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EDITORIAL

WHAT DOES IT MATTER ANYMORE?

A Perspective on Honor

Honor's a fine imaginary notion.

—Joseph Addison, *Cato*

I DEMONSTRATED leadership ability at an early age, leading the neighbor's children in a candy-stealing expedition to the local drugstore when I was six. We were quite happy with our ill-gotten gains until their father, an Air Force officer, found out. He *strongly* explained to me the error of my ways and then marched me and the tearful but guilty group to the store to make restitution. Next, he turned me over to my own father, who dealt with my backside. Oddly, this experience made a great impression on the development of my moral character.

Nowadays, of course, I don't think you'd find many Air Force officers willing to confront and discipline the neighbor's children. Anyone who chanced it would probably be sued. After all, modern child psychologists (and proponents of situational ethics) would likely argue that the children never did anything wrong in the first place. They were probably only finding a nonviolent expression for their quite normal frustration. Certainly, to accuse children of "stealing" pins too harsh a label on those so young. Besides, a confrontation over the issue could quite possibly damage their little developing psyches.

All this talk about values is rather tedious. Every time I look in my in-basket, I find something espousing "OUR CORE VALUES: Integrity, Courage, Service," and so forth. Don't our leaders know that sociologists have decided that moral absolutes no longer exist? Besides, how can the Air Force expect people raised in an environment of situational ethics and values clarification to even care?

But many people seem concerned with all this values stuff. Quite a few studies over the last 20 years have noted a "values crisis" in the Air Force. Some of them note that perceptions of ethical issues vary by rank: the more senior the officer, the less likely he or she is to perceive an ethical problem. Perhaps that explains the recent spate of scandals involving top-level officials. Similar findings come from another Air Force ethics study of the rank and file, though the majority of respondents was well aware of the standards of behavior for Air Force officers. A significant number, however, simply chose not to obey them. Do the findings of these two studies indicate that, over time, people who violate their consciences long enough lose the ability to discern right from wrong?

Certainly, there will always be exceptions. Jomini claimed that "being capable of distinguishing right from wrong and choosing the right is a virtue that is indispensable in our profession." Some officers are still willing to commit to lives of personal integrity. Several months ago at a farewell luncheon, I watched in amazement as person after person attested to what the departing field-grade commander had meant to them personally and to their unit. NCOs told of how this man had "restored their faith in the officer corps." They liberally used words like *integrity*, *service*, *tenacity*, and *competence* (amid a sprinkling of tears no less!). Hmmm. Perhaps core values matter after all, and maybe—just maybe—one person really can make a difference in someone's life.

GDF

RICOCHETS

Letters to the editor are encouraged. All correspondence should be addressed to the Editor, Airpower Journal, *401 Chennault Circle, Maxwell AFB AL 36112-6428. We reserve the right to edit the material for overall length.*

MISSILE MAELSTROM

The title of the article by Lt Col John R. London III ("The Ultimate Standoff Weapon," Summer 1993) interested me, but the basis for a conventional intercontinental ballistic missile (CICBM) falls short.

First are his concerns over current cruise missile technology. Colonel London points to the raid of 17 January 1993 on Baghdad to highlight the "vulnerability" of cruise missiles. The point is that all weapon systems, including CICBMs, have a probability of kill of less than 1.0. We launched a sufficient number of cruise missiles to strike the target to the degree set by national command authorities (NCA). He feels that cruise missiles are slow in retargeting. This may be true, but the process is no slower than rolling out and fueling a liquid-propellant CICBM. One should also consider the hours/days that the NCA may take in deciding how to react. Further, the range of cruise missiles could be extended by using a smaller warhead. Couple this possibility with the whiz-bang guidance technology of a CICBM, and we could put a 200-pound bomb in the bedroom of a foreign command element 1,000 miles inland (from 300 miles offshore).

Second is the statement that "overflight of foreign territories should not be an issue since a missile's trajectory is largely in space" (page 66). I disagree. We could not overfly a nation with ballistic missile warning radars (imagine how a friendly 20-minute warning can alter the effect of a strike), a nation with nuclear weapons of any type (as Colonel London implies), or any of the myriad nations that would protest such an action. Additionally, no opposing/nonaligned national leader will be comfortable with our stating that the warhead is conventional as it descends over his or her capital city en route to a neighboring country. Furthermore, as nations such as China, Iran, India, Pakistan, Japan, Brazil, and so forth develop space booster capabilities, courtesy agreements will be extended and launch notifications will become required. In contrast, a cruise missile announces itself upon arrival.

The matter of basing the CICBM in a nuclear-free zone may be counter to current national policy. We neither confirm nor deny the presence of nuclear warheads on any weapon system. The capability to loft a nuclear-armed reentry vehicle will still be a capability of the CICBM. Colonel London's statement that warhead choice could include nonlethal weapons floored me. Why use an ICBM to drop leaflets or tear gas?

Finally, the article identifies three areas in which a CICBM would be "highly effective." The first is in demonstrating resolve. Sorry, but our NCA has ample systems to demonstrate resolve. One more tool in the toolbox will not bestow greater resoluteness upon the NCA. The second mission is crisis response, London's example being the quick destruction of a threatening weapon (North Korean nuke?). This point has merit, provided there are no other weapon systems available to eliminate what I presume is a serious threat to our national security. In my mind, the only threat at this level would be a nuclear weapon. This presents its own dilemma. What if the conventional warhead fails to destroy the threat? What if the CICBM strike results in a nuclear yield, due to faulty safeguard systems in the threat? (A further issue must be a redefining of nuclear launch on warning, but this problem will first necessitate a visit to the Judge Advocate General.) The third area of CICBM effectiveness is in the leading edge of a combined arms attack. It "could not only attack the most heavily defended targets, but could do so with no warning whatsoever to most potential adversaries" (pages 66–67). As time has permitted a combined arms attack, Colonel London just described the F-117.

The cold reality is that the most effective precision guided munition ever conceived is not held by the Air Force. It is the saboteur.

Capt Gilbert O. Classen, Jr., USAF
Davis-Monthan AFB, Arizona

JFACC

PROBLEMS ASSOCIATED WITH BATTLEFIELD PREPARATION IN DESERT STORM

THIS ARTICLE examines several problems the joint force air component commander (JFACC) experienced during Operation Desert Storm. These problems show how different service perspectives drive "joint" operations. Most likely, these problems will plague the next war-fighting JFACC or commander in chief (CINC) if they are not resolved.

Before the JFACC problems are addressed, we should review Desert Storm's campaign objectives. On 4 August 1990, President George Bush met with key military leaders at Camp David, Maryland, to determine a course of action. At this meeting, Lt Gen Charles Horner, as the JFACC, briefed air capabilities and options.[1] From this meeting General Horner brought back to his staff the president's objectives:

- Force Iraq out of Kuwait.
- Destroy Iraq's nuclear, biological, and chemical (NBC) capability (5–10 year setback).
- Minimize loss of life (but do not draw out the war).
- Minimize civilian casualties.

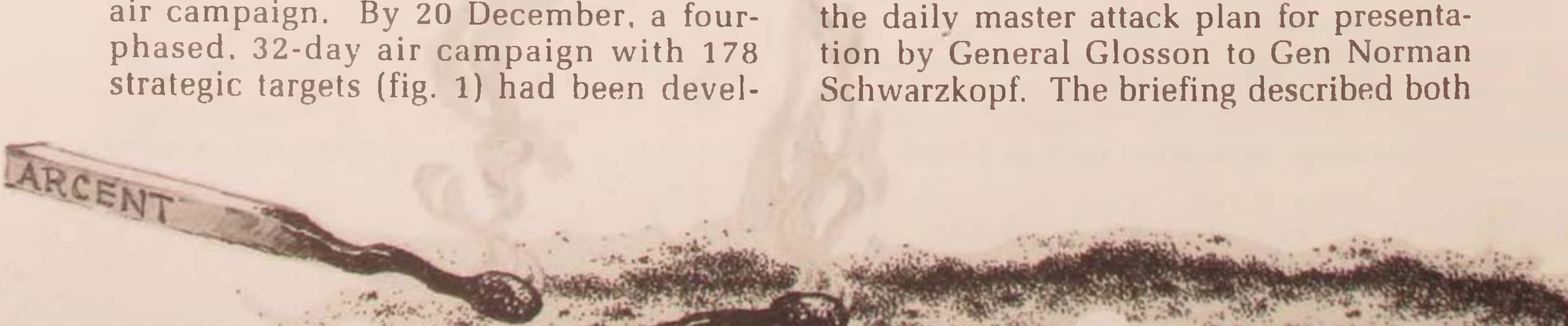
On 17 August, General Horner assigned Brig Gen Buster Glosson as US Air Forces Central Command (CENTAF) director of campaign plans and directed him to develop a detailed offensive operational air campaign. By 20 December, a four-phased, 32-day air campaign with 178 strategic targets (fig. 1) had been developed. Just prior to General Glosson briefing an earlier version of the plan to President Bush (12 October), the CINC determined that key to the success of theater operations was the requirement to have 50 percent of the Iraqi occupying forces destroyed (phase III) before launching the ground offensive. For the first time in the history of air power, a CINC's ground scheme of maneuver was dependent on air forces attriting a significant portion of the ground forces.[2]

Note that the Republican Guards were singled out as part of phase III. The CINC considered them as one of the enemy's "centers of gravity." This was true because they were Saddam Hussein's elite forces and were deployed as his theater reserves located in Iraq just north and west of the Kuwaiti border.

Before discussing JFACC problems, we also need to discuss US Central Command's (CENTCOM) targeting structure, which identified Army targets to the JFACC.

CENTCOM Targeting

From the start of the air campaign (17 January 1991), this author prepared a nightly summary of the targets listed in the daily master attack plan for presentation by General Glosson to Gen Norman Schwarzkopf. The briefing described both

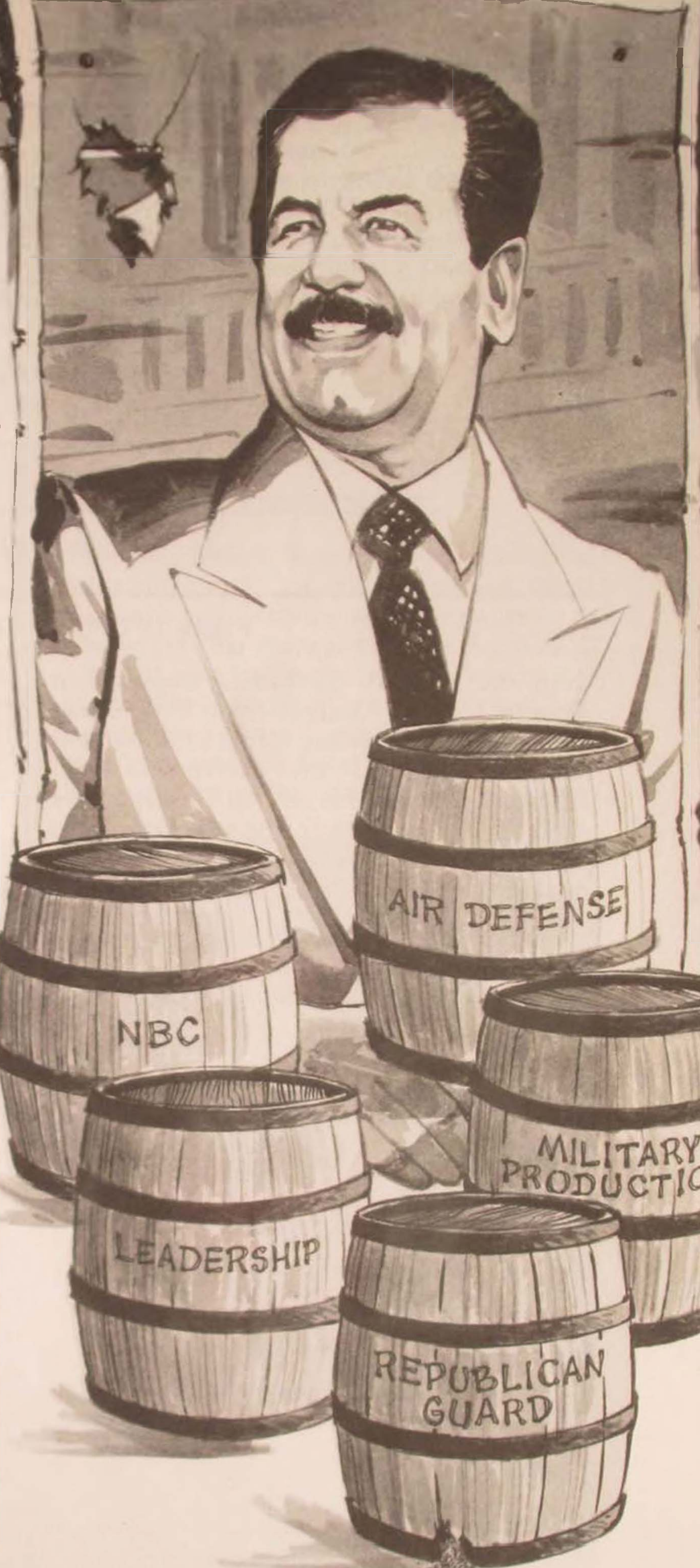


Col Richard B. H. Lewis, USAF

the targets that were in the current air tasking order (ATO), which covered a 24-hour period starting at 0500, and the targets tasked in the next ATO. The strategic targets came from a document whose development began before the war started. The document, called the master target list, described each target required to be destroyed. Both Gen Colin Powell and General Schwarzkopf kept a copy of the list, including a supplement explaining each target's strategic importance.

As the intelligence communities studied Iraq over the months prior to D day, the master target list grew from 84 in August 1990 to about 350 by the start of the air campaign. It was not unusual for each target to have multiple elements requiring destruction. There were 12 general target categories that included nuclear, biological, and chemical (NBC) facilities; the Republican Guards; and leadership, command and control, airfield, air defense, military production, oil, electrical, naval, Scud missile, and railroad targets. Before the war ended, the target list grew to just over 700 as more information became available. Note that targets in Kuwait submitted by ground commanders and associated with battlefield preparation became part of the deputy CINC's (DCINC) target list. This list was kept as a separate group, not as part of the master target list.

Initially, the campaign emphasized destroying strategic targets throughout



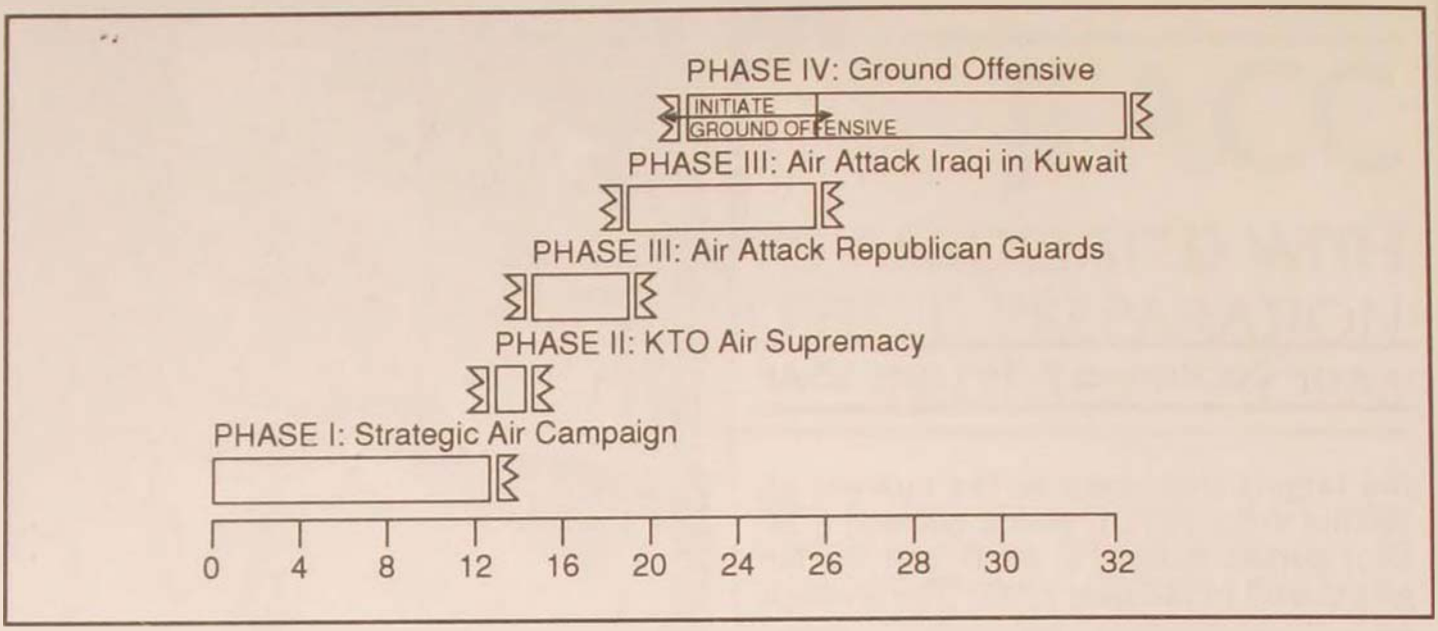


Figure 1. "Original" Theater Campaign

Iraq and Kuwait—including Republican Guard forces. Later, on 9 February, Secretary of Defense Dick Cheney and General Powell met with General Schwarzkopf and his staff at Headquarters CENTCOM in Riyadh, Saudi Arabia, to discuss the timing of G day. After this meeting, the DCINC, Lt Gen Calvin Waller, was given the responsibility of reviewing the targets nominated by the ground commanders and apportioning aircraft. His reviewing process started daily at 1200 hours. In essence, the DCINC was performing as the land component commander (LCC). At 1800, the DCINC passed his target list to the JFACC (fig. 2).

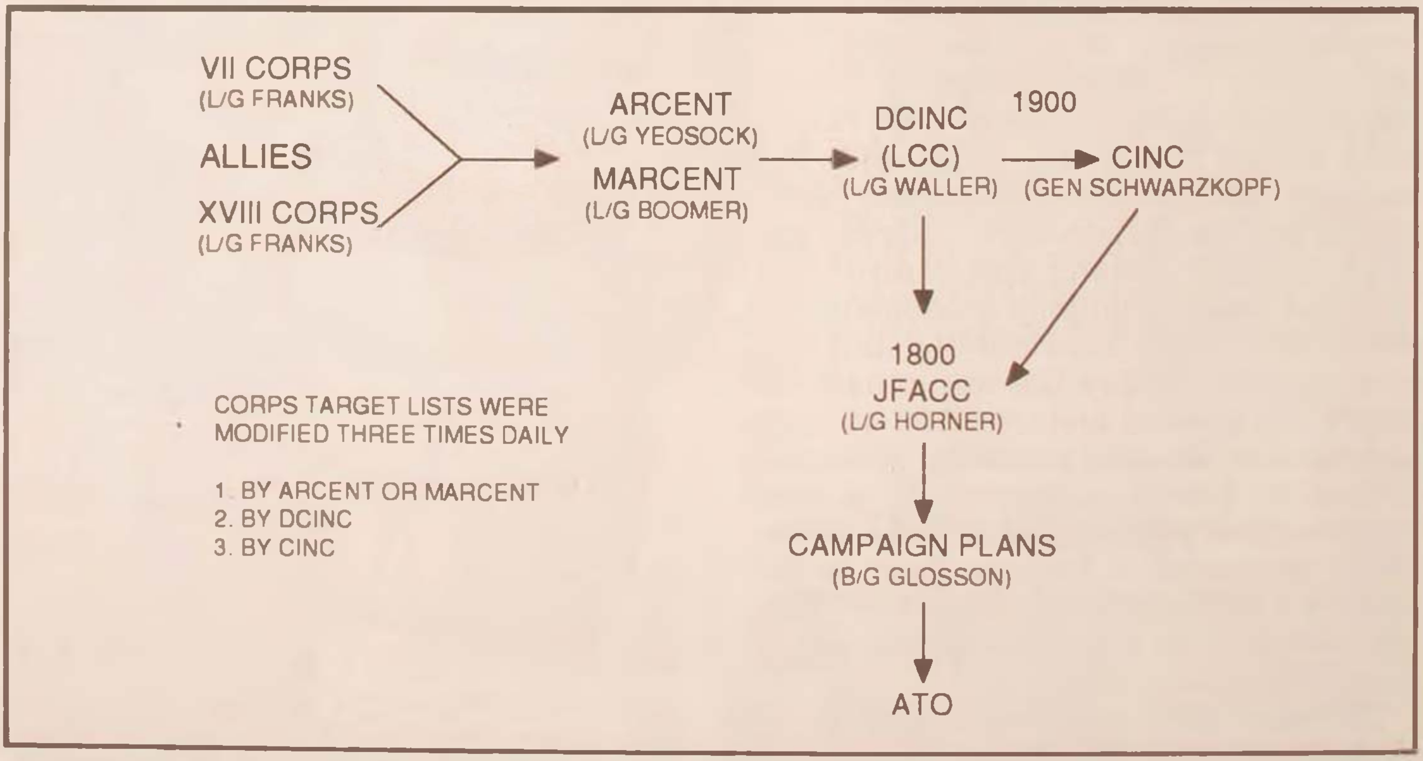

VII CORPS
(L/G FRANKS)
ALLIES
XVIII CORPS
(L/G FRANKS)
ARCENT
(L/G YEOSOCK)
MARCENT
(L/G BOOMER)
DCINC
(LCC)
(L/G WALLER)
1900
CINC
(GEN SCHWARZKOPF)
1800
JFACC
(L/G HORNER)
CAMPAIGN PLANS
(B/G GLOSSON)
ATO
CORPS TARGET LISTS WERE
MODIFIED THREE TIMES DAILY
1. BY ARCENT OR MARCENT
2. BY DCINC
3. BY CINC

Figure 2. CENTCOM's Target Nomination Structure

At 1900, at the nightly staff meeting, General Waller briefed the results of the process to the CINC. Strikes against the selected targets were still 34 hours away. During the 34-hour period, the JFACC would allocate aircraft sorties against the DCINC's target list and publish an ATO. Following the DCINC, General Glosson briefed the strategic targets currently hit or to be hit within 34 hours. In addition, using target data previously provided by the DCINC, General Glosson briefed the total sorties by type of aircraft that were allocated against each Iraqi division in the Kuwaiti theater of operations (KTO). Thus, each night the CINC was briefed on the ATO for that day and the next two days, and he typically made adjustments affecting any of them.

Now that we've reviewed the campaign objectives and the CENTCOM targeting process, we'll focus on the problems the JFACC experienced during Desert Storm. The first problem was that of having to cut short phase I, strategic bombing.

Strategic Bombing versus Battlefield Preparation

During Desert Storm, the technological advantages of America's conventional weapons and doctrine were far superior to Iraq's; yet, for several reasons the JFACC was not able to destroy all of Iraq's strategic targets—specifically chemical and biological weapons. First, US intelligence was incapable of locating several of the key sites prior to conflict termination.

The objectives of Operation Desert Storm came down from the national command authorities. To fulfill their role in this process, Gen Colin Powell, chairman of the Joint Chiefs of Staff (middle), and Secretary of Defense Dick Cheney (right) often traveled to Saudi Arabia to discuss such things as the timing of G day with the CINC.

POWELL
U.S. ARMY

Second, there were bunkers and hardened facilities that were virtually impenetrable. However, the primary reason was the premature allocation of sorties from strategic bombing to battlefield preparation.

Originally, phase I, strategic bombing, was estimated to take approximately two weeks. This assumed good bombing weather and 1,000 sorties a day. Unfortunately, by day five, 50 percent of the sorties were diverted from strategic bombing to battlefield preparation.[3] The CINC reflected in his book that

> after two weeks of war, my instincts and experience told me that we'd bombed most of our strategic targets enough to accomplish our campaign objectives; it was now time, I thought, to shift most of our air power onto the army we were about to face in battle.[4]

Contrary to this statement, the JFACC was directed by the CINC to initiate phase III well before the two weeks were up (fig. 3).[5] In fact, General Glosson objected directly to General Schwarzkopf concerning this issue. The only latitude given General Glosson for strategic bombing was the use of F-117s, F-111Fs, and F-15Es. All other aircraft were to be used exclusively in battlefield preparation.[6]

The result of prematurely accelerating phase III was that the strategic bombing phase was never completed as planned. It remains to be seen whether or not Iraq's NBC capability was set back five to 10 years as President Bush directed. However, it is known that before the United Nations inspectors arrived in May 1991 most of Iraq's nuclear stockpile (some 10 tons of natural uranium) had been smuggled to Algeria.[7]

Battle Damage Assessment

The CINC made both US Army Forces, Central Command (ARCENT) and Marine Corps, of Central Command (MARCENT), responsible for assessing battle damage in their areas.[8] The rationale for assigning the responsibility for battle damage assessment (BDA) to both was understandable. If G day was to be determined after air attacks had reduced Iraqi combat strength 50 percent, then ARCENT and MARCENT should make that determination since each was to conduct a major

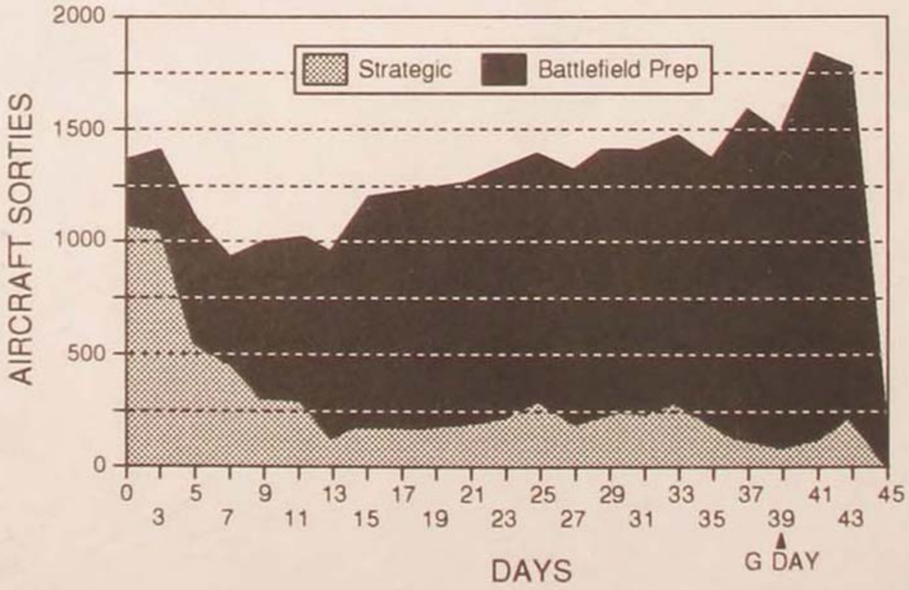


Figure 3. Sorties Executed

attack within their sectors (fig. 4). However, the problem for the JFACC was that the rules defining a tank kill were not standardized between ARCENT and MARCENT (a tank kill in this context refers to tank, armored personnel carrier [APC], and artillery kills). In addition, as G day approached, the definition of a tank kill became more restrictive.

Prior to D day, the JFACC staff assumed that pilot mission reports would be a primary means for determining the number of tank kills in CENTCOM bomb damage assessments. Therefore, it came as a surprise that the results of many coalition aircraft sorties were disregarded by ARCENT. BDA was discussed prior to the war, but no rules were formally established between the JFACC and ARCENT or MARCENT. The following is the sequence of events that led to the tank-killing problem.

At the beginning, BDA of Iraqi army units, including the Republican Guards was nonexistent. This led to General Schwarzkopf commenting on 29 January that "vehicles must be on their back like a dead cockroach before J-2 will assess a kill." Because the system was broken, he said that CENTCOM should use pilot reports.[9]

On 31 January, Lt Gen John Yeosock, the ARCENT commander, briefed the CINC that the Republican Guards were at 99 percent of their full strength. This was the first BDA we heard and believed the figure was impossible! For 15 days, over 2,000 aircraft sorties were flown against three of six Republican Guard divisions.[10] General Yeosock further briefed that the overall Iraqi combat effectiveness in the KTO was 93 percent. Using this rate of reduction—one-half percent per day—as a basis for projection, G day would be delayed until D+100; the original phase III objectives were planned to be completed by D+26 (fig. 1); the actual G day came on D+38.

After researching the problem, I discovered on 3 February that only A-10 mission

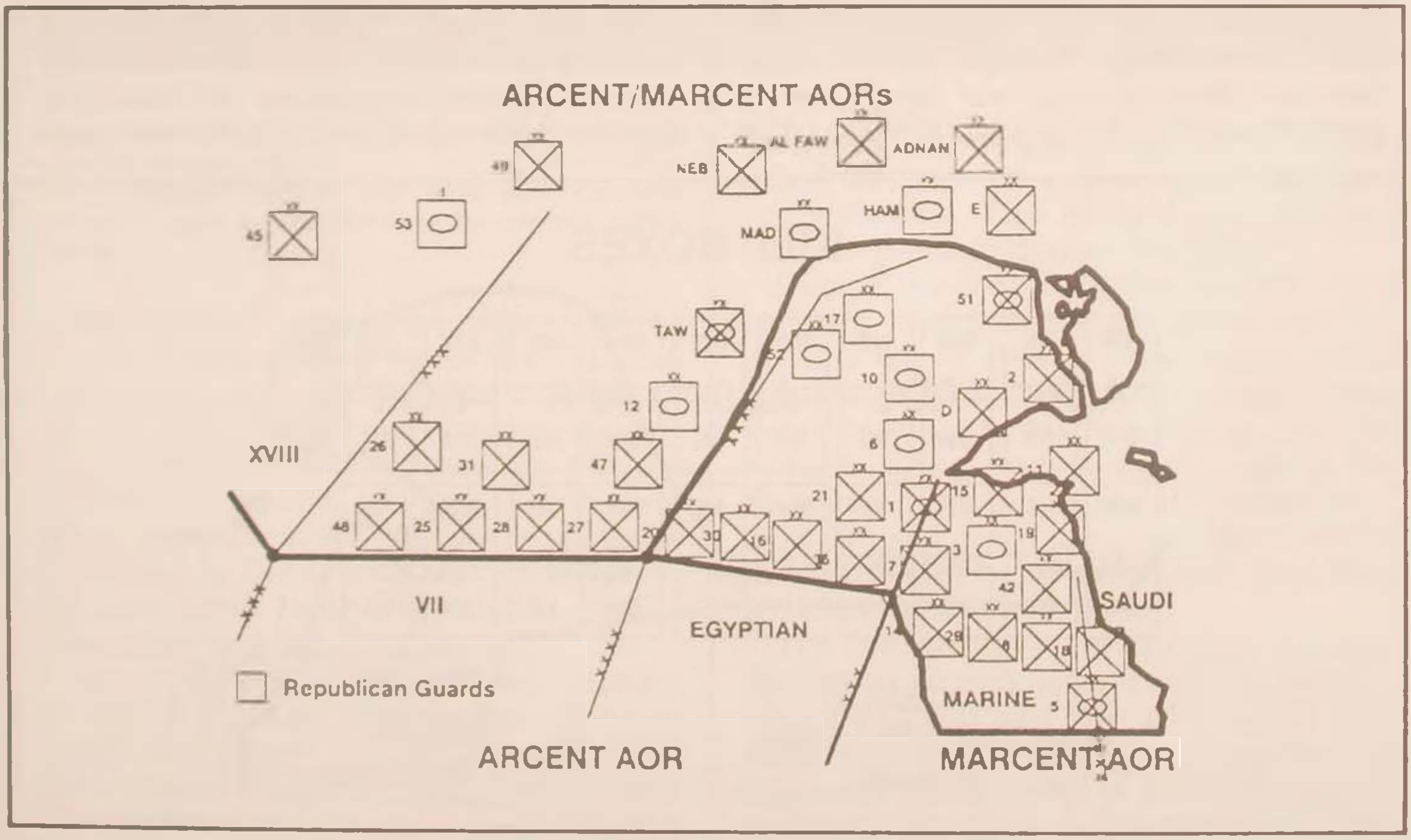


Figure 4. ARCENT/MARCENT AORs

reports (MISREP) were being used by ARCENT for BDA. ARCENT counted BDA when

- confirmed by A-10 mission reports when shown as killed;
- confirmed by imagery intelligence (IMINT) or signals intelligence (SIGINT) when shown as probable, killed, or destroyed.

They did not count BDA when

- unconfirmed by IMINT or SIGINT when shown as possible killed; or
- unconfirmed by CAS when shown as probable kill. Other coalition air strikes did not count in BDA unless overhead sensors picked up equipment damage. This practice meant that substantial errors would persist. Intelligence collectors were already overloaded from trying to assess the damage from strategic bombing and from trying to locate Scuds. In any case, assessing individual tank kills was beyond the capability of the intelligence community, as will be discussed later.

An additional source of error was that only three target categories counted toward determining an Iraqi unit's strength—tanks, APCs, and artillery. The destruction of critical support—ammo depots, supply areas, command posts, food, and water—was not factored in by ARCENT and MARCENT. So, no matter how degraded their capability, enemy units continued to be counted as fully effective so long as they had weapons.

Because coalition air was not able to destroy KTO targets as fast as planned, General Glosson took several steps to adjust bombing tactics. The first step was to get better F-16 results. F-16s were dropping bombs from altitudes that were too high for the pilots to distinguish between vehicles such as tanks or trucks. Even though it was known that ARCENT would still not use BDA taken from F-16 pilot MISREPs, the JFACC staff could expect better sortie effectiveness. Also, by flying lower, F-16 pilots could help resolve intelligence shortfalls by locating concentrations of armor and artillery necessary for follow-on attacks by other aircraft.

Another adjustment was the use of F-16 pilots as killer scouts or fast forward air controllers (FAC). These were formed and directed to "kill boxes" in order to improve target acquisition for incoming flights of aircraft (fig. 5). Kill boxes were

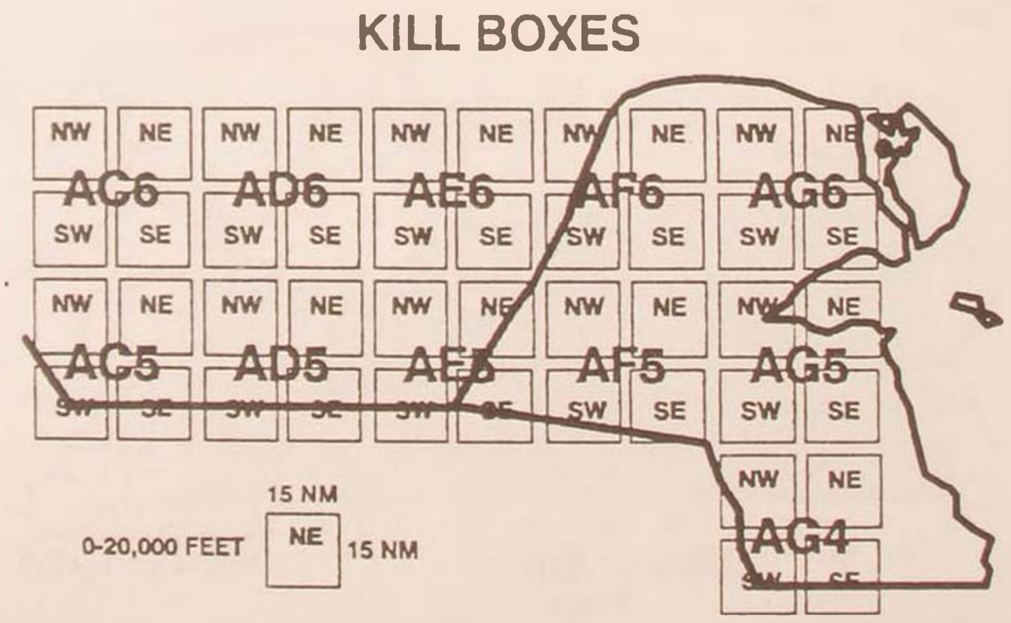


Figure 5. Kill Boxes

Gen Buster Glosson was given latitude concerning strategic bombing with F-117s, F-111s, and F-15Es. Here, General Glosson and other staff members review the gun camera film from the previous night's sorties.

predesignated areas measuring 15 by 15 nautical miles laid out across the KTO and containing airspace from the surface to 20,000 feet. Flights of various aircraft would seek out their primary target in the kill box as directed in the ATO but drop their ordnance on the most lucrative target identified by the killer scout. Target priority was given to artillery, tanks, APCs, then other vehicles.

As a third adjustment, General Glosson assigned F-111Fs, F-15Es, and A-6s to attack armor and artillery at night using laser-guided 500-pound bombs (GBU-12s). The primary reason for this change was that Iraqi soldiers had recently buried their tanks up to the turret, placed sandbags over the tops, and wrapped gun barrels with rags. This made it very difficult for A-10 pilots to destroy the tanks.

During the day, lucrative targets were located by the killer scouts and passed on to units whose aircraft would attack them at night. Initially, only a few sorties were flown in order to test whether or not the buried tanks and artillery could be acquired. On the night of 9 February, after earlier limited successes, 40 F-111Fs dropping GBU-12s destroyed over 100 armored vehicles.

The net results were positive, though frustrating. It took several days of pressuring CENTCOM and ARCENT staffs and showing F-111F video film of exploding tanks and artillery before ARCENT agreed to count the BDA. However, ARCENT insisted that the BDA would only be counted if each claimed kill was verified by the unit ground liaison officer (GLO) and submitted by separate report directly to the 513th Military Intelligence Brigade (MIB). Air Force units had GLOs, but not the Navy carrier units. Thus, the A-6 tank kills were not counted by ARCENT. In addition, the Navy felt that pilot MISREPs were sufficient and would not send reports to the 513th MIB.

On 9 February, Secretary Cheney and General Powell met with General Schwarzkopf and his staff at CENTCOM headquarters in Riyadh to discuss the timing of G day. The JFACC briefed that G day could occur as early as D+35, 21 February. This date was possible because of dramatic improvements in CENTCOM's BDA.

As shown in figure 6, G day was predicted to be D+35 based on being able to attrit Iraqi forces 2 percent a day until combat strength was 50 percent (dotted line). The solid line depicts the actual results of the battle preparation bombing phase. Note that on 15 February, the tank kill rules changed. The end result was that by G day, the KTO enemy was assessed at 63 percent strength rather than the desired 50 percent.

On 11 February, I learned that the BDA rules of MARCENT included MISREPs from A-10s and AV-8s. This was understandable, yet different from ARCENT's. I learned something else that was just as troubling: for unknown reasons, there were several nights when F-15Es and A-6s were not credited for tank kills in MARCENT's sector. On a typical night, these aircraft were destroying over 30 artillery pieces or armored vehicles. This was evident because each day's aircraft video results were compared with CENTCOM BDA reports. Unfortunately, these discrepancies could not be resolved before conflict termination.

On 12 February, the CINC specifically stated during the nightly targets briefing that he did not want to bomb Iraqi units that were below 50 percent strength. His intent was not to fly aircraft affecting BDA against those specific units. As a result,

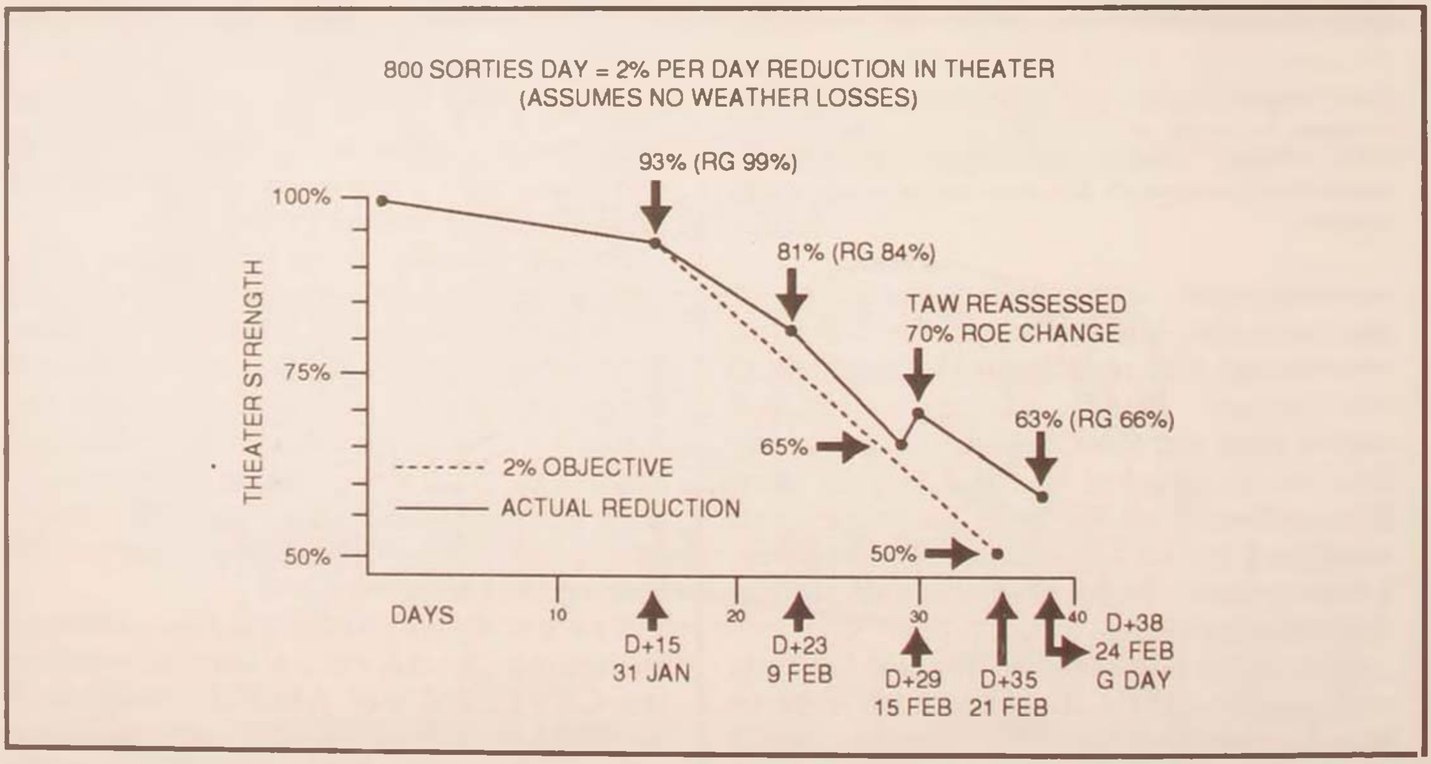


Figure 6. Battlefield Preparation

General Glosson briefed the CINC at the 1900 staff meeting on the total sorties by type of aircraft that were allocated against each Iraqi division in the KTO. Aircraft sorties specifically affecting BDA—A-10, F-111F, F-15E, and A-6—were highlighted. So, if a corps commander wanted a target hit in a division that was at less than 50 percent strength, other coalition aircraft such as F-16s, B-52s, or Tornadoes would be used.

Other coalition aircraft were flying approximately 800 sorties a day. Since other coalition air MISREPs were not specifically tracked by ARCENT, Army corps commanders had a difficult time assessing JFACC support in their areas of interest.

On 15 February, just when the JFACC staff thought it understood BDA rules, the Defense Intelligence Agency (DIA) muddied the water by reassessing the Tawakalna Republican Guard Division at 74 percent combat effectiveness—26 percent greater strength than CENTCOM's estimate of 48 percent. DIA had derived its BDA using overhead and medium-altitude sensors. After analyzing only a single division, DIA forced ARCENT into increasing overall combat effectiveness assessments (fig. 6) and changing their BDA kill criteria. Now, only one-third of A-10 and one-half of F-111F, F-15E, or A-6 kills were credited. This meant that if A-10s claimed to kill nine tanks, three would be counted, and if F-111Fs killed 10 tanks, only five would be counted as killed. As a result, figures for enemy combat effectiveness on G day overestimated actual Iraqi capability.

The fault lay with DIA's dependence on overhead and medium-altitude sensors, which could only detect catastrophic kills, and on the fact that Washington did not have access to the aircraft videotapes. For example, DIA could seldom detect damage to targets buried in the sand. Furthermore, it took DIA one week just to assess one out of 42 Iraqi divisions in the KTO. Obviously, intelligence analysts could not keep up with the pace at which coalition air was now destroying targets throughout the theater of operations.

Besides frustrating the JFACC staff, this situation had a negative effect on various Army units. For example, the 82d Airborne Division's intelligence personnel lost much of their credibility with the division command group because of recurring inexplicable changes in BDA. How were they to explain why one day the Medina Armor Division of the Republican Guards was 40 percent combat effective and the next day it was back up to 70 percent?[11]

The discrepancies also caused frustration within the command staff. On 20 February, the CINC chastised the DCINC for accepting targets nominated by ground commanders located in Iraqi units below 50 percent strength.

Redundancy among intelligence agencies regarding their own BDA estimates continued to raise doubts. On 21 February as G day approached, the Central Intelligence Agency (CIA) became nervous about CENTCOM claims of 1,700 tank, 900 APC, and 1,400 artillery kills.[12] It briefed President Bush that it could validate only 500 kills. Fortunately, DIA's Rear Adm Mike McConnell and Secretary Cheney had seen videotapes of F-111Fs killing tanks and recommended the president accept CENTCOM's BDA.

As G day approached, ground commanders and the CINC shared divergent concerns, partly owing to faulty reporting and communication practices. Corps commanders were concerned that they were not getting enough air allocated to the enemy's frontline divisions. On the other hand, the CINC was concerned with reducing Republican Guard strength. In addition, General Schwarzkopf directed General Glosson not to attack frontline artillery until three or four days before G day to prevent it from being replaced.

In summary, by G day, coalition air had reduced Republican Guard forces to 66 percent, ARCENT had reduced Iraqi frontline forces to 33 percent, and MARCENT had reduced Iraqi frontline forces to 59 percent using the most conservative BDA rules imaginable. The collective effect was that on 24 February (G day), breaching was relatively easy and close air support (CAS) requirements were less than planned. In fact, three divisions facing the Egyptians were already destroyed by coalition air and were bypassed to be cleaned up later.

Concerning CAS, predetermined corps fire support coordination lines (FSCL) facilitated CAS planning and execution. The preplanned FSCLs made rapid coalition troop movements easier for coalition air to respond. In addition, the "Horner Line" was established. This line was 30 nautical miles parallel to and in front of the FSCL. While FACs worked inside the FSCL, killer scouts controlled the area between the FSCL and the Horner Line. As the FSCL moved forward, there was constant coordination between the Army ground FACs, airborne FACs, and killer scouts.

While over 1,200 sorties per day were available for CAS, many were not required by the Army. As a result, air interdiction (AI) sorties were flown continuously beyond the FSCL using killer scouts and kill boxes. Any or all of the AI sorties could have been diverted while airborne to CAS targets if Army ground commanders had needed them.[13] As the battle progressed, the 1,200 sorties available daily for CAS grew more and more geographically confined because of rapid FSCL movement toward Basrah (fig. 7). There were times when the rapid FSCL movement hindered air operations while it benefited the enemy. Probably the number one mistake of the ground campaign occurred on G+3. Seventh Corps pushed the FSCL 50 miles beyond their position covering the escape of the

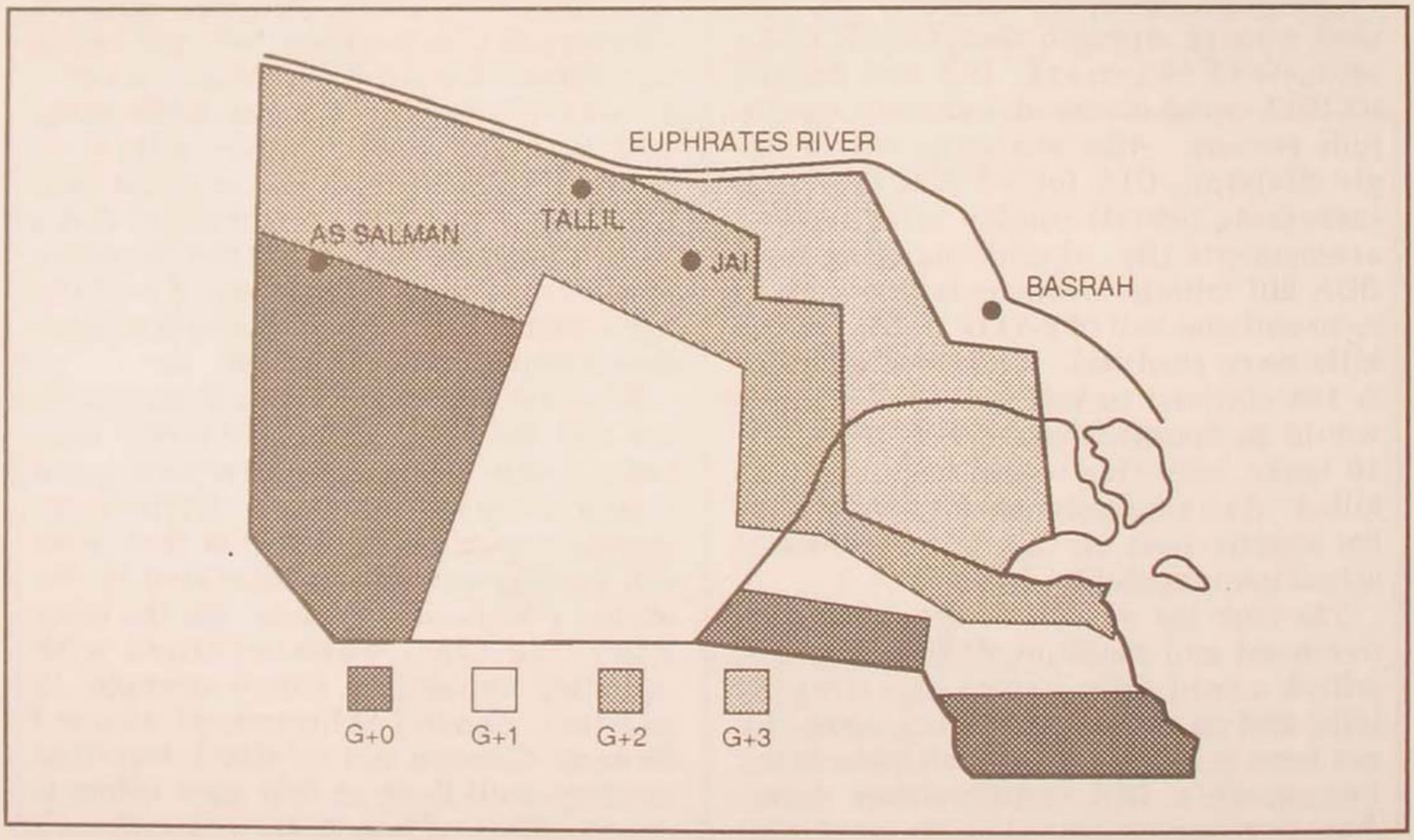


Figure 7. FSCL Movements as of 1800L

Hammurabi and Medina Republican Guard divisions headed north. Both General Horner and General Glosson attempted to get General Schwarzkopf to move the FSCL south toward the Kuwaiti border, but Gen Frederick M. Franks talked him out of it. As a result, the two divisions escaped. Overwhelming force could not be applied because every sortie flown inside the FSCL had to be controlled by a FAC.[14]

The degree of success as a result of prior bombing was spectacular, even though ground operations occurred before air attacks were able to attrit enemy forces in the KTO to the stated objective of 50 percent. Two days into the ground war, coalition army units were already one day ahead of scheduled objectives. As a result, when bad weather hindered available air power, the CINC instructed ground commanders to delay attacks until they could have air support. On 27 February—G+3—a 100-hour cease-fire was called. Of the 42 Iraqi divisions facing the coalition, 39 were listed as combat ineffective or destroyed.[15]

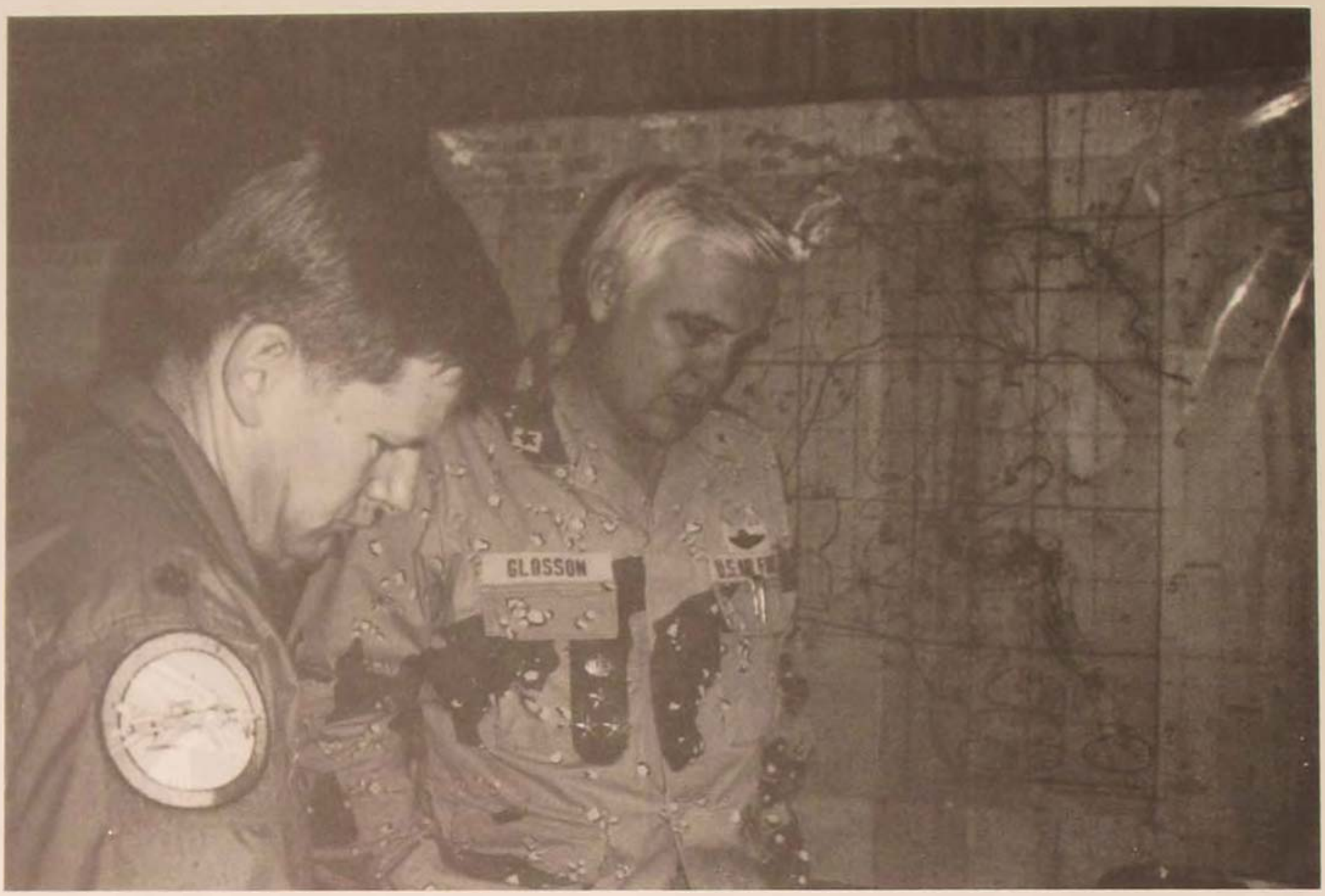
Obviously, tank kills were not the only factor used in making the decision for G day. The 800 sorties a day flown by coalition air forces that were not counted in the BDA were indirectly impacting the CINC's decision. For 24 hours a day, a barrage of bombs were dropped on Iraqi soldiers. Unlike strategic bombing in cities, aircraft flying in the KTO against enemy troops in the field could release their weapons against targets obscured by weather. B-52s hit a target in the KTO every three hours from 17 January until the end of the war. Over 35,000 battlefield prep sorties were flown in the KTO including 5,600 directed against three divisions of the Republican Guards.[16] One enemy prisoner of war (EPW) stated he surrendered because of B-52 strikes. "But your position was never attacked by B-52s," his interrogator exclaimed. "That is true," he stated, "but I saw one that had been attacked." Another Iraqi general stated the dramatic difference air attacks made for him and his soldiers:

> During the Iran war, my tank was my friend because I could sleep in it and know I was safe. . . . During this war my tank became my enemy . . . none of my troops would get near a tank at night because they just kept blowing up.[17]

Other sorties involved neutralizing Iraqi fire trenches six days prior to G day. The CINC wanted to wait until G+6 to ensure that the trenches could not be rebuilt. The F-117s destroyed 32 oil-pumping stations and junctions while other aircraft set the residual oil on fire. In addition, just prior to G day, a massive bombing plan against communications throughout the KTO was completed by F-117s and F-111Fs. This plan forced Iraqi troops to use radios rather than land lines. As a result, command and control was degraded and conversations were exploited.

Air attacks had other collateral effects that impaired Iraqi performance. Iraqi soldiers were starving because air attacks had cut troop supplies of food and water. Over five weeks of around-the-clock bombing had a tremendous effect on unit morale. Suffering from low unit morale, hundreds of EPWs crossed the border. Most EPWs were infested with lice, covered with sores, sick, or in shock. As G day approached, frequency of frontline executions of deserting soldiers increased dramatically. Also, a senior officer EPW described very high losses in artillery units caused by casualties and desertions.[18]

As coalition ground forces launched their offensive, the Iraqi army was demoralized and severely degraded in combat effectiveness. Secretary Cheney said that "the air campaign was decisive." Subsequently, he stated that Iraq could not fight back "because the air war turned out to be absolutely devastating."[19] As a



Each night the CINC was briefed on the ATOs for that day and the following days. The author and General Glosson prepare the targets brief.

result, in the 100 hours of the ground offensive, coalition forces took into custody over 86,000 Iraqi prisoners.[20]

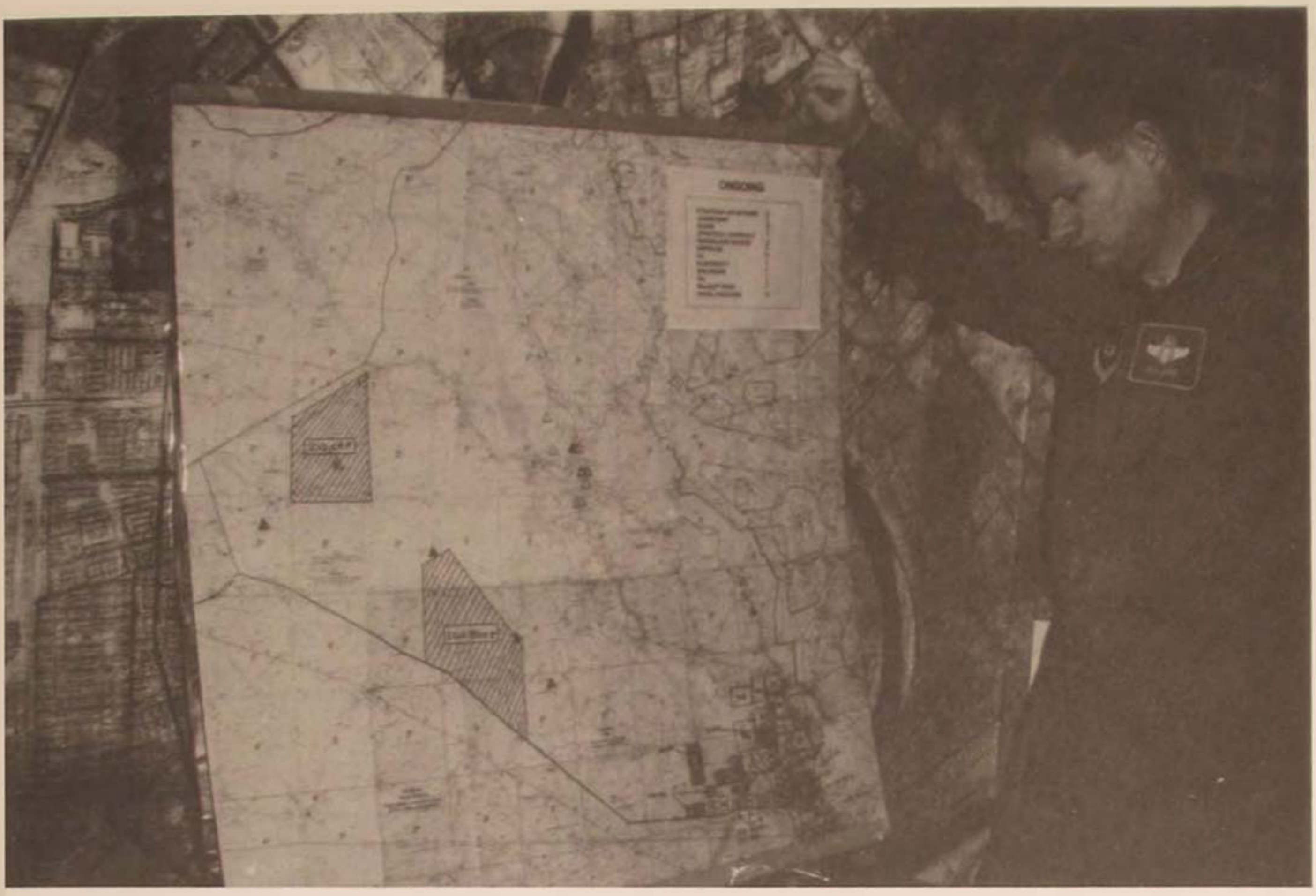
Army Complaints

Although the ground campaign was a complete success, the Army corps commanders were not satisfied with JFACC operations. Corps commanders during Desert Storm wanted each corps, not JFACC, to have responsibility for shaping the battlefield through air interdiction both prior to and after G day. In addition, each corps commander wanted to receive a set number of daily sorties.

These preferences reflect a basic difference in views about the proper control and use of air assets. If corps commanders had received what they wanted, air operations would have been severely degraded, just as they were in early World War II. During the 1942 North African campaign, such employment made it impossible for tactical air to achieve air superiority. Lack of such superiority contributed to the defeat of US forces at Kasserine Pass.[21] Gen Dwight D. Eisenhower recognized the nature of the problem:

> Direct support of ground troops is naturally the method preferred by the immediate commander concerned, but his vision did not extend beyond the local battle. It did not consider the competing demands of individual commanders on a far flung battlefront, each of whom would naturally like to have at his disposal some segment of the Air Force for his own exclusive use.[22]

As a result, Army Field Manual (FM) 100-20, *Command and Employment of Air Power*, was published in July 1943.



This briefing board was used to brief the CINC.

That field manual formalized the idea of centralized control of air power under an airman.

It would have been just as bad to dedicate a set number of daily sorties to each corps commander in Desert Storm as it was in World War II. The number of sorties flown is not as important as the types of aircraft and weapons used. For example, if a corps commander wanted to reduce artillery in his area, eight F-111Fs carrying four laser-guided bombs each could be allocated for the job. However, if the target was a supply depot, only three B-52s carrying 54 gravity bombs each could be used. Furthermore, in reducing combat unit effectiveness—tanks, APCs, and artillery—some aircraft sorties were not counted by the Army for BDA purposes. Thus, requests for dedicated sorties would have tied the JFACC's hands and diluted the air effort. A much more effective approach would be to provide the JFACC specific targets and objectives, like those on the DCINC's target list. The JFACC could then allocate the most effective combination of aircraft and sorties to achieve the objectives, and the CINC would review the results at the nightly targets briefing.

After Desert Storm, VII Corps criticized the Air Force by claiming that only 200 of over 2,000 Army-nominated targets were actually targeted by air (15 percent). However, the Army also stated that coalition air did a magnificent job of preparing the battlefield. By examining a VII Corps target list submitted to ARCENT, we can see why only 300 targets were selected.[23]

VII Corps Target List

The corps could normally nominate up to 40 targets a day, prioritize them, and

(42 TARGETS SUBMITTED 31 JAN)

OLD TARGETS	AAA OR SAMS	INFANTRY	ATO TARGETS
30 DEC ARTY BTRY	30 NOV AAA SITE	UNK INF BN	27 JAN CP
8 JAN COMM SITE	29 DEC S-60 AAA	3 JAN INF BN	24 JAN LOG SITE
23 JAN TANK CO	UNK SA-2 RADAR	8 JAN INF BN (-)	24 JAN ARTY BN (-)
20 JAN 26 ID CP	UNK S-60	8 JAN INF BN	27 JAN POSS LOG
24 JAN CP	13 JAN RADAR	8 JAN INF BN (-)	27 JAN POSS CP
21 JAN LAA SITE	15 JAN 3-SA-9S	26 JAN INF BN (-)	28 JAN CP
19 JAN ARTY BN	24 JAN AAA SITE	9 JAN INF BN (-)	
24 JAN MECH CO	24 JAN AAA SITE	19 JAN INF BN	
24 JAN ARTY BN	24 JAN AAA	30 JAN INF BN	
24 JAN CP	21 JAN AAA		
24 JAN TANK CO	25 JAN SIGINT SITE		
28 JAN ARTY BN	22 JAN SA-6		
24 JAN LOG SITE	24 JAN AAA		
24 JAN POSS LOG			

NOTE: MANY WERE OLD, OUTDATED TARGETS OR PREVIOUSLY HIT.
DATES WERE LAST VALIDATED DATES.

Figure 8. VII Corps Target List

send them on to ARCENT. From ARCENT, the targets would be prioritized with other ARCENT targets and sent to the DCINC (fig. 2).[24] Figure 8 provides an illustration for 31 January. Of 42 targets submitted by VII Corps, six were fragged in the ATO (15 percent). Targets were rejected for several reasons. First, the length of time between target submission and its validation was excessive: typically, corps intelligence was two to three days behind that of CENTCOM. Some target validations were over a month old. Others were unconfirmed, while still others had been hit previously and were awaiting BDA results. Second, antiaircraft artillery (AAA) and surface-to-air missiles (SAM) were not considered valid targets if over a few days old. This rule related to other conditions and standing practices. Coalition air had continuous EF-111 and F-4G area coverage all across the KTO. If AAA or SAMs became a threat, they were immediately destroyed by dedicated suppression of enemy air defense (SEAD) assets. Third, infantry battalion targets were not suitable for coalition air. Target identification and destruction were nearly impossible because troops were in trenches and widely dispersed. Without napalm or suitable fuel-air explosives, coalition air was better targeted against food, water, and ammunition depots—targets that indirectly negated the combat effectiveness of the infantry troops. In summary, of 42 targets submitted, 14 were old targets or awaiting BDA (33 percent); 13 were outdated AAA/SAMs (31 percent); and nine were infantry (21 percent). Six good targets remained and were selected for the ATO (15 percent). Obviously, if sorties had been flown against all 42 targets in VII Corps area that day, many other key targets in-theater would have gone unserviced. More important, many lives would have been put at risk unnecessarily.

According to a VII Corps air liaison officer (ALO) report, the corps target nomination process had three major problems. First, each target received the same measure of merit whether it was a division command post or a single SA-9. Second, no revalidation criteria was set to remove dated mobile targets. Finally, the corps made no attempt to correlate and remove from the list targets reported destroyed by the Air Force, especially when coordinates did not agree exactly with the corps data base.[25]

The target list example should point out two things. First, a corps does not always have the technical expertise or current intelligence necessary to nominate targets appropriate for aircraft. Second, in order to exploit air power and avoid its misuse, air must be kept centralized at the theater level under a JFACC.

During Desert Storm, there was another reason for maintaining centralized control of air forces. The JFACC needed control of all the air assets in order to respond to the unforeseen circumstances of war. For example, over 2,400 sorties were diverted to Scud hunting.[26] Sorties were diverted when Iraq broke out chemical munitions, forcing the JFACC to destroy this time-sensitive target. Also, there were many days when weather forced coalition air to swing from one corps to another and from one target category to another. Finally, examine what occurred on 29 January at Khafji. There was a major border incident when the Iraqi III Corps moved south to engage friendly forces. During the second night of attacks, the Iraqi corps commander tried to reinforce the battle with two divisions.[27] The first diverted aircraft started bombing within 20 minutes. Bombing continued for eight hours, decimating the two divisions. If aircraft had not been diverted, premature escalation of the war may have occurred.[28]

These examples highlight the need for the JFACC to centrally control air forces in order to react to the unforeseen circumstances of war. By maintaining control, the JFACC can concentrate air power in the most efficient way possible.

JFACC Ignored Corps Inputs

After the war, VII Corps complained that the corps was denied air prior to G day. This was true for several reasons. First, while VII Corps was moving into position, the CINC would not allow the JFACC to target the Iraqi forces in the western zone. The CINC wanted to limit activities in this area in fear of compromising the coalition attack plans.

Second, the CINC directed General Glosson not to attack units at less than 50 percent strength. Since almost every unit arrayed in ARCENT's front lines was less than 50 percent by G-10, this constraint significantly affected corps target lists. The JFACC was required to hit these targets with aircraft that were not counted in ARCENT's BDA. This meant A-10s, F-111s, F-15Es, and A-6s were held back from those units. However, at least four sorties of other coalition air were fragged against every target submitted by the DCINC. Thus, because the corps could not track individual pilot mission reports for aircraft with missions in their sector, many targets were hit without corps knowledge.[29] If BDA was observed by overhead systems, the earliest it would show up in a report at the corps level would be four or five days later.

Third, the DCINC had to modify corps commander target lists in order to consolidate, prioritize, and develop a single list within the capabilities of the JFACC. In addition, at the nightly staff meeting, the CINC would modify this list even further.

Finally, not until after the war were corps commanders aware of the CINC's guidance not to attack Iraqi units less than 50 percent strength—apparently reflecting a breakdown in communication between ARCENT and the corps commanders. In addition, corps commanders were concerned with breaching frontline Iraqi units while the CINC was concerned with reducing the Republican Guard theater reserves to less than 50 percent.

After the war, VII Corps cited two specific examples where the JFACC did not respond to corps input. Just prior to G day, VII Corps requested more artillery be hit in two units that were believed to be greater than 50 percent, the 47th and the 26th Infantry Divisions (fig. 4). In response to VII Corps commander concerns, General Glosson convinced the CINC to take F-111Fs off Republican Guard units for one night, 22 February, in order to hit the Iraqi 47th Infantry Division. The 47th Infantry had the largest concentration of artillery in the KTO. While most divisions had 72 artillery pieces, the 47th had 204 and was in position to swing against either the Egyptians or VII Corps. Over 100 artillery pieces were destroyed that night, but this data was overlooked by ARCENT. As a result, overall combat unit effectiveness prior to G day was actually at 34 percent in contrast to 52 percent as ARCENT showed.

In addition to the 47th Division, VII Corps wanted the 26th Infantry Division hit. It was thought to have 72 artillery pieces, of which 18 were destroyed by A-10s prior to the request. After the initial A-10 kills, artillery targets could not be found by other aircraft—40 F-16s along with a killer scout. After G day and the destruction of Iraq's 26th Infantry Division, ARCENT revised the artillery count to only 18 artillery pieces in its total inventory. Thus, overall unit strength prior to G day was really only 40 percent, compared to 70 percent as initially reported by ARCENT.

After the war, VII Corps also said there was a lack of CAS support. Here the main problem was simply semantics. The corps was really referring to the lack of air support provided against its target list prior to G day. It complained about the perception that coalition air did not perform battlefield preparation in accordance with stated desires. Once G day occurred, however, VII Corps was satisfied with CAS support.

It seems that the measure of merit for determining the effectiveness of battlefield preparation should not have been based on the number of targets serviced on the corps commander's target list. Rather, the measure should have been whether each corps could execute its planned scheme of maneuver with an acceptable number of friendly casualties. During VII Corps's breaching of the enemy line on G day, not one artillery round was fired into friendly troops. General Schwarzkopf thought that the scheme of maneuver or ground offensive could take up to 21 days.[30] In fact, he asked General Glosson for assurance that the air intensity could be maintained for 21 days minimum. Not surprising, coalition ground forces completed operations in four versus 21 days. Casualty figures were expected to be as high as 10,000. Actual combat casualties were less than 100.

Conclusion

Although Desert Storm was a tremendous success, it has been pointed out that significant problems did exist. These are problems that could plague the next warfighting CINC or JFACC if not recognized and resolved.

First, the CINC needed to place more emphasis on phase I, strategic bombing. There were many strategic targets on the master target list that should have been hit early in the war. As a result, President Bush's plan to set back Iraq's NBC capability five to 10 years was probably not accomplished. This was not a situation in which the CINC had to choose between executing phase III early to reduce casualties or continuing the strategic bombing effort. There was time to complete both.

No one will know for sure what percentage of Iraqi troops were really attrited by air power prior to G day, nor was it critical for making the decision to launch the ground offensive. However, having both ARCENT and MARCENT responsible for assessing BDA in their own sectors was a mistake. To start the next war with only two aircraft—such as A-10s and AV-8s—as the designated tank killers would be unworkable. Rules for defining a tank kill must be standardized and published at the theater level before G day. This would have averted problems associated with BDA rules that got increasingly more rigid as G day approached. In addition, it is critical that aircraft video be exploited daily by the intelligence communities, not just the JFACC staff. We need to purchase equipment that will allow each wing to transmit its aircraft video to both the JFACC and DIA.

Without question, corps were denied air power prior to G day, but not by the JFACC. The JFACC attacked every target on the DCINC's target list. What was missing in Desert Storm was feedback to the corps on the targets they submitted to ARCENT that "didn't make the cut." Also, BDA was missing for corps targets that were bombed.

Finally, a corps cannot expect to have dedicated sorties. During the war, the close working relationship between the JFACC and the CINC worked superbly to accomplish the planned objectives. Had the JFACC been forced to relinquish more control, air power's overall effect would have been diluted. In addition, the CINC would have lost the combat synergy associated with centralized control of air power. Had corps commanders been given dedicated air power, the Desert Storm campaign would likely have lasted months rather than weeks. □

Notes

1. H. Norman Schwarzkopf with Peter Petre, *It Doesn't Take a Hero: The Autobiography of General H. Norman Schwarzkopf* (New York: Bantam Books, 1992), 300.
2. Ibid., 319.
3. In addition to this diversion of resources from strategic bombing, weather over Iraq was worse than it had been in 14 years. There were only seven days of good weather in the first 18 days of execution.
4. Schwarzkopf, 430.
5. *Conduct of the Persian Gulf War—Final Report to Congress* (Washington, D.C.: Department of Defense, April 1992), vol. 1, chaps. 1–8, 135.
6. Lt Gen Buster C. Glosson, interview with author, Washington, D.C., 19 March 1993.
7. Yossef Bodansky, "Nuclear Weapons and Radical States Pose New Situations," *Defense & Foreign Affairs Strategic Policy* 20, no. 6 (June 1992): 7.
8. *Conduct of the Persian Gulf War*, vol. 2, appendices A–S, C-15.
9. Lt Col Richard B. H. Lewis, notes from CINC staff meeting, D+12, 29 January 1991.
10. The CINC would not let the JFACC bomb the three Republican Guard divisions that were infantry because he wanted to focus bombing on the armored divisions. As a result, they were probably some of the hardest fighting ground forces engaged by VII Corps.
11. Col Steven A. Epkins, *A Division G2's Perspective on Operations DESERT SHIELD and DESERT STORM* (Carlisle Barracks, Pa.: Army War College, 15 April 1992), 34.
12. *Conduct of the Persian Gulf War*, vol. 1, chaps. 1–8, 188.
13. Lewis, G+0.
14. Glosson interview.
15. Lewis, G+3.
16. *Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War* (Washington, D.C.: Department of the Air Force, September 1991), 41.
17. Ibid., 38.
18. Ibid., 49.
19. Ibid., 52.
20. Ibid., 51.
21. Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 2, March 1992, 113.
22. Quoted in "Command and Control of Air," Headquarters USAFE, study, July 1991, 6.
23. Maj Irving L. Halter, Jr., "8th Air Support Operations Group Paper," 29 October 1991, 1.
24. Maj Irving L. Halter, Jr., "8th Air Support Operations Group After Action Review, Operation Desert Storm," draft report, 6 November 1991, 15.
25. Halter, "8th Air Support Operations Group Paper," 1.
26. *Reaching Globally*, 25.
27. *Conduct of the Persian Gulf War*, vol. 1, chaps. 1–8, 175.
28. Coalition ground forces were still in the process of moving out west in order to execute the "Hail Mary" maneuver. Thus, VII Corps was not in position to start a major offensive, nor would it be for another week.
29. Halter, "8th Air Support Operations Group After Action Review," 16.
30. *Reaching Globally*, 51.

TET OFFENSIVE
JUST CAUSE
URGENT FURY
DESERT STORM

CLOSE AIR SUPPORT

Repeating the Past . . . Again?

CAPT SCOTT A. FEDORCHAK, USA

ARISTOTLE WROTE that "almost all things have been found out, but some have been forgotten,"[1] an adage demonstrated repeatedly in the profession of arms, where lessons paid for in blood have been forgotten or neglected in peacetime, only to be rediscovered and paid for again in the next battle. For example, the doctrine and weapons for close air support (CAS) are allowed to wither between conflicts, only to be revived for the next war. This pattern stems from the Air Force's lack of commitment to the CAS concept and its consequent unwillingness to provide CAS aircraft and support them. Indeed, Carl H. Builder notes that "close air support has been the most consistently neglected mission of the Air Force."[2]

Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, defines CAS as "air action against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces."[3] The employment of CAS has been the subject of serious debate between ground and air forces since the introduction of the airplane as a weapon of war. Ground forces want more of it in support of ground operations, while air forces concentrate on other missions such as counterair, air interdiction, and strategic bombing, which support the theater campaign. Regardless of the different priorities assigned to CAS by the Army and the Air Force, the fact remains that the United States has needed CAS in past conflicts and will continue to need it in the future.

Doctrinal Focus on Strategic Attack

Since the beginning of aviation, air power enthusiasts sought to identify the Air Force as a separate service with a unique role in the military establishment. Led by early air power theorists such as Giulio Douhet, Air Marshal Hugh M. Trenchard, and Gen William ("Billy") Mitchell, they pointed to the strategic capability of air power to rain destruction on political capitals, transportation centers, and industry. Rarely able to strike such strategic centers of gravity, land and sea forces attacked tactical and operational centers of gravity. But air power advocates believed that—after achieving air superiority—air forces should conduct strategic attacks to destroy the enemy's industrial infrastructure and thereby destroy his ability to wage war.[4]

Thus, the fledgling US military aviation establishment seized upon strategic bombing doctrine as its raison d'être, almost to the exclusion of other air power missions.[5] Specifically, the Air Force "has defined, tested and proven a doctrine which makes CAS a strictly secondary task of its air combat units,"[6] and "until [air superiority] is won, any effort not contributing to it is diversionary and should only be undertaken in emergency situations."[7] Although the Air Force did not totally neglect its support of ground operations, it preferred to use air interdiction rather than CAS.

Early air service schools such as the Air Corps Tactical School at Maxwell Field, Alabama, were established to study and develop doctrine, tactics, and aircraft for the air-ground mission. Instead, the schools' leadership turned its attention to the development of strategic bombing strategy.[8] In the 1930s, the US was the only country to establish an air unit—the 3d Attack Group—dedicated to ground support and thus could have led the way in developing air-ground operations. But the focus on strategic bombing left the US Army Air Corps ill-prepared to conduct air-ground operations on the eve of World War II.[9] That war served as a testing ground for strategic bombing, which severely hurt the Axis war effort. Some postwar analyses, however, dispute the effectiveness of this doctrine:[10]

> Air power had a mighty vindication in World War II. But it was Mitchell's conception of it—anything that flies—rather than Douhet's [the strategic bomber] that was vindicated. It was in the tactical employment that success was most spectacular and that the air forces won the unqualified respect and admiration of the older services. By contrast, the purely strategic successes, however far-reaching in particular circumstances, were never completely convincing to uncommitted observers.[11]

Still, air power enthusiasts point to the dropping of atomic bombs on Hiroshima and Nagasaki as proof of air power's role as *the* decisive element on the battlefield. But this stance neglects the Navy's contribution of carrier-based aviation and—more importantly—the role of its submarine forces in strangling Japan economically in the Pacific theater.[12] As a subordinate element of the Army, the Army Air Forces (AAF) also made major contributions to ground operations in all theaters through CAS and interdiction campaigns. However, commanders of B-17 and B-24 wings and P-47 and P-51 squadrons continually squabbled with ground commanders over diverting their assets from the strategic effort. These leaders—as well as their present counterparts—overlooked the need to combine land, sea, and air power to win on the modern battlefield.

The post–World War II era marked the ascendancy of Strategic Air Command (SAC) and strategic nuclear bombers in Air Force doctrine. Strategic bombing strategy focused on a total war with the forces of Communism and required strikes at the enemy's strategic centers of gravity. The US sought to contain enemy threats through nuclear deterrence, and each service competed for funding by demonstrating its ability to deliver nuclear weapons. Because the strategic bomber had already proven itself in this regard, SAC was able to dominate Air Force decision making on the development, deployment, and use of Air Force assets from the 1950s through the early 1980s.[13]

Virtually neglecting its tactical role in support of ground forces, the Air Force proposed a 70-wing strategic bomber force to meet national security needs, although it also pushed for development of a supersonic jet fighter to perform the counterair mission, to escort bombers to their targets, and to protect the US from Soviet bombers. Bigger, better, and faster strategic bombers and jet pursuit fighters capable of carrying heavier loads were actively developed. Further, Tactical Air Command (TAC) aircraft were designed to deliver tactical nuclear weapons, and theater tactical air forces all tried to become "little SACs with the primary and almost only mission being the nuclear one."[14] Consequently, the Air Force either mothballed its ground-support assets or allowed them to become obsolete since air power doctrine anticipated no role for tactical air power.[15] Although deterrence did manage to prevent a global nuclear war, the emphasis on nuclear delivery impaired the Air Force's ability to make effective use of tactical air power in limited wars.

Historical Perspective on CAS Doctrine and Execution

US involvement in a theater war remained a possibility throughout the cold war, but the US actually fought only in limited wars during that time. Unfortunately, the air power community had forgotten the lessons in CAS and battlefield air interdiction (BAI) learned by Ninth Air Force in the European theater of operations and by Fifth Air Force in the Pacific theater of operations. Further, it made no effort to preserve the lessons learned, to train for future applications, or to maintain the aircraft needed for CAS.[16] Gen O. P. Weyland, commander of Far East Air Forces (FEAF), commented, "What was remembered from World War II was not written down, or if written down was not disseminated, or if disseminated was not read or understood."[17]

From the Korean War through the Gulf War of 1991, SAC rarely used its strategic bombers as designed. That is, B-29s and, later, B-52s dropped conventional, high-explosive bombs during CAS and BAI missions in Korea, Vietnam, and Southwest Asia. In fact, in Korea and Vietnam, strategic bombing of political, military, and economic infrastructures that did not depend on traditional support

FS-182
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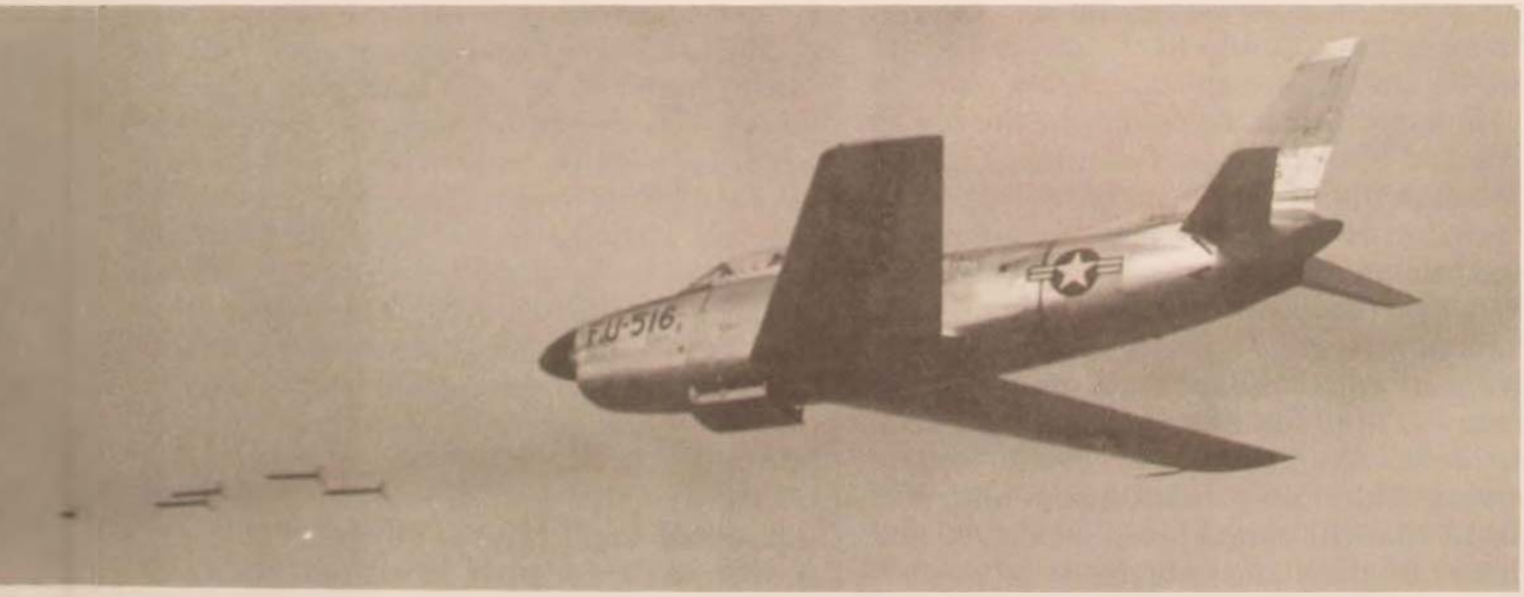
At first, Far East Air Forces had only the F-80 Shooting Star and the F-86 Sabre available for use in Korea. Stationed in Japan, the F-86 (above) had speed and firepower but lacked hard points for rockets, bombs, and napalm and could not operate from unimproved airfields in-theater. Like the F-86, the F-84 (below) could not operate in Korea, but both aircraft played roles in the defense of Japan after the Korean War.



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The Air Force helped solve shortfalls in close air support in the Korean War by converting the World War II vintage C-47 transport into the heavily armed AC-47.

had a minimal effect on the outcome of the campaigns. Only in the tactical realm did the US achieve any success.[18]

Such environments called for the use of CAS and BAI in support of ground forces. Although the Air Force preferred to use air interdiction to destroy many pieces of equipment en route to the front rather than destroy them one at a time at the front, the service was never able to decisively interdict the forward movement of enemy ground forces and supplies.[19] CAS, however, was usually successful in preserving American ground forces and thus meant the difference between defeat and victory in many engagements.[20]

Korea provided the first taste of limited war for the fledgling Air Force. Initially, FEAF's assets included only the F-80 Shooting Star and F-86 Sabre, both of which were designed for air-to-air combat. Unfortunately, these advanced, jet-powered aircraft lacked the hard points necessary to carry ground-support munitions such as rockets, bombs, and napalm and were unable to operate from the unimproved airfields in Korea. The fact that they had to be stationed in Japan limited both their time on station and their support of on-call missions, normally the most critical for ground forces. Likewise, the F-84 Thunderjets—converted to air-ground operations but not yet in the Air Force inventory—could not operate from Korean bases. Consequently, the Air Force had to pull mothballed F-51

Mustang fighters from storage depots because they were the only aircraft capable of operating in the Korean theater.[21] During the critical days of the Pusan perimeter, these World War II workhorses—and, later, A-1E Skyraiders—provided desperately needed CAS to United Nations (UN) ground forces.[22] Additionally, the Air Force pulled B-29 Stratofortresses off their strategic bombing missions in North Korea to fly CAS and BAI during the Pusan action, the Inchon invasion, and the retreat after the Chinese intervention.

By the close of hostilities, the Air Force had relearned the lessons of World War II and had used this knowledge to improve its support of ground operations. As was the case after World War II, however, the lessons of Korea were set aside and forgotten, a fact reflected in Secretary of the Air Force Thomas K. Finletter's comment that "the Korean War was a unique, never-to-be-repeated diversion from the true course of strategic air power."[23] Twenty years later, "when the Vietnam War started, we simply had to relearn the basics, and we paid a terrible price to do so."[24] Once again, the Air Force had to use mothballed aircraft, this time borrowing A-1E Skyraiders from the Navy and modifying training planes such as the T-37 to provide CAS when F-105 Thunderchiefs and F-4 Phantoms did not meet CAS requirements. The Skyraider's ability to absorb punishment, carry ordnance, and loiter over the battlefield made it invaluable in major battles such as Tet, Hue, and Khe Sanh and in hundreds of minor engagements, allowing US ground forces to hold out against superior numbers of North Vietnamese and Vietcong. The Air Force also enhanced its CAS capability by converting C-47, C-119, and C-130 transports into heavily armed AC-47, AC-119, and AC-130 ground-support aircraft. Finally, as it had in Korea, the Air Force diverted its strategic bombers, using B-52s for much-needed ground support that saved the lives of hundreds of US ground troops and inflicted numerous casualties on the North Vietnamese.[25]

After Vietnam, both Congress and the Department of Defense prevailed upon the Air Force to reevaluate its CAS mission in light of the Soviet threat to US interests worldwide. Responding particularly to a need to offset the numerical advantage in personnel and equipment that the Soviets would enjoy in an invasion of Western Europe, the Air Force fielded the A-10 Thunderbolt—the first aircraft designed exclusively for CAS.[26]

From November 1983 through May 1984, the Army and Air Force developed 31 initiatives designed to improve air-ground interoperability. This work served as the basis for and later developed into the Army's AirLand Battle doctrine in 1986, which outlined the use of air power to support the land campaign.[27] Work continued through the 1980s to improve the two services' capabilities for fighting jointly on the modern battlefield. With the fall of the Berlin Wall in 1989 and the subsequent disintegration of the Soviet Union, however, the Soviet threat seemingly disappeared, and the US began to downsize its military forces. Among the Air Force's early contributions to this downsizing was the projected mothballing of its entire A-10 fleet.[28]

In 1991 the Air Force rushed the A-10s that remained in the active flying inventory to Southwest Asia at the request of Gen H. Norman Schwarzkopf, commander in chief of US Central Command (CINCCENT), as part of the buildup for Operation Desert Storm.[29] Had the Gulf War occurred only a year later, the Air Force would have had to recall most of these aircraft from mothballs, as in past wars. A-10s were available only because Saddam Hussein made major blunders in timing and in underestimating the US's and the world's resolve to condemn and counter his actions. Effective against Iraqi tanks and other ground vehicles, these aircraft exceeded both the Air Force's and their designer's expectations.[30] In addition, the flexibility and ruggedness of the A-10 allowed it to perform a wide range of missions for which it was not designed—such as suppression of enemy air defenses, armed reconnaissance, and armed escort for search and rescue.[31]

Although they represented less than 10 percent of the coalition's air assets, A-10s were responsible for about 70 percent of the armored vehicles destroyed by coalition air forces.[32] During the latter part of the ground war, Lt Gen Charles A. Horner, the joint force air component commander (JFACC), stated bluntly, "I take back all of the bad things that I said about the A-10. I love them! They saved our ass."[33] Furthermore, a captured Iraqi officer reported that the "single most recognizable and feared aircraft at low level was the A-10. Although the actual bomb run was terrifying, the aircraft's loitering around the target area caused as much, if not more, anxiety since the Iraqi soldiers were unsure of the chosen target."[34] Another source reported that A-10s killed over 50 percent of all enemy tanks, more than 50 percent of all field artillery pieces, and 31 percent of all armored personnel carriers. Interestingly enough, they also accounted for more air-to-air combat kills than the multirole F-16 Fighting Falcon.[35] Clearly, the A-10s were decisive combat multipliers on the battlefield and were instrumental in minimizing US ground losses in the ground campaign that liberated Kuwait. And, once again, the Air Force used B-52s in the BAI role to bomb Republican Guard positions as well as troop or equipment concentrations.[36]

CAS Aircraft Design

Most CAS aircraft were originally designed for counterair operations or air interdiction but were subsequently improvised, modified, or otherwise adapted for CAS operations during wartime. This trend started with the P-51 and P-47 in World War II and Korea and with the A-1E and A-37 in Vietnam; it continues today with the planned conversion of the F-16 to the F/A-16.

What constitutes an ideal CAS aircraft? An Air Force study conducted in the 1960s concluded that it should have the following capabilities:

> 1. The plane has to be able to operate out of short, primitive airfields.
>
> 2. It should be reliable and easy to maintain in the field under wartime conditions.
>
> 3. It must be able to carry large amounts of ordnance and specifically must be able to kill tanks and other armor.
>
> 4. It must have sufficient range to loiter "on call" near the battlefield, and when needed for CAS it should have enough remaining endurance to find the target, identify and confirm that it is, indeed, enemy rather than friendly, and then destroy it.
>
> 5. It must fly at least 350 knots, but be maneuverable enough to turn tightly over the battlefield so that the pilot will not lose sight of the target when visibility is low.
>
> 6. It must be survivable; it should be able to take damage from ground fire and still return to base with a healthy pilot.
>
> 7. It should be a low-cost airplane in comparison to prices being quoted for supersonic jet fighters, and cost overruns . . . were not to be allowed.[37]

Because pilots of CAS aircraft have to visually acquire their targets before attacking to minimize the risk of fratricide, aircraft speed is not a prime requisite. During the Korean War, Army general Mark Clark spent several months with both Army and Air Force combat units to study CAS requirements. He found that both propeller and jet aircraft were equally capable of conducting effective CAS, provided that the jet aircraft were willing to maneuver low and slowly enough to clearly identify targets and deliver ordnance accurately.[38] Although the wide-open terrain of Southwest Asia facilitated pilots' observation of the battlefield and their detection of targets, future battlefields may not be as uncluttered.

More rugged terrain and heavier vegetation, as found in Bosnia, require either forward air controllers (FAC) over each possible engagement area or ground observers with each ground maneuver element that may need CAS.

CAS aircraft must also be rugged in order to protect the pilot and aircraft systems from threats encountered in a low-level environment. Vietnam, Afghanistan, and the Middle East demonstrated the lethality of ground fire—from both small arms and antiaircraft artillery—while the Arab-Israeli wars revealed the danger posed by advanced surface-to-air missiles (SAM) using both infrared (IR) and radar guidance. Specifically, the advent of hand-held IR SAMs such as the Soviet SA-7 and SA-14 and the American Redeye and Stinger has increased the threat to low-flying CAS aircraft.

Once considered a fighter pilot's purgatory, assignment to an A-10 squadron became more appealing after pilots began to develop an appreciation for their aircraft's role and capabilities. The A-10's ability to fly low and slowly allowed pilots to loiter for long periods of time and visually pick out targets, thus increasing the chances of hitting those targets. Flying low also limited the enemy's ability to track and intercept the A-10 with radar-guided SAMs, and its twin engines provided redundancy but presented SAMs with a minimal IR signature. Further, the A-10's maneuverability allowed it to avoid concentrations of ground fire and to break missile locks. Even if all of these defensive measures failed, the A-10's titanium bathtub design protected the pilot, and several redundant operating systems sustained flyability. Thus, it could absorb a tremendous amount of battle damage yet complete its mission and return to base. In the Gulf War, 15 A-10s took multiple hits from a variety of small- and major-caliber ground fires and hand-held SAMs that would have downed any other modern aircraft.[39] Moreover, the fact that the A-10 was the only aircraft capable of operating from primitive forward airfields such as Al Jouf, Saudi Arabia, meant that it could respond quickly to ground forces' requests for support, hunt for elusive mobile Scud launchers, and optimize time on station.[40]

The Future of CAS

Despite the lessons of the past, the Air Force continues to draw down its CAS assets. But the number of limited conflicts has increased in the post-cold-war era as nations or ethnic groups jockey for positions of regional dominance in the new multipolar strategic environment, and current trends point to a continued emphasis on tactical air power operating in its "traditional" air-ground role.[41] As the US moves toward increased participation in peacemaking and peacekeeping operations, the need for CAS aircraft and missions will continue to grow because either rules of engagement or political constraints will prevent the US from applying its full range of air power.

Although the US has been reluctant to commit massive ground forces to peacekeeping operations, it has repeatedly expressed its willingness to commit air power in support of UN operations. In such limited conflicts, we will need tactical air power to strike targets in proximity to committed ground forces, whether they belong to the US or to other nations operating as part of a coalition. Thus, the Air Force must maintain and improve its capability to provide CAS in such conflicts if the US is to project force effectively in support of its national security interests.

The Marine Corps solved its "problem" with the lack of dedicated CAS assets from the Navy by integrating AV-8B Harrier, A-6E Intruder, and F/A-18 Hornet aircraft for CAS and interdiction sorties as an element of its Marine Air/Ground Task Force (MAGTF). Although the JFACC technically controls Marine Corps fixed-wing aircraft for interdiction strike planning and execution, the MAGTF commander can control Marine fixed-wing assets to support the ground campaign plan with CAS strikes. For example, during Operation Desert Storm, the commander of Marine Corps forces, Central Command (MARCENT) turned over all of the A-6E and half of the F/A-18 assets to the JFACC for execution of the air interdiction campaign but retained operational control of the remaining F/A-18s and all of the AV-8Bs to provide CAS to Marine forces.[42] During the air interdiction campaign, the JFACC concentrated air assets on the strategic campaign in accordance with Air Force doctrine and allocated minimal assets to CAS (and interdiction) only when pressed by the CINCCENT. By the third week of February 1991, the JFACC's allocated CAS sortie rate did not meet the MARCENT commander's requirements for adequate fixed-wing CAS, so the MARCENT commander withheld virtually all of his fixed-wing aircraft from JFACC control in order to use them for CAS strikes.[43]

Such an arrangement will not work for the Army because it lacks suitable fixed-wing assets and must rely on the Air Force to meet its CAS needs. Army helicopters alone cannot fulfill CAS mission requirements because they lack the range and ordnance-carrying capability of Air Force fixed-wing aircraft. Gen Carl E. Vuono and Gen Larry D. Welch, former chiefs of staff of the Army and Air Force, respectively, note that

> the Army and Air Force do not regard attack helicopters as CAS weapons systems. Attack helicopter units lack the speed, lethality and flexibility to enable the theater commander to mass, concentrate, or shift air support intra-theater, which is a vital characteristic of CAS. We both firmly believe that the original concept of Air Force fixed wing aircraft providing support in close proximity to friendly forces remains valid and properly defines CAS today.[44]

The Army uses attack helicopters as part of a combined-arms team including infantry, armor, and field artillery to defeat enemy forces through fire and maneuver. On the battlefield, the helicopter is "an airborne armored fighting vehicle, and in intent and purpose [is] more closely related to the tank than the airplane."[45] Although helicopters can use terrain to mask their approach, they are far more vulnerable than are fixed-wing aircraft to air defense threats such as small arms, artillery, and tanks, as well as traditional antiair gun and missile systems. Experience at the National Training Center in Fort Irwin, California, has shown the ineffectiveness of attack helicopters operating independently in head-to-head confrontations with enemy ground forces. However, their effectiveness improves when they are used as combat maneuver forces, and Operation Desert Storm showed that they are optimally effective in conjunction with Air Force fixed-wing CAS assets in joint air attack teams.[46] Therefore, because of its experience in fixed-wing air operations, the Air Force should continue to develop CAS doctrine and provide the aircraft and missions needed to support the other services in the joint environment.

Like the other services, the Air Force is now redefining its role in the post-cold-war era, part of which is articulated in a recent white paper that identifies five principles as the foundation of the future Air Force and its strategy: sustaining deterrence, providing a versatile combat force, supplying rapid global mobility, controlling the high ground, and building US influence.[47] Significantly, however, that document makes no mention of CAS.

Further, Gen Merrill A. McPeak, Air Force chief of staff, has outlined a proposal for a US Air Force expeditionary force consisting of a composite wing augmented by rapidly deployable Army ground forces designed for use in limited wars.[48] Although the Air Force is developing force structures and equipment for implementing future strategy that supports counterair, interdiction, and strategic bombing, it seems to be neglecting CAS assets.

Additionally, the Air Force continues to fund, develop, and procure the controversial B-1 and B-2 bombers to replace the B-52 for the strategic bombing mission and plans to replace the F-15 with the F-22 for the counterair mission, upgrade the F-15E and the F-16C/D for the air interdiction mission, and replace the A-10 with the F/A-16 for the CAS mission. To produce the F/A-16, the Air Force will modify 200 of the latest production-line-variant F-16s equipped with low-altitude navigation and targeting infrared for night (LANTIRN) by adding a 30-mm gun pod, an improved data modem (IDM) for integration with the joint surveillance target attack radar system (JSTARS), an antijam VHF radio compatible with single channel ground and airborne radio system (SINCGARS) for coordination with ground forces, night-vision goggles, digital terrain mapping, and laser trackers for use with laser designators.[49] A-10s that are retired to Reserve units or mothballed will be replaced with F-16s until the F/A-16s come on-line.

Although these modifications to the F-16 will improve its ability to deliver ordnance in the CAS role, the F/A-16 does not meet the Air Force's criteria for CAS, mentioned previously. Specifically, it lacks the defense and survivability mechanisms necessary for the pilot and plane to operate effectively in the low-level environment and deliver accurate CAS, especially with the 30-mm gun. The F-16's fly-by-wire control systems and single engine lack the survivability and redundancy to absorb battle damage and continue flying. The fact that it is a high-speed aircraft limits the pilot's ability to visually identify and attack targets on the ground—especially in proximity to friendly forces—without airborne FACs or ground controllers.[50] This shortcoming would become especially critical in Bosnia, where pilots would have to visually identify targets in the rugged mountains without the assistance of FACs and/or ground controllers.[51]

In view of those facts, the Air Force should immediately begin design work on a new CAS aircraft as the follow-on to the A-10 and should extend the service lives of remaining A-10s through a product improvement program. It makes more sense to improve an established CAS aircraft than modify/adapt another airframe design for a different role. For example, the addition of the low-altitude safety and target enhancement (LASTE) module to the remaining A-10s will improve ordnance delivery at low altitudes.[52] Other improvements will include protection against IR and radar-guided missiles, enhancement of air-ground targeting through integral LANTIRN for day and night operations, and the addition of IDM to allow downloading of data from JSTARS. Finally, A-10s will also receive advanced navigational systems such as integral global positioning system (GPS); night-vision goggles to improve all-weather, all-terrain capability; and air-to-ground communications equipment such as SINCGARS that is compatible with both Army and Air Force radio requirements. These modifications should improve the A-10's already demonstrated performance until the next-generation CAS aircraft comes on-line.

Conclusion

Field Marshal Erwin Rommel wrote that he had "never seen any forces so inept at first as Americans in battle—or anyone who learned the hard lessons more quickly once the chips were down."[53] We have had to relearn the lessons of CAS from every major conflict from World War II through the Gulf War of 1991, and our ground and air forces have paid the price in blood, sweat, and tears. Because we will continue to need CAS, we must begin to revitalize our capabilities to prevent shortfalls and losses on future battlefields.

Although the Air Force's current professional military education system covers CAS to the Army and other ground forces and the Air Force Fighter Weapons Center at Nellis AFB, Nevada, trains pilots to attack ground targets, Air Force doctrine and support of CAS aircraft still fall short of joint mission requirements.

These deficiencies should be rectified because increased US involvement in limited conflicts will produce a corresponding increase in the demand for CAS. The Air Force was able to meet CAS requirements in the Gulf War only because the drawdown in forces was just getting started. We may not be so lucky in the next conflict. □

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SURPRISE and INTELLIGENCE

Towards A Clearer Understanding

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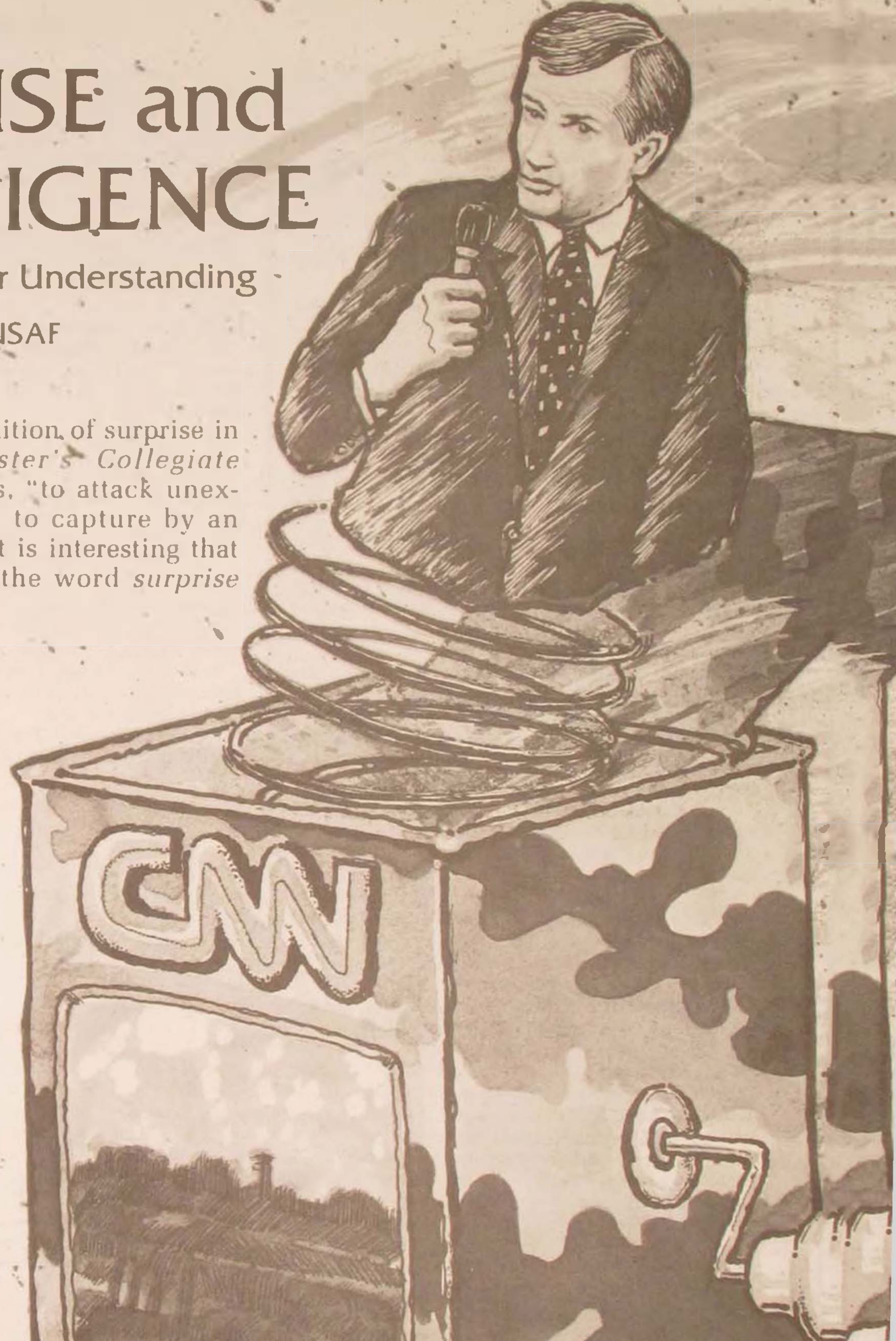
THE FIRST definition of surprise in *Merriam-Webster's Collegiate Dictionary* says, "to attack unexpectedly; *also*: to capture by an unexpected attack."[1] It is interesting that the dictionary places the word *surprise*



within a military context. Yet, the definition falls short of describing the essential elements of military surprise. In keeping with Webster's, Army and Air Force doctrine is constructed using this terminology as a framework. The development of technology that diminishes or eliminates surprise may require a reevaluation of defense strategies currently thought sufficient.

Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, describes surprise this way:

> *Strike the enemy at a time or place or in a manner for which he is unprepared* [italics in original]. To a large degree, the principle of surprise is the reciprocal of the principle of security. Concealing one's capabilities and intentions creates the opportunity to strike the enemy when he is unaware or unprepared, *but strategic surprise is difficult to achieve* [italics added]. Rapid advances in strategic surveillance technology make it increasingly difficult to mask or cloak large-scale marshaling or movement of personnel and equipment.[2]

Clearly, Air Force doctrine acknowledges that quantum advances in overhead surveillance technology seriously jeopardize the military's ability to achieve strategic surprise. While the statement that "surprise is difficult to achieve" does not speak to the past, it certainly describes current and expected conditions of war fighting. Army doctrine seems to concur. The newest Army Field Manual (FM) 100-5, *Operations*, has modified its understanding of surprise while still maintaining that

> achieving outright surprise once hostilities have begun is difficult. The proliferation of modern surveillance and warning systems and the presence of global commercial news networks make complete surprise less likely.[3]

This new understanding seems to come closer to the mark than previous FM-100 definitions. Yet the essence of this understanding is based upon the capability of technology to negate the potential for surprise at the strategic and, less consistently, at the operational level of war.

Each of these services has relegated strategic surprise to the annals of history or, at best, to the realm of being "difficult to achieve." The nature of strategic surprise, however, suggests a future different from that which is currently supposed.

The underlying assumption of current thought places considerable "faith" in the efficacy, reliability, timeliness, and accuracy of intelligence. Faith in intelligence, including overhead imagery, is a two-edged sword: we believe it prevents others from achieving surprise against us and believe it keeps us from surprising others. If this faith is unfounded, then we face the sword ourselves. Consequently, this belief system requires a close examination.

The thesis of this article is that *strategic surprise is difficult to prevent, even in the face of accurate and timely intelligence (including overhead imagery), because it is based on exploiting a leader's or nation's personality and characteristics as well as the bureaucracies that serve them.* Historical evidence seems to indicate that strategic surprise in the twentieth century has rarely been prevented despite a plethora of available intelligence. If the presence of reliable and timely intelligence does not prevent surprise, then a reevaluation of our current thinking is in order. Strategic surprise, in this case, may not only be possible, it may be inevitable. This is a sword that also cuts both ways. While we may not be able to prevent strategic surprise, we can expect to use this principle of war to our military advantage.

This article examines the elements of strategic surprise—its foundation, nature, and potential. It proposes a notional definition for strategic surprise that offers a more relevant application to the military art. Additionally, it identifies and examines the validity of assumptions that form the basis for military doctrine on strategic surprise. It uses historical case studies to test the assumptions of current doctrine

The American press has covered our battles for over a hundred years. Beginning with the Vietnam War, however, the press's ability to affect American public opinion had an impact on how we thought about waging war. In future wars, global commercial news networks may actually compromise our strategic ability to make war. Here the press covers President Lyndon Johnson's 1967 visit to Vietnam.

that link the availability of intelligence to strategic surprise. Finally, it draws conclusions and makes recommendations for those at the operational level and those involved in restructuring a shrinking military force.

It is significant that Joint Publication (Pub) 1 acknowledges, "The principles of war [of which *surprise* is one] represent the best efforts of military thinkers to identify those aspects of warfare that are universally true and relevant" (italics added).[4] It is possible that this concert of thought generally refers to the operational and tactical levels. Yet, US history is not without examples of surprise at the strategic level—both inflicting it and receiving it. Consequently, it is more logical to conclude that joint doctrine acknowledges the potential for surprise at any level. If this is so, then a thorough investigation of strategic surprise is in order before we discard what was previously believed as "true and relevant."

The Nature, Definition, and Potential of Strategic Surprise

There are two schools of thought regarding the potential for strategic surprise that provide a framework for contemporary military theorists. In one corner stand Carl von Clausewitz and Henri de Jomini and in the other Sun Tzu. Certainly, the age in which each lived influenced their assessment of surprise.

Clausewitz takes a dim view of the potential for strategic surprise:

> While the wish to achieve surprise is common and, indeed, indispensable, and while it is true that it will never be completely ineffective, it is equally true that by its very nature surprise can rarely be outstandingly successful. . . . It is very rare therefore that one side surprises another, either by an attack or by preparations for war.[5]

Jomini, too, disparages the potential for achieving surprise in even more drastic terms than Clausewitz:

> The surprise of an army is now next to an impossibility. . . . Prearranged surprises are rare and difficult because in order to plan one it becomes necessary to have an accurate knowledge of the enemy's camp.[6]

Interestingly, Jomini unwittingly presages the potential for surprise should the means (technology?) exist to get "accurate knowledge of the enemy's camp."

In the opposing corner, Sun Tzu expresses considerable faith in the potential for surprise to assist the commander. In Barton Whaley's *Compilation of Principles of War*, surprise ranked third in priority for Sun Tzu, sixth for Clausewitz, and not at all for Jomini.[7] Sun Tzu advocates surprise through conversations between his commanders:

> **Chang Yu:** . . . Come like the wind, go like lightning. . . . *The enemy must not know where I intend to give battle. For if he does not know where I intend to give battle he must prepare in a great many places* [italics in original]. . . . Take him unaware by surprise attacks where he is unprepared. Hit him suddenly with shock troops.[8]

In fairness, Sun Tzu and Clausewitz were speaking about surprise from different vantage points. Michael I. Handel writes that "when Clausewitz speaks of the near-impossibility of achieving surprise, he is primarily referring to the higher operational or strategic levels, whereas Sun Tzu's high estimation of the utility of surprise is mainly in the context of the tactical level of war."[9] Jomini also discards surprise at the strategic and operational levels. In summary, at the operational and strategic levels of war, the three theorists agree more than they differ.

While these theorists reject the potential for strategic surprise due to a lack of available intelligence, Jomini believed attaining timely or accurate intelligence of the enemy's camp was unlikely. The availability of reliable intelligence sources and data might have altered his disdain for strategic surprise. Had comprehensive intelligence been available (imagery, etc.), it is likely that these theorists would have retained their low opinion of surprise, but for exactly the opposite reason. That is, *because I know all about the enemy's camp, and he knows all about me, strategic surprise isn't possible.* This brings the reasoning full circle to the place where we find current military thought.

The weight of academia appears to place current military thought and doctrine on solid ground. Yet, theorists and their theories must be borne out by practical and historical example. A closer examination of historical examples is provided in this article to determine whether technological intelligence, and intelligence in general, provides the means to prevent or achieve strategic surprise.

Exploring the nature and definition of strategic surprise, and reasons for its success or failure, are essential to correctly interpreting historical examples in which this phenomenon occurs. Yet, the nature of strategic surprise is more inscrutable than is readily apparent. According to Handel, "the study of strategic surprise can be rather disappointing for those who have always assumed that a better *theoretical* understanding of the subject at hand would logically lead to the discovery of more effective *practical* means to anticipate strategic surprise and alleviate its impact" (italics in original).[10] If so, then a cursory look at the subject is pointless, and conclusions derived from such studies should be eyed cautiously.

Thus, the nature of strategic surprise is not as simple as it appears at first blush. Surprise is not an absolute reality but a relative concept, and rarely an all or nothing proposition. Further, it is not usually one-dimensional and may involve different facets and phases. If only one facet or phase succeeds out of several attempted, the condition of surprise is still created. (A man who purchases 10 lottery tickets and wins on one does not consider the purchase a wasted effort.)

Finally, though only peripheral to this article's interest, strategic surprise springs from well-developed intelligence operations. In most cases, examples of achieving surprise include aspects of deception operations, confusing the victim with illusions in the midst of reality. Political and military leaders unschooled in the art of deception—and even those familiar with such operations—find it difficult to distinguish between deception and reality. Therefore, skill in these areas can provide leaders at the operational and strategic levels with the tools needed to ably develop plans to achieve surprise from their respective positions.

Coming to a clearer understanding of the nature and foundation of strategic surprise is the first step towards producing a definition that is consistent with history, relevant to the present, and useful for the future. This, in turn, should provide a solid foundation upon which coherent doctrine can be constructed.

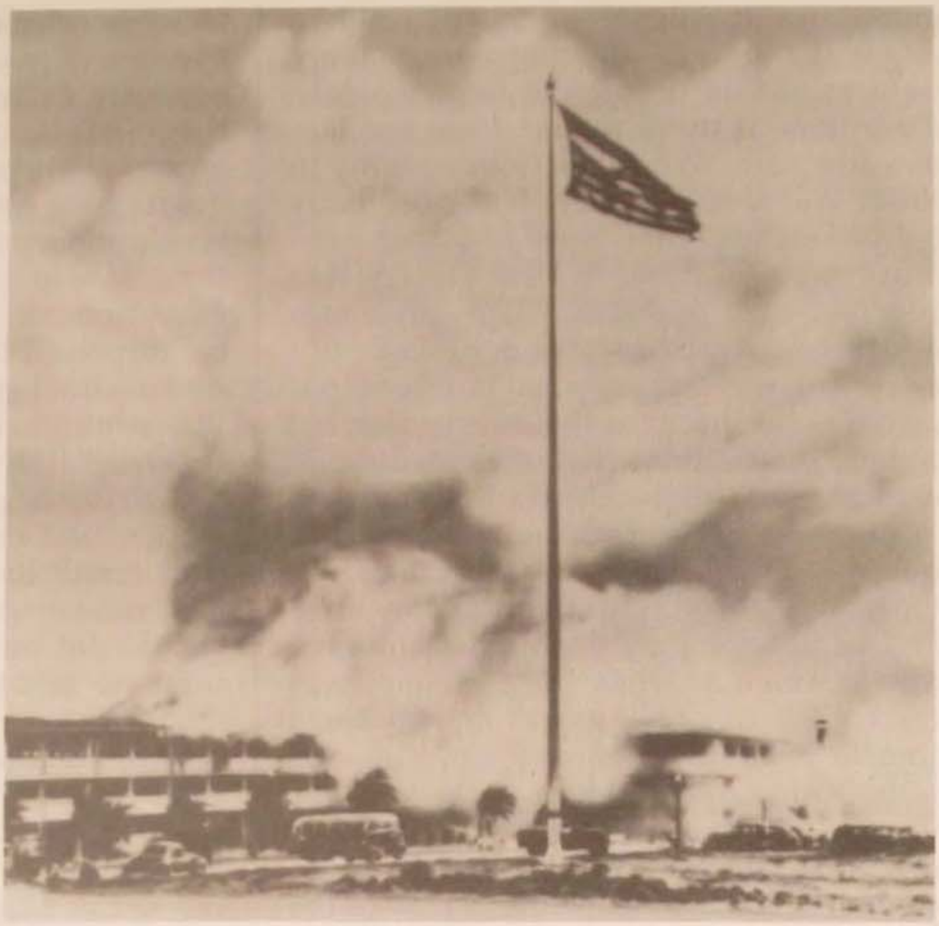
The Definition Redefined

As indicated in the introduction, the current dictionary definition of *surprise* has a more lexical than practical value. Certainly, as Webster concludes, to surprise is "to attack unexpectedly . . . to capture by an unexpected attack." Yet war is not won without losses or fought without opponents, and surprise is not an absolute but a relative concept. If it took two weeks to prepare defenses against a Soviet invasion of Central Europe and only two days' warning was received, the Soviets would have achieved strategic surprise. Defenses would be inadequate to the task by the time the first tanks were rolled across the Fulda Gap.

While lines are blurred between strategic and operational aspects of surprise, certain characteristics are apparent. Strategic surprise is generally understood to occur during initial and, generally, major operations against the enemy. Normally, these operations are launched on directions from the highest levels of government and involve assets and devices not normally assigned to the operational commander. These are usually directed at a single theater of operations. (Due to the enormous size of such operations, most nations are constrained by cost and personnel from undertaking more than one of them at a time.) Operation Overlord, the Allied invasion of Normandy, is a good example of this. It was launched from within the European theater, initiated above the operational commander and involved national intelligence assets and plans (Ultra, Double Cross, Operation Fortitude South), which were all used to deceive the Germans as to the site of the Allied invasion.

If surprise is rarely complete, it is achieved in spite of *some* enemy expectation or anticipation. Even in World War II France, Hitler had a good idea that the Allies would attack at any moment along the coast of France. There were numerous warning signs in the preceding weeks that led to his conclusion about the Allies' intentions. Within Webster's definition, however, there is room to argue that this operation was not a surprise. The point here is not to demean Webster but to point out the definition's limitations and relevancy, especially in light of current technology, for developing military doctrine.

A better definition of *surprise* would be "an attack that achieves a military advantage in the face of inadequate defenses or an unprepared enemy." Within this definition, allowances can be made for the



The lack of centralized control of intelligence led to the strategic surprise of Pearl Harbor. A US naval vessel (below) and the military barracks at Hickam Field (right) burn after the 7 December 1941 attack by Japanese aircraft.

normal warning signals an enemy receives before the attack. Furthermore, enemy preparations do not negate the advantage of surprise, if these preparations are less than adequate. While the German army in World War II had *some* defenses in Sicily and Normandy, they were less than adequate to the task when the Allies launched each operation. The advantage of strategic surprise was achieved, not because it was "unexpected" or "without warning" but because the enemy was led to make preparations that were inadequate to the task. In the case of Sicily, the Germans had diverted their defenses to Greece and, in France, to Pas de Calais.

Strategic surprise is often achieved in the face of an enemy unable to determine *exactly where or when* his opponent will attack. It is this brief gap of knowledge, a moment of time, or ignorance of intended method, that opens the door for strategic surprise. In war, this "gap" can involve time, location, method, or weight of an impending attack. Knowing a part of the plan is not enough to prevent strategic surprise, which is why it has been so often successful.

This redefinition, for military purposes, recognizes that strategic surprise occurs, not in the absence of enemy awareness, but in spite of it. It acknowledges surprise as being more or less successful, depending on the state of enemy preparedness and defenses. It distinguishes surprise from the strictly lexical, and apparently doctrinal, belief of existing only when it is completely unexpected. This also is a far better understanding of how strategic surprise works, especially in an era in which technology has compressed time. The "gap" of warning time involved weeks in the early twentieth century, days during World War II, and now may be no more than hours (minutes in the case of intercontinental ballistic missiles). In this case, an enemy may have the intelligence capability to anticipate an attack yet be unable to prepare adequate defenses.

Unbalanced technology development between offensive weapons and defensive systems may yield a condition where no adequate defense exists. An attack under these conditions, where the enemy is aware of his own lack of defense, would hardly be a surprise. However, rapid and revolutionary technology developments in time of war is the rule rather than the exception. In such cases, the enemy can be surprised by the rapid appearance of new technologies that unbalance systems that were once roughly equivalent. (The fevered pitch of atomic research during the 1940s suggests that results occurred earlier than similar research under peacetime conditions. The application of talent, money, and government support should not be underestimated in developing new technologies during periods of crisis.)

With such potential, it seems less plausible to believe that surprise is in the realm of being "difficult to achieve." In these cases, the repercussions of miscalculating the nature of strategic surprise are enormous. If weapons proliferation is increasing in a world fractured by multipolar schisms, then coherent policy and doctrine is essential—especially in light of the unstable nature of nations seeking and acquiring nuclear, biological, and chemical (NBC) weapons.

This is a fundamental change of thinking from the current "all or nothing" approach. This approach may be both unworkable and historically untenable. Strategic surprise may be returned to leaders and commanders if planning involves methods and means to exploit these "gaps" of enemy awareness and corresponding weakness. The enemy may not be blind but may have enough *blind spots* to enable friendly forces to achieve strategic surprise.

Turning points in history and battles often occurred when resourceful individuals or nations found the means to do what conventional wisdom believed "impossible" or "difficult to achieve." The benefits of strategic surprise are too great for future adversaries to quickly abandon their search for the means to achieve it. Inversely, the potential consequences of misunderstanding or miscalculating its potential for harm and benefit should provide sufficient impetus for further military study.

Potential

The potential of strategic surprise is commonly viewed as a force multiplier. It creates the environment in which fewer lives and materials are spent in pursuit of national policy goals. "A successful unanticipated attack will facilitate the destruction of a sizable portion of the enemy's forces at a lower cost to the attacker by throwing the inherently stronger defense psychologically off balance, and hence temporarily reducing his resistance."[11] Traditionally, *weaker* nations have more diligently sought to maximize their strength using force multipliers. Any activity that is viewed as a force multiplier (intelligence operations, deception, surprise, etc.) have been historically disdained by superpower nations. "Clearly, then, the incentive to resort to strategic surprise (as well as to deception) is particularly strong for countries that are only too cognizant of their relative vulnerability."[12] Recent contractions in superpower military forces will evoke more interest in tools that stretch diminishing resources while simultaneously increasing combat capabilities.

Along with saving lives and material, strategic surprise has the capacity to create something more intangible and insidious—a reaction paralysis. During preparations for launching an invasion in the Mediterranean, the British in World War II conducted a complex deception operation known as Operation Mincemeat. The goal was to make the Germans think that the Allies, who were preparing to land in Sicily, were about to land in Greece. The operation was so successful, and surprise so complete, that reaction paralysis occurred among the German High Command. Ewen Montague, who conducted this deception operation, concluded,

> It is clear that Hitler was completely sold on the idea that we were intending to land in Greece and, now that he had come to this conclusion, he stuck firmly to it. So much so that, on 23rd July, *nearly a fortnight after the Allied landing in Sicily, Hitler still believed that the main operation was going to be an invasion of Greece*, and appointed his favorite general, General Rommel, to command the forces that were being assembled there. (Italics in original)[13]

In the Allied invasion of Europe, surprise was essential to reducing casualties and creating the best possibility for success. An intricate deception plan, Operation Fortitude, produced this desired effect. This plan created a notional landing site and time in the area of Pas de Calais. Again, surprise was achieved to such a degree that when the invasion began in Normandy, German commanders were away from their troops, some even vacationing.[14] Again, reaction paralysis occurred:

> Moreover, because the German commanders (until the end of the second week) and Hitler (*for seven weeks*) feared that the Normandy landings might be a feint to draw away forces from the intended main invasion in the Pas de Calais, the front was not reinforced to the extent that was desirable. Nor would Hitler allow any evacuation of the South of France either. . . . (Italics in original)[15]

The effect of this delay for the German High Command was catastrophic. With the Allies having an advantage of men and material, as well as complete air superiority, the Germans were unable to stem the Allied momentum. Notional or phantom, diversions at Pas de Calais and Greece amplified the effect of surprise and extended the paralysis—in these cases, for a period of several weeks.

The potential for harm or benefit nears

the infinite in the category of nuclear weapons. Predicting and anticipating strategic surprise is far more difficult when there are only minutes rather than months to react appropriately. The proliferation of nuclear weapons to third world countries is not just a matter of concern but a matter of fact. If an attack were to be launched from such a nation on the US, what kind of assistance would launch-warning indicators provide? Indeed, while the attack may be limited to one or two weapons, the decision to respond or not, and at what level, would be far more complex than it was during the period of superpower confrontation. The one unalterable fact remaining from the cold war era is that missile flight times are still very short and adequate defenses do not yet exist.

Certain weaker nations may find the temptation to use such weapons irresistible, righting with one blow the perceived or real injustices suffered at the hands of disparate nations. The United States may face smaller, nuclear-capable nations who have no reservations about using these devices as "great equalizers." In any case, warning signals would be minimal.

> It is no longer necessary for the aggressor to undertake huge movements of troops and ships in the weeks preceding an all-out war. . . . [Nuclear weapons from all platforms] have the capability of delivering a blow many times more devastating than anything imaginable *without yielding any substantial intelligence warning*. (Italics added)[16]

Surprise is a powerful force multiplier that each side desires to achieve. The ability to reduce casualties and material losses and to ensure success and create a reaction paralysis are the benefits of creating such a condition.

Current military doctrine indicates an assumption that overhead technology negates strategic surprise and, inversely, any country possessing such capability cannot be strategically surprised. The doctrine also assumes a timely and unfettered flow of such information to appropriate decision makers. It is a kind of decision by algebra. That is, if timely and accurate intelligence is available, logical decisions will follow, military preparations will be adequate, and surprise will be prevented. If this is so, then historical examples will bear this out.

Despite current doctrine, the weight of history argues against this line of thinking. Strategic surprise has far more to do with the psychology and nature of man and his affairs than with the availability of intelligence. Either way, history should demonstrate whether the availability of accurate and timely intelligence is sufficient to prevent strategic surprise.

Intelligence and Surprise—Historical Overview

Current doctrine presupposes technology has done what previous technology and intelligence operations could not do to prevent strategic surprise. Yet, as will be shown in the following examples, the seeds of surprise originate in the heart and are sown by exploiting the nature of leaders and nations and the bureaucracies that serve them. Thus far, technology has yet to penetrate this enigma called man and reliably discern his intentions.

Beginning in the 1970s, the US pursued a course away from HUMINT (intelligence derived from human resources) and increased its reliance on technology. (This began during the 1970s when the idea of "spying" fell into disfavor under the Carter administration.) The technological approach to intelligence gathering has fiscal advantages and is relatively responsive to short-notice demands. Yet, even photographs cannot necessarily tell a leader the significance and meaning of what he is viewing. Technology may prove unreliable in the future, as it has in the past, when asked to do the yeoman work of predicting and preventing strategic surprise.

A brief look at some recent case studies will help determine the key elements that create the conditions that result in strategic surprise. Obviously, they vary from case to case, yet three significant points emerge relevant to this discussion. *First, strategic surprise occurred in the face of sufficient and accurate intelligence data (including photographic reconnaissance), not in the absence of it. Second, surprise exploited the nature of a leader or nation. The personalities, idiosyncrasies, peculiarities, and weaknesses of man all served as building blocks to create strategic surprise by a resourceful and committed enemy. Third, intelligence networks themselves served as clogged conduits through which valuable information failed to flow.*

These suppositions should be evident from the following three case studies. Space alone prevents a comprehensive study of the nearly two dozen examples of strategic surprise that have occurred since the outbreak of World War II. Another case, the Cuban missile crisis, is included to demonstrate how technology has made surprise difficult to achieve.

Pearl Harbor—December 1941

> If our intelligence system and all our other channels of information failed to produce an accurate image of Japanese intentions and capabilities, it was not for want of the relevant materials. Never before have we had so complete an intelligence picture of the enemy.[17]

The committees and commissions that studied the attack on Pearl Harbor shortly after the war came to a similar conclusion: there was no lack of information on Japanese intentions, capabilities, communications, codes, and changes in operating procedures before the attack. Significant amounts of intelligence preceded the "surprise attack" to provide sufficient warning and should have been relayed by, to, and through elements of military forces stationed in Hawaii.

First, the US had broken the top-priority Japanese diplomatic code, which gave us access to communications between Tokyo and major embassies around the world.[18] Additionally, "cryptanalysts also had some success in reading codes by Japanese agents in major American and foreign ports. [Magic was the code name for the US program for breaking Japanese codes]. . . . Our naval leaders also had at their disposal the results of radio traffic analysis."[19] Unfortunately, no single person or central collection agency ever had control of all these intercepts. They were divided between numerous agencies (as is the case today). "Some [intelligence data] traveled through rapid channels of communication, some were blocked by technical or procedural delays; some never reached a center of decision."[20]

The bureaucratic failings and infighting among intelligence agencies is not particularly surprising. Each competes for limited funding and prestige. It is the nature of all bureaucracies to withhold embarrassing sensitive information, promote their own self-interests, and proceed cautiously in the face of uncertainty. (Witness the recent admissions of the Central Intelligence Agency and the Federal Bureau of Investigation over their complicity in failing to coordinate intelligence gathered in the Bank of Commerce and Credit prosecution. The results in this case left the Justice Department holding an empty gun and unable to effectively prosecute their case.)

On the diplomatic front, Magic analysis indicated that Tokyo was directing their ambassadors to vigorously pursue a diplomatic resolution to the growing conflict with Washington. Washington had knowledge of Tokyo's deadline "for the favorable conclusion of the negotiations, first for November 25, later postponed until November 29. In case of failure . . . Japan was determined to pursue her policy and 'things' would automatically begin to happen."[21] Finally, information was passed to Ambassador Joseph C. Grew (and on to Washington) in January 1941 of a secret Japanese plan to attack Pearl Harbor. This information was discounted as unreliable.

The signals available to military and civilian authorities numbered in the dozens. Yet, "for every signal that arrived in 1941, there were usually several plausible alternative explanations, and it is not surprising that our observers and analysts were inclined to select the explanations that fitted the popular hypothesis."[22] This is a common phenomenon in intelligence analysis. Presupposed ideas are the glasses through which new intelligence data is seen and evaluated.

While signals were available, compartmentalization of secret information (such as Magic) meant few individuals had access to critical intelligence. Additionally, rivalries between military intelligence agencies further obstructed complete analysis and dissemination of available intelligence. Somewhat surprisingly, this kind of adversarial relationship existed among organizations within a single branch of service. "The most glaring example of rivalry in the Pearl Harbor case was that between Naval War Plans and Naval Intelligence."[23]

Further exacerbating the problem was the low opinion held of intelligence analysts in the Pacific theater and correspondingly low budgets to finance their activities. Yet, during the same period England, Germany, and Japan raised intelligence budgets to a level that Congress regarded as utterly ludicrous.

In view of these problems, it is not surprising that the attack at Pearl Harbor resulted in an unpleasant strategic surprise for the United States. Even more distressing is the incident that occurred in the Philippines the following day.

> The information that Pearl Harbor had been attacked arrived at Manila early in the morning of December 8 giving the Philippine forces some 9–10 hours to prepare for an attack. General MacArthur had received a war warning similar to the one received by General Short in Hawaii before the Japanese attacked there. There was no sense of urgency in preparing for a Japanese air attack. . . . When the Japanese bombers arrived shortly after noon, they found all the American aircraft wingtip to wingtip on the ground.[24]

Clearly, signals from multiple sources indicated unfriendly and, in some cases, hostile Japanese intentions towards America. Yet, at Pearl Harbor, and later in the Philippines, the Japanese achieved strategic surprise—not in the absence of intelligence but in the face of it.

Could photographic evidence have prevented such an attack? The possibility cannot be completely ruled out, yet the intelligence evidence available was routinely interpreted as nonhostile. Even photographic evidence is interpreted in the light of currently held assumptions. That is both the rub and paradox. The best intelligence data can tell the entire story of an enemy and still be ruled "inconsequential," "unconvincing," or "so-what?" by analysts or politicians. "There is a good deal of evidence, some of it quantitative, that in conditions of great uncertainty people tend to predict that events they want to happen will actually happen."[25] Those wishful thoughts may or may not correspond to the events at hand.

The surprise at Pearl Harbor happened for many reasons, but the lack of intelligence was not one of them. Bureaucratic infighting and rivalries, wishful thinking about Japanese intentions, failure to heed overt warnings, lack of diligent preparations, and general disbelief in the likelihood of attack led to this disaster. These are the real problems that preceded the strategic surprise at Pearl Harbor.

Stalin and Operation Barbarossa—June 1941

While there were numerous culprits in the surprise at Pearl Harbor, Joseph Stalin himself bears most of the blame for the surprise of Operation Barbarossa (Germany's 1941 invasion of the Soviet Union). In the preceding years, Stalin had led a series of bloody purges that eliminated his most capable military and civilian leaders. So few senior leaders remained in June 1940 that Stalin promoted 479 officers to major general, the largest mass promotion of any army in history.[26] With such inexperienced leadership, one might initially conclude Stalin was failed by those around him. Yet, the facts of the case don't bear this out.

As was the case with Pearl Harbor, there was a plethora of intelligence available to the Soviets prior to the initiation of hostilities. Unlike the Pearl Harbor case, the intelligence was less cryptic and emanated from an even greater variety of sources. *The key elements in this strategic surprise centered around Stalin—his wishful thinking, denial, and desire to save political face.*

Beginning on the diplomatic front prior to hostilities, Stalin was well informed by both British and American governments that Germany had decided to attack Russia. These estimates came from Ultra (decipher of German secret messages by British Intelligence) HUMINT traffic decodes and sources in the Lucy network (a spy ring) operating from Switzerland.[27] Stalin viewed these warnings as nothing more than provocations, believing the West was trying to goad him into entering the war. He viewed the West far more suspiciously than he did Germany. "It is obvious from his statements, speeches and addresses [Stalin] considered Britain the chief enemy of Russia."[28]

On the spy front, Stalin received excellent information from agents operating in Germany and Tokyo. "Richard Sorge [a double agent] was even able to report—from Tokyo on 15 May—the exact date of the impending German invasion and the details of Hitler's plans."[29]

A lack of intelligence in this case could not be used as a plausible excuse for the surprise of 22 June. "Throughout pre-war 1941 intelligence flooded the Kremlin from various sources, among which were Winston Churchill, the American State Department, Soviet military attachés, Soviet frontier troops, Soviet Military District headquarters and German army deserters."[30] Amazingly, Stalin continued to deny any reports of German hostilities even after being attacked. Reports of the invasion began to flood the Kremlin, yet Stalin considered them only provocations by renegade German generals.[31] The list goes on and on.

Stalin had invested a great deal of faith and political prestige in the Molotov-Ribbentrop Pact of 1939. Determined to placate Hitler, Stalin continued to grant Germany concessions (beyond treaty requirements) and strictly adhered to the economic terms of the pact.[32] His investment of political prestige in averting a war with Germany led him to continue to deny incontrovertible intelligence that told a different story. Political leaders, where the power to avert strategic surprise finally rests, see through glasses fogged with issues not normally faced by the military.

Stalin also exhibited a strong tendency towards wishful thinking and denial in the days preceding the hostilities. This is not uncommon in both governments and individuals involved in moments of crisis situations. As mentioned before, during periods of crisis many people react upon a priori beliefs of how that unexpected crisis would develop. This may have little to do with the actual event itself.

Would satellite surveillance have made a difference in the case of Operation Barbarossa? Various sources indicate that Stalin had upwards of 200 different confirmations of an impending attack from Germany. Photographic intelligence would not have prevented strategic surprise considering the fact that *four hours after hostilities began, Stalin was still rejecting reports that Germany had invaded.*

This case demonstrated the relationship between political leadership and achieving strategic surprise as well as the role of wishful thinking and reality denial in the face of unpleasant or unexpected intelligence. The weaknesses and strengths of a leader and nation are always available for resourceful enemies to exploit for this purpose.

Invasion of Kuwait—August 1990

The Iraqi invasion of Kuwait on 2 August 1990 demonstrated the difficulty in preventing strategic surprise, even in the age of satellite technology. Further, American diplomatic involvement was significant in the period of months preceding the outbreak of hostilities. Two important aspects of strategic surprise are evident from this particular case. First, intentions are difficult to measure and far more important in predicting and preventing surprise than the intelligence data itself. Second, satellite surveillance did not deter, predict, or prevent the Iraqi dash into Kuwait.

Aviation Week & Space Technology summed up the feeling of many when it reported in September 1990, "U.S. military planners, preoccupied with the post-cold war drawdown in Europe, were caught unprepared by the Iraqi invasion of Kuwait."[33] The same comment could have been made about the administration in general, in spite of preinvasion diplomatic contact with the Hussein regime.

The diplomatic signals that were sent, but not received, began in February and ended just one week prior to the attack.[34] If these signals were obscure to the American embassy in Baghdad, the tanks massing on the northern border of Kuwait should have given pause for a more thorough investigation. Undoubtedly, the concerns that rose from satellite confirmation of this fact were put to rest by the assurances of Saddam Hussein to Ambassador April Glaspie. The mere ownership of sophisticated intelligence data did not prevent surprise in this situation.

The second relevant case in point relates to the satellites themselves. A Kuwaiti-owned Westinghouse system known as LASS (low-altitude surveillance system) "gave Kuwait the *first* warning of the Iraqi attack."[35] The warning came at 0200 on 2 August, enough time for the royal family to flee, but not enough to prepare adequate defenses. The Kuwaiti military, unable or unprepared to face the Iraqi onslaught, fled into Saudi Arabia. Once the attack occurred, the American military began to shift satellites into an orbit that could provide round-the-clock coverage of the area.[36] Nevertheless, this was after the fact. The ability to detect is one part of the equation. The ability to prevent strategic surprise is far more complex and difficult, as can be seen in this case.

The mere possession of satellite intelligence is not as significant as how the data is interpreted and briefed to political leaders. Moreover, the political interpretation of developing events is more likely to prevail than a technical evaluation of the intelligence data itself. This proved to be the weakness in the case of Iraq and Kuwait, at least from the Kuwaiti point of view.

The Cuban Missile Crisis—October 1962

Presenting a case in which strategic surprise has failed is not as simple as it seems. When a nation announces it has uncovered hostile intentions of a foreign power, the discovered nation is likely to deny the charge and call off its plans. (There is certainly some evidence that this happened in the Middle East in 1973. Six months prior to the war, Israel discovered Egyptian invasion plans and announced them publicly. Egypt denied everything.) Nevertheless, the Cuban missile crisis presents an adequate case to support the current belief that satellite surveillance has made strategic surprise difficult to achieve. This case is also appropriate because it had the potential to alter the balance of power in a strategic way.

After the Bay of Pigs fiasco, which is widely accepted as an intelligence disaster, and numerous overt and covert US actions to weaken the Castro regime, Russia determined to shore up its socialist partner. Believing that Russian missiles in Cuba would be analogous to the US missiles in Turkey, Premier Nikita Khrushchev decided in April 1962 to make preparations to place medium-range missiles in Cuba.[37]

Believing this would be viewed as legitimate, especially if the operation was finished and presented as a fait accompli to the US, he used means that undermined this legitimacy. The means he used were covert, and ultimately Soviet weapons were not viewed as analogous to the US missiles in Turkey. US missiles had been placed there in a conspicuously overt manner. Secrecy undermined the legitimacy Khrushchev sought to gain through his actions. How these missiles were discovered, however, is the aspect of this case most pertinent to this article.

Early in September 1962, reports began to filter in from Cuba that Soviet ballistic missiles were being placed there. (These missiles are not the ones President Kennedy spoke about in his 4 September speech, in which he decried the buildup of Soviet military advisors and the introduction of *antiaircraft* missiles into Cuba.) At this time, the reports of ballistic missiles were originating strictly from hundreds of Cuban refugees who were streaming into the country through Florida.[38] These reports were what initiated further official US actions. At the same time, Sen Kenneth B. Keating (R-N.Y.) began to state he had proof of Soviet offensive weapons in Cuba. On 9 October, he rose to announce he had evidence of Soviet offensive missiles in Cuba. (Senator Keating never disclosed his source for these statements.[39])

These events led the administration to test the veracity of these unconfirmed reports on Cuban missiles by reinvigorating intelligence gathering there. (Intelligence collection had, apparently, fallen precipitously following the Bay of Pigs invasion and subsequent public opinion furor.) This diminished intelligence capability produced the questionable statement before Congress on 3 October by Under Secretary of State George Ball that "*our intelligence is very good that the military equipment supplied to Cuba does not offer* any *offensive capabilities.*"[40] At the time of Keating's speech, American intelligence had not yet uncovered the missiles. On 3 October, "CIA director John McCone ordered U-2 flights over western Cuba."[41] On 5 October, the sites were determined to be launching beds for Soviet medium-range ballistic missiles. The end of the matter resulted in the removal of Soviet missiles from Cuba with a corresponding promise from America not to invade there.

At first blush, this would seem to be a case for the efficacy of intelligence and photography to prevent strategic surprise. This idea cannot be negated in its entirety. Yet, a closer look at the facts in this case is warranted. What intelligence believed and what the facts were in this case indicate that there is a shortfall in what imagery and intelligence can provide.

> One consequence of the American failure to recognize the buildup of a Soviet military contingent was a serious underestimation of the number of Soviet military personnel in Cuba. In September and early October the number was estimated at 4,000 to 4,500. By October 22, after identifying the missile bases (through U-2 imagery) the total was revised at 8,000 to 10,000. Later, the estimates were revised again to 12,000 to 16,000 troops. . . . Retroactive estimates in early 1963 raised the total to 22,000 and were never later revised.[42]

How accurate were any of these figures? In 1979, Castro claimed there had been 40,000 Soviet troops in Cuba, though few believed him. However, "several Soviet sources have now confirmed that in fact, 42,000 Soviet military personnel were in Cuba at the time of the crisis. (Obviously, due to the quarantine, these arrived before the crisis; otherwise even more would have arrived.)"[43]

As to the photographic intelligence, serious efforts to determine what in fact was going on in Cuba began *after* revelations from other sources. Once information came to light that the area in question was on the western side of Cuba, CIA director John McCone redirected U-2 flights there. Even then, overcast skies delayed useful imagery for a day and a half. (Weather is still an issue, some 30 years later, when gathering intelligence using satellites.)

In summary, a case can be made that intelligence averted strategic surprise in Cuba in 1962. Yet, the facts of the case lead one to believe that the results are less than conclusive. Further, open sources drove the discoveries long before intelligence networks alerted the national command authorities. To depend on such fortuitous circumstances in the future is rather like tempting fate. Clearly, preparations must be *more* than adequate for whatever contingencies the future has to offer.

Conclusions and Recommendations

Napoléon once said, "Uncertainty is the essence of war, surprise its rule."[44] Doctrine that supposes otherwise should be eyed cautiously. In spite of quantum advances in technological intelligence gathering, there has been no similar developments in identifying means to avert strategic surprise.

If so, this raises some discomforting issues for military leaders as well as nations at risk. Indeed, no nation can be confidently immune from being strategically surprised. Nevertheless, "history provides us with the consoling observation that there is no direct correlation between achieving the highest degree of surprise at the outbreak of a war and ultimately emerging victorious."[45] The cases of surprise during World War II certainly bear this out.

If surprise is inevitable, as this article and the weight of history seem to indicate, then some changes need to be made in the way we view strategic surprise. First, a restatement of surprise, as written in FM 100-5 and AFM 1-1 needs to be made. Rather than "strategic surprise is difficult to achieve" (in light of technological advances in strategic surveillance), a more accurate view would be *strategic surprise is difficult to prevent, in spite of technological advances in strategic surveillance.* Consequently, the military officer must be prepared to fight initial engagements at a disadvantage and in the midst of great confusion, loss of equipment and personnel, and a certain amount of disorder.

Specifically, certain changes are prudent in preparing for the aftermath of surprise. Dr Michael Handel, professor of strategy and policy at the Naval War College, suggests consideration be given to the following areas:

> a. Upgrade military plans and preparations for operations in event of surprise attack. This must include detailed contingency plans, staff exercises, and military field exercises.
>
> b. Special emphasis must be placed on the preparations and protection of headquarters, communications centers, military airfields, mobilization centers, weapons, ammunition, and fuel depots, major bridges, tunnels, and other "choke points." All primary bases and communications centers must be able to withstand a conventional first strike in order to provide a conventional second strike capability.
>
> c. Special plans must be drawn up to carry out effectively and even accelerate mobilization procedures under attack conditions. Furthermore, they should be maintained and

checked by exercises and updated at regular intervals.

d. A variety of defensive counter-surprises, both technical and operational, should be prepared.

1. On the technological side, the defender can ready more effective anti-aircraft and/or anti-tank missiles to be operated in layered concentrations. New technologies can include dynamic mining, or the preparations of minefields that will channel the attacker into specific killing zones. . . .

2. The initiation of counter-operations, and if possible interceptor attacks, against the attacker. A select number of units should always be available for counter-operations against enemy rear echelons, air fields, and communications and supply lines, to name a few.[46]

The idea of emphasizing second strike capability with diminished forces is not a condition normally exercised by military commanders. In light of this, a strategic surprise exercise should comprise an important part of determining unit readiness and capability. Specifically, training should be conducted within the constraints of peacetime safety with some of the following features:

1. Begin the exercise without notice and on a holiday. Announce the exercise through local radio rather than phone lines. (Coordination would be essential here with local community leaders, yet phone lines would likely be out after a strategic surprise.) Teams could be sent to notify service members of the exercise.

2. Begin the exercise by having an impartial observer select, from a list of participants, 25 percent as being killed in action by the first strike. These may or may not be the ones who could not be located for the exercise. (The list of names should be without rank or job title—war being fairly arbitrary when it comes to these considerations.)

3. Communications throughout the affair should begin by being completely out. Restoration could be phased in, with maybe one in four messages getting through by the end of the exercise.

4. The exercise command center should be located in a place not ordinarily used for such purposes.

5. The exercise should be evaluated as any normal readiness exercise is evaluated. Obviously, perfectly simulating wartime conditions following a surprise attack is not possible in peacetime. Each service would have to design the parameters of its own strategic surprise readiness evaluation. Even so, perhaps some of the above sounds farfetched and unworkable. Yet, the examples of Pearl Harbor and Operation Barbarossa are not so remote as to be unthinkable. In a world that is becoming more, rather than less, fractured and unstable, readiness is more important than ever.

In addition to these recommendations, a further examination of doctrine needs to be undertaken. There should be an evaluation of the curriculum of midlevel and senior professional military education. It seems intuitively obvious that teaching at these institutions forms the basis for service doctrine. The minds of military leaders have been sharpened in the halls of the war colleges. If these institutions, however benignly, serve to dismiss the potential for strategic surprise, then alternate viewpoints must be incorporated into a meaningful curriculum. History is replete with examples of men and nations doing exactly what was thought could not be done.

As has been shown, the nature of surprise has little to do with the presence or absence of intelligence. Rather it is conceived in the heart of man and sown by exploiting the nature of enemy leaders and nations as well as the bureaucracies that serve them. Further, intelligence networks, as one of those bureaucracies, fail at inopportune times for a variety of reasons. It is not necessarily a failing of these networks but the nature of all bureaucracies to proceed cautiously, withhold sensitive or embarrassing information, and promote their own self-interests.

Unless the nature of man changes, the principle of strategic surprise will remain, even in the midst of surveillance technology and accurate intelligence. Francis Bacon said it best when he commented on the condition of man and his view of truth: "In the end, no matter the facts, man will believe the truth that most pleases him." It is both a statement and warning that should not be lightly dismissed. □

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Winter 1993

IRA C. EAKER AWARD WINNER

Maj Jason B. Barlow, USAF

for his article

Strategic Paralysis: An Air Power Strategy for the Present

Congratulations to Maj Jason B. Barlow on his selection as the Ira C. Eaker Award winner for the best eligible article from the Winter 1993 issue of the *Airpower Journal*. Major Barlow receives a $500 cash award for his contribution to the Air Force's professional dialogue. The award honors Gen Ira C. Eaker and is made possible through the support of the Arthur G. B. Metcalf Foundation of Winchester, Massachusetts.

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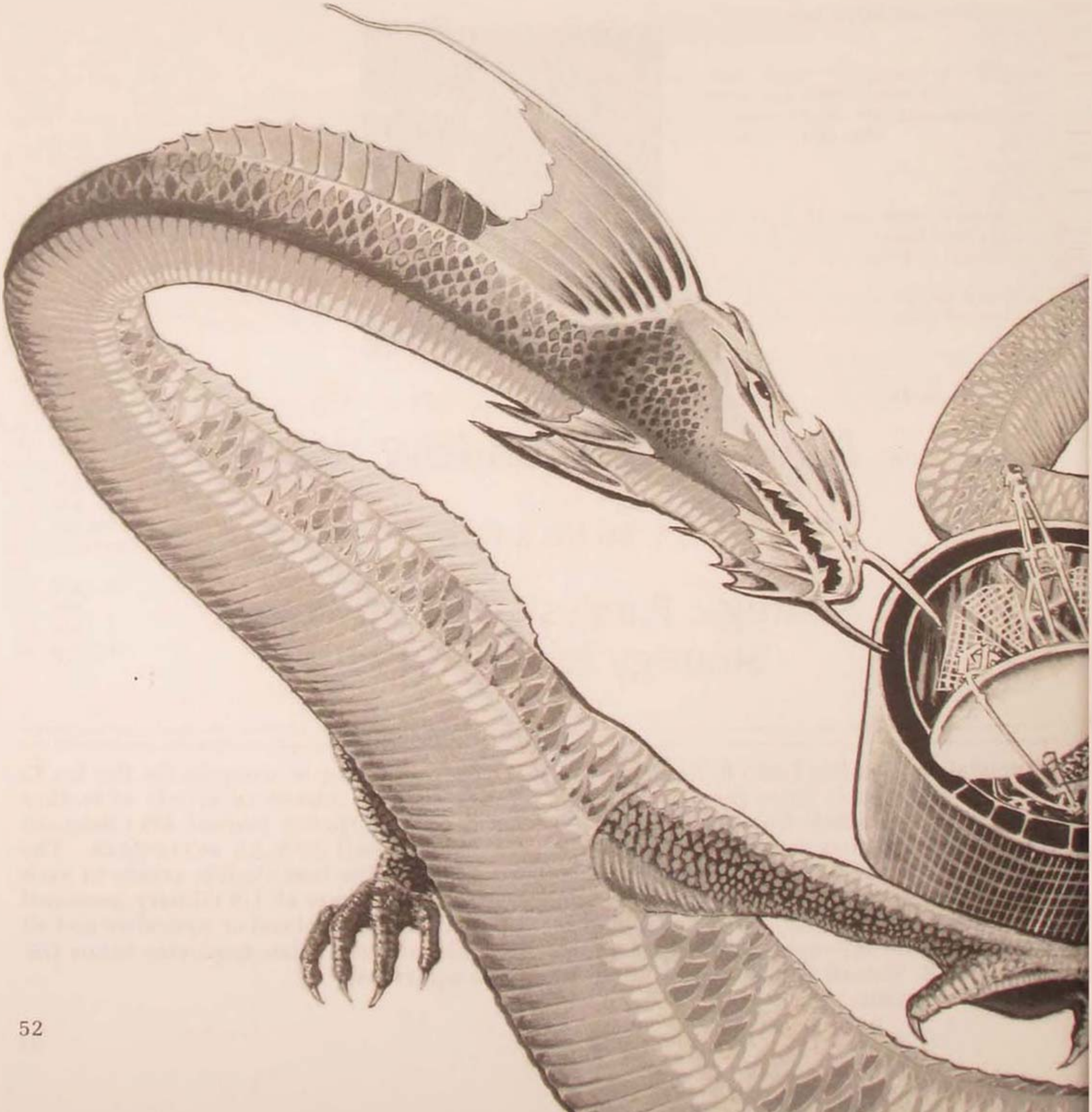
DEFILING THE ALTAR

THE WEAPONIZATION OF SPACE

LT COL MICHAEL E. BAUM, USAF



U.S. Forces Surprised

Worst Intelligence Failure In 70 Years—Thousands Killed

by A. C. Titan IV
Special to *The New York Times*

Washington, December 8, 2011 — U.S. forces were attacked by multiple Chinese regiments in a combined air and sea assault in the Spratly Islands. Losses were estimated in the thousands, as the Chinese initiated a full scale attack on the joint U.S.-U.N. peacekeeping force. . . .

AS GEN WILLIAM SMITH, the chairman of the Joint Chiefs of Staff (JCS), sat in his car reading the headlines from the *New York Times*, he knew it would not be a pleasant meeting with the president. How would he explain that US forces had been surprised for the second time in the last 70 years by an Asian power? Didn't the US have the best surveillance system in the world? Why didn't the US warning indicators signal that an attack was imminent? After Operations Desert Shield and Desert Storm, the US had assumed that it would always have sufficient warning to predict a hostile regional power's intentions. It would also have sufficient time to mobilize US troops and transport them to the battlefield. What had gone wrong?

Rubbing his tired eyes, he began to think why this happened and how the US could recover from the fight it was now involved in. Thinking back, he tried to replay the events of the last 12 hours.

The first indications of the start of hostilities came when the downlink facilities from US satellite systems simultaneously went off the air. It appeared, from initial reports, that a series of well-timed attacks had destroyed or damaged the satellite reception stations at Headquarters North American Aerospace Defense Command (NORAD), the Jet Propulsion Laboratory (JPL), Headquarters Space Command (SPACECOM), Headquarters European Command (EUCOM), Atlantic Command (LANTCOM), Headquarters Pacific Command (PACOM), and Fort Belvoir, Virginia.[1] The destruction of these downlink centers virtually crippled the ability of the Joint Warning Indications Center (JWIC) to monitor the crisis area.[2] The Chinese certainly had taken Sun Tzu to heart and had studied both the strengths and weaknesses of the US forces.[3]

During Desert Storm, the US had controlled the ultimate high ground—space. At that time, thought the general, we had the uncontested use of all of our satellite resources, which gave omnipresent eyes to our commanders. We assumed we would always be able to know what was going on in and above the battlefield, but now we don't have that ability. The Chinese haven't attacked the satellites directly but have attacked a weak link in the system—our ground stations. So, at least for the moment, some of our sensors in the sky are both blind and dead.

With the satellite downlink stations inoperative, what capability remained for getting the vital information from the battle zone? Let me see, he thought, the NAVSTAR (the navigation satellite timing and ranging) global positioning system (GPS), the fleet satellite communications system (FLTSATCOM), and the Air Force Satellite Communications System (AFSATCOM) should still be available since these systems only need local receivers to receive the information. Downlink stations wouldn't be necessary. Would any of the tactical intelligence be available to the field commanders? Yes, the field commanders still should be able to receive the information, but are the downlink commands still controlled in the CONUS (continental United States)? This was a question that had to be answered soon, because while the commanders in Washington and Hawaii might not know what is going on, the field commanders had to have access to the information.[4]

Just then the car stopped in front of the White House and General Smith got out. He went directly to the Oval Office. The president's national security advisor greeted him with, "Well, how bad is it?"

"Well, John, I'm not very sure at the moment. We lost most of our ability to see over the battle area. Our communication links are all right at the moment, but much slower than we're used to."

The door to the president's office opened, and both the general and the national security advisor entered.

"Doesn't look very good for the good guys, does it, General?"

"Not really, Mr President, but the initial information is very spotty."

"What do you mean spotty? We've been tracking what the Chinese have been doing for over a month. I've seen material in my daily intelligence brief saying the Chinese might have the capability to attack, but we didn't know if they would. Why can't we get information on intentions? Well, I guess they have—now what are we going to do?"

"Mr President, as you know, our surveillance satellites are unavailable to send us information right now. . . ."

Just then the phone rang, and the president answered. "General, it's for you."

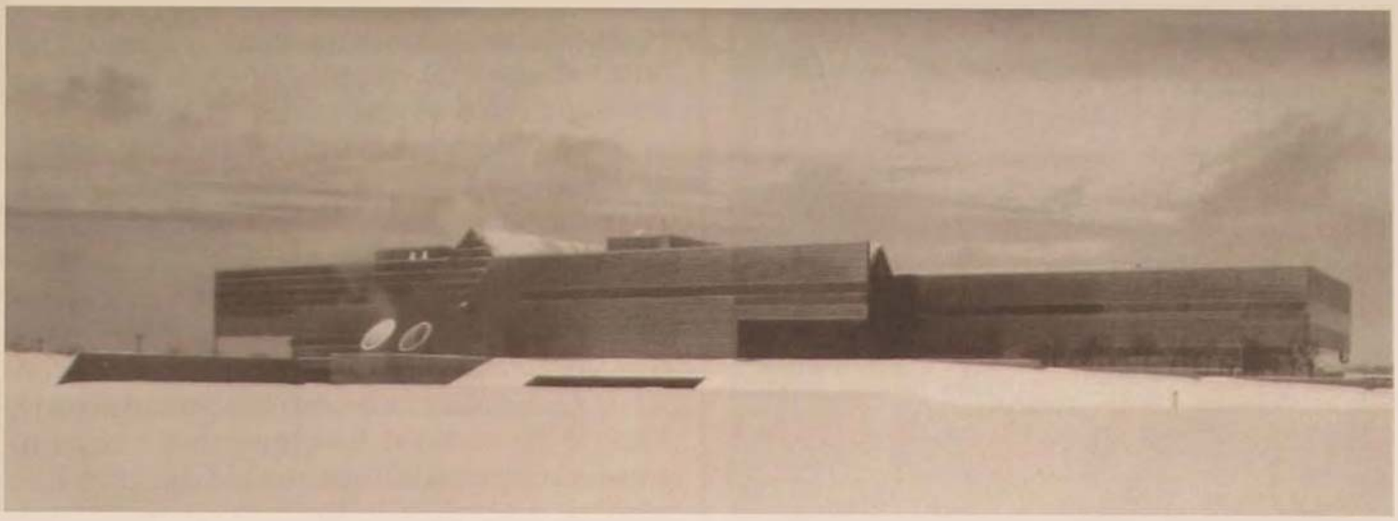
"General Smith. Yes, I understand, but how did we get the information? I see. Keep me informed. Thanks."

"What was that all about?" the president wanted to know.

"It seems that one of our DSP [defense support program] or Brilliant Eye satellites detected a launch from one of the Chinese launch pads, and right after the launch was detected, the satellite went off the air. I know you're wondering how we could get a launch indication. As part of the TMDI [Theater Missile Defense Initiative], which we fortunately procured in the late 1990s, the theater commander gets downlink information from our DSP west. It detected a ballistic launch, but there's no threat to the theater. The sudden loss of signal, though, is not good."[5]

"What is the current situation?" the president asked.

"To begin with, sir, we've lost the ability to monitor the battlefield from space. Until we can jury-rig a way to talk to and downlink the information stored in our PHOTINT [photographic intelligence] satellites, we're unable to see the 'big picture.' Second, the ability to perform on-orbit maintenance of the constellations of satellites is not possible. While in the near term this doesn't present a problem, it could in the future. Third, we've lost between 3,000 and 5,000 casualties in the initial battles—more than we lost at Pearl



Dark clouds hovered over US Space Command headquarters at Peterson AFB, Colorado, two days after its satellite reception station was attacked by the Chinese. A crippling winter snow hid most of the effects of the 8 December 2011 attack.

Harbor and a great deal more than in Desert Storm."

"Is there any good news?" asked the president.

The general shook his head and was about to speak when he was interrupted by another phone call.

"General, it's for you again."

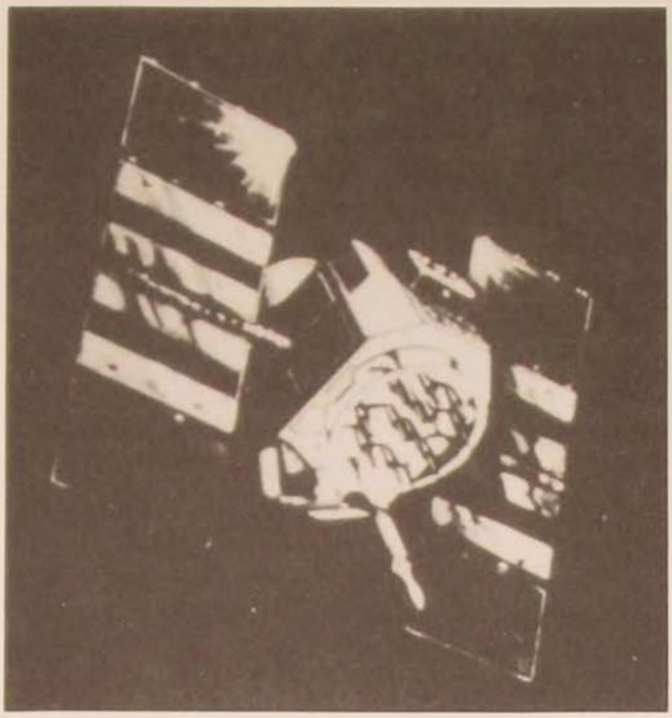
"Yes," the general said, "keep me informed." He hung up the phone and said, "Mr President, it appears that the launch from the Chinese launch complex was some sort of antisatellite system. One of our western relay satellites, which is part of the Defense Satellite Communications System, was destroyed by a co-orbital device. That means we will be unable to monitor or receive military communications from the theater. We still have the potential for using civilian communication satellites, and we will not be able to encrypt the information without the use of the STU-3 system. It also seems our DSP satellite was blinded by either a laser system or a ground launched direct-attack ASAT [antisatellite] system. That means we will be unable to detect any ICBM [intercontinental ballistic missile] or IRBM [intermediate-range ballistic missile] launches at the theater or at the CONUS from the Chinese theater."[6]

"How did we get this information if our satellites aren't working?" asked the president.

"Sir, we were extremely lucky. We had a US crew member on the Japanese orbiting space station, which was finally placed in orbit in 1999, photograph the destruction of the DSP satellite during one of the crew's scientific experiments. The crew actually saw the relay satellite blow up. Our US crew member passed the information to Houston control when the space station was over the US."

"What is our ability to reconstitute either the DSP or more relay satellites? Can we create alternate downlink and uplink capabilities?" the president asked. "Without the ability to influence the battlefield from space, our troops are not in a good position!"

"Yes sir, I know that; my staff is working on the answers to those questions as we speak. Sir, you must realize that during the defense budget cutbacks of the mid- to late 1990s, we reduced our ability to surge-launch satellites. We are lucky if we have the next replacement built. Our on-orbit spare capability is nonexistent. It was considered too expensive to maintain. Even if we had additional satellites, I'm not sure how long it would take to get a



With most satellite downlink stations inoperative after the Chinese strikes, little capability remained to get vital information to the battlefield. The NAVSTAR global positioning system satellites were still available, however, and only needed local receivers.

rocket on the pad and get the payload into orbit. It might be weeks, if not months! Sir, when we have more news, I'll call you on secure phone and get you updated."

On the way out of the president's office, General Smith received another call. "What? Say that again! You mean Cape Kennedy and the Slick 6 complex were just blown up? Those are our only launch facilities. Even if we had spare satellites, we couldn't get them aloft. All right, then, get on the horn, and make sure that the French and Japanese launch complexes are in a full state of alert. Yes, call the State Department and have them work the issue, but get it done fast. If those sites are destroyed, the West has no space launch capability, except for satellites launched from an old NASA [National Aeronautics and Space Administration] B-52 on the advanced Pegasus system."[7]

On the ride back to the Pentagon, General Smith was thinking to himself. When this crisis is over, there will be hell to pay. Just like after Pearl Harbor, the witch hunt will begin. It'll be a search to find out how and why the military screwed up and why the intel [intelligence] world hadn't predicted the failure. His thoughts were interrupted when the car phone beeped.

The general picked up the car phone and attempted to listen, but couldn't make out the words except "PACOM out." Normally, routine communications with Pacific Command headquarters via communications satellites would be just like making a local call. Now, the general realized that he was getting a high frequency (HF) phone patch with Headquarters PACOM. That meant it was going to be fuzzy and extremely hard to hear—if you could make out the conversation at all. It reminded him of days of old when he was a crew member, before the days of satellite communications, when the only means for long-distance communications was HF radio—and what a pain that was. How quickly we forget.

The general hung up and then punched up the secure link with the JWIC. "This is General Smith, I just attempted to talk with PACOM but was unable to understand a word they said. Please try to reinitiate a patch and call me with the information."

"Excuse me sir, you have another call on line one," interrupted his driver.

"General Smith. Some more news? Japanese launch complex was destroyed? How? It was not terrorists? What was it then? A space weapon? Impossible, those are outlawed by the 1967 Outer Space Treaty [Treaty on the Demilitarization of Outer Space] and the ABM [Antiballistic Missile] Treaty."

The general's aide interrupted him and said, "Sir, the 1967 treaty only banned weapons of mass destruction—nuclear, biological, and chemical weapons; it said nothing about the use of conventional arms from space. Also, the Chinese were not a signatory to the ABM Treaty. It is quite conceivable that the Chinese launched a weapons platform as part of one of their satellites. Remember Tzu 10. We couldn't identify what those additional boxes were on the side. Intel thought they were some sort of additional sensor. Maybe they were weapons. You know, if you deorbited a rod from low-earth orbit and gave it GPS information, by the time it impacted the earth, not only would it be accurate but it would destroy a soft target like a launch facility quite easily."[8]

"Yes, you're quite right. It seems the Chinese have taken a page right out of our space doctrine. They have attacked us in space and from space. They have prevented us from getting the usual support our satellites give us, and they control not only the area above the battlefield but potentially the battlefield itself. The question is, how are we going to recover?"[9]

He thought to himself once more. We have at least temporarily lost our ability to affect the battlefield by our spaceborne intelligence satellites. DSP is down, and our relay satellites are inoperative. We have our GPS birds still intact, as well as weather satellites, some naval communications satellites, AFSATCOM, and limited communications capability through commercial satellites. The Chinese have already demonstrated the capability to negate satellites of their choosing and to limit our launch ability. We have no capability to counter their attacks in space—except possibly with a conventional cruise missile attack on their launch facilities. But if we attack these facilities, would they retaliate with nuclear weapons? We would've just struck their homeland with a homeland-to-homeland exchange, and our DSP satellite wouldn't be able to detect a launch, since it's dead. I guess the CIA [Central Intelligence Agency] and DIA [Defense Intelligence Agency] will have some work cut out for them to read the thought processes of the Chinese toward a retaliatory strike on their land mass.

If we lose GPS, even some of our advanced weapons will be of no effect. We can't even target effectively because our eyes in the sky can't take pictures. The French Land Remote Sensing satellite or our Landsat satellite is not going to give us enough resolution. We need a satellite with sensor resolution smaller than five meters if we are to do our job of precision targeting—putting a weapon through a window—something which the NCA [national command authorities] and the American populace have taken for granted but do not appreciate what it takes to do it.[10]

Sitting down in the situation room in the Pentagon, General Smith asked for the latest intel update from the theater. Maj Gen James Jones took the podium and began his briefing. "Sir, here is the current situation. DSP west is down; relay 2 is. . . ."

General Smith interrupted. "I know that information. What is the latest since I talked to you on the bat phone in my car?"

"Sir, the latest pieces of information we have are that GPS constellations in the theater may be in trouble. Our control facilities at the Cape were destroyed during the latest attack and the master control station was damaged in Colorado Springs. It appears that relay 1 and one of our meteorological satellites were also hit by some sort of antisatellite weapon. As for information from the ongoing naval battle, it is sketchy at best. It seems that at least one of our carriers has been sunk and possibly an *Aegis*-class destroyer. The Chinese used their own PHOTINT and SIGINT [signals intelligence] systems to track and locate our battle fleet—countering our tactics of EMCON [emissions control] to hide en route to the target area. The ships seemed to have been attacked by weapons similar to those that hit the Japanese launch facility—in fact, it probably was on the same orbital pass. The Chinese don't seem to be pressing their advantage, but they do seem to be holding all the high cards at the moment."[11]

"Thanks, Jim. If you get any more information, let me know. All right, gentlemen, let's start from the beginning and see how we're going to get out of this mess . . .

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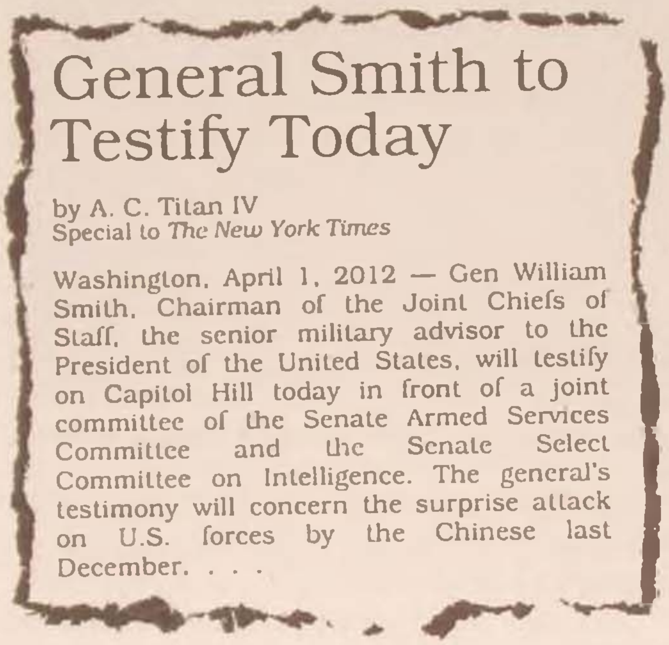


General Smith to Testify Today

by A. C. Titan IV
Special to *The New York Times*

Washington, April 1, 2012 — Gen William Smith, Chairman of the Joint Chiefs of Staff, the senior military advisor to the President of the United States, will testify on Capitol Hill today in front of a joint committee of the Senate Armed Services Committee and the Senate Select Committee on Intelligence. The general's testimony will concern the surprise attack on U.S. forces by the Chinese last December. . . .

Senator Hill: General Smith, welcome to the Senate. We are looking forward to your testimony today.

General Smith: Thank you, Senator Hill. I would have rather been here in more pleasant circumstances. As you know, nearly four months ago US forces, deployed in conjunction with UN forces, were attacked by Chinese land- and space-based weapons. As a result, the UN naval task force has withdrawn from the Spratly area and the Chinese have reoccupied the disputed islands.

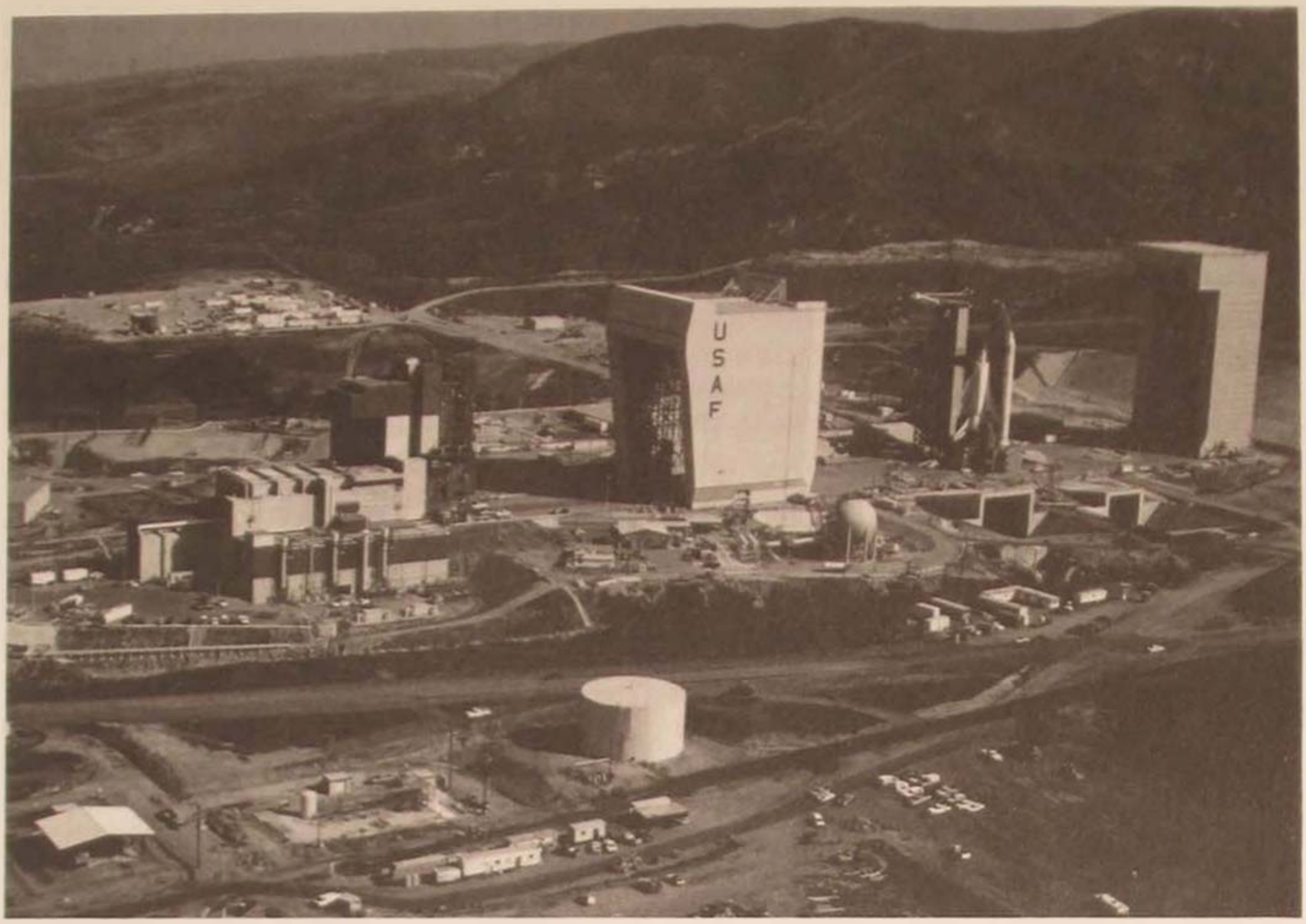
Senator Hill: Excuse me, General, we all know what happened. We want to know the whys and the hows to prevent a situation like this from happening again.

General Smith: Ladies and gentlemen, space has been militarized since early 1957 when our first Discovery satellites started taking pictures of the USSR.[12] With all due respect to the members of the Senate, your grand institution has worshipped at the altar of the peaceful uses of space, while space has been militarized for over 60 years![13] What we witnessed a few short months ago was the completion of the weaponization of space by the Chinese and the lack of weaponization by the US. We, the executive and the legislative branches, could have affected this situation in the late 1990s but chose not to. We've now witnessed the results of our mistakes.

How would I have done things differently? In the mid- to late 1990s, I would have pursued a technological, diplomatic, and procurement strategy radically different than what we did. I would have admitted that space is militarized and would eventually become weaponized. Then I would have aligned our space doctrine with the R&D [research and development] and procurement process. It was purely and simply a strategy and procurement mismatch. We said what was needed but never came through with the bucks to do it.[14]

What the senior leadership, especially ne chairman in 1995, needed to do was explain quite candidly to you folks ere the world was heading and how ortant being able to maintain the ground in space is. Space doctrine written prior to the Desert Storm flict. Air Force Manual (AFM) 1-1, *c Aerospace Doctrine of the United es Air Force*, talked about the aero- e control missions—the gaining and ntaining control of space. It had two nissions:

- Offensive aerospace control operations seek out and neutralize or destroy enemy aerospace forces and ground-



The Chinese destruction of Cape Kennedy and the Vandenberg Slick 6 complex (shown here in a late twentieth-century photograph) meant that the US lost all major space launch capability after the Spratly Island debacle.

based defenses at a time and place of our choosing.

- Defensive aerospace control operations detect, identify, intercept, and destroy enemy aerospace forces attempting to attack friendly forces or to penetrate the aerospace environment above friendly surface forces.[15]

US Space Command Pamphlet (USSPACECOMP) 2-1, printed in March 1990—five months prior to Desert Shield and nearly a year before Desert Storm—stated that space forces had as their objective goal the support of land, sea, and naval campaigns. While support of these traditional surface campaigns was designated in the near term, future wars would also need systems to deny the enemy use of his satellite systems and the support of terrestrial forces. This reliance on space systems was also emphasized in JCS Pub 1, printed in November 1991.[16]

Our dramatic victory in the Gulf was the first space war. The commanders in the field had complete use of navigation, weather, PHOTINT, and communication space resources. The generals knew everything about the Iraqis, but the Iraqis were denied the use of space to know about our force dispositions.

The US took from this the wrong lesson—that we would *always* own the high ground of space and be able to *depend* upon our assets in space. The real lessons of that war were not lost on our adversaries—as China so aptly demonstrated.

The US could have pursued a different course in the 1990s. We needed to take a hard look at what war-fighting tools we would need in this century. The debate in the 1990s, at least in the Air Force, was whether to procure the F-22. The F-22 was to be able to maintain air superiority into the twenty-first century. No one took the time to look at how we would maintain space superiority in the twenty-first century!

The proliferation of advanced technology allowed numerous countries to produce launch platforms and related systems in the mid-1990s. The Russians and the US were no longer the sole occupiers of space. The technology to produce high-quality imaging satellites became available to many countries of the Western world as well as parts of Asia.[17] We let the technology proliferate, rather than controlling it. We should have offered to sell our satellite technology to any country that wanted it because we could have remained the sole seller. This would have had two advantages:

- We would know who owned the satellites.
- Vicariously, we would launch many more satellites than we could afford to launch ourselves.

We also needed to eliminate the single-point weakness of our uplink and downlink facilities and launch complexes, and to have the ability to surge satellites into orbit. We thought the oceans would protect us from attack, as they have historically, but they didn't. Our enemy studied us, learned our weakness, and exploited the single-point failures which we created. The technology existed then and certainly now to create mobile uplink and downlink stations. We should have procured smaller robust satellites that could be launched from aircraft systems—rather than Greyhound-bus-sized satellites that could do everything but were tied to large launch platforms.

We could have built on-orbit spare satellites, small satellites that we could place into orbit and not use until a crisis. Then we could activate these systems to provide more information or to replace systems destroyed in space. With smaller satellites, the US could surge-launch satellites in time of crisis. We would have had to build spares to be kept in case of crisis so we could launch systems in days. Today, if we wanted to launch a new intelligence or communications bird, it might take years to build the satellite and a few additional months to get it into orbit.[18]

We should have also developed stealthy satellites and passive defensive means on our critical space assets. This would have created a much harder targeting problem for our adversaries.

Finally, we should have constructed redundant and hardened or mobile launch facilities for satellite systems that are too large to be launched from aircraft. The single-stage-to-orbit vehicle might have been a potential solution to this problem until its funding was cut in 1993.[19]

While these measures address some of the major problems that went unanswered in the 1990s, the areas of space control were completely ignored. I'm uncomfortable giving this testimony today, but Congress and the nation were not prepared to endorse weapons in space. Let me give but one small example. In 1985, some young action officers at Strategic Air Command headquarters attempted to get funding for a space weapon system called KIM (kinetic impacting munitions). When the funding line came before the Senate Appropriation Committee, it was zeroed. The rationalization was, "One can't militarize space, and one doesn't ever try to weaponize space. It is for peaceful purposes only."[20]

You must realize, ladies and gentlemen, that space was already weaponized in 1985. The US had an operational ASAT system at Johnson Island until 1975. The USSR also had an operational ASAT system.[21] If the US had wanted to stop the further weaponization of space, it should have started a negotiation process then. This would not have been a simple task. It would have meant intrusive inspection of every payload put into space by any country with launch capabilities. This, I thought then and think now, may be nearly impossible without multinational enforcement capability.

Therefore, I think the US should have pursued both offensive and defensive weapons technology programs to match our stated doctrine. It would not have had to be on the scale of the original Strategic Defense Initiative (SDI) program proposed in 1983 but rather be a limited program.[22] We needed a program consisting of three parts:

- Space-to-ground weaponry to provide us the capability to strike anywhere, anytime, and influence the terrestrial battlefield using kinetic energy weapons like the ones demonstrated by the Chinese.
- Active and passive defensive means to protect our support satellites using stealthy satellites, antijamming capability, and the ability to change orbits.
- Space-to-space or ground-to-space weapons able to neutralize a potential enemy's satellite support system—weapons that destroy or jam enemy satellites, land-based lasers, or direct-ascent ASAT weapons.[23]

Did we need to deploy these systems in the 1990s? Of course not. But we also didn't pursue the R&D programs to be able to do these things when we saw other countries developing these technologies. The result today is that we can't maintain space superiority and are still running to catch up.

A few of you may say that by developing space weapons, the US would be repeating history. I'm referring to the 1970s, when the US let the "MIRV genie" out of the bottle. We deployed MIRVs (multiple independently targeted reentry vehicles) on our ICBM force, figuring the USSR would not deploy these systems for over five years. The USSR deployed these systems quicker than we anticipated and capitalized on their huge launch systems, the SS-18s, to take a numerical lead in the ICBM warhead race. It then took us over 20 years to put the genie back in the bottle with the signing of the START (Strategic Arms Reduction Talks) II accords.

I believe that it is easier to negotiate a reduction if you do not or cannot choose the path of prevention by having systems first; otherwise, you have to deal with a situation of an adversary having a system that you don't.

Ladies and gentlemen, let me conclude my formal remarks by stating that we had visionaries of what the next war would look like in the late 1980s and 1990s. Much as Billy Mitchell predicted and developed the initial visionary doctrine for how our aircraft forces would look in his future, so we should have heeded what the doctrinists wrote in the 1990s. The control of space—just like the control of the air—is the most critical aspect of war. Our preconceived notions, assumptions, and biases that the next war would be just like the last allowed us to be surprised and cost us the battle for the Spratly Islands.[24]

Notes

1. The major downlink and control facilities of our space operations are described in William E. Burrows's *Deep Black: Space Espionage and National Security* (New York:

Berkley Publications, 1988), 219. The ability of small terrorist groups to accurately target significant facilities is discussed in Raffi Gregorian's article "Global Positioning Systems: A Military Revolution for the Third World?" *SAIS Review* 13, no. 1 (Winter-Spring 1993): 133–48.

2. JWIC is located in the Pentagon. It is a multipurpose intelligence fusion center that was formed as one of the lessons of Desert Storm.

3. Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (London: Oxford University Press, 1963). In many places in his book, Sun Tzu talks about how to attack your enemy. For example, on page 69 he states, "Attack where he is unprepared." He also states, "The supreme importance in war is to attack the enemy's strategy" (page 76) and "Know the enemy and yourself; in a hundred battles you will never be in peril" (page 84).

4. Stephen Kirby and Gordon Robson, eds., *The Militarization of Space* (Brighton, U.K.: Wheatsleaf Books, 1987), 11–28.

5. Rip Bulkeley and Graham Spinardi, *Space Weapons: Deterrence or Delusion* (New York: Barnes and Noble Books, 1986), 44; Amb Henry F. Cooper, director, SDI Organization, "A Summary of SDI Programs and Plans for Theater and National Ballistic Missile Defenses," 4 January 1993, 1–16; and Lyn Dutton et al., *Military Space* (McLean, Va.: Brassey's, 1990), 105–7.

6. Marcia S. Smith, *ASATs: Antisatellite Weapon Systems*, CRS Issue Brief, 24 September 1991 (Washington, D.C.: Congressional Research Service, 1991), 2–5.

7. The Pegasus launch system was funded by the Defense Advanced Research Projects Agency (DARPA) in conjunction with Orbital Sciences Corporation as a project to launch lightweight satellites off a B-52. A launch of a Brazilian-built satellite occurred in early 1993.

8. The 1967 Outer Space Treaty prohibits the placing of nuclear weapons or any other weapons of mass destruction in space. The complete text of the treaty may be found in *United States Treaties and other International Agreements*, vol. 18, part 3 (Washington, D.C.: US Government Printing Office, 1967), 2411–21. The 1972 SALT I treaty signed by the USSR and the United States prohibits interference with "national technical means," which may be interpreted to mean reconnaissance satellites. Other types of satellites may not be protected by this treaty. See Smith, 24 April 1991; and Dutton et al., 52–58.

9. Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 1, March 1992, 5–8; and United States Space Command Pamphlet (USSPACECOMP) 2-1, *Doctrine for Space Control Forces*, 27 March 1990.

10. Thomas G. Mahnken, "Why Third World Space Systems Matter," *Orbis* 35, no. 4 (Fall 1991): 563–79.

11. Dutton et al., 81.

12. Burrows, 104–7.

13. Julie Bird, "Strategic, Space Command Mix Is Questioned," *Air Force Times*, 12 April 1993, 6.

14. Anthony Cordesman, "U.S. Strategy in the 1990s: Requirements versus Resources," *The Annals of The American Academy of Political and Social Sciences* 517 (September 1991): 41.

15. AFM 1-1, vol. 1, 6, and vol. 2, 104, 110.

16. USSPACECOMP 2-1, 3. After Operations Desert Storm and Desert Shield, the JCS published Joint Pub 1, *Joint Warfare of the US Armed Forces*, 11 November 1991, which discusses the uses of space forces on pages 47 and 54.

17. Dutton et al., chaps. 5 through 9; Mahnken, 563–79; and Gregorian, 133–48.

18. Burrows, chap. 10.

19. Many of these areas are addressed in Secretary Les Aspin's *The Bottom-up Review: Forces for a New Era* (Washington, D.C.: Department of Defense, 1993), 56–60, but the report concludes that "the benefits did not outweigh the near-term costs of such an approach."

20. The system is generically described in Wayne Biddle's "Weapons in Space: The Star Wars Controversy," *New York Times*, 5 and 8 March 1985. The sentiment to keep space unmilitarized is still present today. See Bird, 6.

21. Franklin A. Long, Donald Hafney, and Jeffrey Boutwell, eds., *Weapons in Space* (New York: W. W. Norton and Co., 1986), 150–52.

22. Bhupendra Jasani and Christopher Lee, *Countdown to Space War* (Philadelphia: Taylor and Francis, Inc., 1984), 58–59.

23. David Baker, *The Shape of Wars to Come* (New York: Stein and Day, 1982), 154, 172, and 182; Neff Hudson, "Space Warriors Eye Final Frontier," *Air Force Times*, 31 May 1993, 13; and *America Plans for Space: A Reader Based on the National Defense University Space Symposium* (Washington, D.C.: National Defense University Press, 1986).

24. Ephraim Kam, *Surprise Attack: The Victim's Perspective* (Cambridge, Mass.: Harvard University Press, 1988).

A CRITIQUE OF *THE AIR CAMPAIGN*

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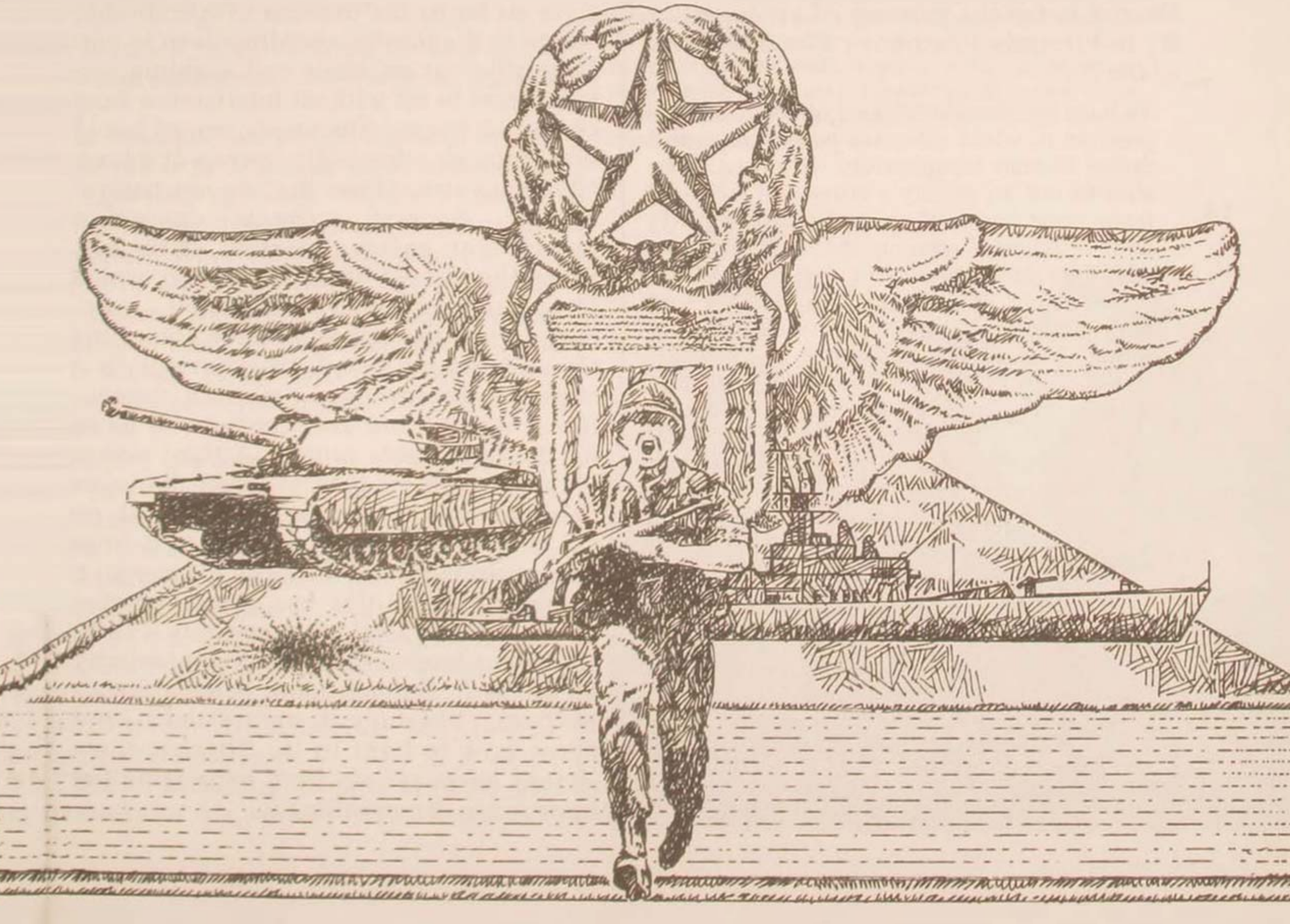
THE AIR CAMPAIGN: Planning for Combat by Col John A. Warden III is a comprehensive look at air warfare.[1] Although the book is a theoretical treatment of the subject, the author makes liberal use of historical illustrations. Filling a void in doctrinal air the-ory that has existed since shortly after World War II, *The Air Campaign* is required reading in most of our nation's professional military schools.

This article examines both the strengths and weaknesses of Colonel Warden's contribution to air power theory. Specifically, the book's treatment of air superiority and the use of operational reserves in air war, together with its holistic view of air war, is impressive. Its use



of the term *air campaign* and its view on the center of gravity are less compelling. Additionally, its view of interdiction points out a weakness in our collective doctrinal theory.

Air Superiority

The Air Campaign's advocacy of air superiority is hardly surprising since the book was written by an airman. After all, the mission of the US Air Force is to "defend the United States through control and exploitation of air and space."[2] Control of air and space is at the heart of who we are and what we do. Without control, there is no exploitation. Thus, to fail to gain air superiority is to fail in our mission.

Theorists from the earliest days of air power have recognized the overriding importance of controlling the air. Giulio Douhet noted the primacy of air superiority in his aptly titled book *The Command of the Air*:

> To have command of the air means to be in a position to wield offensive power so great it defies human imagination. It means to be able to cut an enemy's army and navy off from their bases of operation and nullify their chances of winning the war. It means complete protection of one's own country, the efficient operation of one's army and navy, and peace of mind to live and work in safety. In short, it means to be in a position *to win. To be defeated* in the air, on the other hand, is finally to be defeated and to be at the mercy of the enemy, with no chance at all of defending oneself, compelled to accept whatever terms he sees fit to dictate.
>
> This is the meaning of the "command of the air."[3] (Emphasis in original)

After World War II, military thinkers of all kinds—especially generals entrusted with theater campaigns—had learned about the need for air superiority. For example, Field Marshal Bernard L. Montgomery noted that "as air power grew and developed, it was able to prevent movement in daylight and to any appreciable degree, so much so that it became necessary to gain mastery of the air before beginning a land battle."[4] Likewise, Gen Dwight D. Eisenhower observed that

> the first prerequisite of success in the maintenance of the combined bomber offensive and of our reentry on the Continent is an overall reduction of the enemy's air combat strength and particularly his air fighter strength. The primary role of our air forces in Europe and the Mediterranean theaters is, therefore, to secure and maintain air superiority.[5]

What, then, is the point of restating the importance of air superiority when theorists and practitioners from all of the military services understand its value? Three reasons come to mind, the first two of which Colonel Warden captures extremely well in his book. First, air superiority gives air forces the freedom to operate anywhere in the theater, enabling them to perform other air missions and enabling surface forces to act without interference from enemy air forces. Obviously, armed forces that enjoy air superiority operate at a huge advantage over those that do not control the air. Second, a theater campaign depends on gaining mastery of the air. Since the advent of air power, no armed force has successfully completed a campaign when the opposing force controlled the air.[6] Simply stated, air superiority is a requisite for success in modern conventional warfare and will continue to be so for the foreseeable future. A third reason is that Americans tend to forget the value of air superiority. Since World War II, no US soldier has come under attack from enemy aircraft,[7] and the current generation of American military has never operated without nearly total air superiority. Thus, we have a tendency to take air superiority for granted. But aerospace is the airman's medium. We study it, understand it, and know how to fight in it. Therefore, we should never refrain from expressing the importance of controlling it.

Colonel Warden's description of five cases of war is an original, valuable contribution to the understanding of our craft and provides an excellent framework for evaluating and planning at the operational level:

> In . . . Case I, both sides have the capability and will to strike at each other's bases. . . .
>
> Case II occurs when one side is able to strike its enemy anyplace, while the enemy can do little more than reach the front. . . .
>
> [In] Case III . . . one side is vulnerable to attack but is unable to reach the enemy. . . .
>
> Case IV describes the situation in which neither side can operate against the rear areas and air bases of the enemy, and in which air action therefore is confined to the front. . . .
>
> Case V could come about through mutually agreed political constraints or because neither side had any air power.[8]

These cases bring to mind several questions and comments concerning air superiority.

For example, are certain types of operational plans or schemes more suitable to one case than another? Warden's Case III seems to lend itself to a defensive air operation, whereas Case II seems better suited to an offensive air operation. If operational planners could identify the applicable case, perhaps they could limit their choice of operational schemes to those that promise greater success than others.

Clearly, the objective of an air force in war (assuming the absence of political constraints, as in Case IV or Case V) is to move from Case I or Case III to Case II. Is the operational scheme the best vehicle for making that move? Can the development and use of new technologies be effective? A historical look at how air forces have successfully moved to Case II would be an illuminating addition to Warden's scholarship.

Finally, as is true of most modern discussions of air superiority, Warden's ignores the impact of surface-to-air defenses on air superiority. Yet, unless we destroy enemy air defenses, we cannot really control the air. Perhaps Colonel Warden could address this matter if he writes another edition of *The Air Campaign.*

Air Reserves

Another strength of Colonel Warden's book is its advocation of holding some air forces in reserve during warfare. But airmen object to this practice on three counts. First, they have traditionally eschewed the concept of air reserves, believing that a sortie not flown is lost forever and that air power is best employed in mass.[9] Undoubtedly, this attitude

Like most modern discussions of air superioriity, The Air Campaign *ignores surface-to-air defenses. Athough in the grand scheme of the air campaign, such defenses can be ineffective—as were our efforts at Pearl Harbor—they should nevertheless receive some attention in any subsequent edition of Colonel Warden's book.*

stems from the fact that we have never fought from a position of materiel inferiority and therefore have never had to worry about reserving some forces to deliver (or forestall) a decisive blow.

Second, the timing of a decisive blow has been critical in relatively few life-and-death struggles for air superiority. In fact, in the history of air warfare, many truly decisive blows have come at the *beginning* of the conflict (e.g., the 1967 Arab-Israeli war and the Gulf War of 1991), obviating the need to hold back reserves for the remainder of the war.

Third, arguments for air reserves are usually couched in the language and logic of ground reserves (e.g., "pouring into the battle masses of fresh troops who have the potential to break remaining enemy resistance and force a retreat or a rout" or "the arrival of strong, fresh forces may break the enemy attack and restore the line"[10]). Such concepts are anathema to airmen who understand the flexibility and reach of air forces.

The first objection is the most difficult to deal with, for it strikes at the unique values of air forces—flexibility, reach, and the ability to mass firepower quickly. But the principle of mass in war has never meant throwing everything at the enemy all the time. Rather, the commander's job is to mass the right forces at the right time and place to overwhelm and defeat the enemy. The principle of mass has never precluded a commander's retaining reserves. Further, while it is true that a sortie not flown is lost forever, this argument misses the more important point that an aircraft destroyed is lost forever and with it *all* the sorties it could have flown. If, in order to avoid losing a sortie forever, we sacrifice an aircraft that we need later for a more important mission, we may be unable to mass all the forces we need for a blow at the decisive time.

Warden counters the second objection—the lack of historical precedent for reserves being decisive in a struggle for control of the air—by examining the Battle of Britain in detail.[11] We must remember that doctrine is crafted from both experience and theory. People who build their doctrine entirely on theory risk quick defeat when they must face harsh reality. But those who form their doctrine entirely from experience limit its scope and utility and risk fighting future wars with outdated ideas, weapons, and tactics. Though we have not faced a desperate struggle for control of the air, our doctrine should be flexible enough to allow us to face such a situation successfully in the future.

The third objection is a valid one. If arguments for holding air forces in reserve are based on the reasoning behind land warfare, then we should ignore them in air planning. But there is a huge difference between the concepts of ground reserves and air reserves. Operational ground reserves should be withheld until the commander has an opportunity to strike the enemy's center of gravity (or until the commander needs them to protect a friendly center of gravity). The commander must design an operational scheme to expose the enemy's center of gravity to the operational reserve—not an easy task. Once committed, ground reserves are engaged for days and are difficult to reconstitute. The commander who employs ground reserves at the wrong time or wrong location can incur severe penalties. Indeed, once an operational commander commits the ground reserve, few forces are left for influencing the outcome of the ground battle until the commander rebuilds the reserve—a time-consuming process.

But air forces have none of these restrictions. The enemy's center of gravity is often vulnerable to air strikes at any time. These forces may be (and are) committed across the theater daily; further, they are easy to reconstitute (assuming low attrition) and are easy to employ at another time in another location. Thus, an employment error in time or location can be corrected much more easily than is the

The Luftwaffe flew only a few Ju-87 sorties during the first four days of its counterair operation against the Allied air forces, preferring to save the Stukas to strike at the Allied operational center of gravity when it became accessible from the air.

case with ground forces. Air forces are nearly always available to an operational commander as a tool to influence the battle, either directly through the commander's apportionment decision or indirectly through the joint force air component commander (JFACC). Thus, any argument for withholding air forces as an operational reserve must be underpinned by the logic and language of air warfare.

In this context, Colonel Warden considers two scenarios that require the use of operational air reserves. In the first one, the enemy's operational center of gravity is inaccessible from the air (either because of enemy defenses or by our own choice), and the attrition rate in sorties not aimed at the center of gravity is so high that insufficient aircraft are available later to destroy that center of gravity.

The Israeli Air Force (IAF) found itself in this predicament in 1973. Surprised by the onset of hostilities, the IAF felt it had to attack the enemy operational center of gravity (the Egyptian Second Army and Third Army in the south and the Syrian army in the north) instead of first defeating the enemy's formidable surface-to-air defenses. After the war, the IAF's Maj Gen Benjamin Peled commented, "Instead of carrying out air defense suppression operations in an orderly manner, we rightly preferred to break them up into small operations and try to do them in the periods between other things that were more important at the time."[12] Had the IAF succeeded in turning the ground battle, the general's point would be understandable. In light of the facts, however, he seems to be justifying a bad decision. Specifically, during the three-week war, the IAF lost 102 aircraft—97 to ground fire.[13] Of these, 79 were shot down in the critical first three days of the war, when Arab air defenses remained unchallenged.[14] The enemy center of gravity was simply inaccessible to the IAF from the air without unacceptable losses. For that reason, the IAF pulled its ground-attack aircraft out of the fight (or sent them against the enemy's air defenses) until the center of gravity was accessible.[15] If the IAF had held these air forces in reserve from the beginning, it would have avoided unnecessary losses and been more effective once the operational center of gravity became accessible from the air.

The Luftwaffe used just such a strategy during the 1940 invasion of France, when it conducted a classic counterair operation against the Allied air forces yet flew few Ju-87 sorties in the first four days.[16] The Germans realized that the Stukas would be wasted against the high-performance Allied fighters and wanted them available to strike at the operational center of gravity—the combined forces of the French Seventh Army and the British Expeditionary Force—when it became accessible from the air.

The second scenario involves an operational commander holding air forces in reserve to strike a decisive blow in a drawn-out struggle for control of the air. Although there have been few historical examples of this situation, it nonetheless must be a part of our theory and doctrine. As noted earlier, the US has never fought an air war in which it faced a real danger of running out of air forces and is not likely to encounter this problem over the next decade. But air forces—ours included—will be much smaller and more precious in future conflicts, making a shortage of those forces more conceivable than in the past. We should be prepared to face such a dilemma.

Holistic View

The greatest contribution of *The Air Campaign* is its holistic view of air warfare, as conceived and written by an airman. Although modern airmen do not write much theory, our predecessors published many books on air warfare between the world wars. Several, such as *The Command of the Air*, Gen William ("Billy") Mitchell's *Winged Defense*, and Alexander P. De Seversky's *Victory through Air Power* are well known. Not surprisingly, many books came from Great Britain's Royal Air Force—the world's first independent air force.[17]

Immediately after World War II, airmen wrote a few books on air power.[18] Unfortunately, they slowly disappeared from the literature, and we have seen very few since.[19] Perhaps this paucity of studies is due to the fact that nuclear and deterrence theory dominated our thinking during the cold war.[20] It may also be an unintentional result of the unnatural separation of our fighter and bomber communities during that time. This separation may have suppressed the development of a holistic air power doctrine by encouraging divergent thinking on how, why, and when to use air power.

Now that the cold war is behind us, our combat air power is unified in our warfighting commands, and we have a tremendous opportunity to unify our thinking also. Airmen seek to understand how best to wage war in a unique medium, and that process includes developing and refining theories of air warfare. If *The Air Campaign* stimulates other airmen to think and write about air power, it will have made an invaluable contribution to our profession.

Air Campaign

We now turn to a few weaknesses of Colonel Warden's book, one of which is its use of the term *air campaign*. This usage conflicts with joint US military doctrine as delineated in Joint Pub 1, *Joint Warfare of the US Armed Forces*: "Campaigns of the US Armed Forces are joint; they serve as the unifying focus for our conduct of warfare."[21] The point here

Between the world wars, airmen published many books on air warfare, such as Billy Mitchell's Winged Defense. *Unfortunately, his passion for air doctrine led to his court-martial.*

is that in modern warfare, no medium is independent of the others. Rather, modern theater campaigns should convey a holistic view of air, land, and sea forces working together to meet strategically assigned theater objectives. *Air campaign* implies that air operations are a unified whole, independent from other theater forces and operations. In fact, air forces are coequal and codependent but not independent of the theater commander's campaign.

Furthermore, other services, especially the US Army and Marine Corps, understand the term *campaign* in the way that Joint Pub 1 describes it. In a 1988 study of operational campaign planning, a US Army War College study team defined a campaign as

> the operational way that the commander of a theater of war or theater of operations coordinates, employs, and sustains over time his available resources in a series of joint actions across an expanse of air, land, and sea in order to achieve strategic objectives. . . . A key characteristic of a campaign is the commander's authoritative synchronization of land, sea, and air efforts to attain his strategic objective.[22]

Because the Joint Chiefs of Staff have chosen the term *campaign* as a unifying focus for our conduct of warfare, because other US services understand the term in that way, and because precision in doctrinal terminology is critical, the Air Force should dispense with the term *air campaign*. If we must distinguish the air portion of a campaign, *air operation* should suffice, for it is—by itself—a major operation of any theater campaign.

Center of Gravity

The most compelling problem with *The Air Campaign* is its concept of the center of gravity:

> The point where the enemy is most vulnerable and the point where an attack will have the best chance of being decisive. . . . Every level of warfare has a center *or centers* of gravity. If several centers of gravity are involved, force must be applied to all if the objective is to be moved.[23] (Emphasis added)

Warden describes possible centers of gravity as enemy logistics, enemy staff system, enemy command, enemy country (Japan), enemy aircraft and missiles, enemy personnel, and enemy command and control (C^2) systems.[24]

Two problems with this view of center of gravity come to mind. First, it is inconsistent with the scientific theory of mechanics from which it is derived. Specifically, there can be only one true center of gravity—not several. The second, more severe, problem is that Warden's view of center of gravity renders the concept inadequate as an organizing intellectual construct. The purpose of using this metaphor is to help the commander find an element of enemy power whose destruction will lead to victory. Having to attack several centers of gravity all over the theater, however, means that we must parcel out our forces, an action that prevents us from concentrating on a decisive point—the very purpose for the metaphor.in the first place.

Carl von Clausewitz, who made famous the military sense of center of gravity, says that

> one must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, *on which everything depends*. That is the point against which all our energies should be directed.[25] (Emphasis added)

Examples cited by Clausewitz include (1) the main army of Alexander, Gustavus Adolphus, Charles XII, and Frederick the Great; (2) the army of the protector (in small countries that rely on large ones); (3) the capital city (in countries subject to domestic strife); (4) the community of interest (in alliances); and (5) the personalities of the leader and public opinion (in popular uprisings).[26] Note that possibly the third and certainly the last two examples lie at the strategic rather than the operational level of war, a distinction not recognized by Clausewitz.

Clausewitz's first definition of center of gravity occurs earlier in *On War*:

> A center of gravity is always found where the mass is concentrated most densely. It presents the most effective target for a blow; furthermore, the heaviest blow is that struck by the center of gravity. . . . Our position, then, is that a theater of war, be it large or small, and the forces stationed there, no matter what their size, represent the sort of unity in which a *single* center of gravity can be identified. That is the place where the decision should be reached; a victory at that point is in its fullest sense identical with the defense of the theater of operations.[27] (Emphasis in orginal)

Evidently, even Clausewitz is inconsistent on the subject. (How can a "community of interest" or a "personality of the leader" strike the "heaviest blow"?) Even earlier, he calls the battle "the center of gravity of the war" or "of the entire campaign or conflict" and notes that a major battle in a theater of war is a "collision between two centers of gravity."[28]

The solution to these apparent inconsistencies may lie in the differentiation between the strategic and operational levels of war. On the one hand, when Clausewitz refers to a center of gravity in the sense of what we now call the strategic level of war, he acknowledges that an alliance, a leader's personality, or a capital city may possibly be a center of gravity. On the other hand, when Clausewitz speaks in terms of what we now call the operational level of war, he *always* refers to the main enemy (or friendly) force or grouping of forces. The clarion call throughout *On War* is for the operational commander to strike a decisive blow against the enemy's main force when a decision in one's favor is equated to success in the campaign.

What then of Colonel Warden's other operational centers of gravity (logistics, C^2, staff, etc.)? They certainly are not centers of gravity in the Clausewitzian sense. Warden misses the distinction—an important one—between the center of gravity and the way a commander chooses to attack and weaken or destroy that center of gravity. Clausewitz's operational center of gravity is what the enemy uses to strike "the heaviest blow." Stated in another way, the center of gravity is that force or group of forces a commander will use to strike the final, decisive blow against an opponent. (For Clausewitz, it was always the enemy's main army, but air forces struck the heaviest blow against Iraq in the Gulf War.) There are several ways to defeat such a force. Clausewitz would choose a decisive attack against it on terms favorable to the friendly force. A friendly commander could also choose to weaken or defeat the enemy by cutting his logistics lifeline, or by disrupting the C^2 of his forces, or by incapacitating his staff, or by countless other methods. But these actions are not ends in themselves but means to an end: the defeat of the enemy's main striking force. Similarly, they are not centers of gravity but ways of weakening *the* center of gravity so that we can defeat it on terms favorable to our side.

To reiterate, there is and must be *only one center of gravity at each level of war.* To view the concept any other way causes a commander to disperse his forces and attack the wrong targets at the wrong time, thus negating the value of the metaphor (i.e., to focus a commander on the primary, critical, decisive target for the campaign).

Interdiction

In *The Air Campaign*, Colonel Warden seeks to review how our present air missions, illustrated by historical vignettes, fit into the air campaign—an objective he achieves quite well. However, his review reveals a weakness in our current view of interdiction. There is a striking difference between historical interdiction missions and the missions we do (and would do) today. For example, the speed and brevity of modern warfare make useless any attacks on traditional interdiction targets such as the ball bearing industry, pilot training bases, or aircraft production facilities. (Indeed, current pilot training and aircraft production probably occur in a third country not even involved in the war!) The point here is that our doctrine has not kept pace with the changes in warfare, especially with regard to surface attack missions such as interdiction.

The traditional Air Force missions for theater employment are counterair, interdiction, and close air support (CAS). The current version of AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, adds counterspace and strategic attack.[29] But there are three problems with this traditional approach.

The first concerns the term *strategic.* We have used this term since before World War II to differentiate between "independent" air power and air power that supported surface forces. (During and immediately after the Gulf War, we began to hear about a new mission called strategic attack—really not a new mission at all but one of our original missions that had been improperly delegated to the nuclear regime.) Current joint doctrine, however, makes obsolete the Air Force's use of *strategic*:

> The [strategic] level of war [is the one] at which a nation or group of nations determines national or alliance security objectives and develops and uses national resources to accomplish those objectives. Activities at this level establish national and alliance mil-

> itary objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of power; develop global or theater war plans to achieve those objectives; and provide armed forces and other capabilities in accordance with the strategic plan.[30]

Clearly, this has nothing to do with dropping bombs. US joint doctrine and the military doctrines of most other nations agree that actual fighting occurs at the tactical level of war.[31] In today's terminology, the application of firepower from the air, regardless of where it is used or what target it is used against, is a tactical-level event that supports a theater commander's operational plan (that plan, in turn, fulfills a strategic objective in a theater of war).

Second, the traditional concepts of interdiction and CAS (neither of which changed in the new AFM 1-1) focus on a linear battlefield, where the issue is always decided in a great clash between two ground forces on the front lines. But the Army does not plan to fight that way any longer. Evolving Army doctrine has moved increasingly to a nonlinear battlefield without traditional front lines, where ground, air, and naval forces fight simultaneously throughout the depth of the battlefield.[32] As we and our enemies have expanded the effectiveness of weapons far beyond the ranges associated with the traditional linear battlefield, language like "destroy[ing] . . . the enemy's military potential before it can be brought to bear effectively against friendly forces" or "air action against hostile targets which are in close proximity to friendly forces"[33] has far less precision and thus is far less useful than it was in the past.

Third, the traditional Air Force missions are not sufficiently descriptive of everything we do from the air. For example, in the Gulf War, coalition air power attrited many frontline Iraqi ground units by as much as 50 percent, rendering them combat ineffective.[34] Traditionalists would call this *interdiction* (since it does not fit anywhere else), insofar as we destroyed the enemy force before it could be brought to bear on friendly forces. But this is an out-of-date, ground-focused view of what happened. A more correct view is that a theater commander, who had the capability to strike enemy forces simultaneously throughout the theater of operations and from all three mediums, chose to destroy certain of those forces with air power.

Further, as this article goes to press, the US is considering using air power to destroy Serbian artillery tubes that are shelling Muslim towns in Bosnia. How does this mission fit into our doctrine? It is not strategic attack. Since the Serbian artillery is shelling civilians in towns and since no friendly ground forces are in-theater (other than UN peacekeeping forces), neither is it interdiction nor CAS. Rather, a theater commander is simply choosing to apply air power against an enemy threat in the theater of operations.

The time has come for a major change in Air Force doctrine, and our mission statement provides the foundation for such a change. Specifically, if our mission is to defend the United States through the control and exploitation of air and space, then naturally we would have some control missions and some exploitation missions. Our current doctrine specifies four sets of missions (called roles): aerospace control, force application, force enhancement, and force support.[35] The first set matches the "control" aspect of the mission statement, while the other three sets are subsumed under the "exploitation" aspect of the statement.

The more difficult problem is what to do about our three force application missions—strategic attack, interdiction, and CAS. I propose that we call them "air attack of surface targets" since, acting as either a primary (supported) force or a supporting force, we do in fact attack surface forces.

Air attack of surface targets conducted by a supported force includes what we now erroneously call strategic attack and those missions for which the theater commander has chosen air power as the primary weapon for destroying a set of targets, whether they be C^2 facilities, mobile missiles, supply depots, or ground forces. Air attack of surface targets conducted by a supporting force applies to target sets generated when the theater commander is using forces of another medium and wants the unique capabilities of air power to support those operations. These include missions that we now call CAS and some that we now call interdiction. In fact, we may want to retain the terms *CAS* and *interdiction* as descriptors of what we do as a supporting force in air attack of surface targets.

Why change these terms when everyone is comfortable with them? First, such changes would make our terminology consistent with that of joint doctrine. Although airmen are fond of the term *strategic attack*, it simply does not reflect current thinking about strategic matters. Second, these changes would dissociate surface attack missions from their effect on or proximity to ground forces except when such application is appropriate. New terminology would recognize air forces as coequal players on a joint team that the theater commander can use as either a supported or a supporting arm for a given objective. Finally, this terminology would apply equally to targets on land or at sea. *Strategic attack*, *interdiction*, and *CAS* in their current usage apply exclusively to ground targets, but aerospace is a seamless medium that does not stop at the shoreline. Neither should air doctrine.

Conclusion

Colonel Warden's *The Air Campaign* is a well-developed, comprehensive, holistic theory of air war that fills a 40-year void in that subject. Airmen who wish to expand their knowledge of air warfare and attain a better understanding of their profession would do well to read this book. ☐

Notes

1. John A. Warden III, *The Air Campaign: Planning for Combat* (Washington, D.C.: National Defense University Press, 1988).

2. Gen Merrill A. McPeak, "Does the Air Force Have a Mission?" speech to the Air War College, Maxwell AFB, Ala., 19 June 1992.

3. Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (1942; new imprint, Washington, D.C.: Office of Air Force History, 1983), 23. See also William Mitchell, *Winged Defense* (London: Kennikat Press, 1925), 9–10; and Alexander P. De Seversky, *Victory through Air Power* (New York: Simon & Schuster, 1942), 123–25.

4. Quoted in Richard H. Kohn and Joseph P. Harahan, eds., *Air Superiority in World War II and Korea* (Washington, D.C.: Office of Air Force History, 1983), 9.

5. Ibid., 10.

6. Some people would argue that Vietnam is the exception. However, the North Vietnamese did not win the campaign until after the United States withdrew, relinquishing its mastery of Vietnamese skies.

7. In the Gulf War of 1991, attacks with theater ballistic missiles added a new dimension to air (or air and space) superiority.

8. Warden, 20–21. To my way of thinking, these are not five cases of war (or even air war) but five cases of air superiority, as Warden's table 1 identifies them (page 21).

9. Ibid., 115–27.

10. Ibid., 116. See also Richard Hough and Denis Richards, *The Battle of Britain: The Greatest Air Battle of World War II* (New York: W. W. Norton & Co., 1989), 247–50.

11. Warden, 119–24.

12. Quoted in Zeev Schiff, "The Israeli Air Force," *Air Force Magazine* 59 (August 1976): 37.

13. Chaim Herzog, "The Middle East War, 1973," *Journal of the Royal United Services Institute for Defence Studies* 120 (March 1975): 12.

14. B. Latter, "Lessons for NATO from the Yom Kippur War," *RAF Quarterly* 16 (Winter 1976): 380.

15. Indeed, some ground commanders stopped asking for air support because it was ineffective and because so many airplanes responding to requests for support were being shot down. See Herzog, 13.

16. Alfred Price, *Luftwaffe: Birth, Life and Death of an Air Force* (New York: Ballantine Books, 1969), 45–46. See also Williamson Murray, *Strategy for Defeat: The Luftwaffe, 1933–1945* (Maxwell AFB, Ala.: Air University Press, 1983), 36–37.

17. For example, see Brig Gen P. R. C. Groves, *Our Future in the Air: A Survey of the Question of British Air Power* (London: Hutchinson & Co., 1922); Wing Comdr J. C. Slessor, *Air Power and Armies* (London: Oxford University

Press, 1936); and Squadron Leader E. J. Kingston-McCloughry, *Winged Warfare: Air Problems of War and Peace* (London: Jonathan Cape, 1937).

18. For example, see Sir Arthur Tedder, *Air Power in War* (London: Hodder, 1948); Air Vice-Marshal E. J. Kingston-McCloughry, *The Impact of Air Power on the Classical Principles of War* (London: Jonathan Cape, 1949); and Alexander P. De Seversky, *Air Power: The Key to Survival* (New York: Simon & Schuster, 1950).

19. Gen William W. Momyer's *Airpower in Three Wars* (Washington, D.C.: Department of the Air Force, 1978) is a notable exception.

20. Bernard Brodie's *Strategy in the Missile Age* (Princeton, N.J.: Princeton University Press, 1959) set the tone for the strategic and doctrinal debate that would shape the cold war until after Vietnam. His book was followed closely by Herman Kahn's *On Thermonuclear War* (Princeton, N.J.: Princeton University Press, 1960) and many others that dealt with nuclear deterrence theories.

21. Joint Pub 1, *Joint Warfare of the US Armed Forces*, 11 November 1991, 45.

22. *Campaign Planning* (Carlisle Barracks, Pa.: US Army War College Strategic Studies Institute, 1988), x–xi. See also US Army Field Manual (FM) 100-5, *Operations*, 1993, 6-2. Maj Rolf Sandbakken, USMC, makes the same point in "Responsive Air Support—Another View," *The Air Land Sea Bulletin*, June 1993, 10.

23. Warden, 9–10.

24. Ibid., 44, 52-53, 63, 138.

25. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 595–96.

26. Ibid., 596.

27. Ibid., 485–87.

28. Ibid., 248, 258–59.

29. Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. 1, March 1992, 7.

30. Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 1 December 1989, 349.

31. Ibid., 362. See also Colmar Freiherr von der Goltz, *The Conduct of War*, trans. Joseph T. Dickman (Kansas City, Mo.: Franklin Hudson Publishing Co., 1896), 25; Herman Foertsch, *The Art of Modern Warfare*, trans. George Fielding Eliot (New York: Oskar Priest, 1940), 19; Ivan G. Zaryalov, "Evolution in the Relationship between Strategy, Operational Art, and Tactics," in Harriet Fast Scott and William Scott, eds., *The Soviet/Art of War: Doctrine, Strategy, and Tactics* (Boulder, Colo.: Westview Press, 1982), 217; and G. F. R. Henderson, *The Science of War* (London: Longman's Green & Co., 1916), 39.

32. See FM 100-5, 6-12.

33. Joint Pub 1-02, 17, 70.

34. *Conduct of the Persian Gulf War: Final Report to Congress* (Washington, D.C.: Department of Defense, 1991), 91, 142.

35. AFM 1-1, vol. 1, 7.

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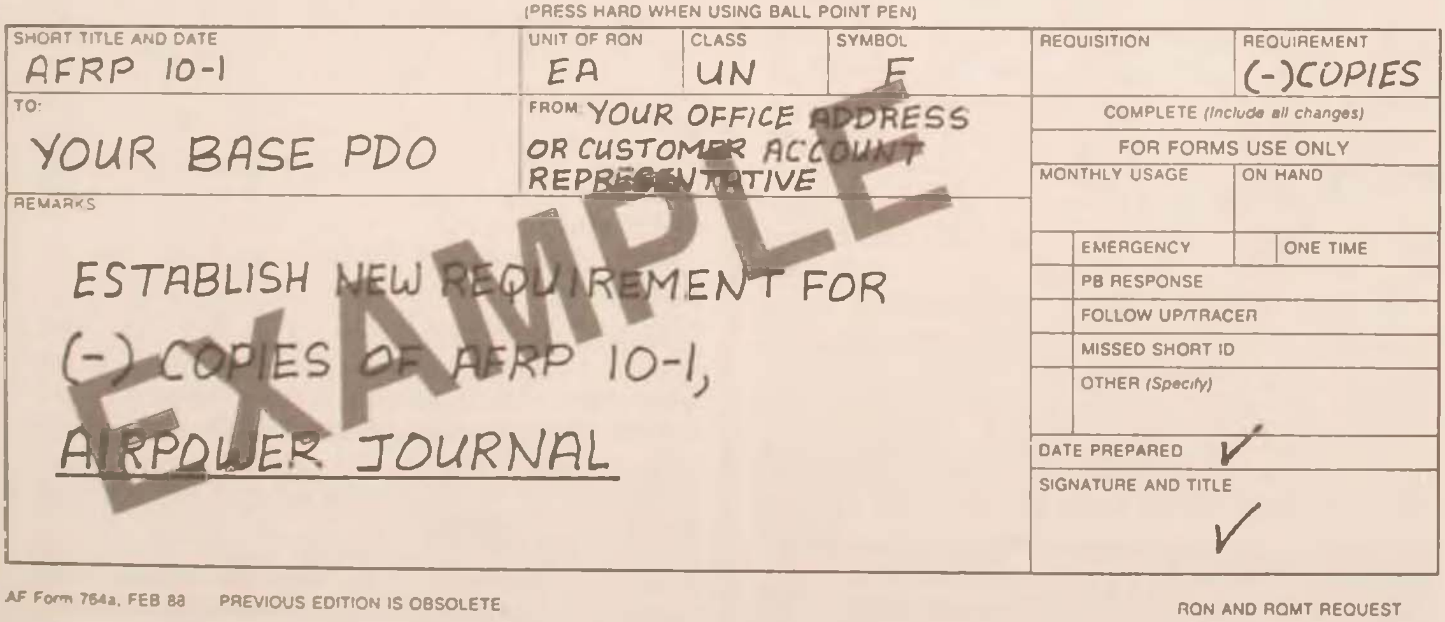

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RON AND RQMT REQUEST

instead of a tail wheel" and no brakes at all (page 3). She progressed quickly, becoming a proficient stunt pilot. When Gen Henry ("Hap") Arnold, commander of the Army Air Forces during World War II, offered her a chance to join the newly formed Women's Auxiliary Ferrying Service (WAFS), James didn't hesitate. As a "ferry queen," she flew nearly every type of aircraft that was used in World War II, including the P-47 and the P-51. Weathering the loss of her husband in the war, she continued to serve her country as a member of the USAF Reserve and is still active in promoting aviation.

Churchill's book is enjoyable to read for several reasons. First, it makes extensive use of firsthand material provided by personal interviews with James. The fact that James is the primary source of most of the information gives the book an authenticity that is not forthcoming from secondary sources. For example, James's vivid descriptions give immediacy to the joys and terrors of being a WASP—witness her description of being buzzed by a Japanese Zero during the attack on Pearl Harbor:

> He passed so close under us that our celluloid windows rattled violently and I looked down to see what sort of plane it was. The painted red balls on the tops of the wings shone brightly in the sun. I looked again with utter disbelief. Honolulu was familiar with the emblem of the Rising Sun on passenger ships, but not on airplanes. (Page 48)

Second, Churchill makes no attempt to deconstruct the early history of the WASP program. Her descriptions of the discrimination and bias that Teresa James confronted in her struggle for recognition for female aviators are not venomous, politically charged, or inflammatory. Instead, they are objective (yet personal) vignettes that drive home the effect of discrimination in the armed services.

Finally, the fact that the book is relatively short makes it easy to digest and enjoyable to read. *On Wings to War* doesn't pretend to be a comprehensive history of the WASP program but gives a personal "view from the cockpit" in a concise 184 pages. Other accounts of women in the Army Air Forces may be dry and impersonal, but not this one.

On Wings to War should be good reading for anyone who has an interest in the early history of the Air Force, the role of female aviators in World War II, or good storytelling about seat-of-the-pants aviation. Whether it has been 50 years or 20 years since servicewomen first pinned on WASP or UPT wings, books such as Churchill's ensure that their contributions to the world of aviation will not go unrecognized.

2d Lt William D. Casebeer, USAF
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The Rickover Effect: How One Man Made a Difference by Theodore Rockwell. Naval Institute Press, 118 Maryland Avenue, Annapolis, Maryland 21402-5035, 1992, 411 pages, $24.95.

Before there was total quality management (TQM) with its visions and goals, there was a man with a vision and a goal—Adm Hyman G. Rickover. His vision was a nuclear Navy, and his goal was to create that Navy. Admiral Rickover didn't need buzzwords, posters, or a special center to achieve quality. To him, quality was simply a matter of well-trained, thinking people achieving the high standards set for and expected of them. This book is about the effect that Admiral Rickover had on the Navy and, indeed, on the nation as a whole. That effect can be summed up in one word—*quality*.

Frequently called the "father of the nuclear Navy," Admiral Rickover was truly a legend in his own time. Despised by some, adored by many, respected by all, he was not your run-of-the-mill military officer. As an engineering duty officer, he gave up ship command to concentrate on bringing the Navy into the increasingly technological future. Often the subject of bitter controversy, he was twice passed over for flag rank, saved from involuntary retirement by congressional intervention, and finally fired by the secretary of the Navy after having achieved the rank of four-star admiral. There are probably more books, papers, and articles written about Admiral Rickover than about any other post–World War II military officer. The Air University Library alone has 15 books and papers about Admiral Rickover as well as eight books and papers written by him.

So why another book about Admiral Rickover? The complexities of the man, together with the breadth and depth of his achievements, make it unlikely that anyone could write the definitive work about him. As a result, each new book contributes another incomplete, yet valuable, perspective. This book, by Admiral Rickover's technical director during the pivotal years from 1954 to 1964, gives us an insider's perspective of Rickover's genius for getting things done. The author covers the admiral's entire life and military career but focuses primarily on the building of the nuclear Navy from 1947 to 1964. Using lots of colorful anecdotes and vignettes, he discusses the effect that Rickover had on other people, both during his lifetime and afterwards. As Adm James D. Watkins says in the foreword, "The resultant mosaic is as I remember Rickover."

Rickover stories abound, and with the telling and retelling, it's hard to distinguish truth from fiction. Most of us know or have heard about the short-legged interview chair and the notorious pinks—carbon copies of all office correspondence, which Admiral Rickover perused nightly. One of my favorites is Rickover's encounter with a "stereotypical little old lady" who—"bubbling all over, and gushing"—asked him, "You're somebody famous. Who is it?" After Rickover replied, "I'm the late Admiral Richard E. Byrd," she happily continued on her way saying, "Yes, that's it—Admiral Byrd! Isn't that wonderful." But, as Ed Kintner, Mark I project officer and nuclear power superintendent at Mare Island Naval Shipyard, points out, "Rickover anecdotes are fine as far as they go, but they give a confusing and contradictory picture of the man."

Yes, Admiral Rickover was in many ways confusing and contradictory. However, his vision and his dedication to excellence were always clear and unwavering. The true measure of Rickover's contributions is his impact on other people. The author calls this the Rickover Effect, a "reborn recognition of the need for excellence, quality, professionalism, and integrity." Perhaps the greatest tribute to Admiral Rickover comes from the students at the Center for Excellence in Education, formerly the Rickover Science Institute. These students are still so inspired by a tape of a 1984 address given by the admiral that they call themselves "Rickoids."

We can all be inspired by studying the life of this great American. Whether you are looking for lessons about quality, leadership, or technical excellence, this book has much to offer. It's not just a Navy story. It's a story for us all.

Lt Col William F. Furr, USAF, Retired
Montgomery, Alabama

HISTORICAL

Six Days in June: How Israel Won the 1967 Arab-Israeli War by Eric Hammel. Charles Scribner's Sons, 866 Third Avenue, Seventh Floor, New York 10022, 1992, 426 pages, $30.00.

Save your money. Although it may be true that Eric Hammel "is at his proven best when describing the actions of men at war," you may never overcome the frustration that you will develop in the first 161 pages of *Six Days in June*. I didn't, even though the author's portrayal of the human side of battle was spellbinding.

Hammel is an award-winning author and historian with 17 books to his credit. His reputation makes it difficult to understand why this work has so many structural deficiencies. Several of his earlier books include pictures (both combat and "personal") and good, detailed maps to help the story come to life. However, Hammel normally puts all the maps at the front of the book, which makes it awkward for the reader to follow events as they unfold in the text. Such is the case with *Six Days in June*.

The 11 very plain maps in this book lack both north arrows and scales. Such inattention to detail is magnified in map eight, which shows Gaza as part of Israel, despite being shown correctly in map two as belonging to Egypt. Additionally, none of the maps are cross-referenced anywhere in the text. You will waste considerable time thumbing back and forth trying to determine exactly where operations are taking place; in fact, unless you already know the region's geography, you will find that this map problem is extremely distracting and frustrating.

Six Days in June is less a scholarly study than it is journalistic hero worship—and astonishingly one-dimensional hero worship at that. The book has no footnotes whatsoever. Further, both his commentary and bibliography attest to the fact that Hammel is clearly pro-Israeli and much enamored with ground forces. This orientation seems to give him some paralyzing blind spots.

Although the book's opening sentence acknowledges that there "was no single cause" for the 1967 war, Hammel almost flippantly credits Israel's completion of its National Water Carrier project in 1964 as "good a place as any to begin a countdown toward the Six-Day War." Overlooked and never mentioned are such bedrock issues as the Sykes-Picot Agreement of 1916 and the Balfour Declaration of 1917. His "history" is simplistic and virtually ignores the Arab perspective.

Such lackadaisical scholarship does not inspire confidence. Indeed, Hammel's reporting of an incident that occurred in 1966 illustrates his inability or unwillingness to present evenhanded history. Although he notes that Israel claimed destruction of 40 structures in a retaliatory raid into Jordan, he goes on to say that "other sources—either the Jordanians or, perhaps, U.N. observers" attributed almost four times as much destruction as claimed by Israel. Frankly, the numbers are unimportant, but Hammel's obvious lack of effort to clarify the situation disappointed me.

The sad thing about this book is that its faults detract from some very moving portraits of warriors in action. Space does not permit me to adequately examine Hammel's frenetic descriptions of Israel's successful three-front ground operations. Suffice it to say that the book is full of vignettes about key military leaders. These are heartrending descriptions of sacrifice or plain, dumb luck on the part of Israelis from the highest levels down to the company level in the Israeli Defense Forces (IDF or Zahal—the Hebrew acronym for the IDF). However, Hammel emphasizes the ground forces, never acknowledging the vital contribution of the Israeli Air Force (IAF).

Hammel claims that Zahal's innovations ushered in a genuinely new approach to warfare, yet his detailed accounts of the actual fighting contradict his thesis. His almost breathless enthusiasm over Zahal's "uniqueness" simply doesn't stand up to the realities of combat—and he doesn't seem to notice the contradictions! By page 112, his claims have become downright insulting. He suggests that Zahal was and is the only military force that "wants a leader who can think quickly on his own, who will accept responsibility for his actions, and who is flexible enough of mind and spirit to back off and seek a different course in the event his bold, improvised plan" doesn't work. Even if we try to keep Hammel's observations in the proper historical context of the 1960s, such arrogance is difficult to accept.

Somehow, Hammel also overlooks the significance of the IAF's preemptive strikes in the war's opening hours. With air supremacy established early, the IAF was able to roam the skies at will, frequently providing timely close air support and interdiction that enabled ground forces to accomplish truly magnificent feats. On more than one occasion, Hammel mentions an IAF intervention to break an impasse, yet he never recognizes that ground maneuvering was possible as a result of the protective umbrella that air power brought to the battlefield. This is reminiscent of the occasionally acrimonious debate about air power's contribution to the success of Operation Desert Storm.

All in all, this book has great potential. It certainly provides exciting insight into the soldiers' war at the Israeli front. However, I recommend a companion book—A. J. Barker's *Six Day War*, a volume from Ballantine's Illustrated History of the Violent Century series—if you want to get a better feel for the military actions that Hammel is trying to portray. The pictures and maps from Barker's short work were a welcome—indeed vital—complement to Hammel's account. I recommend that you purchase Barker's book for your personal collection but just borrow Hammel's volume from the public library.

Col C. J. Bohn III, USAF
Maxwell AFB, Alabama

LITERATURE AND THE ARTS

Call to Duty by Richard Herman, Jr. William Morrow and Co., Inc., 1350 Avenue of the Americas, New York 10019, 1993, 432 pages, $20.00.

Let me describe the world as it is in Richard Herman's novels. It is a world in which fighter pilots can thrive. The president of the United States, his son, *and* his grandson are or were fighter pilots. It is a world populated by lots of strong male characters. Even the women are strong male characters. It is a world where corrupt, manipulative politicians and incompetent, self-serving military commanders strike an uneasy balance with honest, caring civil servants and inspiring, resourceful soldiers and airmen. There is plenty of intrigue and action to go around. It is a world in which everyone is a trained professional. In short, if you are looking for nonstop, straightforward exhilaration with incredibly vile bad guys and truly heroic champions, this is the place to be.

In *Call to Duty*, Herman continues his story of Zack Pontowski, the US president whom readers met in Herman's earlier book, *Firebreak*. Pontowski faces a test of wills when a drug warlord (the current villain-in-vogue for technothrillers) kidnaps a US senator's daughter and her friends. The senator is a keen political rival of the president and is quite willing to use this situation to his best advantage. When the warlord begins to execute the Americans, it is time for military action. The reader is treated to two roughly parallel story lines. The contemporary story line concerns the men and women of Special Ops in their rescue attempts on the ground and in the air in MH-53s and MC-130s. The other story line, told in flashbacks, follows a young Zack as an American pilot flying for the Royal Air Force (RAF) during World War II, and his encounters with—among others—Winston Churchill and the German ace, Gen Adolf Galland. The book's title is very apt since each major character must answer a call to duty. An obvious example is the president's postadolescent romp in the RAF; however, the most interesting call to duty is that of the senator's kidnapped daughter. Heather Courtland faces a horrendous challenge and must develop a startling strategy to survive.

Herman has a knack for painting memorable characters in a few brushstrokes—a good thing, because he packs a lot of characters and subplots into this taut adventure tale. The background is war, and—as happens in war—not everyone survives. A couple of the significant players end up "missing in action," and it would not surprise me if these characters reemerge—Darth Vader-like—in a future book. The author has researched his subjects (in both eras) extremely well and has even managed to incorporate a few classic war stories. This authenticity is the book's main strength. Having flown over 200 missions in Southeast Asia, Herman knows aerial combat well. You read *A Call to Duty* for the spectacularly realistic flying sequences—they stir the blood—and when it is all over, you can come back to the real world.

Lt Col Donald R. Erbschloe, USAF
USAF Academy, Colorado

Tunnel to Glory by F. L. Kafka. Presidio Press, 505B San Marin Drive, Suite 300, Novato, California 94945-1340, 1992, 249 pages, $19.95.

In *Tunnel to Glory*, F. L. Kafka interweaves personal stories of heroic Union and Confederate soldiers with a broad sketch of a Civil War scenario to create a suspenseful, dynamic plot. This design culminates in an exciting mission by Union forces who plan to destroy a Confederate artillery stronghold with an enormous explosive and thus end the stalemate over Petersburg. The mission is complicated by one important factor: the only way to reach the enemy artillery position is by tunneling more than 500 feet underground.

Kafka smoothly alternates between strategic snapshots of the Civil War and the personal narratives of soldiers. The first two chapters, "Petersburg I" and "Petersburg II," for example, describe both Union and Confederate positions and the protracted stalemate between the warring forces. However, chapter 3, "Michael Curran," flashes back to the childhood of the young Irishman of that name as he learns the dangerous trade of mining and develops into the soldier capable of engineering the Union tunnel later in his career.

By merging history and fiction in *Tunnel to Glory*, Kafka creates a balance between key facts that document events of the Civil War and people who gave their lives in service to their country. But his technique of flashing back to the lives of different characters ultimately tips this balance in favor of the soldiers, who win our sympathy. In addition to increasing our awareness of the tragic loss of life, this structure also creates tremendous suspense as we follow the building of the tunnel.

As the tedious planning of the project gives way to the actual digging, we begin to understand each character's role in the process. For example, Edmund Service craves glory as the captain of Columbia University's equestrian team before the war. These feelings fuel his ambition to become the leader of an Army reserve cavalry in Indiana just prior to the war. During the war, his soldiers suffer heavy casualties as he recklessly pursues a general's stars and earns the nickname "Bloody Service." However, the ever-egotistical General Service considers his nickname a compliment and sees the potential for failure in the tunnel project as nothing more than a faint stain on his reputation, predicting that "these troops aren't going to see any action today, and one out of ten is going to die of pneumonia anyway, and they'll call me Bloody Service for doing absolutely nothing" (page 235).

Kafka's lifelong independent study of the Civil War is evident in his knowledgeable explanation of the strategic and tactical details concerning Petersburg. Further, his experience as a B-26 bombardier-navigator during the Korean War gives him insight into the hardships endured by soldiers at war.

The unique structure of *Tunnel to Glory*, coupled with Kafka's insights, makes the novel worthwhile and enjoyable. I recommend it to readers whose interest in the Civil War extends beyond the mere acquisition of facts.

Capt Rosemary A. King, USAF
USAF Academy, Colorado

SCIENCE AND TECHNOLOGY

Laser Weapons: The Dawn of a New Military Age by Maj Gen Bengt Anderberg and Dr Myron L. Wolbarsht. Plenum Press, 233 Spring Street, New York 10013-1578, 1992, 230 pages, $24.95.

After reading this book, one could easily agree with the notion that laser technology has brought us to the dawn of a new military age. Those of us who grew up on a steady diet of *Star Trek* and *Star Wars* are prone to exaggerate the current capabilities of laser weapons. The authors of *Laser Weapons* skillfully summarize the current status of laser development and clearly show that we are in the early stages of a revolution in military technology perhaps equal to the invention of radar or aircraft. The book also reveals the true nature of laser weapons and demonstrates that they are not "Federation phazers" or "Klingon disruptors" but are affordable, available, and practical weapons for today's battlefield. We also learn that they have the potential to be improved dramatically in the near future.

The authors do have trouble walking the line between a technical description of lasers and the application of laser technology in combat. Some readers may be intimidated by the discussion of quantum theory in chapter 1. The explanation is accurate but contributes little to an understanding of the technology of laser weapons. Once readers get past this section, they will find a smorgasbord of concepts dealing with laser applications. Unless you know something about the frequency spectrum, however, you may still have some trouble following the discussion.

The book's publication is well timed, given the fact that today's military environment permits the proliferation of a wide variety of technology, including laser weapons. *Laser Weapons* should set off alarm bells in the minds of military planners when they realize that our potential enemies may soon (or may already) possess these weapons. From my perspective as an Air Force flyer, I now view the sky as a potentially far more hostile medium than I did before reading *Laser Weapons*. I am sure that Army, Navy, and Marine readers will be equally alarmed. The book helps the reader appreciate that today's low-energy lasers and tomorrow's high-energy lasers are not replacements for but complements to existing weapon systems and that they add a new degree of deadliness to air, land, and sea battles.

Laser Weapons is not an A-to-Z description of laser technology but a report on the status of unclassified developments in both antipersonnel and antiequipment laser weaponry. The first chapter includes a somewhat tedious but understandable summary of the history of lasers and their current capabilities. The authors then launch into a detailed analysis of the possibilities and ramifications of using lasers as weapons. Further, Anderberg and Wolbarsht insert realistic material such as the following passage from the chapter on "Protection and Countermeasures":

> When the beam struck my eye, I heard a distinct popping sound caused by a laser induced explosion at the back of my eye. My vision was obscured almost immediately by streams of blood floating in the vitreous humor and by what appeared to be particulate matter suspended in vitreous humor. It was like viewing the world through a round fishbowl full of glycerol into which a quart of blood and a handful of black pepper have been partially mixed.

The book gives nearly equal weight to a description of high- and low-energy laser weapons. The high-energy laser is generally a tool or threat for tomorrow, but the book makes clear that unless today's planners take this device seriously, many of our best weapons could be negated. Since most current military lasers (e.g., sensors and range finders) fall into the low-energy category, the book appropriately concentrates on them. The authors evaluate the effect that available low-energy lasers would have on a variety of likely targets, particularly light-sensitive sensors and the human eye. They conclude that many of our valued weapon systems and personnel are vulnerable. *Laser Weapons* also includes a chapter on countermeasures and one on lasers in international law. The former is short on details, and—contrary to a military "can-do" attitude—neither this chapter nor the one on international law provides much hope that existing and future laser weapons can be easily countered or banned.

The authors of *Laser Weapons* illustrate the potential benefits and hazards of the rapidly emerging laser technology. Because the book treats air, land, and sea operations without bias, military planners in all services could benefit from the information found in its pages. Our forces are drawing down, but our reliance on advanced technology will grow. Therefore, an understanding of laser weaponry will provide planners and war fighters a valuable insight into the nature of future battlefields.

Maj Dan Hobbs, USAF
Offutt AFB, Nebraska

SPECIALIZED INTEREST

Women in the Military: An Unfinished Revolution, rev. ed., by Maj Gen Jeanne Holm. Presidio Press, 505B San Marin Drive, Suite 300, Novato, California 94945, 1992, 510 pages, $27.50.

Regardless of what you feel about women serving in the military, Maj Gen Jeanne Holm's update of her 1982 edition of *Women in the Military* is important reading. The revised edition includes many significant events, including the role of women in the Gulf War and the congressional decision of 1992 that allowed women to serve on combat aircraft and ships. Holm, who has 30 years of military service to her credit, is an advocate of a gender-neutral military. Additionally, her writing bears witness to the fact that she is a fine stylist.

In the preface, Holm states that *Women in the Military* is not a history but an attempt to influence the ongoing debate about this subject. Nevertheless, her generally chronological account of what military women have done and how they have done it—from participating in basic training to flying aircraft—makes for a reasonably accurate history of women in the military.

Holm's experience in three wars (World War II, Korea, and Vietnam), her eight-year stint as the director of Women in the Air Force, and her attainment of two-star rank allow her to speak with authority. She is at her best when she describes the bureaucratic and political nuances of her topic—an account that is fascinating and insightful. For example, she shows her readers the wrangling over power as it occurs in congressional committees, the White House, and the Pentagon, and discusses how military women often become pawns in other power struggles. She presents the military bureaucracy's handling of women at all levels of service, providing details on everything from toilet facilities in barracks to restrictions on the families of military women (but not military men). Her firsthand accounts of why senior military officials and politicians stand where they do on the issues are powerful, convincing, and sometimes surprising.

The author's documentation, however, leaves something to be desired. For example, Holm asserts that "most military women, with or without children, viewed the political debate on exempting a single parent or one parent in dual-service couples from deployment as a thinly disguised attempt to undermine women's hard-earned acceptance as military professionals" (page 468). But she provides no evidence for such an assertion. Is she relying on some survey of military women? I do not know and cannot find out. Holm also fails to update statistics, such as the number of Air Force pilot-training slots open to women (page 323). Furthermore, she is inconsistent in identifying the year through which the statistics are valid—sometimes she cites a year, sometimes she doesn't. Finally, Holm glosses over information that may hurt her case for a gender-neutral military. The most obvious instance is that, while she tells many positive stories about women in the Gulf War, she relates very little of the negative information that has surfaced concerning gender issues since Operation Desert Storm.

Although I enjoyed *Women in the Military* and highly recommend it, I question its value as a stepping-stone to further research and policy analysis. Nevertheless, General Holm's book may be a revelation for some readers and may lead them to reevaluate their views about women in service to their country.

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STRATEGY, POLICY, AND INTERNATIONAL AFFAIRS

Beyond the Sound of Cannon: Military Strategy in the 1990s by Richard J. Meinhold. McFarland & Co., Inc., Box 611, Jefferson, North Carolina 28640, 1992, 192 pages, $29.95.

In *Beyond the Sound of Cannon*, Richard J. Meinhold argues the familiar thesis that the end of the cold war has invalidated the US national security strategy in effect since World War II. Instead, a new policy must emphasize low-intensity conflict (LIC). Although such an approach raises our hopes for this book, Meinhold's solution is ultimately disappointing. *Beyond the Sound of Cannon* lacks focus and tries to do too many things—and thus does none of them well.

Meinhold falls into the trap of oversimplifying complex historical events. He first surveys the causes and nature of war from the earliest times to the modern era, an analysis that leads to a discussion of the spectrum of conflict and the US's historical unpreparedness for the low end of the spectrum. Meinhold repeats and compounds this error of oversimplification in the chapters on "The Strategic Heritage of the United States" and "Elements of Strategic Culture" by merely restating obvious facets of US strategic history. He discusses values but doesn't indicate which values should change or how. Meinhold's oversimplification of these topics leaves knowledgeable readers unsatisfied.

The reader looks in vain through the early chapters for Meinhold's point. What position is he trying to support? Only at the end of the book, in his discussion of the process of developing strategy, does his argument take on direction. Still, the culmination is quite disappointing. He never recommends a specific policy for the post–cold war period.

Meinhold maintains that because of our culture and values, ad hoc processes and salesmanship hold hostage the US process of strategic decision making. Political compromise becomes more important than the actual attainment of our security objectives. Because of the costs, risks, and lead times inherent in the procurement process, we tend to refine current techniques rather than encourage innovation. This procurement-oriented outlook causes a lack of flexibility in anticipating crises and developing strategy.

To solve the decision-making problem, Meinhold addresses methods to evaluate the effectiveness of potential strategies. He points out the limitations of exercises, simulations, games, and analytical models, as well as the lack of tools for developing higher-level strategies. Meinhold claims that the Department of Defense (DOD) should procure computers to apply decision models and thus aid in strategic planning and decision making. He rails against the shortsightedness of DOD, complaining that although such technology exists, his idea has no constituency because of our focus on combat-oriented procurement.

Although Meinhold cites *On War* in his bibliography, he overlooks Clausewitz's warning against the dangers of "artificial systems." War is a product of human nature and thus is subject to chance, friction, and emotion—all nonquantifiable factors. Meinhold's computer model would ignore human creativity and military genius. Further, such a model is subject to the computer law of "garbage in—garbage out." This problem is particularly relevant in LIC—which he sees as our main challenge—because information about LIC is especially fleeting and uncertain. A popular, apocryphal anecdote tells how in the late 1960s—during the Vietnam War—Secretary of Defense Robert S. McNamara's whiz kids in the Pentagon fed all relevant data about the war into a computer. They asked it, "When will we win?" The computer replied, "You won in 1965!"

Even Meinhold realizes that his concept is idealistic but not for the right reasons. This is not his only unrealistic vision. He also calls for a nonpartisan committee charged with determining US national interests and objectives, as well as the strategy for achieving them. Then DOD can base its plans purely on the nation's needs. How does one implement such a concept? What is nonpartisan, and how is that determined? His idea is preposterous, since any particular vision of our national interests and objectives is one of the most partisan issues our government must debate. By making such a proposal. Meinhold displays his ignorance of our constitutional system.

Beyond the Sound of Cannon may serve as a primer to people who are new to international relations and national security policy. Yet, the book's lack of originality and its tendency toward oversimplification prevent me from recommending it to most military readers. Although a glance at the table of contents raises our hopes, we are ultimately disappointed by Meinhold's poor development and lack of details. There are other works on the same topic that would be more helpful to a military professional or academician.

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Making War: The 200-Year-Old Battle between the President and Congress over How America Goes to War by John F. Lehman. Charles Scribner's Sons, 866 Third Avenue, New York 10022, 1992. 297 pages, $24.00.

Making War presents the reader with a polemic directed at the US Congress's increasingly negative influence on military affairs. The author, John F. Lehman, was secretary of the Navy in the Reagan administration and a veteran of 14 years' experience in high bureaucratic levels of the national security apparatus, something he often reminds the reader of. Lehman also worked with Henry Kissinger and served presidents Nixon, Ford, Reagan, and Bush.

He focuses on the consequences of the Founding Fathers' intentional division of the nation's war-making powers between the legislative and executive branches of the federal government. The drafters of the Constitution created this classic check and balance between the executive and legislative branches, not to promote military efficiency but to prevent military tyranny. In his examination of the topic, the author cites examples from each of the United States's five declared wars and from most of the country's other armed actions.

He advances his thesis that although the advantage in the competition between Congress and president has changed from time to time, Congress has held the predominant position for the past two decades. He notes that one of Congress's greatest powers, that of investigation, receives no mention in the Constitution. The first congressional investigation of executive branch affairs concerned Gen Arthur St. Clair's ambush by the Indians. President Washington apparently first used the doctrine of executive privilege to counter some of this investigating committee's demands. But the power of investigation, with its threat of coercion, threat to reputation, and inordinate consumption of time—as well as Congress's chronic indiscipline in safeguarding national security information—forces the executive branch into confrontation and concealment. Two other factors greatly increase Congress's capability for meddlesome mischief: (1) the elimination of the congressional seniority system, which geometrically increased the number of congressmen who needed to be placated in any legislative deal, and (2) the rise of the congressional standing bureaucracy (quintupled since 1974 to 39,000 employees) that is attached to the proliferating number of standing committees and subcommittees. Furthermore, each government agency's inspector general and many senior members of the civil service have such strong ties to their appropriate congressional committees that they in effect also work for Congress against the president. The author further notes that, once conflict begins, Congress will support the president as long as he is successful because no congressman wants to be accused of not supporting the war effort. When popular support for hostilities wanes, Congress reflects the mood of its constituents.

As a member of the executive branch during the last days of the Nixon White House and as a Republican frustrated by the Democrats' permanent lock on the lower house of Congress, Secretary Lehman begins with some firmly fixed opinions. He believes, for example, that Nixon was done in by Congress—not by his own limitations. Likewise, Reagan's insistence upon the defense buildup made possible the victory in Operation Desert Storm. Lehman attributes our success in the Gulf to the accomplishments of naval aviation, Tomahawk land-attack missiles, and 16-inch naval guns. One cannot argue with his observation that strong presidents with popular support—such as both Roosevelts—can do much as they please, while weak presidents—such as Ford and Carter—cannot resist congressional interference. But as an advocate of the imperial presidency, Lehman downplays its dangers and thereby creates the chief philosophical flaw of this work. By implication, he would redirect the emphasis of the Founding Fathers (not that they were all-knowing or all-seeing by any means) to efficiency and thus dismantle some of the protections against arbitrary government backed by military force. In the current new world order, such a move seems neither necessary for national survival nor prudent. The nation has muddled through for 200 years and seems capable of doing so for many more.

Although *Making War* is entertaining and thought-provoking, it is not deep. The book fails to convey its premise in a consistently applied manner and contains some annoying errors of fact. The latter include the description of the strategic air campaign against Iraq and the assertion that the F-111 lost against Libya in 1986 merely flew into the ocean, rather than crashed as a result of being hit by a surface-to-air missile. Nonetheless, if you keep in mind the above caveats, Secretary Lehman's book deserves a place on your bookshelf, but only if you purchase it from the remainders' section.

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Modern Guerrilla Insurgency by Anthony James Joes. Praeger Publishers, 88 Post Road West, Box 5007, Westport, Connecticut 06881, 1992, 248 pages, $47.95.

"Insurgency and the Future" is the title of the introduction to *Modern Guerrilla Insurgency* by Anthony James Joes. Perhaps "Insurgency Is the Future" would be more apt, given the fact that as this century draws to a close and more attention is focused on the plight and rights of mankind, the potential exists for a series of conflicts the likes of which have never been experienced by the American people.

Certainly, a precedent has been set with the wars of liberation in Greece, the Philippines, French Indochina, Vietnam, and Afghanistan, which occurred despite the best efforts of some of this century's acknowledged leaders, both civilian and military. Even though Soviet Communism and the cold war have gone by the boards, an awareness persists that all is not well.

Joes sets forth the who, what, where, how, why, and when as well as the causes and effects of twentieth-century insurgency. For example, he reveals that Greece, the birthplace of democracy, ironically turned to insurgency in its bid for liberation; that the Philippines insurgency of 1900 foreshadowed the Vietnam War (e.g., American soldiers under the command of Gen Arthur MacArthur faced booby traps in the jungles and antiwar propaganda at home); and that the Army of the Republic of Vietnam (ARVN) was a formidable force, second only to the Israeli army.

Modern Guerrilla Insurgency teaches us that, as the flames of insurgency grow brighter, US policymakers should be flexible because conventional diplomacy and warfare are no more the solution to today's conflicts than they were in the past. Indeed, the so-called peace dividend may be only wishful thinking if Americans do not prepare themselves for hard and bitter choices in the coming time of new world disorder.

The peoples of Asia and Europe have long lived with conflict as a way of life and are well versed in insurgency. Watch Cable News Network; read newspaper articles about Sarajevo, India, New York, and so forth—and then read this book.

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VIETNAM

Vietnam above the Treetops: A Forward Air Controller Reports by Brig Gen John F. Flanagan. Praeger Publishers, One Madison Avenue, New York 10010, 1992, 313 pages, $24.95.

Vietnam above the Treetops is an extremely well written, informative, and thrilling account of Gen John F. Flanagan's one-year tour as an air liaison officer/forward air controller (ALO/FAC) in America's longest war. Flanagan provides detailed descriptions of the role of ALO/FACs in Vietnam and of his experiences in the forefront of joint operations with the US Army and combined operations with South Korean and South Vietnamese units. He also describes how most US and allied troops fought valiantly despite the bankruptcy of institutional values and the failure of grand strategy.

Vietnam above the Treetops is significant for another reason: it is one of the few accounts of warfare by a US Air Force Academy graduate. Flanagan, who graduated in 1962, begins his book with descriptions of how the Academy reinforced his value system, which was already solid from his Catholic upbringing in White Plains, New York. His recollections of how the Academy emphasized the honor code and how it taught cadets to be warrior leaders form the basis for one of the book's underlying themes—the dichotomy between the way the war should be fought (ethically, morally, etc.) versus the way it was actually fought.

Flanagan begins his one-year tour of combat in January 1966 as an ALO to the American 1st Cavalry and the South Korean Tiger Division near Qui Nhon, a coastal city on the South China Sea. Here he learns the fundamentals of directing aircraft in support of American and allied ground troops. Flanagan also gets his in-country orientation in the Cessna O-1 Bird Dog—the aircraft he would use as a FAC, for which service he would earn a Silver Star, a nomination for two others, and other medals.

Early in his book, General Flanagan explains the dark side of the Vietnam War—the low morale; blatant careerism; ineffective leadership; shortages of supplies, equipment, and training; the convoluted rules of engagement; and the problems with command, control, and communications. Throughout, Flanagan cites examples of these shortcomings, which eventually cripple the US war effort. At the same time, however, Flanagan points out the valor and dedication of troops in the trenches.

In Tiger V, one of his first major combat operations, Flanagan learns firsthand the fundamentals of joint/combined operations by working with the South Koreans in seizing and occupying the major rice-growing region of Binh Dinh. He directs F-4Cs, B-57s, F-100s, and A-1s in support of two South Korean regiments; flies his first missions as a FAC over the Phu Cat mountains; and is able to use the words that FACs love to say: "Hit my smoke! You're cleared hot."

Flanagan's success earns him the chance to serve with Project Delta, an elite, autonomous reconnaissance unit staffed by American and South Vietnamese special forces. He directs air support while six-man recon teams are inserted into the jungle at dusk to gather intelligence on enemy movements.

From the Central Highlands, to the Cambodian and Laotian borders, and up to Khe Sahn, Flanagan flies numerous missions that are as exciting as scenes from the movie *Apocalypse Now*. But even this elite unit suffers from problems generated from the command structure in Saigon.

A tragedy on one combat mission embodies all the major themes of the book. A Delta team that includes two of Flanagan's close friends—Willie Stark and Russ Bott—and four Vietnamese is overrun and destroyed by the North Vietnamese Army (NVA) near Laos, along with five Americans who attempt to rescue the team by helicopter. The loss of these 11 men is all the more bitter because of the intense command pressure to complete the mission despite horrendous weather, which causes the helicopter pilots to insert the team at the wrong location (Laos) and prevents fighter support when the team runs into a huge NVA formation. Sergeant Bott's desperate plea to Flanagan—"FAC, please help us! We're hit bad!"—is the last thing any American hears from the team. These words haunt Flanagan years afterward. Because the team had been inadvertently inserted into Laos, which was off-limits, commanders in Saigon decided to cover their backsides by hindering the search for the doomed men. Flanagan states that "the institutional value system had collapsed, and the integrity of the commander had been prostituted."

The dichotomy of the Vietnam War is aptly illustrated in this gripping mission—Flanagan's last. The courage of the lost Delta team; the selflessness of the helicopter crew; the perseverance of Flanagan, the fighters, and the members of Project Delta who search for their comrades in the middle of a monsoon while the NVA closes in—such bravery stands in stark contrast to the cover-up and incompetence of the senior command structure.

Vietnam above the Treetops is an informative, well-written, and concise memoir of a FAC and his comrades who did their jobs above and beyond the call of duty, despite the ineptitude and ethical cesspool that senior commanders had immersed them in. General Flanagan's book should be required reading for anyone interested in joint/combined operations, the role of air power in Vietnam, the value of an Air Force Academy education in wartime, and the triumph of individual values in the face of widespread abuse of those values. Aside from those reasons, the book is simply fun to read. I highly recommend *Vietnam above the Treetops* and commend General Flanagan for making such a valuable and unique contribution to the history of warfare.

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WORLD WAR I

Chemical Soldiers: British Gas Warfare in World War I by Donald Richter. University Press of Kansas, 2501 West 15th Street, Lawrence, Kansas 66049-3904, 1992, 282 pages.

One would expect a book about chemical warfare to be dry, dull, and overly technical. That's not necessarily so. In *Chemical Soldiers*, Donald Richter has written a first-rate piece of military history. This well-researched and readable book fills a large gap in the history of the First World War and, with the renewed fear of gas warfare in the third world, provides some useful lessons for the modern military leader.

Richter writes about the Special Brigade, Britain's chemical warfare force of 1915–18. Once the Germans initiated gas warfare in 1915, the British formed their own force capable of carrying out chemical attacks. The British approach to gas warfare was plagued with problems from the start. For one thing, the British army raided industry and universities for trained chemists—enlisting them as corporals and sending them to the front, mostly to haul gas cylinders and connect pipes. This is a superb example of an army's misuse of highly educated technical personnel.

The author effectively manages to make the science of chemical warfare understandable and interesting for the layman. His study demonstrates that the British use of gas was generally ineffective. Much of the blame lies with Charles Foulkes, the Special Brigade commander. He preferred to release the gas by cylinders—an awkward process that relied upon pipe systems, which were hard to construct and easily damaged. The British insisted upon using the cylinder system until the end of the war, long after all the other combatants had turned to more efficient modes of delivery.

Chemical Soldiers dispels much of the sensationalism and misinformation surrounding gas warfare. For example, the effect of gas in World War I, for all its fearsome reputation, killed relatively few people. Most of the gas casualties on both sides recovered within days and were returned to service. Many British officers finally came to the conclusion that the results of gas warfare did not justify the enormous expense and effort of initiating a gas attack.

The book gives the reader a feel for the tactics, techniques, and difficulties of chemical warfare. Richter effectively covers all aspects of the Special Brigade, from recruitment, to training, to major gas attacks of the war. He points out that the British chemical war effort was enormous. By 1918 the Special Brigade numbered over 5,000 men who participated in an effort that was materiel-intensive. By extensive use of diaries and contemporary sources, Richter concludes that the soldiers at the front had developed no moral qualms about the use of gas in battle. For soldiers and commanders, it quickly became just another mundane weapon of war to be used as the tactical situation dictated.

I highly recommend *Chemical Soldiers*. The author, a thorough scholar who uses a variety of sources, provides an excellent study of leaders and soldiers who quickly learned to adapt to new conditions and technology.

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WORLD WAR II

A Blood-Dimmed Tide: The Battle of the Bulge by the Men Who Fought It by Gerald Astor. Donald I. Fine, Inc., 19 West 21st Street, New York 10010, 1992, 515 pages, $28.00.

In the 48 years since the end of World War II, historians and journalists have churned out a flood of words about that conflict. From scholarly works to memoirs, the story of the war—especially the Battle of the Bulge—has been the subject of much reexamination and interpretation. Gerald Astor has written still another chronicle of this bloody battle, using journals and personal accounts of the men who fought in it. Although *Blood-Dimmed Tide* is billed as being in the tradition of the "new history" following Cornelius Ryan and Studs Terkel (and presumably Charles B. MacDonald), it falls short of the mark.

In the first two chapters, the author provides background sketches of the typical American soldier, which prepare the reader for the discussion of Hitler's decision to launch an offensive through the Ardennes between December 1944 and January 1945. Astor describes the confusion in some of the pitched battles between the advancing German forces and the dug-in American units. Particularly gripping is the firsthand account by a survivor of the Malmédy massacre—the killing of nearly 100 captured American prisoners by German soldiers. By describing life in the stalags for many prisoners of war and then describing their lives afterwards, the last chapter updates what many of these survivors are doing today.

The use of personal accounts can be extremely effective in telling a story, as anyone who has read MacDonald's *A Time for Trumpets* or *Company Commander* can attest. But Astor's book falls apart on this account. Although the author has gathered a large number of interviews and has read still more published personal accounts, he fails to blend them into a good narrative. For example, the first two chapters consist almost entirely of quoted matter that could have been more effectively used by judiciously mixing it in with narrative analysis. Furthermore, the chapter describing Hitler's plans for the fateful plunge through the Ardennes is pretty thin with regard to Hitler's reasons for shifting his strategy. This problem is further compounded by careless writing. To wit, the author has Pearl Harbor and the German declaration of war against the United States occurring in December 1942 (page 60). He also cites Gen Hermann Fegelein (in a personal quote from an unknown source) as Hitler's brother-in-law (page 64). A personal assistant to Hermann Göring, Fegelein did marry Eva Braun's sister, but Fegelein was not Braun's brother. Additionally, Astor has Hitler invading Yugoslavia in 1942 instead of 1941 (page 59). A good editor should have caught these errors and saved the author much embarrassment.

Astor has not resolved any controversy over what the book jacket calls "egregious miscalculations by both German and Allied forces" because of his inability to place the Bulge in proper context. Against the advice of his top generals, Hitler decided to shift forces from east to west in the hope of capturing Antwerp and splitting the Allies. At this late stage in the war, Germany's resources were about depleted, her boundaries were collapsing, and Allied air power controlled the skies. The Allies did not miscalculate Germany's rapidly declining ability to prosecute the war; neither did the senior German generals fail to see the end in sight. Only Hitler dreamed that the element of surprise was still on his side. But when the Battle of the Bulge ended, even *the Führer* should have recognized that his intended surprise was an illusion.

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The German Air War in Russia by Richard R. Muller. The Nautical and Aviation Publishing Company of America, Inc., 8 W. Madison Street, Baltimore, Maryland 21201, 1992, 300 pages, $24.95.

When Hitler ordered the Wehrmacht to begin planning the invasion of the Soviet Union, Gen Hans Jeschonnek, chief of the Luftwaffe General Staff, remarked, "At Last! A proper war for our air force!" The Luftwaffe's doctrine, training, and experience were precisely suited for the Soviet campaign—something that could not be said of the Luftwaffe's readiness for the unsuccessful Battle of Britain.

In Richard Muller's *The German Air War in Russia*, we have a thorough and original analysis of what went right and wrong for the Luftwaffe in the Soviet Union. Muller's work fills a significant gap in the literature of World War II. Until now there has been no work in English that carefully examines the Luftwaffe's campaign in the USSR in a comprehensive manner. Muller provides the reader with a study of this enormous air campaign, particularly emphasizing the Luftwaffe's leadership and planning; he also outlines the major air battles.

Muller begins his work with an analysis of "operational air war" (*operativer Luftkrieg*), which was the Luftwaffe's doctrine of large-scale air war. The Luftwaffe's doctrine was much more complex than many aviation historians realize. It included not only support for the army but also for the independent missions of deep interdiction and strategic bombing. Muller's opening chapter on air campaign doctrine is probably the best essay in English on the Luftwaffe's concept of operational air war.

In the Soviet Union, the Luftwaffe's way of war worked brilliantly up to the first winter of the war when logistical limitations forced the Germans to halt their advance. The Luftwaffe's air superiority campaign gave the Germans complete control of the air for the first months of the war. Even through 1942, which saw the resurgence of the Red Air Force, the Luftwaffe controlled the air and played a decisive role in the German victories of that year. Muller's approach is unique in that he concentrates not only on the events but also on the discussion and debate within the senior Luftwaffe leadership on the best means of using the Luftwaffe in the campaign.

After the German advance into the USSR bogged down, several of the Luftwaffe's leaders argued for the execution of a strategic bombing campaign against the Soviet war industry. Even with a relatively short-ranged bomber force, the Luftwaffe on the Eastern Front had considerable capability from 1941 to 1943 to carry out strikes which could have seriously damaged the ever-increasing Soviet war production. Muller devotes a large part of his work to examining numerous missed opportunities and the misuse of the bomber force through most of the war. The greatest single disaster to confront the German bomber force was Hermann Goering's insistence on using experienced bomber wings to supply the doomed Sixth Army in Stalingrad in the winter of 1942. By the end of January 1943, 169 Heinkel-111 bombers had been lost in the airlift, marking the virtual destruction of two bomber wings. The battle of Kursk in 1943 led to further attrition of the bomber force.

The rest of the war saw numerous plans by the Luftwaffe to strike decisive blows against Soviet industry, but poor intelligence and target planning as well as constant attrition and the increasing effectiveness of the Red Air Force all conspired to delay the implementation of a strategic air campaign. In the end, every attempt by the Luftwaffe leaders to assemble a significant bomber force saw that force quickly expended on futile and indecisive campaigns.

The German Air War in Russia is thoroughly researched from the original documents, and for that reason alone it is important for the military historian. Muller has found a large number of sources which provide some excellent insights into the decision making and leadership of the Luftwaffe. His book provides a sound analysis of the roles played by a number of German generals—among them Hans Jeschonnek, Guenther Korten, Ritter von Greim, Wolfram von Richthofen, and others—in the rise and fall of the Luftwaffe in the east.

I recommend this book highly. It is well written and thoroughly researched, and covers a great deal of new ground on a very important topic in military history.

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Pearl Harbor: Final Judgement by Henry C. Clausen and Bruce Lee. Crown Publishers, 225 Park Avenue South, New York 10022, 1992, 485 pages, $25.00.

The years and months leading up to the 50th anniversary of the Japanese attack on Pearl Harbor brought forth a spate of works seeking to reexamine, commemorate, or exploit the event. Many of these books hinted darkly at a grand conspiracy involving Franklin D. Roosevelt, George C. Marshall, Winston Churchill, or other highly placed figures. A secondary purpose of many authors was to rehabilitate posthumously the reputations of Adm Husband E. Kimmel and Lt Gen Walter C. Short, the unfortunate Navy and Army commanders at the scene who were found guilty of "errors of judgement" by a congressional committee immediately after the war.

Pearl Harbor: Final Judgement in large measure upholds, clarifies, and amplifies the findings of that committee. Although graced with a garish dust jacket and a publisher's blurb promising "the explosive truth," the book is neither sensationalist nor exploitative. It is, rather, a detailed and meticulous personal account of an investigation authorized by Secretary of War Henry L. Stimson and conducted in 1944 by Clausen, then a major assigned to the Judge Advocate General's Corps. Stimson, aware of shortcomings in the recently concluded investigation by the Army's Pearl Harbor Board, supplied Clausen with an extensive collection of Magic decryptions pertaining to the Pearl Harbor attack. (*Magic* was the code name for communications intelligence which the US derived from intercepted Japanese communications during 1941.) He authorized Clausen to use these decryptions as "memory aids" in the process of seeking depositions from a wide range of participants and other relevant witnesses. Clausen's specific findings, although reflected in the decision of the aforementioned congressional hearings and in Stimson's own final report on the subject, were never made public. This book represents an attempt to fill the gap.

Clausen's findings are of two basic types: systemic and personality-oriented. He argues that the command structure at Pearl Harbor, which he characterizes as "codependent," precluded the smooth and timely sharing of intelligence information. Clausen maintains that the "proximate cause or guilt for the disaster at Pearl Harbor was an unworkable system of military intelligence, including the fact that the Navy withheld from the Army vital intelligence information that called for Army action" (page 300). Clausen makes a fairly persuasive, if somewhat self-evident, argument for unity of command, integration of intelligence agencies, and selection of intelligence personnel based upon their talents in the field. His description of one of the principals in Army intelligence at Pearl Harbor—who held the post by virtue of his "golfing skills, smiling demeanor, and magic tricks" (page 302) rather than any particular intelligence skills—personalizes his latter point. The structure of military intelligence in 1941, he maintains, allowed the inevitable human weaknesses and lapses to have a significantly greater impact on the course of events than they might have had otherwise.

While stressing the institutional factors that led to the debacle, Clausen devotes a great deal of space to identifying those individuals who he believes bore specific guilt. The major onus falls upon the familiar scapegoats, Short and Kimmel. He likens them to Rudyard Kipling's "shut-eye sentry," charged with safeguarding the installation and completely failing to do so. While this is an old charge, Clausen marshals evidence (most impressively in the 150 pages of appendices) demonstrating that sufficient and compelling intelligence information on the likelihood of an attack was available in Hawaii as early as 3 December 1941. His treatment of events clashes sharply with the account given by Rear Adm Edwin T. Layton in his 1985 memoir *And I Was There: Pearl Harbor and Midway—Breaking the Secrets*. Although Clausen is in general agreement with Layton's description of bureaucratic problems within the Navy Department, he identifies Layton as a major contributor to the failure to disseminate vital intelligence information to the Army. He singles out 11 other participants (including Roosevelt) as being guilty of "contributory negligence." Clausen's inclusion of Roosevelt among the guilty is somewhat curious. Most of his charges against lesser figures stem directly from his investigation, which traced the progress of individual decryptions from agency to agency and in some cases literally from desktop to desktop. His charge against Roosevelt is based mainly upon circumstantial and impressionistic evidence and is at variance with the meticulous, legalistic tone of the rest of the argument.

Despite its sweeping title, *Pearl Harbor: Final Judgement* is probably not the last word on the subject. Partisans of Kimmel and Short may well point out that Clausen's great personal loyalty to, and admiration for, Stimson may well have influenced his investigation and subsequent account. The book is nevertheless an excellent case study of the process of intelligence management at the strategic and operational levels of war. It resembles a prosecution brief more than anything else, albeit an unusually detailed and thoroughly documented one. It goes a long way towards definitively answering the question of "who knew what—and when." With luck, this work will serve to stem the tide of conspiracy theories and "special pleading" that have plagued the study of 7 December 1941.

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The Strategic Bombing of Germany, 1940–1945 by Alan J. Levine. Greenwood Publishing Group, 88 Post Road West, Box 5007, Westport, Connecticut 06881, 1992, 202 pages, $45.00.

Alan Levine has written an excellent history of the Combined Bomber Offensive (CBO) in World War II. Synthesizing dozens of secondary sources, he uncovers no new evidence but tells the story of the CBO with clarity, insight, and freshness, while also coming up with some interesting conclusions.

All the essentials are related here: the prewar doctrine in both Britain and America that stressed daylight precision bombing; the shock when Royal Air Force Bomber Command suffered severe losses in daylight strikes against Germany; the retreat for safety to night operations; the abysmal accuracy of the night attacks and the spirit of revenge engendered by German attacks on London that led to a policy of urban bombing; the entry of America into the war and our determination to carry on with daylight strikes; the search for a long-range escort fighter; the "wizard war"—the first electronic battle; the diversion of strategic air power to surface operations in the Atlantic, North Africa, Italy, and Normandy; the attainment of air superiority over Europe; and the "crescendo of bombing" that collapsed the German oil, transportation, and armaments industries. Levine's is a balanced and articulate account that points out the fact that the CBO was not really very combined, concentrated, or coordinated. The British and Americans had definite and differing views on how the air campaign should be conducted and seldom worked together as a close and effective team. In this discussion, Bomber Command comes off somewhat the worse.

In an interesting conclusion, Levine argues that Bomber Command made a serious error in switching to night operations. Although the initial daylight strikes were costly, Bomber Command too quickly jettisoned its carefully formulated doctrine and adopted one for which it was neither trained nor equipped. The command based its decision on three faulty assumptions: it was impossible to build long-range escorts to ensure safety in daylight; night operations could be conducted accurately; and German night defenses would not pose a serious threat. In reality, developing escort aircraft such as the P-47 and P-51 was quite possible and should have been pushed earlier; night-bombing accuracy was dismal at first, thus virtually necessitating the questionable area attacks; and German night defenses became extremely capable. Indeed, Levine pointedly titles the chapter dealing with the costly Berlin campaign in early 1944 as "The Defeat of Bomber Command." At that point in the war, it was safer to fly in daylight with the Eighth Air Force than it was to strike with Lancasters at night.

Like most accounts written since the war, Levine's book places most of the blame on Air Marshal Sir Arthur Harris, head of Bomber Command. Undoubtedly, Bomber Command would have been better off if Harris had been as innovative as he was plodding. It would seem, however, that the air marshal's reputation for fanaticism has grown more as a result of historians' attitudes than of archival discoveries. One must keep in mind the context of the war and Britain's vulnerable and precarious position when trying to understand why Harris so single-mindedly worked to destroy German cities and why he was supported by the majority of the politicians and British people at the time. As we move farther away from that setting, we tend to judge Harris by current standards instead of those of his time. War is the providence of passion, and Harris was a very passionate man.

Although Levine's text is a truly excellent synthesis, it remains largely an operational narrative. We are told how many bombers went out, what loads they carried, what they bombed, and how many were shot down; further, we are provided quotes from Nazi officials regarding the impact of some strikes. This is important and necessary material. But it is time to move beyond this narrow focus in a discussion of air warfare. The unique characteristic of air power is its ability to strike directly at strategic targets deep in enemy territory. Determining precisely what those targets should be thus becomes crucial. It is a peculiar aspect of air power history that writers have paid very little attention to this area. Although Levine mentions the target organizations that studied the German economy to determine its nature and vulnerabilities, this is not enough. Airmen must know why certain targets were selected and given high priority while others were not; how planners arrived at their decisions; what data they found valuable in their analysis and where they found it; what the roles of the economist, engineer, mathematician, and sociologist were in this process; and how planners tracked results of bombing strikes. In sum, if it is true that targeting is the key to air power and that intelligence is the key to targeting, then we must know much more about the history of air intelligence, particularly with regard to its organization and employment. This is perhaps the area most in need of serious study by air power historians and the one most lacking in works such as Levine's.

Nonetheless, *Strategic Bombing* is an excellent book written in clear and readable prose. The sources are solid, and the conclusions sound. More importantly, its dispassionate approach to the subject provides a balanced view that is generally lacking in other histories. As a consequence, this book should become the standard work on the subject of the Combined Bomber Offensive.

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Tennozan: The Battle of Okinawa and the Atomic Bomb by George Feifer. Ticknor and Fields, 52 Vanderbilt Avenue, New York 10017, 1992, 622 pages, $25.00.

This is a nasty, mean, dirty book. Feifer meant it to be. It tells of war in a way Americans seldom read and haven't seen in 50 years.

The book takes its title and central concept from the battle at Tennozan, Japan, in 1582—a single, desperate struggle on which everything was staked. That fight became a model that the Japanese looked to in their efforts to win World War II. The battles on Saipan and Iwo Jima had been Tennozans, and the Battle of Okinawa became one—the greatest sea, land, and air fight of the preatomic age. To explain the meaning of a Tennozan, Feifer focuses on three stories at once: the Battle for Okinawa, the destruction of both indigenous Okinawa's culture and many of her people, and the belief that dropping atomic bombs was necessary.

While interweaving his three stories, Feifer describes the sea and air battles: the invasion fleet, radar pickets, the death cruise of the mighty *Yamato*, the lack of air cover for the Japanese, and their use of kamikazes. He recounts the horrors of the land battle from the perspectives of four people who fought it: Dick Whitaker, a 19-year-old marine; 23-year-old Tadashi Kojo, a Japanese officer from Satsuma; Masahide Ota, a 20-year-old Okinawan who fought for the Japanese; and Ruriko Morishia—"Miss Victory Day"—and her female companions who nursed the wounded and dying. Feifer describes the effects of rain, mud, constant shelling, fighting, maiming, and death on these people and thousands of others during the three-month drive to penetrate the Shuri line, to force the Japanese to the southern end of the island, and to eventually exterminate them.

Using extensive quotes and wide research, Feifer explains the Japanese Weltanschauung that led to World War II. He does so by recounting the meanings of the codes of the Satsuma warrior, of Bushido, and of the *Yamato damashii*—the Japanese fighting spirit—as demonstrated in terrible combat. Feifer makes it clear that the Hiroshima and Nagasaki bombs shook that spirit and obviated what could have been enormous slaughter in a battle for the home islands. He believes that, although Emperor Hirohito and some of his cabinet members wanted peace, the bombs had to fall. They had to shake the minds and faiths of those Japanese who opposed surrender, as well as set the stage for capitulation.

Feifer walked the ground, did extensive reading in the sources of all three sides, and conducted numerous interviews. His book is laden with quotes from the survivors of the battle and can stand with the books of Paul Fussell and John Kagan, whom he admires. Although *Tennozan* is a battle book, it starkly outlines the importance of a national mind-set in determining the extent of tragedy that a war can inflict. The casualty list of the three-month fight puts the Korean, Southeast Asian, and Persian Gulf wars in perspective: 7,613 soldiers and marines; 4,900 sailors; 107,500 Japanese; and 150,000 Okinawans. All dead.

Tennozan is valuable for policy planners and strategic thinkers, but it is first and foremost a book for war fighters.

Lawrence C. Allin
Norman, Oklahoma

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