



U.S. Marine Corps (Brian L. Wickliffe)

# Trends in Future Warfare

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**T**he United States has engaged in several conflicts since the Cold War. It built a coalition to drive Iraq out of Kuwait, conducted an air campaign against Serbia with its NATO allies to halt ethnic cleansing in Kosovo, and defeated the Taliban in Afghanistan as part of the global war on terrorism. And it has launched an invasion of Iraq to overthrow Saddam Hussein. While these interventions have failed to bring peace to the world,

the Armed Forces are likely to remain militarily committed for many years.

Recent conflicts offer insights on the conduct of war in the early 21<sup>st</sup> century. These trends are drawn from high-intensity combat operations over a relatively modest timeframe. Trends over the last decade will probably endure for another ten years and underscore the relevance of strategic realities, military capabilities, and enabling technologies for the future.

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## Some Basic Assumptions

War will continue to be an instrument of national power. The fact that there have been four major conflicts since the Cold War may be evidence enough that the near-term future is unlikely to be peaceful. Trends revealed in these

conflicts will not be rapidly overtaken by revolutionary new technologies. Those analysts who have studied the revolution in military affairs in an historical context argue that technical breakthroughs are not sufficient in themselves to bring about an entirely different way of warfighting. Corresponding organizational and doctrinal changes require twenty or thirty years to take root, mature, and evolve into new capabilities.

Trends in warfare can be plotted across a range of conflicts. The diversity of the conflicts

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argues in favor of capabilities for both high-intensity and small-scale contingencies. Asymmetry is a commodity that will be coveted by the United States and its enemies. A conventional imbalance will induce potential enemies to wage

asymmetric warfare. The Armed Forces must be prepared to confront such threats. The task is examining trends that describe enemy actions in recent conflicts and point to areas in which Washington can increase its competitive advantages.

An analysis of future warfare cannot review all aspects of military strategy and operations. For example, increased reliance of land, sea, and air operations on space-based assets is difficult to weigh. Moreover, areas such as information operations, air and missile defense, and post-conflict operations do not readily lend themselves to trend analysis but are also clearly worthy of serious evaluation.

Hindsight is not always accepted as useful in developing recommendations on the conduct of future war. After all, there is the old adage that the military often prepares to fight the last war. A corollary may be that little can be learned from past conflicts because of their uniqueness. While recent conflicts have been unique, evidence suggests that the historical record is relevant.

### Political-Military Trends

The location of recent conflicts suggests a shift from Europe toward Asia, a region of vast economic importance and diverse security challenges. Whatever a future war in that region might look like, it will not resemble an intense battle in Europe from large fixed bases dispersed over relatively short distances envisioned over the last half century.

America depended on alliances such as NATO for collective defense during the Cold War. In three post-Cold War conflicts, coalitions

were organized as the result of an ad hoc approach to securing international support for military operations led by United States. Rather than the long-term arrangements that typified past alliances, future coalitions are likely to be temporary liaisons, with some partners proving more faithful than others.

In contrast to the Cold War, recent allied contributions have largely come in the form of political support and access to facilities rather than combat forces. Trends in coalition warfare have revealed widening disparities in capabilities that will cause allies in the future to fall farther behind, although niche capabilities such as special operations forces will remain valuable.

Evidence underscores the potential for military showstoppers arising from political issues, the tyranny of distance, and constraints on infrastructure. Efforts to obtain political access can be complicated, especially for conducting offensive operations. Moreover, Asia has a much lower base density and less developed infrastructure than Europe and the Middle East. Although anti-access threats were limited in recent conflicts, power projection will be confounded by improved enemy capabilities.

Enemies have sought to evoke global criticism and weaken coalition resolve by exploiting American sensitivity about casualties and international aversion to collateral damage. Failing that, enemies have sought to reduce the vulnerability to coalition action through air defense, camouflage, concealment, deception, dispersal, mobility, and hardened facilities. Weapons of mass destruction have cast a long shadow in recent years, and proliferation may be the response to the conventional military dominance of the United States. The consistency of these trends suggests that similar challenges may arise in the future.

### New Ways of War

Two consequences of increased situational awareness and their implications for time-critical strike operations in the future warrant attention. First, the rapidly improving speed at which targets can be generated and attacked by a combination of battle management, sensor, and strike platforms has compressed what is known as the kill chain. For example, while the targeting process took weeks in operations against Iraq in 1991, it was reduced to 45 minutes or less by 2003. Second, the distinction between command and control and execution is increasingly blurred, mainly because of real-time operational pictures of the battlefield as well as the role of civilian and military leaders in issuing targeting guidance. The latter trend resulted in a creeping centralization of command and execution as the rear echelon reaches forward to the battlefield in near-real



U.S. Navy (Rob Gaston)

Combat direction  
center aboard  
*USS Enterprise*.

time. Because of the enhanced political content of conflict in a world of instantaneous information, centralized execution will often accompany centralized control.

The deliberate planning process is a legacy of the Cold War that sustains a predilection for scripted as opposed to dynamic military operations. However, in the nonlinear and fluid operating environments that will characterize future battlefields, renewed emphasis on adaptive planning and dynamic operations is necessary. Experiences in Desert Storm, Allied Force, Enduring Freedom, and Iraqi Freedom underscore this trend. For example, 20 percent of targets were selected after aircraft launch during the Gulf War, whereas 43 percent were selected once planes were airborne over Kosovo. In Afghanistan 80 percent of carrier-based sorties were launched without designated targets. The statistics for Iraqi Freedom are likely to be consistent with this trend.

Throughout the conflicts, combat losses were statistically insignificant despite the enemy objective of causing heavy casualties to hasten termination. The reasons lie in a combination of new operational capabilities, highly survivable combat platforms, and guidance systems to limit the vulnerability of U.S. forces.

Long-range operations are an outgrowth of the access problem and migration of conflict to distant and remote regions. During the Cold War, planners developed concepts of operations based on the premise that forward operating bases would be available to both launch and sustain combat. From the Gulf War to Afghanistan and Iraq, the trends suggest that this assumption is increasingly risky. As a hedge, provision must be made to project firepower over long distances. For example, problems regarding access to forward bases in 2001 and 2003 resulted in emphasis on carrier-based aircraft, long-range bombers, and aerial refueling.

While rapidly deployable, highly maneuverable ground forces that can leverage the effects of modern precision weaponry are integral to dynamic military operations against elusive enemies, there is a mismatch between slow-moving and late-deploying heavy land forces and the demands of the future operating environment. In addition, the ways of delivering firepower have changed. As the Secretary of Defense observed: "Looking at what was overwhelming force a decade or two decades ago, today you can have overwhelming force, conceivably, with lesser numbers because the lethality is equal to or greater than before." The ground force employed



U.S. Air Force (Stacy L. Pearsall)

Searching Abu Ghurayb market.

in Iraqi Freedom was lighter than and half the size of that in Desert Storm, but it had a more ambitious mission.

### Technological Advantages

Precision-guided munitions have emerged as the centerpiece of a new revolutionary style of air warfare. One trend since the Persian Gulf War has been the steadily increasing place of these weapons in the percentage of munitions delivered:

8 percent in Desert Storm, 30 percent in Allied Force, 60 percent in Enduring Freedom, and 70 percent in Iraqi Freedom. Other trends are the growing number of precision-guided munitions delivered per sortie and the increasing percentage that can be delivered in adverse weather, ranging from 13 percent in the Gulf War to 90 percent in Afghanistan and Iraq. Finally, the trend points to new capabilities derived from increased payload fractionation (delivering larger amounts of smaller unguided weapons) and mass precision (rapidly releasing large numbers of weapons).

In Iraqi Freedom, a smaller organization delivered twice as many munitions per day as the air component in Desert Storm.

Another advantage stems from the quantity and quality of sensors and their integration into systems and networks. The trend toward network-centric operations is advanced by a promise of information dominance and situational awareness.

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Underpinning this promise are technologies to create network-centric architectures consisting of high-quality sensors and rapidly transmitted data that will be fused and integrated at command and control centers. Conflicts since the Gulf War witnessed growing integration of command, control, intelligence, surveillance, and reconnaissance assets. In the future, less expensive, more capable, and lighter sensors will support networking intelligence-quality sensors on the battlefield. Assuming that data streams from myriad sources can be rapidly integrated, commanders will enjoy greater situational awareness.

From the Persian Gulf to Kosovo, and to a lesser degree in Afghanistan but reinforced in Iraq, low-observable aircraft were used with revolutionary impact. Low-observable technologies applied to combat aircraft have allowed them to operate with relative impunity against sophisticated air defenses. The ability of stealth aircraft to operate independently has reduced the requirement for considerable resources to escort attack aircraft. Electronic warfare assets were used in support of stealth aircraft but were more critical in enabling non-stealth aircraft—the mainstay of the current force—to survive in nonpermissive environments. Emphasis on airpower-centric campaign plans will demand renewed investment in stealth and electronic countermeasures.

Unmanned aerial vehicles have demonstrated their increasing operational utility in the post-Cold War era, particularly when enabled by advances in satellite guidance and communications, computerized flight control systems, and sensor technology. Indeed, unmanned systems assumed new roles because of improvements in range, endurance, on-board sensors, and data transmission. Though only one vehicle, the Pioneer, was deployed in the Persian Gulf War, ten types were used in Iraq in 2003 to provide situational awareness in a cluttered battlespace. And while they were used principally in earlier conflicts for intelligence, surveillance, and reconnaissance, they had evolved into sophisticated, air-breathing, hunter-killer platforms by 2001.

### The Future

The new way of warfare exhibited over the last decade is not compatible with the clash of interstate armies that prevailed during the Cold War. Indeed, as opposed to the Eurocentric vision of warfare encompassing large armies and vital interests, the strategic center of gravity has moved to uncertain threats emanating from Asia. This trend has been accompanied by a change in the way allies are selected: a trend in favor of temporary coalitions and ad hoc partners who are valued for their political and diplomatic support rather than direct military participation.

F-16 over Afghanistan,  
Enduring Freedom.



U.S. Air Force (Suzanne M. Jenkins)

Meanwhile, enemies of the future could include rogue states, nonstate actors, and possibly a peer competitor, all poised to undermine the use of force by the United States, with the objective of exploiting sensitivities to casualties, international public opinion, and battlefield vulnerabilities. In addition, enemies can be expected to exploit the multifold dimensions of the access challenge by confounding U.S. capabilities to project and sustain military power in the region of conflict. Most ominously, events in Iraq suggest that enemies may possess and use weapons of mass destruction, the mere possibility of which will deter some courses of action, limit basing options in theater, compel the focus on counterforce missions by targeting weapons of mass destruction, and frustrate campaign-level force employment options.

Militarily, there has been a dramatic trend away from scripted plans and operational orders to a fluid, nonlinear, and adaptive battlespace in which targets are generated while attack platforms are en route. Factors that account for this approach to target generation begin with requirements for extended reach in recent operations. Added to the tyranny of distance is the elusive nature of enemy forces and sketchy target sets characterized by fleeting opportunities, which are masked by deception. These factors are offset by an order of magnitude improvement in situational awareness that enables commanders on all levels to view the battlespace and intervene in near-real time.

Battle management indicates that the trend toward centralized execution is a growing reality. Finally, the most prominent tendencies in force deployment and employment include an increased role for naval and air forces to project power quickly from a distance, a diminished emphasis on slow-moving, heavy ground forces requiring a large footprint in favor of agile fixing forces, and continued means and measures to lower the risk of American casualties.

With regard to technology, the trend has been dominated by the use of precision munitions. They not only hit their targets, lowering the level of effort and minimizing collateral damage, but also reduce capabilities that must be deployed. But such weapons are not useful without precise information. They are linked to improved targeting guidance aided by high-quality sensors, stealth and electronic jamming, and unmanned vehicles for intelligence, surveillance, and reconnaissance as well as hunter-killer roles.

The United States has fielded impressive capabilities to meet the challenges of the post-Cold War era, including the global war on terrorism. However, the road ahead appears ever more demanding in terms of both the diversity of the threats and enemy capabilities. Such considerations suggest that the United States must prepare for uncertainty by investing in concepts, capabilities, and technologies to sustain competitive advantages. What will ultimately be required are agile, access-insensitive forces that project power across great distances with little reliance on externals.

**JFQ**