Control of the Spread of Chemical Weapons," in Jean-Francois Rioux, ed., *Limiting the Proliferation of Weapons: The Role of Supply-Side Strategies* (Ottawa, Canada: Carleton University Press, 1992), 63.
26. Alexander L. George, *Bridging the Gap: Theory and Practice in Foreign Policy* (Washington, D.C.: United States Institute of Peace Press, 1993), 84.
27. Robert Jervis, *Perception and Misperception in International Politics* (Princeton, N.J.: Princeton University Press, 1976).
28. Bradley A. Thayer, "The Causes of Nuclear Proliferation and the Utility of the Nuclear Nonproliferation Regime," *Security Studies* 4, no. 3 (Spring 1995).
29. Glenn H. Snyder and Paul Diesing, *Conflict among Nations: Bargaining, Decision Making, and System Structure in International Crises* (Princeton, N.J.: Princeton University Press, 1977), 3–32.
30. Huth, 199–213.
31. David S. Chou, "U.S. Roles in the 1995–96 Taiwan Strait Crisis," in Tai Wan-chin, ed., *The Security Relationship between the U.S. and Taiwan: After the 1996 Mini-Crisis* (Taipei, Taiwan: Tamkang University, 1997), 23–40.
32. See Charles L. Glaser, *Analyzing Strategic Nuclear Policy* (Princeton, N.J.: Princeton University Press, 1990), 207–56.
33. For a discussion of these issues, see Martin C. Libicki, *What Is Information Warfare?* (Washington, D.C.: National Defense University Press, 1995), 9–18.
34. See the similar argument of Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, N.Y.: Cornell University Press, 1991).
35. Stumpf, 5.