Concept for Future Joint Operations

Expanding *Joint Vision 2010*

May 1997

Foreword

Joint Vision 2010 established the initial conceptual template for how we will channel the vitality of our people and leverage technological opportunities to achieve new levels of effectiveness in joint warfighting. This Concept for Future Joint Operations (CFJO) expands the Vision's new operational concepts to provide a more detailed foundation for follow-on capabilities assessments. The CFJO also represents an important step toward the objective of achieving the right capabilities for the challenges we will face in the 21st century.

America's Armed Forces must be able to shape the strategic environment to prevent war, respond when deterrence fails, and begin now to prepare for an uncertain and challenging future. Toward those ends, the CFJO will help us think about future joint operations in the context of the broad range of challenges anticipated. It will also help us identify shortcomings which will drive us to develop better and faster processes for evaluating and adapting emerging warfighting capabilities.

As the implementation of Joint Vision 2010 unfolds and our concepts of joint warfighting evolve, the essential task is to gain the complete commitment of the Services, the combatant commands, and civilian and government agencies to achieving the key characteristic we seek for our Armed Forces—the ability to conduct dominant operations across the full range of possible missions—**Full Spectrum Dominance.** We have made great strides in developing our joint warfighting capabilities in the last ten years. But the challenges of the 21st century demand a new legacy of commitment to joint warfighting. The CFJO is an important step in this direction.

Introduction

In July 1996, the Chairman of the Joint Chiefs of Staff (CJCS) issued *Joint Vision 2010* (*JV 2010*), which provides a conceptual framework for America's armed forces to think about the future. This framework is a means by which to leverage technological opportunities and to channel human vitality and innovation to achieve new levels of effectiveness in joint operations. Focused toward achieving dominance across the range of military operations through the application of new operational concepts, this template provides a common direction for Services, commands, and defense agencies as they prepare to meet an uncertain and challenging future.

JV 2010 is built on the premise that modern and emerging technologies—particularly information-specific advances—should make possible a new level of joint operations capability. Underlying a variety of technological innovations is **information superiority**—the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. Long-range precision capabilities, combined with a wide range of delivery systems, is also emerging as a key factor in future warfare. Advances in low-observable technologies and the ability to mask friendly forces should also continue into the future. The combination of these technological trends should greatly improve joint operations. Adaptations to an increasingly lethal battlespace—likely to take the forms of increased mobility, dispersion, survivability enhancements, and pursuit of a higher tempo of operations—will be necessary.

By 2010, we should be able to change how we conduct joint operations throughout the full range of military operations. We should be increasingly able to accomplish the *effects* of mass—the necessary concentration of combat power at the decisive time and place—with less need to physically mass forces than in the past. To be sure, this will not obviate the need for "boots on the ground" in many situations; nor will it relieve our Service men and women of the need to be physically present at the decisive points in battle or in other operations, or to be exposed to conditions of great danger and hardship. Whether our forces are CONUS-based, permanently stationed overseas, or deployed, they must be able to shape the strategic environment, prevent wars if possible, and fight and win when necessary.

JV 2010 helps us think about technological trends and other variables in the context of operations in an uncertain and dynamic future environment. This *Concept for Future Joint Operations* (*CFJO*) amplifies *JV 2010*'s four new

operational concepts—**dominant maneuver, precision engagement, full-dimensional protection,** and **focused logistics**—each enabled by information superiority and technological innovation. Developing this concept is the first phase of a comprehensive implementation process that should eventually transform key *JV 2010* ideas into actual joint force capabilities. As an intellectual foundation for changes that follow, the *CFJO* is intended to be a living document that will provide the initial basis for a variety of assessment activities. It will subsequently be refined based on assessment results.

The continuing refinement of this concept requires the full collaboration of Services, combatant commands, and other agencies. The concept itself is a means by which to explore and debate the nature of future joint force operations across the full range of military operations. The larger process of implementation will move us toward a future in which our 2010 joint capabilities give us **Full Spectrum Dominance**—a joint team ***persuasive in peace, decisive in war, preeminent in any form of conflict.***

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Chapter 1

A Pathway to the Future

The nature of modern warfare demands that we fight as a joint team. This was important yesterday, it is essential today, and it will be even more imperative tomorrow. Joint Vision 2010 provides an operationally based template for the evolution of the Armed Forces for a challenging and uncertain future. It must become a benchmark for Service and Unified Command visions.

Joint Vision 2010

Introduction

1-1. US armed forces support the *National Security Strategy* (*NSS*) with a *National Military Strategy* (*NMS*) that describes their critical role in achieving our nation's objectives. The current *NMS*, 1995, states, "Being ready to **fight and win** the nation's wars remains our foremost responsibility and the prime consideration governing all our military activities." It establishes two national military objectives—to **promote stability** and to **thwart aggression**—and supports these objectives with three strategic components: **peacetime engagement**, **deterrence and conflict prevention**, and **fight and win**. The *Concept for Future Joint Operations* (*CFJO*) assumes that this basic thrust will remain the same, even though the names of these *NMS* objectives and components might be different in 2010.

1-2. Although concepts, in general, explore new ways of organizing and employing joint forces, they also rest on a foundation of time-tested principles, relationships, and the lessons of history. For example, application of the principles of war that guide operations at the strategic, operational, and tactical levels has remained essentially the same over many years. These principles and other established fundamentals provide a logical point of departure for examining and expanding the innovative concepts and ideas described in *JV 2010*.

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1-3. Joint forces in 2010 will have important roles supporting our future military strategy. They will help shape the security environment in peacetime by fostering stability through overseas presence. A strong US military in 2010 will have a substantial deterrent value just by its existence. It can help prevent conflict through its ability to rapidly commit forward deployed forces or project power to bring control to an unstable situation, preferably with allies but unilaterally, if necessary. Moreover, strategic nuclear deterrence will remain at the core of American national security, requiring a robust, survivable joint strategic triad of nuclear forces and support infrastructure. Finally, the ability of future joint forces to fight and win will remain fundamental to our national survival. Since these

strategic components cover the full range of military operations, the *CFJO* must be relevant to military requirements across that range.

1-4. Joint Pub 1, "Joint Warfare of the Armed Forces of the United States", Joint Pub 3-0, "Doctrine for Joint Operations", and Joint Pub 0-2, "Unified Action Armed Forces" support the *NMS* and form the core of current joint operations doctrine. They establish the framework for our forces' ability to fight as a joint team in the late 1990s and provide a baseline of proven relationships for the *CFJO*. Joint Pub 3-0, for example, relates the range of military operations to most of the tasks inherent in the three *NMS* strategic components mentioned earlier. The conceptual expansion of *JV 2010* should cause us to question some of these relationships and, perhaps, derive new or better models that describe future joint operations. Should information, for example, be added as another principle of war? Will information superiority fundamentally alter the nature of joint command and control (C2)? We must explore answers to these and other questions in a manner that will demonstrate the value added of such changes to today's doctrine.

Joint Vision 2010

1-5. *JV 2010* provides common direction for Services, combatant commands, defense agencies, and military-related businesses as they prepare to meet an uncertain and challenging future. It addresses continuities and changes for joint forces and establishes the intellectual foundation for how they might operate in 2010. It builds on the strengths of our Services and the quality of our leaders and warriors by integrating new and emerging technologies with operational concepts that should greatly improve our ability to conduct joint operations across the full range of military operations.

1-6. Revolutionary advances in information-specific technologies will enable us to achieve **information superiority** which, along with **technological innovation**, will transform traditional ideas about maneuver, strike, protection, and logistics into four powerful new operational concepts: **dominant maneuver**, **precision engagement**, **full-dimensional protection**, and **focused logistics**. These new concepts will combine so that we can achieve **Full Spectrum Dominance**. This capability to dominate any adversary and control any situation in any operation will be the *key characteristic* we seek for our armed forces in the 21st century, making these four operational concepts central to the conduct of future operations:

- *Dominant maneuver* is the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, sea, land, and space forces to accomplish the assigned operational tasks.

- *Precision engagement* is a system of systems that enables our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required.

- *Full-dimensional protection* is the multilayered offensive and defensive

capability to protect our forces and facilities at all levels from adversary attacks while maintaining freedom of action during deployment, maneuver, and engagement.

- *Focused logistics* is the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical levels of operations.

1-7. *JV 2010* visualizes fully developed joint force operations capabilities, circa 2010, that are possessed only in varying degrees today. All Services, for example, have precision strike capabilities they provide to combatant commanders. Yet *JV 2010*'s precision engagement concept envisions a system of systems that will enable our forces to far exceed those capabilities. Likewise, our current information operations concepts and capabilities represent only a small measure of those necessary for the level of information superiority the Vision describes. Each of *JV 2010*'s four new concepts represents a significant improvement over today's capabilities. Together, they combine to enable the 2010 joint force commander (JFC) to dominate any adversary across the range of military operations (Figure 1).

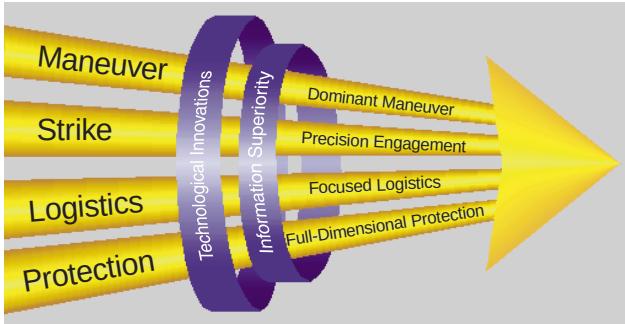

Figure 1. New Operational concepts

Achieving Future Capabilities

1-8. Implementation of *JV 2010* aims at achieving capabilities necessary for projected 2010 joint operations. The implementation process consists of two primary efforts. First, it will provide common direction—the defense community will incorporate *JV 2010* as strategic guidance. Second, *JV 2010* will also guide the development and assessment of future joint warfighting concepts and lead to fielding those operational capabilities needed to conduct joint military operations in 2010. In both of these efforts, the combatant commands are integral to concept development and assessment, and the Services are prime movers in restructuring and programming.

1-9. The long-term process of achieving *JV 2010* capabilities requires a disciplined approach that projects the nature of future joint operations; assesses the merit of alternative concepts, technologies, and systems; and directs changes necessary to meet 2010 challenges. To support this effort, the *CFJO* will serve as the intellectual foundation for long-term assessment activities. The *JV 2010* implementation process (Figure 2), which the CJCS initiated as joint policy in October 1996, establishes the road map for how *JV 2010* concepts will be transformed into future capabilities.

1-10. This *CFJO* is the first step toward implementing *JV 2010*. It is intended to be a **marketplace of ideas**—a tool to help us think about future operations. It is a starting point that allows us to explore the effects of different combinations of technological and operational variables in seminars, wargames, simulations, exercises, and other experiments to find the combination that best

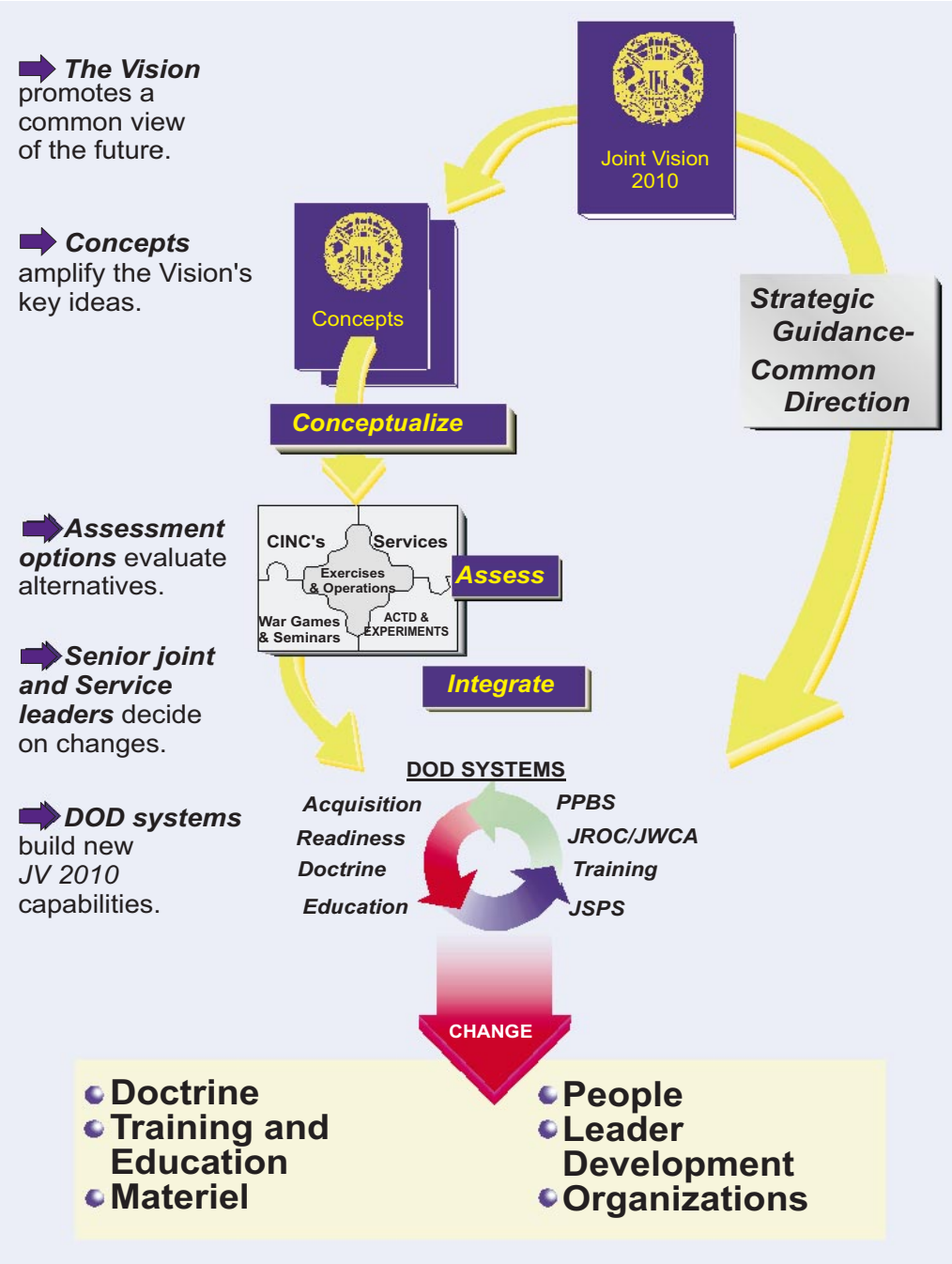

Figure 2. *Joint Vision 2010* Implementation Process

facilitates *JV 2010*'s Full Spectrum Dominance. This exploration will generate ideas for making timely and relevant changes in six critical areas: personnel, leadership, doctrine, education and training, organizations, and materiel. To achieve *JV 2010*'s Full Spectrum Dominance, our leaders and people must be able to accomplish a wide range of missions including peacetime engagement activities, humanitarian assistance and disaster relief operations, peacekeeping and peace enforcement, and larger-scale combat operations requiring forcible entry. This requires our military to develop high-quality personnel, innovative leadership, joint doctrine, joint education and training, agile

organizations, and enhanced materiel relevant to the entire range of military operations. To that end, this *CFJO* discusses implications in each of these areas and provides the basis for follow-on concepts and future assessment activities.

1-11. As the next level of detail below *JV 2010*, the *CFJO* is intended to explore key areas such as information superiority and the new operational concepts in greater depth. Many areas, however, will require research and discussion beyond what is feasible here. Subordinate levels of *supporting concepts* will develop these areas in detail sufficient to support the assessment process.

1-12. Like *JV 2010*, the *CFJO* focuses on the operational level. Therefore, it does not encompass everything relevant to the future of our armed forces. For example, although it describes linkages between strategic, operational, and tactical operations, it does not deal with strategy and policy issues such as changes to future *NMS* and realignment of combatant commanders' areas of responsibility. The concept acknowledges the importance of Total Force contributions to future joint operations but does not discuss options for an Active and Reserve Component (RC) mix to meet various requirements. It is not intended to propose solutions to force structure issues. And, while it discusses the contribution of overseas presence to future operations, the *CFJO* does not describe potential force dispositions or basing options. It should, however, contribute to discussions in these important areas.

1-13. Successful implementation requires the focused integration of many efforts through established Department of Defense (DOD) systems in order to determine and pursue capabilities relevant to 21st century joint operations. For example, Service, combatant command, and Joint Staff representatives will participate in developing and refining the *CFJO*. Modeling and simulation experts will support joint advanced warfighting experiments to assess variations of projected technological and operational capabilities. The DOD research and development community will explore specific materiel enhancements relevant to the *CFJO* and supporting concepts. Combatant commands, Services, and the Joint Staff could structure certain exercises to examine organizational and operational options. Other existing programs and groups, such as the Joint Warfighting Capabilities Assessment (JWCA) and the Joint Requirements Oversight Council (JROC), will fill appropriate roles in the process. Defense agencies, too, will have major roles to play in implementing the Vision. With *JV 2010* as the impetus and the *CFJO* as the foundation, the far-reaching effect should one of promoting DOD unity of effort to achieve 2010 capabilities. The CJCS Instruction (CJCSI) 3010.01, *Chairman's Joint Vision 2010 Implementation Policy*, establishes policy and procedures for this process.

Conclusion

1-14. The US military faces a challenging future in an era of dynamic change, constrained resources, potential new roles, and rapid technological advancement. These factors require innovative thinking and new ways to shape change if we are to retain our worldwide position of leadership as we respond to future challenges. A disciplined process for implementing *JV 2010*—centered on a holistic *CFJO*—can integrate and focus the joint and Service communities' efforts to develop the right people, doctrine, organizations, training and education, leader development programs, and materiel for operations in 2010 and beyond.

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Chapter 2

Future Challenges

. . . the US must prepare to face a wider range of threats, emerging unpredictably, employing varying combinations of technology, and challenging us at varying levels of intensity.

Joint Vision 2010

Introduction

2-1. Establishing a framework for thought about future joint force operations requires us to anticipate the 2010 strategic environment and potential challenges in achieving US national security objectives. The 2010 JFC's ability to meet these challenges depends on having relevant, flexible doctrine, training and education, materiel, organizational design, leader development programs, and the right people. These, in turn, depend on our ability to envision the nature of future challenges so that we can explore innovative operational concepts, develop the right technologies, commit resources to appropriate materiel and systems, and posture the joint community for the future.

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- **Conclusion**

2-2. From a strategic perspective, patterns of conflict that we have experienced since about 1989 will likely continue into the 21st century. We expect to be involved—normally as part of a multinational force—in large-scale combat contingencies such as the Persian Gulf Conflict, 1990-91; foreign humanitarian assistance efforts such as Operation SEA ANGEL in Bangladesh, 1991; noncombatant evacuation requirements such as Operation ASSURED RESPONSE in Liberia, 1996; peace operations such as those in Bosnia and Haiti; and various other types of operations requiring US military capability. Some will be close to our country, such as Operation JUST CAUSE in Panama, 1989; others will occur within our national borders, such as disaster relief operations in Florida following Hurricane Andrew, 1992. Although the threat of large-scale worldwide conflict is less likely than during the Cold War, such conflict remains possible in a world made increasingly smaller by sophisticated transportation and communications. Strategic nuclear deterrence, therefore, will remain a key pillar of our *NMS*.

Trends

2-3. We continue in an era of dynamic change, constrained resources, and rapid technological advancement. Such an era requires innovative thinking and the ability to shape and manage change if the US is to retain its position of worldwide leadership. The road ahead offers great promise and diverse challenges for both our nation and its armed forces. Projecting trends in key areas helps us form a picture of the future environment so that we can better understand the challenges we face.

2-4. Judgments based on trends can be relatively precise for the near term—one to three years—but will become less so as the focus extends into the future. Some trends, such as national demographics, can be charted with a high degree of confidence. Others, such as geopolitics, tend to be less predictable and quickly influenced by world events. Most analysts, for example, did not foresee the end of the Cold War five years before the dissolution of the Soviet Union and reunification of Germany. Yet, in a relatively short period, these events profoundly affected geopolitics in general and US military force-structure planning specifically. The following trends lead to some general observations about the likely characteristics of the world environment that will challenge US capabilities and influence US actions at home and abroad circa 2010.

Global Trends

2-5. Some of the global trends that will affect our future *NSS* and *NMS* are:

- The developing world will increase in population at a rate greater than developed nations. Demographic trends indicate a tremendous increase in the numbers of people moving to and living in urban areas. By 2010, nearly two-thirds of the world's population will be urbanized, with much of the growth centered in littoral areas of the world.

- As global population increases, the environment will continue to deteriorate. Many developing nations will require assistance from the world's developed nations and international institutions to deal with population growth that outstrips available supporting infrastructure. While developing nations will experience economic growth, the poorest nations will face declining standards of living. Mass communications will convey these differences, leading to political instability in some places.

- The number of international groups—including states, multinational corporations, international crime syndicates, terrorist groups, and other organizations—seeking to influence global security issues will increase.

- The number of developing countries that face serious instability and potential state failure due to political unrest will increase.

- Global economic growth and resulting tax revenues will provide many states with considerable means to invest in weapons and military forces.

- The interdependence of the world economy will increase. Economic

trading blocs—sometimes dominated by a single regional power—will become significant forces.

- Petroleum and natural gas should remain the most important sources of natural energy, although some nations will continue to pursue advanced nuclear power generation.

- The diffusion of technology and information will accelerate, increasing interaction across national borders. New applications of advanced technologies will outpace governmental attempts to regulate their use. In support of economic and political agendas, developed countries will export advanced technological systems, including weapons.

- Access to information should be comparatively equal for most nations. Superiority will depend on the speed and accuracy at which it can be integrated and understood. It will also depend on the ability to deny or degrade an adversary's systems while defending one's own. Nations and others will be able to purchase access to space-based capabilities and modern computer and communications equipment, which can be used to support military operations.

Military-specific Trends

2-6. Following are military-specific trends that will impact our future *NSS* and *NMS*:

- Despite arms control, the proliferation of both conventional weapons and weapons of mass destruction (WMD) will continue. The number of nuclear-capable states will likely expand. Some will attempt to acquire or create both conventional and unconventional WMD delivery systems. The possibility that nuclear, biological, and chemical weapons could fall into the hands of non-state groups will increase.

- Proliferation of theater ballistic and cruise missiles will increase the vulnerability of US and allied military forces in theater and jeopardize access to ports and airfields.

- Advanced technology weapons, platforms, and sensors will significantly increase the capabilities of some military forces.

- Microtechnology and biotechnology will create new areas for activity and competition. Breakthroughs are likely in the military application of directed energy.

- Information technology will be vital to military operations. Those who can most quickly and effectively process, analyze, prioritize, disseminate, and correctly act upon available information will gain a distinct advantage. Capabilities of, and dependency on, a wide range of information systems will increase dramatically. Access to advanced space capabilities, such as modern computer and communications systems, will allow more nations to leverage information and other technologies.

- Military power will remain one of the primary tools for political and strategic competition between states, including major powers. Most developed countries will prefer to form coalitions when using military forces.

- The demand for US overseas presence is not likely to diminish. Peacetime engagement requirements will remain manpower-intensive.

- US and allied forces will be called upon in humanitarian assistance efforts and conflict prevention and resolution. As the only global superpower, the US will usually find itself in the role of leader and major force contributor.

- The major powers of the world will attempt to maintain an appropriate balance of their conventional and nuclear capabilities, as well as an equilibrium in nuclear capabilities with other nations.

- Generally, military forces in the developed world will be smaller but more capable and better trained, fielding fewer new systems. However, some states with improving economies will field large armed forces as symbols of sovereignty and of their emergent status as regional powers.

- Weaponry will become more portable and lethal. Military forces will increase their mobility, complicating US and allied targeting. Against paramilitary forces, distinguishing combatant from noncombatant will become increasingly difficult.

- Some states will rely on asymmetric capabilities—such as ballistic and cruise missiles, man-portable air defense, WMD, advanced space capabilities, information operations (IO), and terrorism—as a substitute for, or complement to, large conventional forces.

US Military Posture

2-7. Barring reemergence of a military peer competitor or hostile coalition, US military force structure is not expected to increase above current levels, and pressure to decrease annual defense budgets could continue. US military leaders will continue to struggle for the best balance in our defense investment strategy. The various budget accounts that support military readiness, training, and quality of life must encompass the integration of the RC into the *Total Force* concept, must be adequate to avoid hollowing of the force, and must ensure that we are ready to respond when called upon. Modernization efforts must transform our high-quality force of today into the predominant force of the future by developing operational concepts, doctrine, organizations, and systems that empower quality warriors across the range of possible operations. Inducements for the marketplace to explore technology with military application should be expanded. A continued investment in research and development is vital to maintaining the premier advantage the US enjoys by keeping a technological lead on all potential adversaries. Additionally, the increased use of private contractor support for advanced technologies will complicate protection and sustainability challenges.

> *Our overseas presence and highly mobile forces will both remain essential to future operations.*
>
> ***Joint Vision 2010***

2-8. Mindful of public concern and expectation to minimize the unnecessary risk of casualties, the National Command Authorities (NCA) will continue to seek quick, focused, effective, and decisive application of combat power when and where it is required. The challenge to commit the right balance of air, land, sea, and space forces to be decisive, yet efficient, in any situation will continue.

2-9. The US will continue to maintain forces and other military capabilities in foreign regions. These forces will represent US commitment, enhance deterrence, provide influence and stability, increase access, and strengthen the organization of coalitions and multinational operations to deter or defeat aggression. Influencing events overseas requires credible forward-deployed and power-projection capabilities. Power projection and overseas presence will likely remain the fundamental strategic concepts of our future force.

- Achieved through rapid strategic mobility, **power projection** will enable the timely response critical to our deterrent and warfighting capabilities. For example, forward-deployed naval forces, long-range air power, space capabilities, special operations, and rapid-reaction ground forces provide flexibility for meeting initial power-projection requirements. Depending on the specific mission, operations within and beyond the littorals can require a wide variety of Service capabilities under a JFC. Due to the diversity of potential adversaries in 2010, power-projection forces must be able to task-organize rapidly. Infrastructure, both in the continental US (CONUS) and overseas, must be optimized to provide power-projection facilities to all US military forces. A sustainable forcible-entry capability is essential whether or not land basing adjacent to a conflict is possible.

- Carefully tailored to regional requirements, **overseas presence** facilitates power projection and sends a clear signal of US commitment and resolve. It creates a climate of security and stability that, in many cases, is critical to continued democratic and economic development and the protection of US interests. Overseas forces have a stabilizing effect that tends to deter conflict and provide commanders an array of flexible options, allowing them to respond promptly to aggression. These forces allow the peacetime engagement that shapes the strategic environment. Effective overseas presence demands a balance between permanently stationed forces, rotational forces, and temporarily deployed forces. Each contributes uniquely to the stability, continuity, and flexibility that support US interests.

2-10. These strategic concepts and their associated capabilities directly support *JV 2010*'s goal of Full Spectrum Dominance in the 21st century. Both concepts, for example, can extend the 2010 JFC's operational reach, an essential element of joint operational art. Basing, in a broad sense, supports overseas presence and power projection and helps enable *JV 2010*'s four new concepts during joint operations. Chapter 7 discusses this and other elements in describing how the 2010 JFC will think about balancing the four new operational concepts to be decisive in any operation.

2-11. The success of 2010 joint operations will continue to rely on a Total Force effort. An expected trend of continuing high operational tempo and personnel tempo could cause the RC to be even more instrumental in responding to 2010 requirements, causing significant doctrine, training, education, and materiel implications for their preparedness. Many unique capabilities will continue to reside principally within the RC. The JFC must be able to rapidly integrate these capabilities, even as the joint force deploys.

Multinational Operations

2-12. While formal alliances will continue to exist, coalitions will be a key strategic feature in 2010. They will tend to be of a more *ad hoc* nature in regions or situations not addressed by standing alliances. Where its interests dictate, the US will assume the primary leadership role; at other times, it will provide assets and enabling capabilities for coalition partners or allies. In most cases, the perception that the US role will be decisive will likely be the underpinning of the coalition itself. Adversaries will attempt to attack or destabilize coalition partners, especially those who provide key assets or facilities. Preempting the formation of a coalition may be more effective than confronting its forces directly.

2-13. Challenges associated with forming coalitions will increase considerably as the number of potential partners expands and the gap increases between their capabilities and those of the US. Peacetime engagement activities can be crucial to maintaining an acceptable level of interoperability with coalition partners. Dissimilar training, equipment, technology, doctrine, and language will continue to challenge coalition partners across the full range of military operations. Long-standing alliances will continue to be key because of the internal stability they foster. For a variety of reasons, however, the US must remain prepared to conduct unilateral operations when required.

Threats and Challenges

2-14. Circa 2010, the US will experience a variety of external threats to the country, its citizens, and its national interests, while internal challenges to the nation will continue.

External Threats

2-15. States should remain the most important political actors in the future, and any that are hostile to the US for economic, nationalistic, ideological, or ethnic reasons could perceive the US as their principal enemy. Many could easily

> *Through 2010 and beyond, well-balanced military forces that can dominate opponents across the full range of military operations will be critical. These forces will provide the National Command Authorities the widest array of options in protecting America, American citizens, and national interests.*
>
> **1996 Joint Strategy Review**

coordinate anti-US policies in their regions and have the means to field significant enhancements to military capabilities. While unlikely that any single nation could globally challenge US interests in 2010, probably more than one will have both the will and the ability to concurrently issue such a challenge. Potentially, the US could face parallel military challenges in different regions at roughly the same time.

2-16. The proliferation of WMD and their means of delivery will seriously challenge US security. Possession of nuclear, biological, and chemical weapons can make states or non-state groups potential threats to the US. Even if missiles and aircraft can be countered successfully, unconventional delivery means—such as terrorists, unmanned aerial vehicles (UAV), and civilian aircraft—will render the US homeland more vulnerable.

2-17. Conflict that is not directed at the US could nonetheless threaten US interests and the safety of its citizens. Such conflicts between or within states can arise from regional acts of aggression and complex human emergencies, such as environmental catastrophes and mass migrations to escape civil strife. These crises can threaten the security of national borders, thereby expanding to new levels. Such conflict may directly threaten a US interest such as security guarantees to an important ally, access to a strategic resource, or US credibility.

2-18. Economic growth means that more countries will be able to confront the US regionally. A regional competitor taking advantage of advanced technological capabilities may be able to gain local superiority long enough to achieve limited aims. Any of these situations could involve US military forces that the NCA might send to the region in response, resulting in a range of combat and noncombat requirements.

2-19. There is an increasing trend for non-state groups to threaten US interests. Multinational corporations, legal and illegal cartels, alliances, and special interest groups will compete with the US in specific arenas. They may or may not conform to international conventions and may resort to violence to achieve their objectives.

2-20. Democratic nations that value the rule of law are vulnerable to international organized crime. Criminal organizations will oppose US interests in areas such as drug and arms trafficking, immigration, and antidemocratic political intimidation. Technology may provide criminal organizations with weapons capabilities, intelligence, and communications comparable—and in some cases superior—to those of law enforcement agencies.

2-21. Terrorism can be considerably more lethal if biological and chemical weapons are employed. Terrorist acts will become increasingly sophisticated, resulting in pressure to further restrain societal and individual liberties. As information warfare (IW) practices proliferate and antiterrorist security measures become more effective, terrorist attacks on information systems are likely to increase. Also, the distinction will blur between terrorist groups, warring factions in ethnic conflicts, insurgent movements, international criminals, and drug cartels.

Domestic Challenges

2-22. Domestic challenges to our national security in 2010 will remain as varied as they are today. The threat of drugs to our society will not abate. Drugs represent a serious risk to the US, affecting society in such areas as crime, violence, health care, moral values, and other direct and indirect social and economic costs. Immigration across the nation's borders due to

instability in Central and South America and other countries will increase border security requirements. The need to harvest and process natural resources into products for US consumers will continue to create tension between industry and environmentalists.

2-23. Disaffected groups in the US that may be tempted to act in concert with hostile foreign powers pose a continuing threat. As equipment and technology proliferate in both open and illegal markets, these groups will become greater threats, challenging law enforcement organizations. Occasionally the military may be required to support domestic authorities in niche areas, often in crisis-response situations.

2-24. A variety of natural disasters will threaten lives, destroy property, and require significant outlays in state and national disaster assistance. Until the 1930s, there was one major earthquake over seven on the Richter scale every decade. Earthquakes have been increasing in frequency since 1950 to at least 125 such events during the ten-year period beginning in 1980. Such natural disasters will increasingly tax military resources in the future.

2-25. Also likely is that traditional terrorist activities, such as bombings, will increase in the US. Even more significant, perhaps, is the danger of domestic or international terrorists, hackers, criminals, and foreign states penetrating our key information and national control systems. Our federal banking system, air traffic control system, military C2 systems, public switched telephone networks, energy grids, and other systems are potentially vulnerable to intrusion, even with sophisticated security in place. The US should make appropriate technological investments to ensure that we can protect our systems from these threats.

Counterbalancing US Military Superiority

2-26. Deploying US forces over long distances to unfamiliar surroundings will be a continuing challenge. Combat operations could closely follow deployment, particularly if forcible entry operations are required. In other cases, combat operations to achieve limited objectives might be conducted without establishing preliminary lodgments in the operations area, or perhaps before the joint force is fully formed. A combination of forces could conduct such operations, such as forward-deployed naval forces and land-based air and land forces deploying from CONUS, other theaters, or forward bases elsewhere in the theater, all supported by space capabilities. Yet, such operations will continue to require the forward-positioning of maritime, air, and other assets, and the securing of agreements that provide overflight rights and basing of US forces in countries close to the conflict. Even deployed forces conducting noncombat operations could face significant sustainment challenges over long lines of communications (LOC).

2-27. While our advanced technology provides US forces with many advantages, we can expect future adversaries to actively and passively exploit technology to improve their military capability and to counter US military strength. Global interaction, for example, provides a regional power the potential to accelerate its development as a peer competitor without the buildup signals and warning time expected in the past.

> *Advanced technologies can make third-class powers into first-class threats.*
>
> **Dick Cheney**
> **Former Secretary of Defense**

2-28. The arena of conflict in 2010 will include the US homeland, strategic LOCs, and global information infrastructure, including space, as US adversaries attempt to exploit nontraditional vulnerabilities. Even inferior powers could offer serious challenges to US military superiority in 2010. Adversaries will closely observe US capabilities and tactics in an effort to exploit weaknesses by asymmetric approaches. These approaches may include attempts to inflict heavy casualties at home or abroad, to exploit the media, to conduct acts of terrorism, and to defeat our national will. Proliferation of WMD and their delivery means requires the US to field effective counters. The US must maintain a credible and survivable nuclear deterrent as well as a balanced counterproliferation program of prevention, deterrence, and protection. Deterring non-state groups requires a comprehensive intelligence effort that could necessitate a broader concept of strategic deterrence.

2-29. In its 1995 summer study titled "Investments for 21st Century Military Superiority", the Defense Science Board (DSB) identified the following fundamental capabilities that 21st century adversaries may pursue to counter US strengths:

- Offensive Information Warfare (IW)
- WMD
- Reconnaissance, surveillance, and target acquisition (RSTA)
- Precision strike
- Counter-RSTA
- Camouflage, concealment, and deception
- Large numbers of inexpensive missiles
- Small numbers of sophisticated, very low observable cruise missiles
- Land and sea mines
- Diesel submarines and advanced torpedoes
- Underground facilities

2-30. At the operational level, significant advances in any of these areas could degrade the JFC's ability to accomplish the mission. Offensive IW, for example, could be targeted at US dependence on information systems. Sea and land mines and submarines—both diesel-electric and air-independent propulsion—coupled with a shallow-water and choke-point environment, could seriously hamper a 2010 US contingency force during forcible entry operations. Large numbers of relatively cheap cruise missiles could overwhelm missile defense capabilities. Sophisticated counter-RSTA and camouflage, concealment, and deception efforts could degrade the JFC's ability to accurately locate and destroy important targets, regardless of our precision engagement capabilities. Some potential adversaries have already buried key facilities several hundred feet underground, making their destruction by conventional munitions extremely difficult. We can expect some adversaries in 2010 to have the ability to attack low-earth-orbiting satellites. A variety of countries are pursuing NBC capabilities. The potential use of WMD will certainly affect the JFC's courses of action (COAs) for joint force operations.

2-31. Figure 3 is a DSB analysis that compares a potential adversary's difficulty in developing

various measures and countermeasures to the effectiveness of those measures against the US. For example, it shows that a sophisticated air force, although difficult for most countries to develop, would be no match for US capabilities. On the other hand, sea and land mines, offensive IW, and underground facilities, while fairly easy to develop, could also be very effective in slowing forcible entry operations and impeding our ability to locate and destroy them.

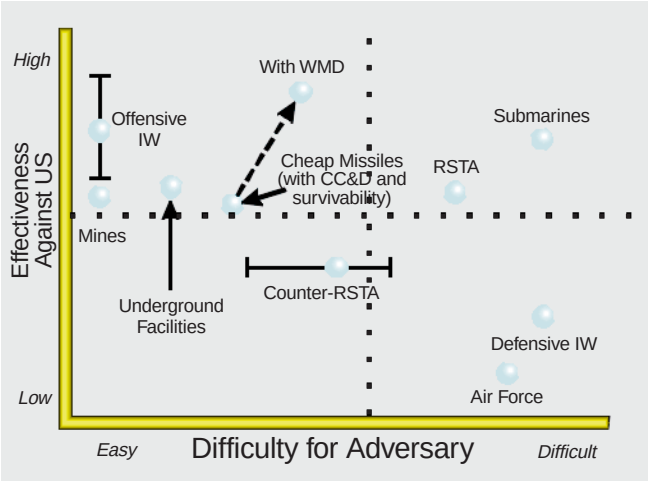

Figure 3. Asymmetric Counters

Conclusion

2-32. A projected 2010 strategic environment helps us consider potential future US military operations. This chapter projects a future world that will remain uncertain, and even dangerous, posing a variety of challenges to US and global stability. It assumes that the US will seek to maintain a position of world leadership and will use force, if necessary, to protect its vital interests. The challenge to commit the right balance of air, land, sea, and space forces to be decisive, yet efficient, in any situation will continue.

Chapter 3

The 21st Century Warrior

We recognize that, regardless of how sophisticated technology becomes, the individual warfighter's judgment, creativity, and adaptability in the face of highly dynamic situations will be essential to the success of future joint operations.

Joint Vision 2010

Introduction

3-1. Force in combat normally is provided by weapons of some type, backed by sophisticated technology that locates the enemy during day or night in any kind of weather and delivers both guided and unguided munitions with great precision. These weapons combine with technologically advanced systems that facilitate command and control, protect our fighting forces, and sustain their operations throughout the course of conflict. Yet as General George Patton, Jr., said, "Wars may be fought with weapons but they are won by men. It is the spirit of men who follow and the man who leads that gains the victory."

Contents

- Introduction
- The Human Dimension
  - Physiological Considerations
  - Psychological Considerations
  - Ethical Considerations
- Leadership
- Education and Training
- Technology
- Conclusion

3-2. Joint operations combine human and physical dimensions. Our leaders' and warriors' training, initiative, resilience, and understanding will be essential to success in future operations. Their physiological and psychological limitations also will make them a vulnerable part of our warfighting system. Their spirit and perseverance, their will to win, their dedication to the cause, and their devotion to their fellow warriors are human elements. But these make the difference between victory and defeat. These will remain relevant as long as we must fight wars.

The Human Dimension

3-3. Soldiers, Sailors, Airmen, Marines, and Coastguardsmen—well prepared and led by competent and caring leaders—will remain key to success in future joint operations. The judgment, creativity, and fortitude of our people are essential to comprehending and executing the four new *JV 2010* concepts. In the 21st century, these warriors will face a wide variety

of challenges across the range of military operations. We must seek ways to empower them in order to fully use their potential. One is to enhance training and education—as well as physical and mental readiness—to cope with the rigors of high-tempo, high-technology combat operations in 2010 and equally essential missions associated with peacetime engagement, deterrence, and conflict prevention.

3-4. Although it will influence future conflicts just as it has those in the past, **technology does not negate the requirement for basic warrior skills**, which include decision making, observation, and empathy. Within their commanders' overall intent, 21st century American warriors must reach their full potential in both initiative and action regardless of technology. Skills such as vision, innovation, adaptability, and creativity will allow understanding and clarification of complexities and ambiguities, even when operating under stress. Warriors must be able to make rapid, doctrinally-sound decisions as they plan and execute missions in diverse, high-pressure environments.

> *Man is the foremost instrument of combat.*
>
> **Ardant du Picq**
> **Battle Studies, 1880**

3-5. In both combat and noncombat operations, our warriors must have trust in their systems and equipment, but more importantly, they must have complete confidence in their own abilities, in their leaders, and in their comrades. To build such trust, leaders must consider physiological, psychological, and ethical aspects associated with the full range of military operations.

Physiological Considerations

3-6. Warriors in the 21st century will be exposed to diverse operations in different geographical environments. Those who are physically unfit or unhealthy will not withstand the rigors of combat. Conditioned warriors, healthy and reasonably rested, can persevere even under harsh conditions. Commanders can ensure the fitness and self-confidence of their fighting forces through tough, realistic training; provision of proper uniforms and equipment; disciplined hygiene and health practices; and enforced rest.

Psychological Considerations

3-7. Combat often has a greater effect on the mind than on the body. Since the mind directly affects the will to win, it must be prepared to accept the stress of combat. The threat of WMD compounds psychological challenges because of the debilitating protective measures necessary to survive in such an environment. Increasingly nonlinear, widely dispersed, autonomous operations in the 2010 battlespace could create a sense of loneliness and fear that is unparalleled in previous conflicts. High-technology weapons can inflict casualties that also cause great psychological stress to survivors. Even military operations that do not involve large-scale combat have their own levels of uncertainty that will stress leaders and warriors. In many operations, for example, the adversary will blend in easily with the indigenous population, exacerbating friendly uncertainty. These operations will often have rules of engagement (ROE) that limit or prohibit friendly response except in life-threatening situations.

3-8. Information superiority can help counter physical separation and uncertainty in combat and other operations by keeping warriors and leaders in constant contact. Strong morale, unit cohesion,

leadership, and training will also counter hardships and uncertainty. Leaders must develop realistic training programs that promote individual confidence and unit capabilities. They must also understand the conditions that can lead to both combat and noncombat stress and deal with them quickly and effectively. Well led, disciplined, and mentally conditioned warriors can overcome extremes of combat.

Ethical Considerations

3-9. The American people expect their fighting forces to adhere to the highest standards of professional conduct and to reflect American values: a strong respect for the rule of law, human dignity, and individual rights. No matter how our technology, organizations, and weapons change, we will always require adherence to core values that have been part of our Services since their inception. Despite the difficult problems we could face in the future, our fighting forces will be expected to obey established laws of warfare, to protect civilians and other noncombatants, to limit collateral damage, to respect private property, and to properly treat prisoners of war. The integrity of every warrior is paramount to success in future missions.

Leadership

3-10. The dynamic nature of joint operations in the 21st century battlespace will require continued emphasis on strong leadership skills: functional experience, expertise, mental agility, and self-discipline. Leadership greatly affects a joint force's ability to build and sustain combat power. Leaders inspire warriors with the will to win by providing purpose, direction, and motivation. They also can infuse *the people* with the will to win; in many future operations, *the will of the people* could well be our strategic center of gravity. Leaders determine how the new operational concepts and emerging capabilities are appropriately combined to meet different requirements, ensuring these elements are effectively employed against the enemy or to control a situation.

> *It is in the minds of commanders that the issue of battle is really decided.*
>
> **B.H. Liddel Hart**
> **Thoughts on War, 1944**

3-11. Leaders must understand the interrelationship of military power, diplomacy, economic pressure, and the media as well as the role of various agencies in achieving our national security objectives. They require a sophisticated understanding of historical context and superb communications skills to perform well in the changing international environment. The evolution of command structures, the increased tempo and scope of operations, and the continuing refinement of force structure and organizations require leaders with knowledge of the doctrine and systems of all Services. They must also have the skills to operate routinely and easily as part of a joint force. In 2010, as today, commanders must be able to master both the science and the art of command. They must be skilled at—

- Planning and executing independent operations within the higher commander's intent—characterized by versatility and initiative, a willingness to take calculated risks, and the ability to exploit opportunities.

- Developing and using detailed, understandable, flexible operations plans—characterized by communicating the intent verbally, visually, and in writing while providing purpose, direction, and motivation.

- Combining technology with a human dimension—characterized by tactical and technical competence and consistent building of cohesive teams.

- Rapidly grasping changes in situations, exercising initiative through independent planning, and executing doctrine-based actions that maintain a steady focus on accomplishing the assigned mission.

- Integrating, synchronizing, and controlling a wide array of supporting forces and capabilities when available.

3-12. When in command, leaders must infuse their units with ideas, desires, energy, and methods. The personal competence and influence of commanders of large forces will have a positive bearing on the outcomes of battles and campaigns. Professional competence, personality, and the will of strong commanders are significant to any unit's combat power potential. While leadership requirements differ with unit size and type, all leaders must demonstrate character, solid values, and high standards. They must act with courage and conviction, building trust and teamwork. Leaders must know where to be to make decisions and where their personal presence will influence actions. Strong leaders and trained, motivated, dedicated warriors are the JFC's greatest combat multipliers. **No other element is more important to developing combat power than the quality of leadership.**

Education and Training

3-13. Our education and training programs must prepare joint warriors to meet the challenges that *JV 2010* envisions. Joint professional military education (JPME) programs must provide our warfighters with an understanding of the strategic concepts that underlie operations. They must know how military force will be applied, understand individual Service and their RC systems, and appreciate how integration of these systems enhances joint operations. Even junior leaders must understand that tactical actions can often have strategic consequences. JPME also must prepare warriors and leaders for operations that will more frequently involve a variety of governmental agencies, nongovernmental organizations (NGO), and private volunteer organizations (PVO).

3-14. From the beginning of their careers, future leaders must be both educated and experienced in joint operations without sacrificing their basic Service competencies. Leader development must begin with individual leader selection and extend beyond formal training and education. Operational experience must be provided in diverse, progressive assignments that stress innovation, the need to deal with ambiguity, and the application of military art and science. When possible, this experience must include operations with allies. In short, our leaders must learn and experience the very highest levels of mental and physical agility and versatility in increasingly complex joint and multinational operations.

3-15. A well-rounded professional education program is vital. Self-study of the profession, its doctrine, and of the world in which it will be practiced is a critical element of that development. Other elements include programmed professional military education (PME) and challenging assignments in a variety of locations and positions. Such a program will, perhaps, become more critical in the future as a smaller military force is called on more frequently to accomplish more diverse missions throughout the world. To master the complex tasks of 2010 may require our warriors—particularly our leaders—to become perpetual students of military art and supporting technologies. This does not imply the need for additional centralized classroom time, but instead the ability to leverage information systems and distance-learning capabilities in an "education-on-demand" mode.

3-16. Just as important as education is the requirement for realistic, stressful training that amplifies education and fully prepares our forces for joint operations. Joint education and training must emphasize integration of Service and joint capabilities and develop skills that increase individual and organizational effectiveness. Stressful training must reflect emerging threats and include the challenges of both information saturation and information flow interruption. Units and individuals must be able to adapt to operations in low-technology environments as well as in those in which all systems work as designed.

Technology

3-17. Just as technology can greatly improve the durability, reliability, security, accuracy, and lethality of various systems and munitions, it can also profoundly affect the warrior and leader who will execute 2010 missions. Lightweight materials, for example, should enable ground forces to carry more equipment and ammunition, thereby increasing individual and unit firepower. Vision-enhancement technology will continue to improve operations after dark and in poor weather. Rapid advances will be made in the way we collect, communicate, and use information, allowing smaller staffs to perform more functions. These advances should permit commanders complete and secure access to their entire suite of information systems from anywhere in the battlespace. Video technology and miniaturization—such as video cameras on a chip—combined with Global Positioning System (GPS) and targeting technologies, could provide the capability to fire smart personal weapons and select the specific point of impact while the round is in the air. Lightweight body armor will afford greater individual protection. The combat effectiveness of aviators could increase exponentially due to new capabilities such as supercruise, smart flight controls, smart weapons that allow multiple kills per sortie, and rapid-firing solution determination. By 2010, a wide variety of improvements will enhance a warrior's survivability, lethality, mobility, and access to any relevant information sources.

3-18. Rapid information processing will revolutionize training. The 2010 warrior will receive initial or refresher training on demand, with mission-rehearsal training—perhaps in a 3-D multisensory virtual environment—quickly available. Enabling technologies could include wide-band terabyte data-transfer and data-processing capability, 3-D immersion, and fully interactive training systems. These technologies

will enable near-real-time information to be rapidly processed, filtered as needed, and assimilated by the warrior on the front line as well as the decision maker in the command post.

3-19. Scientists and developers will always be able to build systems that can outstrip individual physical and mental capabilities. Aircraft, for example, can easily exceed pilots' g-tolerances. Likewise, if appropriate safeguards are not considered, the risk of overloading 2010 warriors and commanders with information is substantial. Moreover, some effects are better achieved with people than with technology. The challenge is to find the best mix for each situation. When considering technological advances in warfare, one must always remember **that the purpose of technology is to equip the man**. We must not fall prey to the mistaken notion that technology can reduce warfare to simply manning the equipment. **Warriors and leaders are at the heart of all operations; technology and equipment help them accomplish the mission**.

Conclusion

3-20. We can achieve Full Spectrum Dominance only with a force that has courage, stamina, and the intellectual ability to cope with the complexity and rapid pace of future joint operations. Just as they have in the past, military operations will continue to demand extraordinary dedication and sacrifice under adverse conditions, including close combat on the ground, at sea, and in the air. The courage of our Soldiers, Sailors, Airmen, Marines, and Coastguardsmen will remain the foundation of mission success.

Chapter 4

The Impact of Technology

This era will be one of accelerating technological change. Critical advances will have enormous impact on all military forces.

Joint Vision 2010

Introduction

4-1. The US military must integrate emerging technological advances with innovative thinking to gain new warfighting capabilities. Indeed, technological innovation is one of two "key enablers" presented in *JV 2010*. In 2010, potential opponents will have access to a worldwide market containing an array of sophisticated, modern technologies, including advanced air, land, sea, and space systems; WMD production capabilities; and sophisticated communications and information management systems. As the United States reshapes its forces to meet the challenges of a changing world, it will leverage present and emerging technologies to provide the best possible equipment, doctrine, training, and support for American armed forces. The US military is examining how these technologies, combined with organizational and operational changes, can produce the improvements in military effectiveness necessary to realize the new operational concepts in *JV 2010*.

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  - Military Operations
  - Vulnerabilities
  - Innovation and Improvement
- **Technologies for *JV 2010* Concepts**
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  - Precision Engagement
  - Full-Dimensional Protection
  - Focused Logistics
- **Links to Existing Programs**
- **Conclusion**

The Revolution in Military Affairs

4-2. A revolution in military affairs (RMA) is a conceptual point of departure for future joint operations. In response to a strategic opportunity or threat, an RMA may be a complete renovation of the conduct of war. Generally, the military of an affected state must incorporate advanced technology, leading to new tactical, operational, and strategic concepts and relevant

organizational adaptation. Twentieth century examples include Germany's unrestricted submarine warfare in World War I, the Blitzkrieg and strategic aerial bombardment in World War II, and, during the Cold War, the creation of nuclear forces based on intercontinental missiles. Sometimes, as in the transformation of the French Army in the 1790s or Mao Tse-tung's development of the "people's war," an RMA may not involve the use of advanced technology but only new concepts. In this context, the term *revolution* does not mean *rapid* change—past revolutions have unfolded over a period of decades; rather it means that change is profound and the new concepts and methods of warfare are far more powerful than the old. In the current RMA, three major ideas are emerging on how military operations will change:

- First, long-range precision weapons, with unprecedented worldwide mobility, coupled with effective sensors, C2 systems, and precise intelligence will alter operations and tactics. Long-range precision engagement can play an increasingly prominent role in power projection at all levels across the range of military operations.

- Second is the emergence of information operations. Information is critical to every aspect of military operations. Information technologies have dramatically improved our ability to gather, process, store, and disseminate information in near-real time. Protecting the effective operation of one's own information systems, and exploiting, degrading, destroying, or disrupting the opponent's will become a major operational focus.

- Third is the increased use and application of space systems. This exploitation will impact all aspects of military operations, enhancing information systems and relevant information capabilities, dominant battlespace awareness, and C2 capabilities. (Note: The *CFJO* uses *information systems and relevant information* rather than the broader and less well defined *C4ISR*.) The potential emergence of space as a warfare theater will alter its military importance. The ability to locate and destroy, with a high degree of confidence, high-value fixed and mobile targets on earth and in space may fundamentally change how we think about and conduct war. These same capabilities could also impact other present-day military tasks such as peacekeeping and humanitarian assistance missions.

4-3. Not only will enhanced information technologies and systems provide a breadth and depth of information unparalleled in military history, but rapidly mobile precision strike weapons will use that information throughout the battlespace. Planning for 21st century warfare must consider that potential adversaries will also have access to many of the same enabling technologies. Selecting appropriate technologies and rapidly evaluating and incorporating innovations are major challenges to understanding what may be an RMA and exploiting capabilities described in *JV 2010*.

4-4. Superior technology has been a cornerstone of US *NMS* since the dawn of the Cold War and will remain so through the year 2010. *JV 2010* is fueled by advanced technologies and leveraged by our unique capabilities to conceptualize and integrate complementary or supporting systems. Maintaining this edge is even more important today as the size of US forces decreases and advanced technology weapons and other

applications emerge on the world market. DOD is leveraging commercial technology and funding industry, academia, and government laboratories to perform the research necessary to achieve the capabilities envisioned in *JV 2010*.

Technological Trends

4-5. Technological developments will have a tremendous impact on military operations in the future, even as investment in defense technology declines because of budgetary constraints. The ability to locate high-value, time-sensitive fixed and mobile targets and to destroy them with a high degree of confidence will fundamentally change the conduct of war.

Military Operations

4-6. While new technology alone will not eliminate the "fog of war," it should change the battlespace and the ways in which war is waged. Technology should allow units to be more widely dispersed, lighter, more mobile, increasingly lethal, and have smaller "footprints." Conversely, as technology advances enable adversaries to effectively attack long-range targets, our concept of the battlespace will expand to include the US homeland as well as space. The adversary's use of asymmetric strategies could include nontraditional activities such as IW, unconventional delivery of WMD, attacks on space assets, and terrorism. The four key technological areas highlighted in *Joint Vision 2010*—low-observable/masking technologies (LOMT), smarter weapons, long-range precision capability, and information technologies—are discussed below:

- LOMT will continue to grow as an important tool in military operations. Active radio frequency and next-generation passive infrared stealth capability may replace radar signature reduction techniques with a corresponding boost in vehicle survivability. LOMT allows the US military to be present in areas of interest when and where it chooses in either a purposeful "show-the-flag" mode or to conduct combat operations. The ability of US weapons systems to passively and actively manage or reduce their signatures is an important force multiplier. Air, land, sea, and space assets will be able to use LOMT to conduct operations at will; gain a significant positional—and thus lethal—advantage in air, land, or sea combat; and gain control in the battlespace or arena in which they operate. Weapons systems could be fitted with integrated deception suites to protect them from enemy threats as they move farther into hostile territory in support of national interests and "point of use" delivery efforts.

- As part of a trend toward quantum increases in computer storage capacity and greater automation of warfare, the microprocessor will be deployed on smarter weapons. Computers will continue to augment, and in some cases may replace, human intervention, and automated decision making or aids to decision makers will increase. Microprocessors will be ubiquitous in the battlespace of the future. Advances in computer architecture and machine

intelligence will have reached the point where weapons systems can analyze the environment and current battle situation, search likely target areas, detect and analyze targets, make attack decisions, select and dispense munitions, and report results. With each incremental improvement, the battlespace will become more lethal.

- The US military is dramatically improving its conventional combat capability. It is on the verge of fielding long-range precision weapons systems that can kill hardened, mobile, or deeply buried targets with air- or surface-launched delivery systems. The combination of high survivability and the massing of lethal firepower from dispersed locations will significantly influence many battle situations. The fusing of advanced sensors with brilliant weapons and battlespace management systems will bring a technological revolution to the battlespace of the next century. Many experts agree conventional warfare will rival the strategic impact of WMD because of the technological sophistication and range of future conventional weapons.

4-7. The strength and the basis for successful use of information technology lies in its integration. This technology enables better performance of platforms, weapons, sensors, and people. It is the basis for continual improvement in communications, intelligence gathering, processing, analysis, and distribution; precision strike, vehicle control, sensor data processing, and human performance. It includes the means to collect, process, store, distribute, and display information horizontally and vertically throughout organizational structures across the battlespace. Information technology provides the decision-making tools, decision support systems, and simulations that enable commanders to make better decisions.

Vulnerabilities

4-8. While technological innovation affords many advantages, it also increases our vulnerability if not advanced in a systematic, holistic manner. Not only have we availed ourselves of increasingly capable computer systems for much of our warfighting and information processing, but we may outpace our allies and coalition partners' ability to integrate with us in future operations. We need to understand the potential significance of over reliance on technological solutions alone and ensure that we can work with future allies. Following are related problems:

- Information processing system capabilities can cause data overload. Some suggest artificial intelligence technology embedded in decision support systems will assist the future commander and help him overcome this abundance of information. Nevertheless, individual judgment is a uniquely human trait that even the most sophisticated support systems cannot replace. The key is to consciously and systematically develop, using new, properly focused training and education approaches, the human ability to exercise correct judgments in a rapidly changing digitized environment covering a widely dispersed battlespace.

- Many of the envisioned new technologies depend on the use of the electromagnetic spectrum. However, due to the pressure to make the spectrum available to support commercial

services, assured military access to all required frequencies can not be taken for granted. Identifying the spectrum requirements for the new technologies early, designing them with sufficient technical flexibility, and working to ensure that the necessary spectrum is available both domestically and abroad will be critical to achieving Full Spectrum Dominance.

- Access to extensive information about the tactical situation may tempt strategic and operational commanders to take control of tactical actions. Normally, however, tactical leaders should have the authority and responsibility for their missions. The principle of centralized control, decentralized execution is still applicable. (See Chapter 7, "Joint Operations in the Information Age," for a more detailed discussion of this topic.)

4-9. Over reliance on, or unrealistic expectations from, information systems could inhibit or lengthen decisions. The concept of information superiority in *JV 2010* does not imply perfect intelligence. However, it does suggest lowering the level at which decisions are made and rapidly forcing information forward or up the chain of command. Commanders must avoid waiting too long for all possible information before acting.

4-10. Sophisticated information systems can fail. Regardless of technological enhancements, people will continue to be the most important element in future military operations. Missions will still have to be accomplished even when the GPS is down, night-vision equipment breaks, communications gear is jammed, or resupply is delayed. When high-tech systems don't work as advertised, leader skill and individual innovation will be key to successfully completing the mission. Even when systems work as planned, it will be vital that the joint force of 2010 have already developed a new skill set of knowing how to correctly evaluate digitized information.

Innovation and Improvement

4-11. Aware of the current technological revolution, the military should recognize that ultimately, success results from technological advances and innovative ways of considering and combining them for warfighting. Undoubtedly, improving legacy systems and employing them in new and different ways will have a place in the world of *JV 2010*.

Technologies of *JV 2010* Concepts

4-12. Opportunities to push the frontiers of science, transform new knowledge to mature technology, and apply this technology to US military needs will exceed funds available. Nevertheless, within the bounds of affordability, the four new *JV 2010* operational concepts will in large part depend on harnessing technological innovation. They, along with current DOD-proposed technology objectives, show promise of yielding fieldable results through innovative development and application.

4-13. The focus of the DOD science and technology investment is enhanced and guided

by Defense Technology Objectives (DTO). Each DTO identifies a specific technology advancement that will be developed or demonstrated, the anticipated date of technology availability, the specific benefits resulting from the technology advance, and the funding required to achieve the new capability. These benefits not only include increased military operational capabilities but also address other important areas, including affordability and dual-use applications, that have received special emphasis in the *Defense Science and Technology Strategy* published annually by OSD/DDR&E (Office of the Secretary of Defense, Director of Defense Research and Engineering

4-14. Tables listing some of the DTOs which support the four new operational concepts in *JV 2010* are presented below. They are provided for reference only. In depth explanation of each DTO may be gained by consulting the *Defense Technology Objectives of the Joint Warfighting Science and Technology Plan* and the *Defense Technology Area Plan*. (DTOs may be expressed as Technology Demonstrations or TDs, Advanced Technology Demonstrations or ATDs, and Advanced Concept Technology Demonstrations or ACTDs.)

Dominant Maneuver

4-15. The adoption of shared information, equipment interoperability, and mobility technologies among the Services, US allies, and coalition members can be achieved through the use of common advanced systems and standards. Sensors, communications, and precision weapons will be integrated to realize a joint target engagement system. This system can yield an

Table 1 Dominant Maneuver DTOs

DTO No.	Title	Completion
A.02	Robust Tactical/Mobile Networking	FY01
A.03	Joint Power Projection/Real-Time Support (Navy) / Rapid Force Projection Initiative Command and Control TD (Army)	FY03
A.05	Integrated Collection Management ACTD	FY99
A.06	Rapid Battlefield Visualization ACTD	FY00
A.07	Battlefield Awareness and Data Dissemination ACTD	FY00
A.09	Semiautomated Imagery Processing ACTD	FY99
A.11	Counter-Camouflage Concealment and Deception ATD	FY01
A.13	Satellite C3I/Navigation Signals Propagation Technology	FY03
A.16	Navigation Warfare ACTD	FY99
A.17	Joint Task Force ATD	FY01
A.19	Extending the Littoral Battlespace (Sea Dragon) ACTD	FY01
E.01	Small Unit Operations TD	FY02
F.01	Synthetic Theater of War ACTD	FY99
G.04	Joint Countermine ACTD	FY00
G.05	Rapid Battlefield Mine Reconnaissance	FY00
G.06	Rapid Sea Mine Neutralization	FY00
G.08	In-Stride Amphibious Breaching	FY98
AP.01.00	Advanced Aerodynamic Concepts for Increased Flight Efficiency	FY01
GV.06.02	Surface Ship Integrated Topside Concepts	FY03
GV.10.01	Submarine Signature Control	FY03

important new capability to conduct *sustained* and *synchronized* maneuver and strike operations from dispersed locations to dominate an enemy. Some of the high-potential DTOs for dominant maneuver are listed in Table 1.

Precision Engagement

4-16. Selective direct connectivity from ISR sensors to "shooters" can achieve nearly instantaneous response to high-priority, time-sensitive targets or objectives. This capability enhances our ability to achieve the desired effect and assess results in real time. Advanced information systems will support joint and multinational operations across the globe, allowing forces at all echelons to draw from remote data bases the information most needed for their success. Table 2 lists some of the precision engagement DTOs being investigated.

Table 2 Precision Engagement DTOs

DTO No.	Title	Completion
A.05	Integrated Collection Management ACTD	FY99
A.11	Counter-Camouflage Concealment and Deception ATD	FY01
B.01	Precision Rapid Multiple Rocket Launcher ACTD	FY98
B.03	Precision Signals Intelligence Targeting System ACTD	FY99
B.05	Target Acquisition ACTD	FY98
B.06	Air/Land Enhanced Reconnaissance and Targeting ATD	FY00
B.07	Joint Continuous-Strike Environment (Proposed ACTD)	FY01
B.08	Arsenal Ship	FY01
B.11	Guided Multiple Launch Rocket System ATD	FY98
B.12	Enhanced Fiber Optic Guided Missile ATD	FY01
B.15	Antimateriel Warhead Flight Test ADT	FY00
B.19	Cruise Missile Real-Time Retargeting ATD	FY00
B.21	Miniaturized Munitions Technology Guided Flight Tests	FY02
C.01	Battlefield Combat Identification ATD	FY03
E.03	Objective Individual Combat Weapon ATD	FY99
E.04	Non-Lethal Weapons Technical Demonstration	FY01
H.09	Sensor Fusion/Integrated Situation Assessment TD	FY02
J.03	Counterproliferation I ACTD	FY00
J.04	Counterproliferation/Counterforce II (Proposed ACTD)	FY03
J.05	Wide-Area Tracking System (Proposed ACTD)	FY00

Full-Dimensional Protection

4-17. Full-dimensional protection will use emerging detection and information-sharing technologies to direct and integrate tactical and supporting information system resources for mission preview to exploit and shape the battlespace. Technologies that elevate the level and speed of understanding of enemy, friendly, and geospatial situations and maintain consistency of that view across tactical and supporting forces will contribute to this new operational concept. Battlespace awareness could be enhanced by continuously projecting friendly and enemy moves and their likely outcomes and by providing tailored information for mission execution. Table 3 lists some of the full-dimensional protection DTOs being explored.

Table 3 Full-Dimensional Protection DTOs

DTO No.	Title	Completion
A.07	Battlefield Awareness and Data Dissemination ACTD	FY00
A.10	High-Altitude Endurance Unmanned Aerial Vehicle ACTD	FY01
A.12	Information Security	FY01
A.14	Tactical Unmanned Aerial Vehicle ACTD	FY99
C.01	Battlefield Combat Identification ATD	FY03
C.02	Combat Identification ACTD	FY99
C.03	Advanced Identification ATD	FY01
D.02	Integrated Sensor/Data Fusion Demonstration	FY02
D.05	Advanced Space Surveillance	FY03
E.02	Military Operations in Urban Terrain ACTD	FY02
G.02	Vehicular Mounted Mine Detector ATD	FY98
G.11	Advanced Mine Detection Sensors	FY01
H.04	Miniature Air-Launched Decoy ACTD	FY99
H.07	Enhanced Situation Awareness Insertion ATD	FY99
H.09	Sensor Fusion/Integrated Situation Assessment TD	FY02
I.02	Biological Early Warning (Proposed ACTD)	FY01
CB.06.12	Advanced Lightweight Chemical Protection	FY00
MD.04.J00	Medical Countermeasures for Botulinum Toxin	FY98
MD.13.J00	Medical Countermeasures for Staphylococcal Enterotoxin B	FY00
MD.15.J00	Medical Countermeasures for Encephalomyelitis Viruses	FY00

Focused Logistics

4-18. Semiautonomous search and retrieval, bar code readers, active data bases and data mining, advanced human-computer interface, agile manufacturing, real-time on-board diagnostics, simultaneous transmission of logistics data across the distribution system, global interconnectivity, increased reliance on fast transportation, commercial sector inventories, and shared white

boards will advance the planning, execution, monitoring, and rapid replanning of logistics support. The logistics pipeline will be enhanced by advancements in cargo containerization and handling equipment allowing more effective integration of intermodal transportation. Advancements in deliberate planning tools will allow pinpoint tailoring and time phasing of force deployment to crisis situations to occur virtually on the fly. Focused logistics will use new software tools and protocols to control the logistics pipeline and enable the warfighter to project and sustain overwhelming combat power. By 2010, advances in transportation technologies coupled with the information management revolution will enable operational commanders and logistics managers alike to rapidly, efficiently, and effectively direct transport and maintain movement visibility of deploying forces. Successfully reducing reliance on large inventories hinges on the ability to capture and implement commercial sector successes within the Defense Transportation System (DTS). The resultant warfighter success in the joint battlespace of 2010 relies on, in large part, modernization of the DTS to include attributes such as full dimensional sea lift, rapid air mobility, reliable mobility infrastructure, and responsive global information systems. The concept aims to put resources in the right place, at the right time, while reducing reliance on large inventories. Some of the DTOs that apply to focused logistics are in Table 4.

Table 4 Focused Logistics DTOs

DTO No.	Title	Completion
A.07	Battlefield Awareness and Data Dissemination ACTD	FY00
A.12	Information Security ATD	FY01
F.02	Advanced Joint Planning ACTD	FY99
F.14	Joint Decision Support Tools (Joint Logistics ACTD, Phase II)	FY98
F.15	Real-Time Focused Logistics (Joint Logistics ACTD, Phase III)	FY01
F.16	Logistics Tech. For Flexible Contingency Deployments & Operations	FY99
F.17	Adv. Amphibious Log. & Seabasing for Expeditionary Force Ops. ATD	FY01
F.18	Joint Advanced Health and Usage Monitoring ACTD	FY00
I.03	Airbase/Port Biological Detection ACTD	FY00
I.05	Chemical Add-On for the Airbase/Port Bio. Detection (prop. ACTD)	FY01
IS.02.01	Forecasting, Planning, and Resource Allocation	FY03
IS.03.01	Integrated Force and Execution Management	FY02
IS.10.01	Simulation Interconnection	FY03
IS.20.01	Universal Transaction Communications	FY03
IS.21.01	Assured Communications	FY01
MP.07.06	Affordable Sustainment of Aging Aircraft Systems	FY01
MP.14.11	Wartime Contingencies and Bare Airbase Operations	FY03
MP.16.06	Firefighting Capabilities for the Protection of Weapon Systems	FY03
MP.17.11	Airfields and Pavements to Support Force Projection	FY02
MP.23.06	Affordable, Short-Lead-Time Parts Production and Repair	FY97

Links to Existing Programs

4-19 The DDR&E has recently strengthened the DOD strategic planning process to improve the Service science and technology (S&T) community's responsiveness to their warfighting and acquisition customers. Critical to this process is the aforementioned *Defense Science and Technology Strategy* (*DSTS*) and its supporting *Basic Research Plan* (*BRP*), *Defense Technology Area Plan* (*DTAP*), the *Joint Warfighting Science and Technology Plan* (*JWSTP*), and its companion reference *Defense Technology Objectives of the JWSTP and DTAP*. These documents are a collaborative product of OSD, the Joint Staff, Services, and appropriate defense agencies. The strategy and plans are congruent with *JV 2010*. These S&T documents are available to US Government employees, defense contractors, and our allies with the goal of focusing our collective efforts on superior joint warfare capabilities and improving interoperability between the United States and our allies.

- *Defense Science and Technology Strategy*. The *DSTS* is responsive to the Secretary of Defense's vision to "develop and transition superior technology to enable affordable, decisive military technology." The strategy focuses on four generic considerations; affordability, dual use, accelerated transition and strong technology base, that have high priority in making strategic decisions about which technologies are pursued.

- *Basic Research Plan.* This plan presents Defense objectives and investment strategies for DOD-sponsored Basic Research performed by universities, industry, and Service laboratories.

- *Defense Technology Area Plan*. The *DTAP* presents defense objectives and the Applied Research and Advanced Technology Development investment strategies for the technologies critical to DOD acquisition plans, Service warfighting capabilities, and the *Joint Warfighting Science and Technology Plan*. It takes a horizontal perspective across Service and defense efforts, thereby charting the total DOD investment for a given technology.

- *Joint Warfighting Science and Technology Plan*. The *JWSTP* also takes a joint perspective horizontally across the Applied Research, and Advanced Development Plans of the Services and defense agencies, but for a different purpose. Its objective is to ensure the S&T program supports priority future joint warfighting capabilities. The JROC has endorsed the *JWSTP* planning process, methodology, and the Joint Warfighting Capability Objectives (JWCOs) used in the development of the *JWSTP*. The ten JWCOs are not all inclusive—there are other significant joint and Service-unique warfighting capabilities under development that also require S&T support. Nevertheless, the JWCOs provide a focus for the overall DOD S&T program and identify specific joint warfare areas requiring technology emphasis. Table 5 shows their level of support (as determined by OSD) for the concepts in *JV 2010*. Together, the *JWSTP*, *DTAP*, *BRP*, and DTOs ensure the near-, mid-, and far-term technology needs of the joint warfighter are properly balanced in the DOD S&T program.

These documents are revised annually to ensure the DOD S&T program remains responsive to the continually evolving capability needs of the Service warfighters.

Table 5 JWCO Support for *JV 2010*

Joint Warfighting Capability Objectives	*JV 2010* Operational Concepts			
	Dominant Maneuver	Precision Engagement	Full-Dimensional Protection	Focused Logistics
1. Information Superiority	●	●	●	●
2. Precision Force	O	●	O	
3. Combat Identification	O	●	●	
4. Joint Theater Missile Defense		●	●	
5. Military Operations in Urban Terrain	●	O	●	
6. Joint Readiness and Logistics	●	O	O	●
7. Joint Countermine	●		●	O
8. Electronic Combat	●	●	O	
9. Chem/Bio Warfare Defense and Protection	●	O	●	O
10. Counter Weapons of Mass Destruction		●	●	

● Strong Support O Moderate Support

Conclusion

4-20. Rapid advances in several key areas are creating warfighting and support capabilities far exceeding those of today. However, we must not lose sight of the fact that potential adversaries will likely have access to much of this same technology. Recognizing the opportunities presented by these sophisticated innovations is a challenge in itself. *JV 2010's* challenge is developing and integrating them to give the warfighters new capabilities. All must remember that technology enhances the *potential capabilities* of the force. Only through improved doctrine, tailored training and education, innovative leadership, agile, and adaptable organizational structures will our force of quality people be able to use these innovations to achieve the new operational concepts broadly described in *JV 2010*. Finally, although advances in technology make these new operational concepts possible, we should not view them as a panacea. At times, technology may not provide us with the leverage we need at the lower end of the range of operations, and there will be no substitute for "aircraft overhead, ships at sea, and boots on the ground."

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Chapter 5

Information Superiority

Throughout history, gathering, exploiting, and protecting information has been critical . . . While the friction and the fog of war can never be eliminated, new technology promises to mitigate their impact.

Joint Vision 2010

Introduction

A New Era

5-1. Sun Tzu reminds us, "Know the enemy and know yourself; in a hundred battles you will never be in peril." His timeless wisdom is about **information superiority**. *Joint Vision 2010* defines it as "the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same." This is a central precept of *JV 2010*.

5-2. Throughout history, possessing a relative information advantage has been integral to success in combat. Leaders have always struggled with the need for accurate and timely information about the nature of the operations area, their own force, and the enemy. Likewise, leaders have actively sought to deny the enemy accurate or timely information or deceive him through misinformation to seize and sustain a relative information advantage. From Sun Tzu's parables of ancient Chinese battles in *The Art of War* through the use of a relatively complex and sophisticated network of sensors and processors employed during the Persian Gulf Conflict, history is rich with examples of victories enabled by having an information advantage. Today, however, information-specific technologies are providing an unprecedented capability to know oneself and the enemy and to establish information superiority as the primary enabler of a new era in joint warfighting. We must bear in mind, however, that war itself is a human enterprise—a complex struggle of independent wills. Despite the revolution in information technologies, uncertainty will remain a fundamental characteristic of warfare.

Contents

- **Introduction**
  - A New Era
  - Global Information Environment
- **A New Conceptual Framework**
  - Information Systems
  - Relevant Information
  - Information Operations
  - Challenges
  - Potential Threats
- **Conclusion**

5-3. We are at the dawn of the Information Age, where advanced technologies, especially information-specific technologies, are providing an ever-increasing range of unparalleled

capabilities, unequaled possibilities, and unmatched challenges. This ever changing and complex new environment provides seemingly limitless access to an infinite volume of information. We are seeing tremendous changes in virtually every facet of human enterprise in today's far more interdependent, informed, yet uncertain strategic environment.

5-4. The United States is a world leader in developing and employing information technologies. Simultaneously, we are expanding our knowledge about the "revolutionary" impact information technologies are having on traditional organizational processes. In almost every arena—civil, social, government, economic, and military—their proliferation is challenging many established ideas and conventional practices in order to remain competitive in this new environment. Although we have much to learn, the fact that Information Age capabilities demand new means and methods to compete and win is indisputably clear.

Global Information Environment

5-5. Joint forces operate within a Global Information Environment (GIE)—a worldwide network of information sources, archives, consumers, and architectures—that provides the framework for this new global setting. The GIE is comprised of and influenced by a wide range of actors that includes US, UN, and foreign governments; various media including a growing web of independent, on-line sources; academic institutions; a multitude of NGOs and PVOs; complex national and international business conglomerates; an array of groups affiliated by religious, regional, or ideological similarities; and various individuals not necessarily affiliated with any organized group. Many of the actors operate with apparent independence while others are very interdependent. But all are becoming increasingly interactive in this pervasive and ever more influential GIE. While each may have its own motive or special interest, all have the potential to affect geopolitical, economic, or military decisions in some manner.

5-6. Within the GIE are complex and interconnected information infrastructures that link individuals and organizations to an ever-increasing abundance of information which provides an unprecedented interconnectivity across national lines, over Service boundaries, and between military commanders and their supporting activities. This often nebulous web extends across geographic and political boundaries and presents many new unexpected opportunities as well as unique and unprecedented challenges.

5-7. The American military exists and operates within the GIE and is connected to it by a set of information infrastructures. The Global Information Infrastructure (GII) is the web of communications networks, computers, data bases, and consumer electronics, as well as personnel and processes, that make vast amounts of information available to users. All nations' National Information Infrastructures (NII) are part of the GII. NII components are similar in composition but the scope is national not global. The Defense Information Infrastructure (DII) is the shared and interconnected system of computers, communications, data applications, security, people, training and other support structures serving the Department of Defense information needs. It includes C2, tactical, intelligence, and commercial communications systems used to transmit DOD data. Like the other actors, the US military is affected by the tremendous force of rapidly expanding and increasingly powerful Information Age technologies. This new information environment

is challenging currently accepted methods of linear, sequential processing, hierarchical decision making, and relatively rigid organizational structures. Likewise, information technologies are creating a new setting from which to think about new ways of planning and executing military operations and changes to organizational processes and structure that will leverage this unprecedented, new capability.

A New Conceptual Framework

5-8. We are in a unique time which presents us with the opportunity to acquire some tremendous new capabilities which may significantly change how we conduct both war and other military operations. The abundance of available and emerging technological innovations and improvements can extensively strengthen the current warfighting concepts of maneuver, strike, protection, and logistics. By acquiring these new technologies and skillfully overlaying them on tested and proven warfighting concepts, we will achieve a significantly improved and more powerful warfighting capability, as figure 4 depicts.

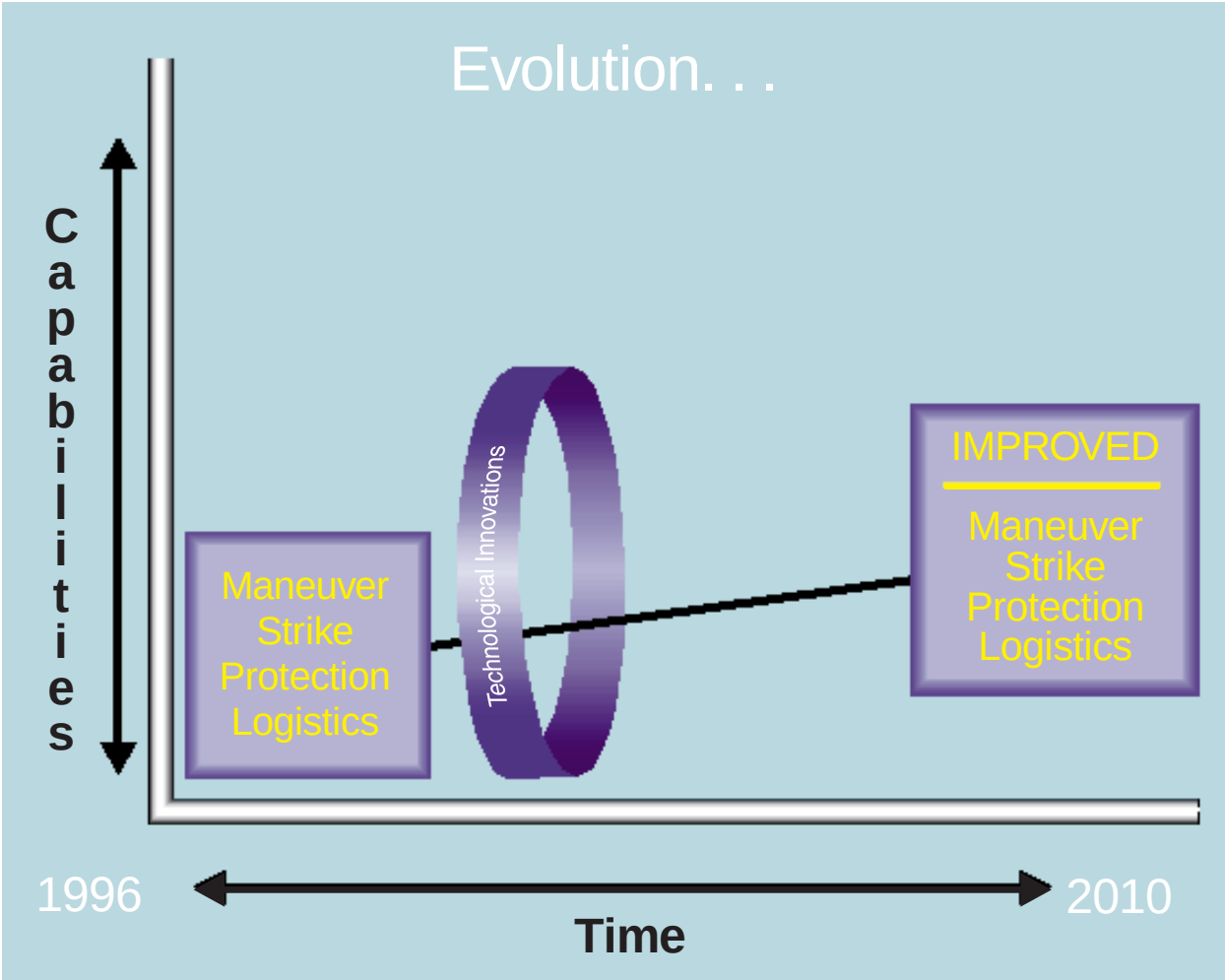

Figure 4. Evolutionary Trend

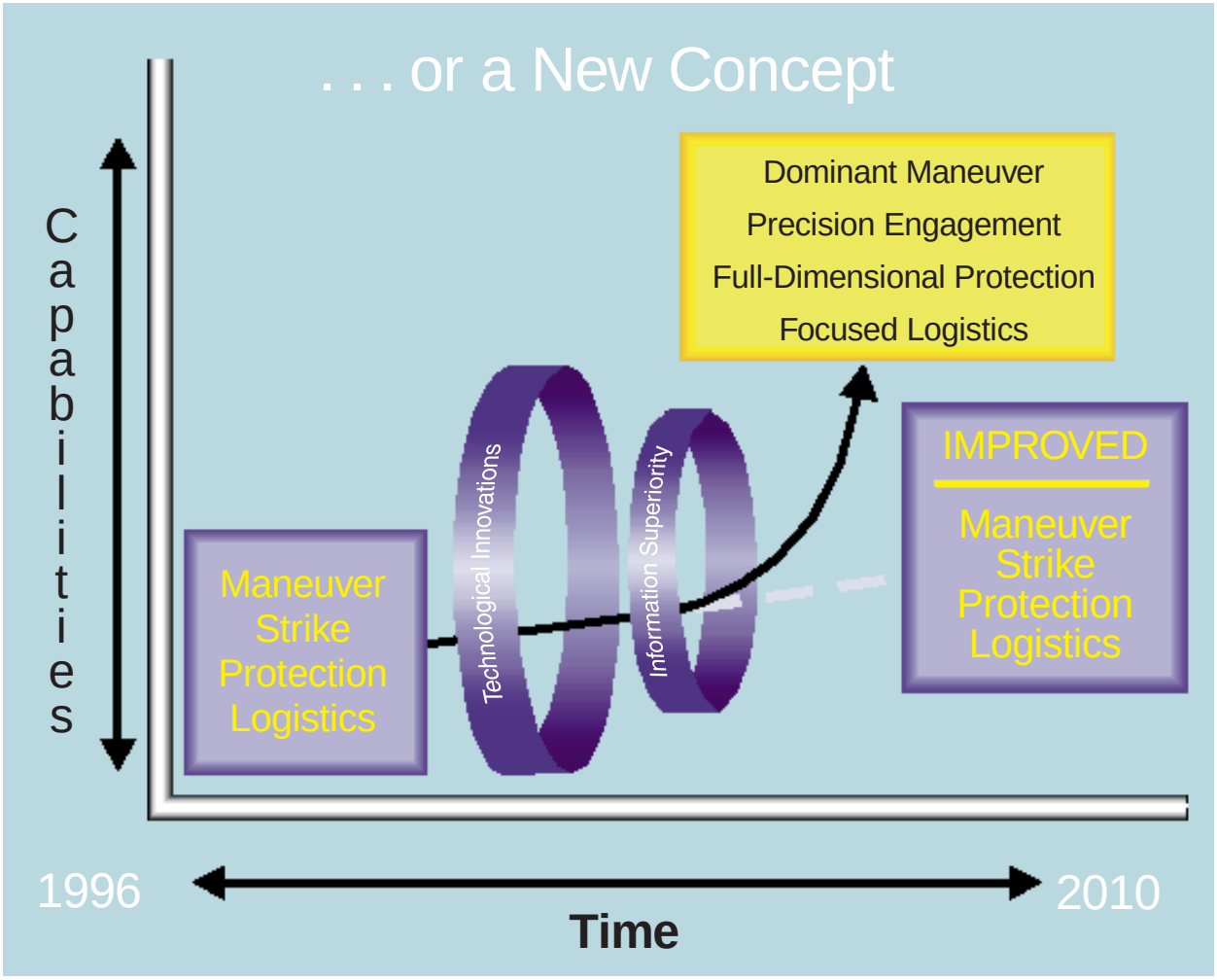

Figure 5. A New Conceptual Framework

5-9. However, information-specific technologies give us a unique opportunity to achieve more than just incremental improvement to existing capabilities. Collectively, they have the potential to yield an unprecedented new capability *JV 2010* calls **information superiority**. This tremendously more powerful notion has the potential to allow us to plan and execute military operations in new ways. This opportunity is analogous in many ways to the post-world war 1920s and '30s when many nations experimented with the integration of technological innovations and improvements. Advances in communications, armor and armaments, aircraft, motor transport, and other weapons were rapidly increasing battlefield lethality and tactical mobility. While all had the choice of how to apply and integrate emerging capabilities into a coherent warfighting concept, only Germany combined them into an operational concept—the *blitzkrieg*—that yielded overwhelming tactical and operational advantages.

5-10. While technological advances have the potential to dramatically alter the quality and character of the traditional battlespace functions of maneuver, strike, protection, and logistics, *JV 2010* asserts that information superiority will transform them into the four new operational concepts—**dominant maneuver, precision**

engagement, full-dimensional protection, and focused logistics—as Figure 5 depicts. The integrated application of the potent warfighting capabilities inherent in these four new operational concepts by leaders who understand the fundamental human nature of war will enable joint forces to conduct dominant operations across the full range of possible missions.

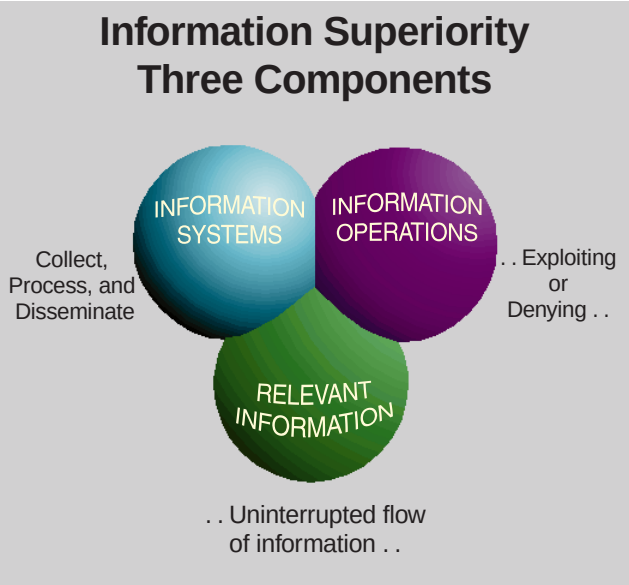

Figure 6. Three Components of Information Superiority

5-11. Figure 6 depicts the three components of information superiority—**information systems**, **relevant information**, and **information operations**.

Information Systems

5-12. *Information Systems* are the architectures and functions for collecting, processing, analyzing, archiving, and disseminating information. Technology is creating an expansive potential for instant, worldwide information exchange. We will use this potential to develop a powerful battlespace information system that could provide warfighters with an unequaled and previously unachievable level of relevant information. That information will include audio, imagery, video, digitized mapping, and command and control material in whatever form mission assignment, orders, control measures, and coordinating instructions will take in the future.

5-13. Clausewitz reminds us that friction in war is caused in part by an inability to clearly know yourself and know the enemy; "The difficulty of accurate recognition constitutes one of the most serious sources of friction in war . . . War has a way of masking the stage with scenery crudely daubed with fearsome apparitions." Military operations in 2010 are based on an ability to have a degree of battlespace awareness that seeks to minimize friction caused by incomplete, inaccurate, or untimely information.

5-14. Historically, visualizing the battlespace has been a process of intuition, which leaders and warriors possess in varying degrees. Coupling disparate elements of information—sometimes inaccurate, untimely, or incomplete—with a "feel" for the battlefield, warfighters created a mental image from which they crafted the fight. Many methods have been used to capture and translate this mental image into a "picture" to provide a common understanding from which to unify and focus the participant's actions. Too often, however, the inability to portray a common vision of the battlespace resulted in the imprecise or diffused application of force and forces.

> *The unqualified importance of information will not change in 2010. What will differ is the increased access to information and improvements in the speed and accuracy of prioritizing and transferring data brought about by advances in technology.*
>
> ***Joint Vision 2010***

5-15. The battlespace information system of 2010 will enable leaders to fuse the intuitive process with a science-based process in ways that might yield a much improved visualization of the battlespace in space and time. This fusion will enable collaborative and simultaneous efforts from local and remote organizations to solve complex battlespace challenges. While organizations and staffs may become more widely dispersed, their efforts will become more focused. The information system will be "born joint" and comprised of a set of interconnected communications and sensor grids, software applications and organizational structures that will provide:

- A redundant, seamless network of cross-Service and interagency links.
- Secure, and responsive information that is available to the right user when needed.
- Accurate and timely intelligence about enemy locations and activities.
- A comprehensive catalogue of, and access to, networked data bases relating to the operations area and adversary capabilities.
- Accurate, real-time friendly location and combat status.
- The capability for sustained split-based operations from force projection locations throughout the battlespace.
- Near-real-time processing of information to allow for a common "picture" of the battlespace.
- Built-in self-protection capabilities.
- Multilevel security access to allow interagency sharing of information, as well as selective sharing with allies, NGOs, and PVOs.

Relevant Information

5-16. *Relevant Information* is the full range of necessary information about friendly forces, the enemy, the operations area, and anything else that affects operational decision making. This unprecedented degree of timely, accurate, relevant, usable, complete, and brief information will allow for an unequaled level of effective planning and execution of military operations.

> *Forces harnessing the capabilities potentially available from [improvements in information and systems integration technologies] will gain dominant battlespace awareness, an interactive "picture" which will yield much more accurate assessments of friendly and enemy operations . . .*
>
> ***Joint Vision 2010***

5-17. When the domain of relevant information centers on a current or potential foreign adversary, the information systems gathering data include both open sources and traditional intelligence, surveillance, and reconnaissance systems and architectures. Collected data becomes information when processed into usable forms such as reports or images. This information is transformed into intelligence by purposeful analysis, interpretation, and collation with related information and background to meet the specific needs of the user.

5-18. Fundamentally, the choice of information should be with the commander or warrior who wants or needs it. Therefore, a fused all-source solution must incorporate a sophisticated and effective combination of "push" and "pull" information:

- The broadcast of "push" information could be similar to the commercial sector's direct-satellite television. It might include continuous broadcast information such as battlespace weather forecast on channel 1, air defense coverage on channel 2, airborne ground surveillance radar display on channel 3, and so on. From relatively simple and inexpensive terminals, users could access an "info-guide" channel from which to pick available information. They could also customize it to meet particular needs.

- "Push" information is of two types. The first is real-time data pushed directly from sensor-to-user such as Joint Surveillance and Target Acquisition Radar System (JSTARS) moving-target-indicator (MTI) data. The second is sensor-to-processor-to-user information which takes longer to process and format. An example might be an analysis of MTI data fused with other inputs to provide a composite look at formations. In addition to the value added by human interpretation and processing of intelligence data, automated processes or artificial intelligence could be used to analyze data about some key indicators. Those indicators could, in turn, be translated into a prediction of an adversary's battlespace capability at a designated time and space. Advanced computer analysis has the potential to provide a comprehensive view of an adversary far beyond a simple database roll-up of facts over time such as combat vehicle attrition and force movements. These advanced systems could assess operational patterns, battlespace tempo, and leadership inclinations.

5-19. The aim of broadcast information is to output a full range of general information. But alone it does not satisfy all of the warfighter's needs. "Pull" information will address specific information requirements. This is very much like searching the Internet—although a much improved and matured Internet—for specific information. Networked, dispersed data bases will "pull" specific information from such sources as imagery, digitized terrain, or detailed information beyond the scope provided by broadcast information. This "push" and "pull" combination allows the user to choose what is needed to fulfill unique requirements and show fused information on a customized display.

Information Operations

5-20. Information operations (IO) involve actions taken to affect adversary information and information systems while defending one's own information and information systems. IO apply across all phases of an operation and the range of military operations, and at every level of warfare. Information warfare (IW) is IO conducted during time of crisis or conflict to achieve or promote specific objectives over an adversary or adversaries. Defensive IO are conducted on a continuous basis, in both peacetime and war, and are an inherent part of force employment across the range of military operations.

> *Information superiority will require both offensive and defensive information warfare. Offensive information warfare will degrade or exploit an adversary's collection or use of information . . . Defensive information warfare to protect our ability to conduct information operations will be one of our biggest challenges ahead.*
>
> ***Joint Vision 2010***

5-21. As an integrating strategy, the focus of IO is on the vulnerabilities and opportunities presented by the increasing dependence of the United States and its adversaries on information and information systems. Employment of IO is essential to achieving objectives of the warfighter. In the Department of Defense, the ultimate strategic goal of offensive IO is to affect a human decision maker to the degree that an adversary will cease actions threatening to US national security interest. At the tactical and operational levels, IO target and protect information, information transfer links, information gathering and processing nodes, and human interaction with information systems. IO may have the greatest impact in peace and the initial stages of crisis.

5-22. IO is one of the many capabilities within the US military element of national power. IO can support the overall US government (USG) strategic engagement policy throughout the range of military operations. The effectiveness of deterrence, power projection, and other strategic concepts is greatly affected by the ability of the US to influence the perceptions and decisions of others. In times of crisis, IO can help deter adversaries from initiating actions detrimental to the interests of the US, its allies, or the conduct of friendly military operations. If carefully conceived, coordinated, and executed, IO can make an important contribution to defusing a crisis; reducing the period of confrontation; enhancing the impact of informational, diplomatic, economic, and military efforts; and forestalling or eliminating the need to employ forces in combat. Thus, both IO in peacetime and IW in crisis or conflict, at both the national-strategic and theater-strategic levels, require close coordination among a wide variety of elements of the USG, to include the Department of Defense.

5-23. The information operations model depicted in Figure 7 is a framework for how to think about actions to seize and secure information superiority.

- First, it asserts that a set of complex functions occur within an organizational and technological architecture to collect, process, archive, and disseminate information.

- Second, it shows that a comprehensive set of **defensive operations**, both active and passive, will ensure we maintain an uninterrupted information exchange.

- Next, it illustrates an extensive range of **offensive operations** to attack an adversary's ability to collect, process, disseminate, and use information. These include the full range of military and other government agency capabilities.

- Finally, it distinguishes the fact that some operations, such as disaster relief and humanitarian assistance, use **other information operations** to inform or influence to support mission accomplishment as well.

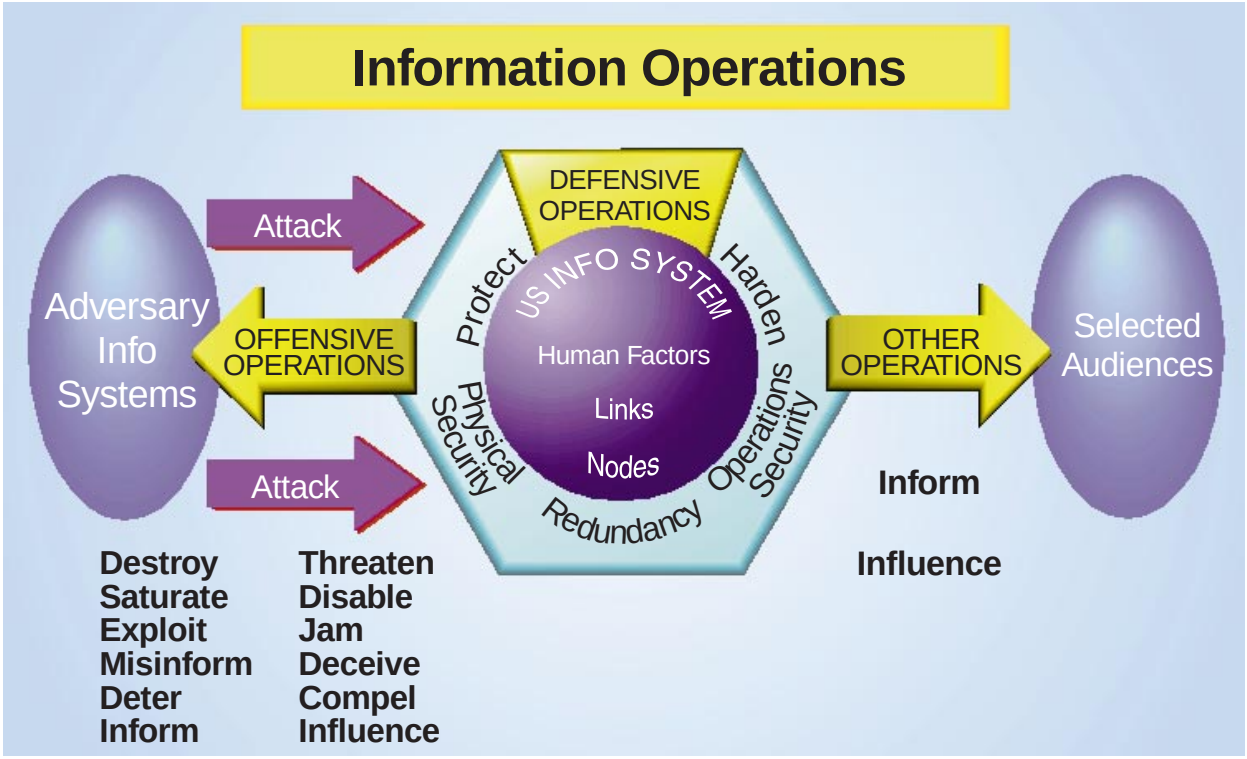

Figure 7. Information Operations—A Model

5-24. Detailed descriptions of joint force 2010 architectures and capabilities are discussed in *C4I For The Warrior* and the Advanced Battlespace Information System (ABIS) report.

Challenges

5-25. With clear hindsight we can see that we have entered a new era. But only with veiled foresight are we discovering the wide range of new opportunities, seemingly endless possibilities, and significant vulnerabilities that it provides. Information Age technologies are revolutionizing the ability to collect, process, and disseminate information, and to develop the battlespace capability to "know yourself, and know your enemy" as never before. In the process, these revolutionary and previously unachievable capabilities are forcing us away from traditional notions about command, organizational design, and perhaps even the conduct of operations.

5-26. By 2010, a generation of warriors who first saw the glimmerings of Information Age warfare during the late 20th century will be the leaders of our armed forces. Due primarily to information superiority, ours will be a far different force than when they began their service. Implied is the need to develop new doctrine and supporting education and training. It requires expanded thought about information collection—how and where to position sensors and related computer systems, networks, and data bases—and information vital to operational planning and execution.

5-27. Joint force 2010 must have a well-developed, integrated, and seamless decision-making architecture. It should leverage emerging capabilities such as artificial intelligence and micro technologies to support more efficient information fusion and multimedia, multifunctional processors capable of near real-time decision support; data compression technologies to increase speed and efficiency;

and "computing-before-communicating" techniques to better utilize available bandwidth and protect information.

5-28. One of our greatest challenges is making the right decisions about investments in information technologies and human capabilities to best employ those which will provide the greatest possible leverage from current or projected battlespace systems. Since the end of the Cold War, wise investment decisions have resulted in a tremendous improvement to our battlespace capability as well as the capability to conduct a wide range of military operations. Weapons systems have become more lethal, agile, and survivable; can engage at more distant ranges; and have greater protection. We have leveraged proven applications of commercial technologies to improve many battlespace functions and have enlarged our capability with nonlethal technologies. And we have institutionalized methods and mechanisms to experiment with new concepts and technologies to make informed decisions for the future. We must continue our investment in information technologies, sensors, and simulation efforts to increase this battlespace superiority, making joint force 2010 persuasive in peace, decisive in war, and preeminent in any form of conflict.

Potential Threats

5-29. We must remain aware that Information Age technologies are not the exclusive domain of the United States or its allies. Cutting-edge technologies are available to any and all who have the money—or leverage—to obtain them. The ever-increasing proliferation and accessibility of information portend increasingly sophisticated capabilities. Those capabilities, even in small quantities, could give a potential adversary temporary or localized battlespace parity or asymmetric advantage.

5-30. The destruction or impairment of our ability to collect, process, and disseminate information—within the nation or the battlespace—is an obvious objective for an adversary. Threats to our information infrastructure are real. With ever-increasing regularity, intrusions into supposedly secure systems, including banks, businesses, and government systems, have resulted in a range of problems from low-level information pilferage and manipulation to much more serious and potentially dangerous paralysis of certain information-related functions.

5-31. The level or intensity of information operations conducted against the United States will depend on the nature of the conflict. During peacetime, information operations may be limited to malicious intrusions, unauthorized access or minor manipulation and exploitation of information. But as a crisis escalates, we should expect attacks against our information systems to increase. Fixed sites, both within the United States and in other forward deployed areas, as well as deployed forces themselves, will all be targets of overt aggression and covert actions. This will require a new set of ideas about protecting vital assets that before were considered "in the rear area".

5-32. Our reliance on information and information systems will continue to grow. Threats will become more complex, sophisticated, and perhaps more clandestine. Meanwhile, the rapid introduction of advanced technologies makes possible the means for the unexpected appearance of asymmetric capabilities from a wide range of potential adversaries. Whether an individual hacker seeking a challenge, a vandal seeking revenge, an organization driven by ideological motivation, or another nation attacking our information systems, the lesson is that information can be our vulnerability as well as our strength.

5-33. Although we will continue to achieve new levels of technological capability, *JV 2010's* prediction that while "the friction and the fog of war can never be eliminated, new technology promises to mitigate their impact" will remain true. War is and will remain a human enterprise, and its nature and character will, in the end, always be influenced by human strength and frailty. We will strive to mitigate the effects of fog and friction but remain aware that they will continue to one degree or another.

Conclusion

5-34. Certain innovations profoundly affect the conduct of war. They grant the nation that correctly recognizes and leverages them the ability to seize a specific battlespace advantage. We recognize that Information Age technologies create some unique opportunities for the United States and its potential adversaries. However, while we are, for the present, a leader in developing and applying information superiority to the conduct of military operations, we are not alone in this contest. Unlike other military capabilities whose costs continually rise, information technologies will be increasingly available to more and more potential adversaries—if not today, then certainly by 2010. Therefore, we must remain vigilant to rapid changes and how we or our potential adversaries might apply them to future conflict in order to produce a joint force capable of Full Spectrum Dominance.

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Chapter 6

JV 2010's New Operational Concepts

Our forces have been largely organized, trained, and equipped to defeat military forces of our potential adversaries. Direct combat against an enemy's armed forces is the most demanding and complex set of requirements we have faced. Other operations, from humanitarian assistance in peacetime through peace operations in a near hostile environment, have proved possible using forces optimized for wartime effectiveness.

Joint Vision 2010

Introduction

6-1. *JV 2010* is founded on a fundamental belief that, "The primary task of the armed forces will remain to deter conflict—but should deterrence fail—to fight and win our nation's wars." *To fight and win our nation's wars*—in nothing else we do are preparations for engagement so exacting, errors in judgment so unforgiving, or consequences of failure so terrible. Organizing, equipping, and preparing our armed forces of the early 21st century to defeat our enemies in battle is, therefore, our most challenging task. To this end, *JV 2010*'s four new operational concepts will help transform our future joint warfighting capability.

Contents

- **Introduction**
- **Decisive Operations**
- **The New Concepts**
  - Dominant Maneuver
  - Precision Engagement
  - Full-Dimensional Protection
  - Focused Logistics
- **Full Spectrum Dominance**
- **Conclusion**

6-2. While we stand ready to fight and win, we also know that we will be called upon to execute a wide range of other military missions that may or may not involve combat. Our aim, therefore, is not only to prepare our armed forces to fight and win against any adversary, but also to posture them with an inherent versatility, tailorability, and agility that will allow us to use the new concepts to be decisive in any mission across the full range of military operations. The aim is not new, however, the capabilities that enable these four new operational concepts are new.

6-3. This chapter, which centers on discussing the new operational concepts, has three major parts. It first introduces the notion of **decisive operations**—the combining of the concepts in the right balance in any single operation to accomplish the mission. The chapter then discusses each of *JV 2010*'s four new concepts in greater depth. The final section describes the relevance of these concepts across the full range of operations to achieve **Full Spectrum Dominance**, providing us with the key characteristic we seek for our joint force in 2010.

Decisive Operations

6-4. The proper, dynamic combination of the new concepts will allow the JFC to protect and sustain the joint force and achieve decisive effects from forces more widely dispersed than ever before. Each concept's individual contributions are not nearly so important as the cumulative effect achieved when they are properly balanced. Whether war or in other military operations, the JFC balances operational concepts to conduct **decisive operations**.

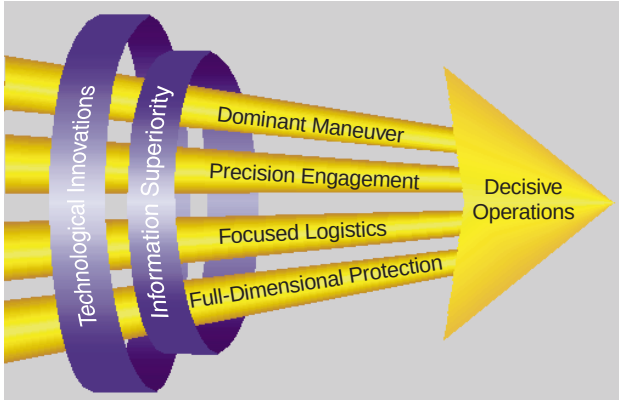

Figure 8. Decisive Operations

6-5. Although the new operational concepts can be defined and explained independently, they are mutually supportive and applied in operations interdependently. The JFC, for example, cannot conduct dominant maneuver, full-dimensional protection, and precision engagement for extended periods without focused logistics. Likewise, focused logistics is not possible in combat operations without the umbrella of full-dimensional protection. The nature of any particular mission will require a unique combination of the concepts and their inherent capabilities. In combat, for example, the capabilities inherent in the concepts are weighted toward providing overwhelming combat power. In a noncombat operation, application would be weighted toward nonlethal capabilities while capitalizing on the agility, mobility, and versatility of the same forces used in combat operations. Joint operational art, discussed in Chapter 7, will help the JFC find the right balance and blend to successfully accomplish the mission.

6-6. In any operation, the JFC seeks to dominate the adversary or, when no adversary is present, to control the situation. In order to be decisive—to accomplish the mission as quickly, effectively, and efficiently as possible—in any operation, the JFC seeks to conduct decisive operations—the dynamic combination of the new concepts. **This ability to conduct decisive operations across the range of military operations is Full Spectrum Dominance.**

6-7. The new operational concepts require information superiority that provides accurate, comprehensive, and timely information about many factors, including—friendly forces; the enemy; allied and coalition status and capabilities; the battlespace, including infrastructure, terrain, weather, climatology, hydrology, electromagnetic spectrum, and so forth; operational patterns; and the location and status of agencies, NGOs, and PVOs. While each situation will have unique aspects, decisive operations will require the abilities—

- Of people, systems, platforms, and munitions to conduct 24-hour, multidimensional operations under any weather conditions.

- To operate seamlessly between and among all components, agencies, and coalition partners.

- To sustain high-tempo operations throughout the battlespace from widely dispersed locations.

- To quickly and smoothly integrate reserve and active component capabilities into a total force package.

- To be balanced in the right proportions to be decisive in any operation across the full range of military operations.

- To employ their capabilities from supporting theaters—and directly from CONUS if required—without significant staging and reconfiguration requirements.

The New Concepts

6-8. *JV 2010* asserts that, "Enhanced command and control and much improved intelligence, along with other applications of new technology, will transform the traditional functions of maneuver, strike, protection, and logistics. These transformations will be so powerful that they become, in effect, new operational concepts."

Dominant Maneuver

Dominant Maneuver

. . . the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, sea, land, and space forces to accomplish the assigned operational tasks.

Joint Vision 2010

6-9. Current joint doctrine describes maneuver as, "Employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage . . . in order to accomplish the mission." *JV 2010* asserts that, "Through a combination of asymmetric leverage, achieved by our positional advantages, as well as decisive speed and tempo, dominant maneuver allows us to apply decisive force to attack enemy centers of gravity at all levels of war and compels an adversary to either react from a position of disadvantage or quit." Like traditional maneuver, dominant maneuver also seeks a positional advantage relative to the enemy. But where maneuver seeks to position traditional maneuver forces to mass firepower, *dominant maneuver* seeks to position an array of air, land, sea, and space capabilities to mass a broader range of effects. The JFC will be able to keep forces involved in dominant maneuver in widely dispersed locations until the right time, then concentrate their capabilities in an intense blow against enemy decisive points and centers of gravity, and rapidly redisperse forces if necessary. This is a tremendously different and much more powerful concept built on two prime enablers: advanced technologies and information superiority.

6-10. Advanced technologies will provide a range of improvements and an array of new

capabilities. Much-improved munitions, propellants, weapons, and platforms have the potential to significantly increase both individual and unit *lethality* and provide new, nonlethal capabilities as well. Innovations in combat identification, multispectral obscurants, stealth technology, reduced electromagnetic and thermal signatures, and improved armor will dramatically affect *survivability*. *Mobility* will improve greatly due to advances in obstacle detection and neutralization; innovations to enhance or enable 24-hour, all-weather, contaminated environment operations; and improved power plant technologies. Additionally, organizations designed to maximize the full potential of these new capabilities will achieve new levels of organizational *agility* and *versatility* that will allow the joint force to quickly adapt to changing battlespace conditions and respond to a wide array of missions. Collectively, these innovations and enhancements will provide unprecedented capabilities for achieving dominant maneuver in 2010.

6-11. Although critical, these innovations and improvements alone will not transform maneuver into dominant maneuver. Information superiority is what makes dominant maneuver a new concept; the combination of these new capabilities with information superiority will enable dominant maneuver. Information superiority will provide our forces information that leads to an unprecedented level of battlespace awareness. It also will enable a previously unachievable command and control capability that will allow the JFC to rapidly mass effects—and forces when necessary—anywhere in the battlespace to outpace and overwhelm the enemy.

6-12. Dominant maneuver will generate a new battlespace framework that differs from the current construct of "close, deep, and rear." It will replace the notion of fighting deep to influence the close fight with a more sophisticated concept that asserts the simultaneous application of combat power throughout the battlespace has an exponentially greater effect and achieves decisive results more quickly. It replaces the associated linear battlespace construct with a new nonlinear model that does not require a contiguous array of forces. Information-based control versus physical control of force and forces will have a tremendous effect on tempo of operations and the rapid massing of effects throughout the battlespace. Likewise, it expands traditional ideas of "mass" with the notion that it can now be achieved by massing *effects* from dispersed locations as well as massing forces themselves.

6-13. Information superiority will allow information-based control to displace physical control of forces—characterized by contiguous force arrays and physical or geographic boundaries—that will make physical seams between forces or areas of operations less relevant. Many traditional graphic control measures—such as the fire support coordination line and unit boundaries—that are necessary to maintain order in the battlespace can be supplanted by information-based methods that will contribute to rapid massing of force and forces. Accurate, real-time, and more complete battlespace awareness will enable timely decisions to create or leverage windows of opportunity. This will promote seamless integration of both forces and capabilities while limiting the potential for fratricide. Automated decision aids will greatly facilitate routine decision making and significantly improve the ability to outpace and overwhelm the enemy.

6-14. Dominant maneuver will allow deployable, agile, and versatile forces trained for combat to prepare quickly for noncombat

missions and apply their inherent overwhelming capabilities to the full range of military operations. In noncombat situations, they will have the intrinsic ability to seize and maintain control of any situation by rapidly responding to emerging challenges and opportunities. Information superiority will provide the means to precisely assess any situation and to plan and execute responses across the entire range of operations. Just as they are in war, decisive operations in other military operations will be achieved through the application of specifically tailored capabilities at the decisive point and time.

6-15. In addition to the common characteristics mentioned earlier, dominant maneuver is characterized by—

- The ability to mass effects and forces rapidly from widely dispersed locations.
- Strategically and operationally mobile forces, "ready on arrival."
- Accurate, effective, and sustainable delivery systems for direct and indirect fires and other effects, both lethal and nonlethal, from short and long ranges.
- Highly lethal, mobile, agile, and versatile organizations; adaptable maneuver units that can be tailored to task for any operation across the range of military operations.
- Precise, immediate combat/operational assessment capability.

Precision Engagement

Precision Engagement

. . . will consist of a system of systems that enables our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required.

Joint Vision 2010

6-16. The roots of *precision engagement* are imbedded in its predecessor strike. This new operational concept provides the capability to precisely apply effects and or forces to achieve desired operational results. It encompasses more than just attacking targets with advanced weapons systems and high-tech munitions; it also uses a wider range of capabilities. Inherently, it includes actions to identify and locate operational targets, determine the desired effect, select and combine the right forces, engage the operational objective, assess results, and reengage if necessary.

6-17. Precision engagement focuses primarily on operational effect, not on the means by which it is achieved. Its capabilities can be applied in war and in other military operations. The JFC, for example, could employ forces, an array of weapons and munitions (to include nonlethal means), a range of information operations, or a combination of those means at decisive points and times as part of decisive operations.

6-18. Technological improvements and innovations that provide increased lethality and accuracy enable precision engagement. Many of these capabilities have application across the range of military operations. Likewise, information superiority enables precision engagement, linking intelligence, surveillance, reconnaissance, and target acquisition with effective command and control. It provides the means to rapidly and accurately identify and assess targets or objectives and to select and apply the precise force to achieve the desired effects. Precision engagement emphasizes responsiveness and accuracy to achieve operational objectives. This new concept will result in less risk, less collateral damage, higher probability of success, and overall economy of force across the full range of military operations.

6-19. Well-equipped forces with agile platforms and lethal munitions characterize precision engagement. Platform agility makes its capabilities applicable at the low end of operations without having to apply lethal munitions. This means that many of the systems we might use to enhance target identification and acquisition should have application at the low end to help increase our situational awareness. Precision engagement is also characterized by—

- The ability to engage targets more responsively and accurately from increasingly longer ranges.
- The ability for responsive, multidimensional engagement that matches capabilities to desired effects in any operation across the range of military operations.
- The ability to provide precise, immediate combat/operational assessment and to rapidly reengage if required.
- The ability to minimize collateral damage through precise targeting and accurate, effective delivery systems and munitions.
- A flexible, time-critical targeting architecture that includes rapid identification and continuous, real-time, sensor-to-shooter links.

Full-Dimensional Protection

Full-Dimensional Protection

The multilayered offensive and defensive capability to better protect our forces and facilities at all levels from adversary attacks while maintaining freedom of action during deployment, maneuver and engagement.

Joint Vision 2010

6-20. To achieve and maximize dominant maneuver and precision engagement, commanders must enjoy the advantage of freedom of action. This is achieved only by protecting our forces, facilities, and lines of communication (LOCs). *Full-dimensional protection* aims at control of the battlespace to ensure our forces are protected from the full range of threats coming from any dimension in order to maintain freedom of action. The full-dimensional aspect of this concept means it applies across the range of military operations. The level of protection afforded the forces should be the same regardless of the operation or the operational environment.

6-21. Our adversaries in future conflicts may not be content to conduct operations only within

their countries or regions. They may seek proactive and asymmetrical ways and means to attack our forces and capabilities where they are most vulnerable. We should expect them to target our forces as they arrive at regional ports and move along intertheater LOC. They may also attack forces preparing to deploy from CONUS or from bases in supporting theaters. A knowledgeable enemy could target the "rear" elements of split-based intelligence, logistics, and command and control resources. They also may try to disrupt our strategic communications means, attack host-nation support (HNS), and coerce potential coalition partners to remain neutral. They may even use terrorist attacks within the United States to influence public will. Full-dimensional protection, therefore, must extend well beyond the immediate battlespace. It relies not only on JTF protection capabilities but those of every commander providing resources to the operation. Considerations for protecting the force apply to any military operation we undertake.

6-22. Like the other new concepts, full-dimensional protection requires information superiority to provide battlespace awareness in all dimensions. It integrates the capacity to see the battlespace, to discriminate friend from foe, to anticipate and rapidly counter enemy actions, and to quickly disseminate threat information to all forces. Information operations support this effort by protecting our information systems and processes while denying the adversary similar capabilities. Protection of our information and information systems is important across the entire range of military operations.

6-23. This new concept provides multilayered protection against a broad range of threats, requiring a full range of offensive and defensive actions such as joint counterair to achieve integrated, in-depth theater air and missile defense, and information operations to achieve and maintain information superiority. Manned and unmanned platforms will contribute to the grids of sensor and weapons capabilities so that the reach of full-dimensional protection can extend wherever friendly forces are in the battlespace. Passive protection measures include enhanced awareness of potential threats—gained through information superiority—enhanced deception and camouflage measures, increased individual protection, dispersed operations, improved electronic countermeasures, and a joint restoration capability against the effects of WMD. New sensors and information dissemination systems will be deployed to detect chemical or biological attack at great ranges and provide warning to specific units that may be affected. Service-unique capabilities will be leveraged to form a seamless joint protection architecture throughout the battlespace. This umbrella of protection will cover our military forces, critical host-nation facilities and areas, and coalition forces as required.

6-24. A wide range of offensive and defensive actions to control all dimensions of the battlespace, including both active and passive protection measures, is a characteristic of full-dimensional protection. Even at the low end of operations, a level of offensive capability may be necessary to preclude having to react after the fact to a threat. Operating at the low end does not mean we must allow a threat to act first before we respond. In addition, full-dimensional protection is characterized by the ability to—

- Identify and track friendly vulnerabilities—potential targets for an adversary.

- Discriminate precisely between friendly and enemy elements at all levels in order to prevent fratricide. This same level

of discrimination is necessary to enhance low-end operations like humanitarian assistance to precisely differentiate NGOs, PVOs, friendly factions, unfriendly factions, and coalition members.

- Reduce risk and limit non-battle casualties through a wide range of other inherent measures, such as sophisticated safety and health initiatives.

Focused Logistics

Focused Logistics

. . . the fusion of information, logistics and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment directly at the strategic, operational and tactical level of operations.

Joint Vision 2010

6-25. While the Persian Gulf Conflict provided a glimpse of the future in many ways, it also demonstrated the limitations of much of our Industrial Age logistics capabilities. Logistics systems and practices that were "good enough" for a Cold War environment are not adequate for operations in the Information Age. The logistics system of 2010 must be as responsive and agile as the force it supports. Information Age technologies—particularly information-specific technologies that provide information superiority—will enable the new concept of *focused logistics* and our ability to project and sustain the 2010 force across the range of military operations.

6-26. *JV 2010* describes focused logistics as an operational concept that is, "... the fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical level of operations." Once achieved, focused logistics will reduce our reliance on large stockpiles and inventory levels, redundant logistics infrastructure, and cumbersome support systems. By 2010, improved transportation capabilities and a range of other technological innovations—coupled with an unprecedented command, control, communications, and computer architecture—will dramatically alter traditional logistics. Our ability to know the location and status of each person, supply item, piece of equipment, and unit in near-real time will allow us to achieve and maintain precise asset visibility throughout the entire logistics pipeline and within all logistics functional areas. This level of knowledge will enable a logistics structure that is as flexible and responsive as the force it supports.

6-27. To meet 2010 challenges, logistics forces will be tailored-to-task, agile, and readily deployable. The integrated logistics system of 2010 will be more anticipatory, providing commanders with the supplies and services they need on time, every time. Its information processing systems will be an integral part of the commander's command and control system. Operational planning will be dramatically improved as new logistics information systems and data bases promote collaborative mission planning. These new systems will not only enhance the ability to quickly and accurately generate logistics estimates for alternative COAs, but also translate the commander's concept of operation directly into logistics terms with the aid of decision support aids. These advanced

systems will allow us to achieve an integrated environment in which the operators, logisticians, and planners at all echelons will coordinate their activities across organizational boundaries. This networked environment will significantly reduce planning time while providing a more accurate logistics estimate to the decision-making process during COA development and comparison. The result will provide the JFC with an ability to rapidly tailor deployment packages. During execution, these advanced systems will allow us to track people, equipment, vehicles, and supplies from point of origin to ultimate destination, and refine the plan as required. Moreover, they will provide tools with which to assess unit readiness, monitor supply consumption, and automatically initiate replenishment to a predetermined level based on operational tempo and subsequent operational requirements.

6-28. Logistics functions will transition from rigid, vertical organizations of the past to integrated, modular, and specifically tailored combat service support (CSS) packages. Service and defense agencies will work with the civilian sector to take advantage of advanced business practices, distribution processes, materiel management programs, and global networks. A total force consisting of active and reserve core CSS capabilities that are prepared for seamless integration into joint operations will provide focused logistics to meet any requirement. Integration of information technologies will enhance airlift, sea lift, and prepositioning capabilities that will lighten deployment loads, exploit pinpoint logistics delivery systems, and extend the reach and longevity of systems currently in the inventory. The combined effect of these improvements will be a smaller, more efficient deployment force, one possessing a much-reduced logistics footprint and capable of 24-hour, all-weather operations. This reduced footprint will not only increase mobility, supporting our ability to conduct dominant maneuver, but also decrease our exposure to enemy action, contributing to full-dimensional protection.

6-29. Technological innovations within combat and combat support organizations also will contribute to focused logistics. For example, smaller fighting elements with easily maintainable equipment, made of more durable materials which share repair-part commonality will significantly reduce the volume and complexity of the supply system. Precision weapons with increased lethality and fuel-efficient systems will reduce demands on the sustainment infrastructure. Semiautomatic, built-in diagnostic sensors will anticipate failure and initiate resupply or replacement activities before failures occur. Further, a vast array of advances in human support and medical care technologies, including telemedicine, will enhance the survivability of the force.

6-30. Advanced information systems and other technological enhancements will enable many new concepts, such as modularity, velocity management, and battlefield distribution, that will make up focused logistics. These will place a premium on efficiency without compromising effectiveness, resulting in unprecedented asset visibility, accountability, responsiveness, and efficiency. The cumulative effect will be a seamless logistics architecture—one that is transparent to the user—with direct depot-to-user capability.

6-31. Although the application of advanced technology and information superiority will significantly streamline logistics support, HNS will remain important to force projection. In most operations, host nation common supplies and services, airfield and seaport access, materiel-handling equipment, and facilities for

deploying troops, aircraft, and equipment will contribute immeasurably to joint force mission success. Without this key in-theater support, force sustainment will require additional US personnel and materiel resources as well as increased intertheater and intratheater lift.

6-32. In addition to the common characteristics mentioned earlier, focused logistics is characterized by—

- Agile organizations with advanced capabilities that allow for a smaller, in-theater logistics "footprint" and reduced logistics "tails" at all echelons.

- Sustained, continuous, flexible logistics operations—tailored for optimum support—from the source of supply to the point of need.

- High-speed, mobile capabilities that can be rapidly deployed, recovered, and redeployed to provide timely delivery of supplies and services to, from, and within the operations area regardless of the theater infrastructure situation. This includes improved configuration of and access to prepositioned assets.

- The capability for rapid and accurate logistics assessment and analysis, precise asset visibility—location, identification, status, and reporting.

- Visibility of commercial, multinational, NGO, and PVO capabilities and sources of supplies and services.

Full Spectrum Dominance

6-33. The convergence of the tremendously potent new operational concepts produces an overwhelming level of joint combat capability. Nonetheless, operations associated with peacetime engagement, deterrence, and conflict prevention remain the most likely use of our 2010 forces. Although the positive implications for enhancing our capabilities across the range of military operations seem obvious, we cannot assume that all new concepts will be equally represented in all operations. Many combat capabilities—such as those resident in dominant maneuver, precision engagement, and full-dimensional protection—will not be required in less hostile operations such as disaster relief. Likewise, the extensive theater missile defense capabilities of full-dimensional protection may not be at all relevant to foreign humanitarian assistance or to the security assistance component of nation assistance.

Full Spectrum Dominance

The ability to dominate any adversary and control any situation in any operation across the range of military operations.

6-34. The JFC, however, can apply the new concepts and key enablers in varying degrees and combinations, even in relatively benign operations. They will provide the ability to apply force rapidly and in a discriminate manner to achieve decisive effects across a broad range of missions. For example:

- The 24-hour, all-weather, and extended-range capabilities associated with each new concept will greatly decrease our response time in time-sensitive operations.

- Focused logistics will continue to ensure delivery of the precise amount and types of supplies needed by US joint forces as well as meeting requirements associated with humanitarian assistance, peace operations, disaster relief, and other operations. This concept will allow the JFC to respond more rapidly and efficiently to even benign operations that rely heavily on our logistics capabilities, supplies, and services.

- Tactical mobility and organizational agility—essential components of achieving positional advantage in dominant maneuver to overwhelm an enemy combat force—will enhance the JFC's ability to place forces in positions of control in counterdrug, counterterrorism, or peace operations. The wide range of technological innovations and improvements, coupled with information superiority, yields capabilities that will strengthen the JTF's ability to control rapidly an unruly populace, hostile paramilitary forces, or parties to an unstable truce and keep a potentially explosive situation from escalating.

- Information superiority will assist in determining the location of guerrilla groups in counterinsurgency operations. When actual target destruction is required, the accuracy and efficiency of our systems and platforms will prevent unwanted collateral damage. The precision engagement concept will help us select the right capabilities for the mission, determine the right time and place to apply them, assess the level of success, and "reengage" with the same or other capabilities if required. This will facilitate both efficiency and effectiveness.

- Any military operation places military forces at some degree of risk. Full-dimensional protection, applied in varying degrees according to the mission, seeks to reduce or eliminate that danger. As in combat operations, the application of full-dimensional protection in humanitarian assistance aims at maintaining the JFC's freedom of action during deployment to and employment in the joint operations area (JOA). In this and other military operations, protection could extend beyond the JTF to US agencies, NGOs, and PVOs that may be committed to the effort. It always extends, even in a peacetime operation, to the various joint force systems that provide information superiority and battlespace awareness. We must ensure that no one is "reading our mail," which may affect our ability to conduct current or future operations. That information could be valuable to potential adversaries if they believe we may be distracted by other operations. Organic individual, vehicle, and small-unit protection capabilities will benefit our forces even in apparently benign military operations. But, as the terrorist bombings of US barracks in Beirut, Lebanon in 1983, and Dhahran, Saudi Arabia in 1996 demonstrate, commanders must always remain fully informed of the requirements for protecting the force.

6-35. While some requirements in 2010, such as military-to-military contacts and security assistance, will be relatively focused and routine, most others will be unique, differing from mission to mission, and often will combine various combat and noncombat operations. The JFC seeks to achieve decisive operations during any specific mission. A single joint force could exemplify Full Spectrum Dominance during the course of a single deployment as it meets a variety of operational requirements, often concurrently. The joint force, for example, might deploy initially to participate in coalition peace enforcement operations. These could involve large-scale combat operations in which the JFC would employ the force using the right combination of the four new concepts and supporting capabilities for that particular mission. The JFC could concurrently be required to conduct an evacuation of US civilians from an adjacent area threatened by the belligerents. As the fighting settles, the joint force could be called on to protect refugees as they move from the contested area or perhaps even establish and run refugee camps. This would involve humanitarian assistance operations for which the JFC is asked to provide additional protection to various NGOs and PVOs that come to assist.

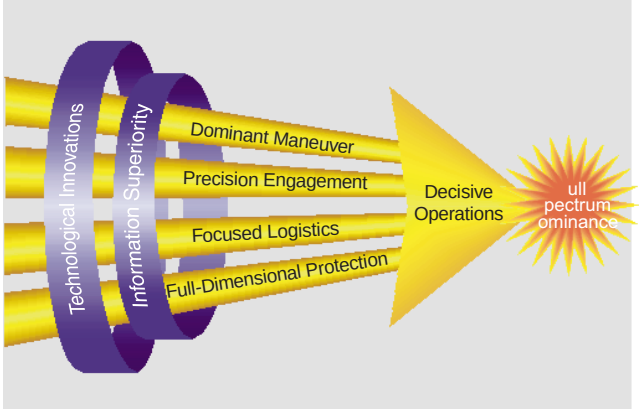

Figure 9. Full Spectrum Dominance

6-36. The 2010 JFC should be able to balance the new concepts to conduct decisive operations to accomplish any of these specific missions. **The ability, then, to conduct decisive operations across the range of military operations is Full Spectrum Dominance**. This, in essence, represents a quantum leap over current levels of effectiveness in joint operations. *As JV 2010* says, "Full Spectrum Dominance will be the key characteristic we seek for our armed forces in the 21st century."

Conclusion

6-37. The application of *JV 2010*'s four new operational concepts will lead to decisive operations. The balance of the concepts will change from operation to operation according to many factors, including the nature of the operation, the COA selected by the JFC, and the actions of the adversary. These concepts are relevant across the full range of military operations. Collectively, they will allow us to achieve Full Spectrum Dominance, the key characteristic we seek in our 2010 joint forces.

Chapter 7

Joint Operations in the Information Age

The Nature of modern warfare demands that we fight as a joint team. This was important yesterday, it is essential today, and it will be more imperative tomorrow.

Joint Vision 2010

Introduction

7-1. Current joint doctrine provides a solid basis for conducting unified and joint operations given today's capabilities. For example, Joint Pub 3-0 discusses campaign planning and describes how the JFC considers various elements of operational art to think about how to achieve strategic and operational objectives. Chapter 6 discussed characteristics and considerations associated with the new operational concepts. This chapter continues the theme by discussing 2010 operations from the perspective of current joint doctrine conventions such as the elements of joint operational art and joint command and control. This should help clarify *JV 2010*'s new operational concepts within the context of current thinking about planning and conducting unified and joint operations.

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- **Operational Stages**
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A 2010 Strategic Context

7-2. A future United States *NMS*—with broad components generally equivalent to today's peacetime engagement, deterrence and conflict prevention, and fight and win—will provide the national strategic context for employment of the US military in 2010. The United States will continue to maintain a world-class strategic and operational deterrent capability. However, deterrence against non-states or rogue actors may be difficult to achieve. Therefore, innovative concepts need to be developed to defend against and deter such groups.

7-3. Power projection and overseas presence will likely remain the fundamental strategic concepts for our future force. Requirements for overseas presence will not have diminished in 2010. The United States will likely have to use a combination of permanently based overseas forces and temporary and rotationally deployed forces to achieve credible presence, meet peacetime engagement and conflict prevention challenges, provide contingency response, and help maintain US influence. Such on-scene forces, together with power projection from the US or supporting theaters achieved through rapid strategic mobility, will enable the timely response critical to our deterrent and warfighting capabilities.

7-4. Within a theater, future unified and joint operations will continue to be under the theater-strategic purview of combatant commanders, who will determine strategic and operational objectives and constitute joint forces to achieve them. The combatant commanders' subordinate JFCs will be able to employ a balance of the new operational concepts in any operation across the full range of military operations. A process of theater campaign planning—encompassing both deliberate and crisis action planning requirements—will remain a fundamentally sound approach to providing broad strategic concepts of operations. It will also provide sustainment for achieving multinational, national, and theater strategic objectives. When combat operations are involved, proper application of the new concepts may shorten a campaign, supporting the desire of the NCA to achieve decisive results while accomplishing objectives quickly and returning US forces to a peacetime deployment posture.

7-5. Strategic lift capabilities projected for 2010 will not eliminate the challenge of rapidly deploying sufficient forces and logistics for immediate, large-scale combat operations. A variety of technological, organizational, and other initiatives, however, will improve our ability to bring combat power to the battlespace more quickly than today. Combat units, for example, will pack more combat capability into smaller packages. They will be more survivable as a result of internal protection means such as better armor and stealth, full-dimensional protection provided by other joint force components and theater capabilities, and greatly increased battlespace awareness. They will be more fuel-efficient and will fire munitions that have greater probabilities of hit and kill per round. These and other improvements will combine so that the units moved by our strategic lift in 2010 represent greater relative combat power and reduced logistics support requirements per individual, unit, airframe, and ship. This will lengthen our operational reach and facilitate intertheater and intratheater strategic agility. It will also greatly enhance the NCA and theater commander's ability to respond to lower-level crises involving combat operations and other more benign requirements for military forces.

Task Organizing for Operations

7-6. Authorities will continue to form JTFs to accomplish those missions which go beyond routine peacetime engagement activities, such as military-to-military contacts and security assistance. These forces could occasionally be larger, such as a subordinate unified command, with a broader continuing purpose. As they do today, these joint forces will combine capabilities under Service and functional components that have specific operational responsibilities. Within

the joint force, the JFC will seek organizational options and concepts of operation that most efficiently and effectively accomplish the mission.

7-7. A variety of initiatives will continue to improve the JFC's ability to rapidly constitute and more effectively employ the JTF. Foremost among these initiatives is pursuit of information systems capabilities—hardware, software, and architecture—and other information superiority technologies that will greatly enhance the C2 function. This initiative considers the need, during design and procurement of information systems, for a common architecture and seamless interoperability among a joint force's components. Information systems that are "born joint" will greatly facilitate joint interoperability. Following are some of the potential impacts on 2010 joint force organization and operations.

- The 2010 JFC will be able to assimilate a wide variety of capabilities from across the joint community, including the RC, into the JTF and employ them more quickly than today, much as emerging "plug-and-play" technology assimilates computer components for immediate use. These same benefits will also enhance the JFC's ability to operate within coalitions and actually integrate multinational forces into the JTF.

- Enhanced information systems and training capabilities will allow the JFC, the JTF staff, and component commanders, even if physically separated, to "meet" in a virtual environment for discussions, training, and rehearsals. These same capabilities, when meshed with information superiority, could allow the JFC to deploy to the JOA with a smaller staff, linking back to support in theater or even in CONUS. This is particularly true if the staff function is to process and provide information rather than control immediate operations.

- The JFC will be better able to organize the JTF to employ resident and supporting capabilities to accomplish the mission. This organization will normally combine Service and functional components, and new functional components may emerge. Once operations begin, sophisticated information systems will allow the JFC to quickly shift JTF capabilities between commands, if required.

- Information superiority will provide the JFC and components with an accurate, common, relevant picture of the situation at any time. This will facilitate task organization changes necessary to respond to unexpected situations and help component commanders operate within the JFC's intent.

Operational Art: Bringing The Concepts Together

7-8. Joint operations require a common frame of reference and guiding principles to integrate and focus joint capabilities toward common objectives. Joint operational art—the design and execution of theater and subordinate campaigns and major operations—establishes the foundation and the framework that promote unity of effort and tie tactical and operational actions

to strategic objectives. Obviously, the context for each campaign and major operation is unique, reflecting a variety of factors such as the nature of the operation, the political aims, restraints, and the type of adversary. Operational art, however, helps frame each unique operation. In the future, joint operational art will help the JFC balance the application of the new concepts in ways that balance the right combination of capabilities to meet any requirements across the range of military operations.

7-9. Projected 2010 capabilities will affect each of the 14 elements of operational art described in Joint Pub 3-0. The elements, in turn, impact how the JFC will combine *JV 2010*'s new operational concepts to achieve objectives. The JFC does so in a theater strategic and operational context that includes understanding the strategic aim and end state; political constraints; nature of the battlespace—topography, climatology, hydrography, infrastructure and culture—political and military partnerships and their inherent capabilities and limitations; and the nature and capabilities of the adversary. Following are changes to operational art elements that should result from technological innovation, information superiority, and *JV 2010*'s new operational concepts. Further exploration may show that some of these elements are not relevant and that 2010 operational art may require some new elements to help the JFC understand proper application of the four new concepts.

- **Centers of Gravity and Decisive Points**. In addition to having traditional characteristics and capabilities, both centers of gravity and decisive points may be cybernetic in the Information Age. Information superiority will help the JFC quickly and accurately identify centers of gravity and decisive points and assess the best ways and means for simultaneously attacking them in depth. Dominant maneuver and precision engagement, under a full-dimensional protection umbrella, will provide greater ability to attack centers of gravity directly, thereby shortening the campaign or operation.

- **Direct versus Indirect Approach**. To the extent possible, JFC's attack directly at enemy centers of gravity. However, a center of gravity is a source of strength that may be so well defended that indirect attacks against it may still be necessary. Information superiority will aid the JFC to identify the location and nature of enemy centers of gravity and assess the best ways and means of attacking it, whether the approach is direct or indirect.

- **Arranging Operations**. Information superiority and the new concepts could greatly affect how the JFC arranges operations to achieve objectives. For example, a conflict that today might require committing US forces in distinct defensive and offensive phases might require only a single "decisive operations" phase in 2010. Follow-on noncombat phases, such as those involving restoration activities and redeployment, will be much more efficient due to information superiority and focused logistics.

- **Simultaneity and Depth**. Capabilities in 2010 will affect simultaneity and depth in many ways. In combat operations, the JFC will want to keep the adversary off balance by engaging key objectives throughout the battlespace. This does not mean striking the adversary everywhere at once, but attacking enemy forces and functions to confuse and demoralize, placing more demands on the enemy than can be

handled. Operations extended in depth—in time as well as space (geographically)—shape future conditions and can disrupt an opponent's decision cycle. Information superiority will help the JFC precisely identify the most critical forces and functions to attack and assess the level of success, greatly adding to the efficiency of these operations. Operations not involving combat, such as a benign humanitarian assistance, can also require the JFC to think in terms of simultaneity and depth, using precision engagement and dominant maneuver in conjunction with focused logistics to provide positive results quickly.

- **Anticipation**. The key to effective planning, anticipation requires remaining alert for unexpected opportunities to exploit a situation. An adversary commander will always have a vote in the outcome of the operation. This is a function of the fundamental nature of war. Access to accurate and timely information will help the JFC determine likely enemy options and actions. However, we must always remember that the enemy is also thinking about the contest and will not always be predictable.

- **Synergy**. Just as it is difficult to view the relative contributions of air, land, sea, and space forces in isolation, it is also limiting to think about the four new operational concepts as independent actions or operations. To be successful, the JFC must continually balance the capabilities of all four, particularly in combat operations. In this way, the JFC projects focused capabilities without any seams or vulnerabilities for an enemy to exploit. Since synergy depends in large part on a shared understanding of the operational situation, information superiority and the resultant dominant battlespace awareness greatly affect it. While this may appear to be less significant in noncombat operations, a close relationship will remain between the four new concepts.

- **Balance**. Balance refers to the appropriate mix of forces and capabilities, as well as the nature and timing of operations. Information superiority and full-dimensional protection contribute greatly to maintaining friendly force balance. They and the other new concepts allow the JFC to quickly disrupt an enemy's balance by striking with powerful blows from unexpected directions and dimensions.

- **Leverage**. Achieving leverage—described in Joint Pub 1 as "the centerpiece of operational art"—is gaining, maintaining, and exploiting advantages in combat power across all dimensions. JFCs achieve leverage by arranging symmetrical and asymmetrical actions to take advantage of friendly strengths and enemy vulnerabilities and to preserve freedom of action for future operations. Dominant maneuver and precision engagement, in particular, greatly enhance the JFC's asymmetrical options. Full-dimensional protection will inhibit the enemy from launching effective asymmetric operations against the joint force. Information operations will provide new ways and means for symmetrical and asymmetrical attack.

- **Timing and Tempo**. The new concepts afford greatly improved warfighting capabilities that have the potential to

make units more physically agile, while information-specific technologies have the potential to make C2 much more agile as well. The overall objective is the capability to set and maintain a tempo of operations that outmatches any opponent, allowing the JFC to dominate the action, remain unpredictable, and operate beyond the enemy's ability to react. Information superiority will enable the precise timing for the employment of force and forces, greatly facilitating their application in time, space, and purpose.

- **Operational Reach and Approach**. Chapter 6 provides examples of technological innovations that will combine so that the units moved by our strategic lift in 2010 represent greater relative combat power and reduced logistics support requirements per individual, unit, airframe, and ship. This will increase operational reach and facilitate intertheater and intratheater strategic agility. For all but specific target-oriented operations, however, a finite range will exist beyond which the JFC cannot prudently operate. Innovative basing options—including operating forward from the sea and combining peacetime land and sea-based prepositioning with temporary contingency advanced bases—can place sufficient combat power within operational reach of an opponent and shorten exterior LOC. Moreover, information-specific technologies are providing unique opportunities to split base functions and capabilities—such as information management, logistics, and C2—traditionally done only in theater. This is based on the ability of a forward element to "reach back" to its base support. The supported force will have access to a wide range of assets and information previously attained by deploying a large supporting element to the area of operations. This lightens lift requirements and increases operational reach.

- **Forces and Functions**. Depending on the mission, the JFC can design operations to attack either enemy forces or functions, or both. The JFC uses knowledge about the adversary and the battlespace to determine enemy centers of gravity—which may be forces or functions—and to identify vulnerabilities which render these centers of gravity susceptible to attack and destruction. Information superiority ways and means, particularly information manipulation, computer viruses, and other information intrusions, will increase the JFC's capability to asymmetrically attack a variety of enemy targets.

- **Culmination**. Various factors should render culmination an unlikely situation in 2010 joint operations. Focused logistics, for example, should prevent culmination from lack of fuel, food, munitions, and repair parts. The capabilities associated with full-dimensional protection, precision engagement, and dominant maneuver will help the JFC build and maintain a much greater level of combat power, decreasing the likelihood of culmination. Information superiority will help keep the JFC aware of the battlespace. It will also help identify potential adversary culminating points in time and space, allowing the JFC to rapidly adjust operations accordingly.

- **Termination**. Knowing when to terminate military operations and how to preserve advantages is a component of both strategy and operational art. Therefore, it is necessary to understand, before operations, the NCA's intended outcome. Information superiority will help the JFC determine when termination is appropriate or imminent and will help the joint force monitor termination actions. The JFC will rely on capabilities of the four new concepts to keep an adversary in check during this unstable period and to enforce termination conditions. The NCA, friendly coalition leaders, or the combatant commander may make termination decisions on short notice for many reasons. *JV 2010* capabilities will help the operational level JFC maintain the organizational agility necessary to respond to rapidly changing strategic situations.

- **Risk**. Identified in Joint Pub 3-0 as a "planning consideration," risk is linked directly to the JFC's application of joint operational art. Information superiority and capabilities inherent in the four new operational concepts should reduce risk in 2010 operations. Nonetheless, technology and information are not substitutes for solid fundamentals. Whether combat or not, operations require thorough planning and rehearsal during preparation and inspired leadership during execution. Overconfidence in technology solutions could actually increase risk.

> *While we must do everything possible to leverage the power of advanced technologies, there are inherent limitations. Confronting the inevitable friction and fog of war against a resourceful and strong minded adversary, the human dimension including innovative strategic and operational thinking and strong leadership will be essential to achieve decisive results.*
>
> ***Joint Vision 2010***

Command and Control of 2010 Joint Operations

7-10. C2 is a properly designated commander's exercise of authority and direction over assigned and attached forces. It is the means by which the JFC synchronizes activities in time, space, and purpose to achieve unity of effort. It ties together other functions at all levels of war and echelons of command across the range of military operations. C2 is, perhaps, the single most important function in military operations.

- Command includes both the authority and responsibility for using resources effectively to accomplish assigned missions. It is the art of motivating and directing people and organizations into action toward a specific goal. It includes establishing a climate of teamwork that engenders success and demonstrating moral and physical courage in the face

of adversity. Command requires understanding the current state of friendly and enemy forces, visualizing future force relationships that must exist to accomplish the mission, formulating concepts of operations to achieve that state, clearly communicating commander's intent and orders to subordinates, and supervising execution through active leadership.

- Control is inherent in the exercise of command. To control is to regulate forces and functions to execute the commander's intent. Control allows staffs to assist commanders by computing requirements, allocating means, and integrating efforts consistent with the commander's intent and concept of operations. Control serves its purpose if it allows commanders the freedom to operate, delegate authority, place themselves in the best position to lead, and synchronize actions throughout the battlespace.

7-11. C2 binds the new operational concepts into a single concept so that the JFC can conduct decisive operations. Enabled by a coherent and timely knowledge of the battlespace, C2 will allow the JFC to properly blend them in the right mix for any assigned mission. This blending will actually be embodied in the JFC's efforts to make the right decisions in terms of planning, directing, coordinating, and controlling forces. The decisions made by the trained, experienced, fully informed 2010 JFC will result in the application of these new concepts in the right proportions, to accomplish the assigned mission, whether or not combat operations are involved.

The Command And Control Function

By command, I mean the general's qualities of wisdom, sincerity, humanity, courage and strictness.

Sun Tzu

7-12. The enduring C2 function rests on planning, conceptualizing, applying experience, leading, and making sound decisions. While information superiority will provide the commander with better and more timely information and sophisticated decision aids and will allow the decision cycle to operate at a higher tempo, C2 will still be about the commander's judgment, experience, instincts and wisdom. These traits will remain of ultimate importance in the battlespace despite advances in technology.

7-13. Information superiority, discussed in Chapter 5, is the key enabler for the C2 function. Optimum C2 in the 2010 environment will depend on seamless communications, all-weather real-time sensors, current and accurate data bases, and the resulting near-real-time situational awareness for the JFC and the entire chain of command. Joint information systems that produce seamless interoperability between Services and other joint elements could well reside within a single national information architecture that is defined by national policy and focuses national efforts on the same 2010 goals. The complexity of this effort will require that the acquisition of information systems be coordinated at the joint level, ensuring that future systems are "born joint."

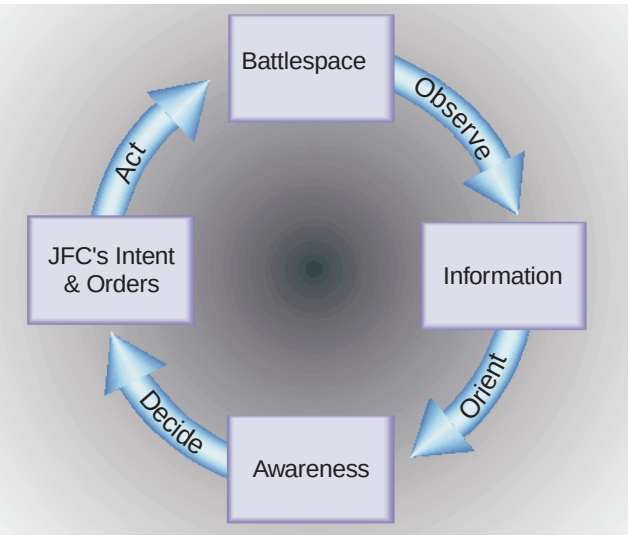

Figure 10. The Observe - Orient - Decide - Act (OODA) Loop

7-14. Figure 10 illustrates information superiority's impact on the C2 function. *Observe* focuses on data sensing and collection, which will be enhanced by new and better sensors, data bases, and automatic, real-time reporting of friendly force disposition and status. Using the power of digitization and the microprocessor, *orient* will analyze and fuse an array of inputs into timely and relevant information. This will provide the JFC with highly accurate and near-real-time battlespace awareness. The 2010 JFC can then grasp the situation quickly, visualize consequences of various actions, evaluate and prioritize risks, and *decide*. The JFC translates decisions into intent and orders, which advanced information systems send quickly throughout the joint force so that various components can *act*. The *decide-act* link could be particularly seamless, representing the true heart of the C2 function.

Planning And Execution

7-15. C2 has two parts: planning and execution. Together, they are the actions that synchronize and sustain the application of military force throughout the JOA so that the purpose of all battlespace functions, processes, and components are unified in a common effort. Information Age technologies will greatly impact, perhaps even dramatically change, both the planning and execution of military operations.

> *New technologies will allow increased capability at lower echelons to control more lethal forces over larger areas, thus leveraging the skills and initiative of individuals and small units. These capabilities could empower a degree of independent maneuver, planning, and coordination at lower echelons, which were normally exercised by more senior commanders in the past. Concurrently, commanders at higher echelons will use these technologies to reduce the friction of war and to apply precise centralized control when and where appropriate.*
>
> ***Joint Vision 2010***

7-16. Our advanced information system will provide the capability to conduct military planning in an entirely new way. It will provide commanders and staffs with the ability to centralize their planning efforts while becoming less centralized in their locations. An abundance of accurate, comprehensive, and timely information will allow remote staffs to develop and coordinate a unifying plan of operations to focus the actions of the force. The ability to rapidly exchange information around the globe and throughout the battlespace will force the sequential, linear planning of the past to give way to simultaneous, interactive planning, which will greatly affect the tempo of execution.

7-17. Likewise, in the execution of future joint operations, our advanced information system will provide an increasingly accurate, timely, and relevant common view of the battlespace that will allow leaders at all levels to more fully

leverage the capabilities of the force and achieve a tempo of operations that will overwhelm any opponent. This unprecedented level of battlespace awareness will permit leaders to operate more effectively within the commander's intent and to act in the absence of direct control.

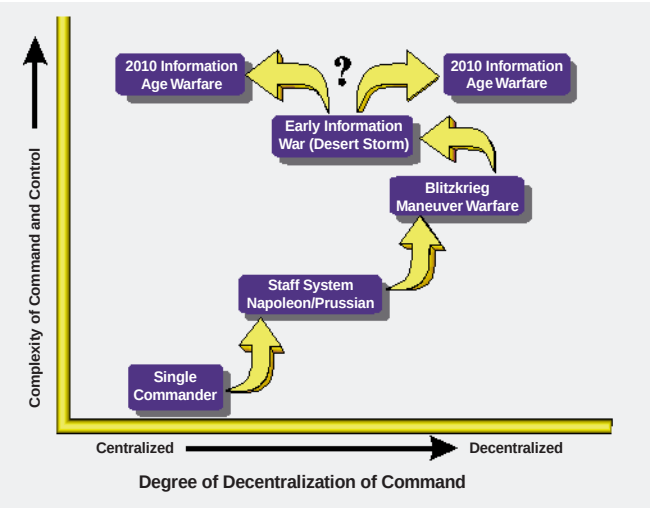

Figure 11. Centralized or Decentralized command and control?

7-18. As Figure 11 depicts, the trend through the 1990-91 Persian Gulf Conflict was toward decentralized execution. However, the capabilities of future information systems could provide such a level of battlespace awareness that senior commanders could have the ability to monitor and directly control the actions of junior leaders and the trend could be reversed to a more centralized execution.

7-19. Clearly, the intent of *JV 2010* is to use information technologies to decentralize the execution of operations while allowing for appropriate involvement of the higher-level commander. This is a logical choice considering the wide range of operations we will be called upon to execute. Operations with clearly defined objectives and a recognizable end state will tend to have a greater degree of decentralization compared to operations that are more ambiguous, less well defined, and where the military is not always in charge.

7-20. As we achieve information superiority, the commander will be able to vary the degree of control based on the current situation (ROE, political constraints, etc.). Although the potential will exist to centralize the execution of future joint operations, appropriate decentralization will more fully exploit the capabilities of agile organizations and the initiative and leadership of at every level. The future commander must resist the temptation to centralize execution authority when it is not warranted.

7-21. Information superiority also will provide the 2010 JFC with new location options. Remote connectivity will allow many staff functions to be accomplished in a single, fixed location, even as the commander moves throughout the battlespace. Protection and logistics requirements can be reduced if the bulk of the JFC staff operates from a remote and secure area, perhaps even from CONUS. The "virtual staff meeting," with all participants interacting as if they were in the same room, should permit the JFC to be extremely mobile and physically accompanied by a very small number of the staff.

7-22. The *JV 2010* precept of massing effects from widely dispersed forces will require a new perspective on the best place from which to lead since, in most cases, "the front" will not be defined. The JFC's mobility, while continuously "seeing" the battlespace, making decisions, and providing direction, may actually enhance the ability to fulfill leadership requirements. The JFC will be able to visit forces dispersed throughout the battlespace without degrading the C2 function. The JFC will have continual near-real-time situational awareness regardless of location, allowing the freedom to be where instincts lead.

7-23. Due to the political sensitivity of the mission, many military operations may require the continued routine participation of the JFC in lower-level decisions. In these situations, some

decisions will be treated as exceptional, with component actions significantly constrained. Seemingly minor adjustments to ROE, for example, could take on a political or diplomatic significance that demands a JFC decision. The situation may be so sensitive in some cases that the combatant commander, and even the NCA, may become involved. *JV 2010* acknowledges this when it says that commanders will "…apply precise centralized control when and where appropriate." All commanders will face situations when they must decide the time and extent of that involvement.

7-24. C2 will continue as the preeminent function in 2010, enabled by technology, but still highly dependent on human judgment and leadership. It will bind and blend the four new operational concepts in the right way and in the right proportions to be persuasive in peace, decisive in war, and preeminent in any form of conflict

Operational Stages

7-25. An assumed national military strategy—underpinned by power projection and overseas presence—will establish a model for decisive operations depicted in Figure 12, regardless of the nature of the mission. Although Information Age technologies will continue to transform many conventional processes and established methods within this model, joint military operations will follow this general pattern for the foreseeable future. However compressed, blurred, or simultaneous these stages may become in the future, this intellectual framework will help us understand the flow of military operations in 2010. The discussion below focuses on missions that involve the joint force in operations to achieve strategic and operational objectives. These operations will generally involve four stages: preparation, establishment and maintenance of conditions for decisive operations, decisive operations, and transition.

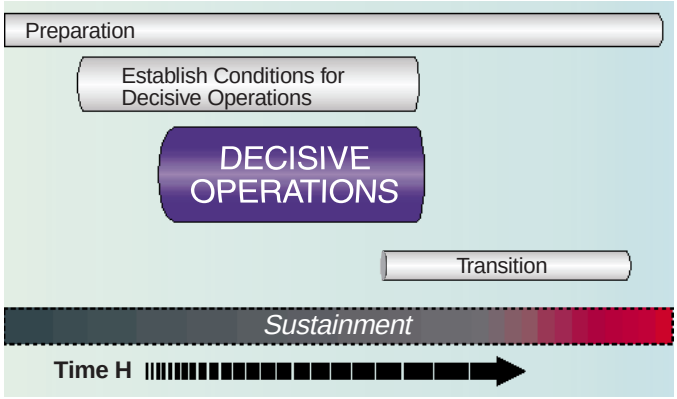

Figure 12. Operational Stages

- *Preparation*. This stage includes activities designed to prepare joint forces for decisive operations, including intelligence preparation of the battlespace, operational planning, training and rehearsals, the initiation of deployment if required, focused logistics, and full-dimensional protection. Its primary objectives are to achieve information superiority and prepare the joint force for deployment. Obviously, information collection does not begin from a dead start; a regional information base will be well-established long before beginning this employment model. However, focused collection efforts will immediately provide an unprecedented capability to plan and prepare for decisive operations. Precision engagement might begin during this stage depending on the nature of the mission and political constraints.

- *Establishment of Conditions for Decisive Operations*. The objective of this stage is to seize and exploit the initiative, continue to posture the force, and set the conditions for decisive operations. This stage will include a broad range of actions to develop a complete and accurate picture of the battlespace, to achieve dimensional superiority (air, land, sea, space, and electromagnetic spectrum), to isolate the opponent and deny him freedom of action, to build and posture combat power to simultaneously attack decisive points and centers of gravity to achieve the military end state, and to achieve unity of effort by unified operations to integrate all supporting organizations and functions, including other government agencies, NGOs, PVOs, and coalition partners. The JFC will set the conditions for dominant maneuver and precision engagement by establishing full-dimensional protection within the battlespace and focusing the logistics effort. The JFC will continue to deploy as required to attain operational reach. The JFC will accelerate use of precision engagement and IO to unbalance the adversary and gain leverage. The JFC steps up attacks against enemy forces and functions, seeking asymmetric opportunities wherever possible.

- *Decisive Operations*. When ready, the JFC will initiate decisive operations to achieve operational objectives quickly at minimal cost. This is the centerpiece of decisive operations—the application of the right balance of the four new operational concepts, uniquely blended for each mission. The JFC strikes at the enemy's centers of gravity, massing the effects from dispersed locations to overwhelm him and rapidly create conditions for success. Key elements of this stage include maintaining information superiority, massing effects from different dimensions, sustaining combat power, protecting the force, operating well inside the enemy commander's decision cycle, maintaining leverage, disrupting the enemy's cohesion, and anticipating and exploiting success.

- *Transition*. The objective of the transition stage is to prepare the joint force for follow-on operations. This could include subsequent campaign phases or sequels, transition to a variety of post-combat operations, operations other than war, hand-over to UN or coalition forces, reconfiguration for other operations, or redeployment.

7-26. The previous paragraphs describe these stages from the perspective of an operational-level JFC conducting combat operations. Although the description suggests a sequence to the stages, they will often overlap, particularly during high-tempo operations as the JFC strives to achieve objectives. The stages also can apply across the full range of military operations that do not involve combat since these missions require preparation, setting conditions for success, and conducting operations. For example, the JFC would set the conditions for decisive operations by providing immediate relief which could include temporary shelter, food and water, and medical support. Decisive operations could involve participating with civil authorities to provide more lasting solutions to the disaster, such as reconstructing permanent facilities, reinstalling utilities, and otherwise creating the conditions for local civil authorities to become self-sufficient in continuing relief operations. Elements of the four new operational concepts and key enablers will come into play in these operations as well as in combat.

Conclusion

7-27. The warfighting capabilities that US Armed Forces possess today result from decades of deliberate planning and wise investments in technological advances, organizational structure, training, leader development, and quality people, within a framework of solid doctrine. While we will continue to realize the benefits of these investments in 2010, new capabilities and methods of operation will dramatically affect how we conduct joint operations. Nonetheless, some fundamental elements will likely bear a close resemblance to what we know today. For example, in the future, campaigns will continue to be designed to accomplish national or multinational strategic military objectives. The planning and execution of campaigns will be accomplished through the application of operational art. In 2010, as is today, operational art will vary with the nature of operational conditions, the nature of the strategic objectives, the time and space available in the theater, and the number and type of forces available. While some elements of operational art could change significantly, most will likely remain fundamentally the same. Moreover, C2 will continue as the function central to success as the JFC skillfully blends, balances, and synchronizes *JV 2010*'s new operational concepts and capabilities in decisive operations to meet any requirement.

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Chapter 8

Implications

We will have to make hard choices to achieve trade-offs that will bring the best balance, most capability, and greatest interoperability for the least cost.

Joint Vision 2010

Introduction

8-1. Joint Vision 2010 leverages new technologies and information superiority to fully develop the four new operational concepts that will lead to full spectrum dominance for the United States Armed Forces by 2010. As these new operational concepts are fully explored and developed, other changes will be required. Although these changes cannot be fully articulated now, many implications—areas that may require changes—can be identified. Those addressed here are intended to highlight the key areas where focused study and thoughtful action will be required to establish the capabilities needed to fully implement *JV 2010*.

8-2. The *JV 2010* implementation process will provide the mechanisms to address these implications. As conceptualization and assessment continue, implications will be resolved, added, or deleted. Not all inclusive, this list will change as *JV 2010* implementation proceeds. It is organized in terms of *JV 2010*'s six critical considerations: high-quality people, innovative leadership, joint doctrine, joint education and training, agile organizations, and enhanced materiel.

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- Introduction
- High-Quality People
- Innovative Leadership
- Joint Doctrine
- Joint Education and Training
- Agile Organizations
- Enhanced Materiel
- Conclusion

High-Quality People

8-3. Although technological enhancements are key to enabling future operations and organizations, they will not provide the answers to all our problems. We will continue to rely on high-quality people. The intellectual tools, physical skills, and motivation of our Soldiers, Sailors, Airmen, Marines and Coastguardsmen have been essential to our current preeminence, and will be even more important as we move into the 21st century

8-4. US demographics are changing. Recruiting and commissioning quality people, who are also in demand by the commercial sector, may become much more difficult. The incentives for pursuing a military career in the future may also change as the demographic base shifts.

8-5. Changes in recruiting, training and developing people; how units operate and organize; and how organizations relate doctrinally will drive changes in career patterns. Although how career paths and professional development processes may look in the future is unclear, implications will exist for our career warriors.

8-6. Unclear, too, is how the Joint Force should be organized to best conduct IO in the future. IO might be exercised with a cadre of IO fighters, or everyone might be treated as an information warrior in the future. The approach selected will have implications for how we select, train and equip people.

8-7. If further reductions in the active force are required, we will depend more heavily on Reserve and National Guard forces, as well as on contracted services. This will have implications for the recruiting, training and education of our active duty and reserve forces.

8-8. Joint personnel and financial systems must be capable of supporting military personnel of all services and components as they move rapidly between geographic locations and between complex command relationships.

Innovative Leadership

8-9. Although technological advances are vital to information superiority as a major enabler of *JV 2010*'s new operational concepts, information superiority is much more than just a technological issue. More critical is the ability to use awareness to make timely, relevant, and correct military decisions. For information superiority to yield its full potential, military decision making should be central to how we educate future leaders.

8-10. With a clearer picture of the 2010 battlespace, commanders will be able to prosecute their operations more efficiently. They will also have the battlespace awareness to think "out of the box" operationally, that is, to see and grasp opportunities to modify the plan in real time to gain a decisive advantage. Training battlespace decision makers to take full advantage of information superiority may be essential to achieving Full Spectrum Dominance.

8-11. Leader development may be enhanced using the timely common picture of the battlespace provided by information superiority. Commanders' ability to "see" events will allow them to delegate more to subordinate commanders, confident that errors can be seen and quickly corrected. Subordinate commanders could thus develop and hone decision-making skills by making decisions earlier and more frequently in their careers.

8-12. Dominant battlespace awareness could cause commanders to become too dependent on information, leading to a tendency to delay decisions in anticipation of "perfect" information. Future commanders should balance their improved awareness with the continuing need to use their experience and instincts, and to take appropriate risks, in their exercise of command.

8-13. *JV 2010* is clear that a joint team must be prepared to pursue military operations in most future contingencies. This has implications for our understanding of operational art and for the

way we develop future joint team leaders. While they will need a high level of expertise within their Services and in their individual warfare areas, early joint operational experience may be a critical requirement.

8-14. We must ensure that as we address future capabilities for combat—our most unlikely but most stressing role—we also maximize our capability at the lower end of the range of military operations. *JV 2010*'s new operational concepts apply across the range of military operations, but they may not apply equally. For example, precision engagement may not carry the same weight in a low end humanitarian assistance mission as in a war, even though the concept itself still applies. Although our 2010 force will be heavily leveraged in technology, situations will arise where the best COA is decidedly low-tech. Commanders will need to keep all options open and apply the right capability in the right place at the right time.

8-15. Information superiority allows the JFC to think in terms of continuous operations, vice distinct decision cycles. Leader development will need to address this fundamental change so that future leaders are mentally prepared for the environment in which they will function.

Joint Doctrine

8-16. Today's doctrine focuses on existing capability, while emerging concepts address the future. Emerging concepts need to be captured within an overarching framework of concepts without compromising joint doctrine's focus on current capabilities. We need to develop a process that will manage the migration of good ideas in new concepts into joint doctrine at the right time. This migration must coincide with related changes, such as organizational or materiel changes, but be early enough to support required joint training and education.

8-17. We need to better understand how information superiority can help the JFC shape an adversary's disposition of forces to create decisive points against which we can direct our force.

8-18. As our complex systems increasingly rely on commercially available technologies, they potentially become vulnerable to use, or to the development of counters, by our adversaries. The implication of this vulnerability is the need to think differently about force protection. Full-dimensional protection requires additional conceptual development to address the best approach to system design, procurement, tactics, doctrine, training, and organizational structure.

8-19. Battlespace awareness helps us identify the enemy's operational centers of gravity. In noncombat operations, the same awareness should allow us to focus our efforts. Further work is needed in the area of centers of gravity in other than large scale combat and how the JFC should most effectively define and address them.

8-20. Overseas presence enhances our ability to promote stability and prevent conflict. Therefore, it will be as essential in the future as it is today. If our overseas basing decreases due to political considerations or fiscal constraints, the requirement for forward deployments could increase. The result might also be a greater need for increased offshore operations in theater, as well as forces that can deploy directly from the US and be operationally employed upon arrival.

8-21. While the new operational concepts will provide an improved joint operations capability, likely demands for capabilities in multiple

theaters cannot all be simultaneously satisfied. We should further investigate how information superiority and other force multipliers can help to optimally distribute available assets and to prioritize risks when we simply cannot do it all.

8-22. In the future, if we do not have access to ports of debarkation or theater logistical support, then we may need a mix of massed effects from deployed forces and strategically mobile maneuver forces. This agility includes the proper blend of overseas presence and power projection and is enhanced by prepositioning—whether on land or in ships—the properly configured equipment.

8-23. Information superiority is a force multiplier, but we are not yet able to accurately or consistently measure its influence on warfighting or its value added in noncombat operations. We must develop means to measure the effectiveness of information superiority.

8-24. Information we share with allies or coalition partners may be used in ways other than we intend. We should ensure that we protect ourselves from potential harm that might be caused by an inappropriate release of information.

8-25. Focused logistics should allow us to conduct future operations with less reliance on extensive stockpiles. Harnessing information technologies should allow us to reduce inventories, improve asset visibility, and build logistics tailoring concepts to precisely support the force. The challenge is to ensure that the enhancements currently being developed—Joint Total Asset Visibility; Joint Logistics C2; Theater Distribution; Joint Reception, Staging, Onward Movement, and Integration (JRSOI); and the Global Combat Support System (GCSS)—are integrated to make focused logistics a reality.

8-26. Nonlethal weapons technologies may provide significant advantages in some operations and should contribute to precision engagement. The exact conditions and operational considerations for use of nonlethal weapons remain unclear and require further study.

8-27. Offensive information warfare—a subset of information operations—is a powerful tool that provides for the disruption or manipulation of an adversary's information system, either electronically or by physical destruction. We should understand the policy implications of offensive IW, especially preemptive measures. The relationship between this type of attack and precision engagement requires further study as well.

8-28. Operating with allies and coalition partners will continue to be important in the future. The United States' rapid advances in information superiority have an associated implication with regard to operations with other governments. As we make the considerable investment in information technologies to achieve information superiority, most nations in the world, friend or foe, will be unable to match that investment, especially in the absence of a viable threat. This will reduce our ability to achieve interoperability with our partners in a given operation. This implication needs to be addressed within the US military and with our allies and likely partners.

8-29. Since discriminate effect is a central objective of precision engagement, we need to develop specific ways of measuring it. Destruction of the target is not always the objective. Precision engagement provides an ability to identify targets and bring the right combination of effects to bear at the right time to accomplish the assigned mission. We need

measures of merit that consider timing, effectiveness, unnecessary damage, risk, and cost versus effect.

8-30. To achieve full spectrum dominance, the military will have to operate with other government and nongovernment organizations and agencies. The military needs to coordinate and consult rather than command and control integrated operations with IOs, PVOs, and NGOs. Thus, the military needs to understand them and complement their strengths without degrading the joint force mission.

8-31. We should determine the implications of consolidating the logistics information system with the weapons characteristics, weapons consumption, weapons behavior, leadership history, force structure, order-of-battle, environmental data, weather, terrain, hydrology, hydrography, infrastructure, and electromagnetic spectrum information systems. A "one-stop-shopping" architecture, while possible, may not provide the best possible support to the JFC.

8-32. With greater reliance on the worldwide network of commercial information systems, we must ensure we protect ourselves from information fratricide. Our offensive IW capability should be carefully managed to avoid unintended degradation of our own information systems.

8-33. With increased availability of near real-time information, we need to understand how to speed its analysis, prioritization, and fusion. Competing types and sources of information might generate information overload and actually decrease our battlespace awareness. The relationship of data analysis and the data's use needs to be fully articulated for the 2010 environment. Additional study is needed to determine how insights from the collected data are correlated with other complementary data to contribute to operational advantage. We also need to examine how improvements in the intelligence function can move us from awareness of current conditions, toward the ability to predict future conditions.

8-34. Adaptive support packages to ensure that the right support is provided at the right place, to the right force, at the right time will require changes to support planning systems. We need to study how joint logistics planning should interface with Service capabilities to make focused logistics a reality.

8-35. As we develop the supporting concepts for dominant maneuver and precision engagement, we need to explore the relationship between these two new operational concepts. Both depend on decisive control of the breadth, depth, and height of the battlespace; both focus on a desired effect or accomplishment of an assigned task. This synergistic relationship seems to be much more acute than the old paradigm of "fire to maneuver/maneuver to fire." We need to explore whether either can exist without the other and, assuming they cannot, determine if, conceptually, they are simply two aspects of a single concept.

8-36. Another doctrinal challenge is how to capture emerging joint doctrine in corresponding Service doctrine. Joint doctrine development will follow joint concept development and assessment and should lead Service doctrine. Service doctrine, while responding to joint concept development, joint doctrine development, and Service concept development, should continue to contribute to mainstream joint doctrine as well. A new model for close coordination between the Joint Warfighting Center and the Service concept and doctrine development centers may well be required.

8-37. Operations in urban environments will become more likely as global urbanization continues. Concepts for urban operations across

the range of military operations will be needed, and should lead to new joint doctrine to address the specific challenges of military operations in urban terrain.

Joint Education and Training

8-38. Future training environments should capitalize on the efficiencies of using models and simulations. Linking the information system with simulations allows future commanders near real-time ability to rehearse operations and contingencies. Future information system architectures need to capture this link to models and simulations to enhance and exercise decision support systems.

8-39. Specific *JV 2010* changes in doctrine, organizations, and operational concepts have begun. Future changes, while still largely uncertain, will occur at an increasing pace in the next few years and will severely challenge our capacity to keep training programs up to date. We need to ensure that changes in training and education keep pace with other *JV 2010* induced changes.

8-40. Training and education in the future can leverage information superiority and much more effectively use remote approaches to train large groups of geographically distributed people. This could change how all training, from basic to advanced, is addressed in 2010.

8-41. As the active force evolves toward innovative methods of training, including interactive simulation and links to actual planning and information systems, the RC will have to be exposed to the same high-quality training if they are to be interoperable when activated.

8-42. New training and simulation capabilities will enable en route training for forces activated or deployed on short notice. This will require reevaluation of routine training programs to ensure that en route training can effectively prepare each of the various elements of the joint force for employment on arrival in theater.

Agile Organizations

8-43. If future force levels are further reduced, we must ensure the JFC retains the ability to protect the force and promptly respond to threats. Future forces should possess the proper level of lethality for combat and the proper level of agility for all operations across the spectrum. Further study is required to determine the relationship between smaller (in size) forces, lethality, responsiveness, agility, and basing and deployment schemes.

8-44. Increased battlespace awareness and refined decision-making processes will provide a commander significant opportunity to operate inside the opponent's decision cycle. At the operational level, commanders may have to repeatedly refine and communicate their intent as the situation changes. Near real-time connectivity, as well as more decentralized C2, will allow rapid exploitation of short-lived opportunities presented by opponents.

Organizations should be more adaptable to change, and planning systems more flexible, interoperable, adaptive, and responsive to rapid changes in the commander's intent.

8-45. Innovative operational concepts can drive how organizations are structured and what functions are performed at each level. If the trend is toward smaller, flatter organizations, commanders will need improved C2, enabled by information superiority.

8-46. The 2010 JFC will capitalize on networked systems and information infrastructures. If staffing processes can be performed by remote and networked capabilities, then commanders may be able to control more force with a smaller immediate staff, resulting in increased mobility. Staff organization and function may have to be adjusted as a result.

8-47. Unclear is whether the Guard and Reserves' primary role in the future will be as a deployable force, a long-term augmentation force, or a backup sustaining force. However, what is clear is that if active force strength is further reduced, the Guard and Reserves will be called on more often. The need for more fully integrated active and reserve components and the need for a more routinely and more quickly available Guard/RC are implications for the total force. Reserve be used in entirely new ways. Imbedding certain capabilities in the National Guard and Reserves that exploit their civilian talents may contribute to achieving the capabilities required for joint operations in 2010.

8-48. Possessing information superiority may change the way future decision makers think about combat power and require reorganization of parts of the force. Further study is required to determine the costs and benefits of information-superiority-based organizational changes. The analysis must consider the impact on any future force of a short- or long-term loss of the information system.

Enhanced Materiel

8-49. More nonmilitary agencies and commercial enterprises are using information technologies in new and aggressive ways. A potential implication is the increased vulnerability to military systems that comes from widespread nonmilitary use of new information technologies. Potential opportunities will present themselves to the military based on commercially developed innovations.

8-50. Full-dimensional protection should be seamless. Today's focus on making Service information systems interoperable should evolve to a concentration on a single, seamless joint information system that will optimize the ability to provide seamless protection of information.

8-51. Adversaries will probably recognize information systems as potential targets for asymmetric attacks on the United States. We need to understand how an adversary might use our information, or our dependence on information, against us.

8-52. As active forces increase their technological capabilities, the Guard and Reserve should keep pace. A modernization plan for the active forces should also consider the need for interoperability with the Guard and RC.

8-53. Commercial off-the-shelf (COTS) technology can lead to lower costs and shorter development and acquisition times, which may

lead to greater use of COTS in the future. A degree of vulnerability is associated with this commercial linkage in that potential adversaries will have easier access to the technology and systems our military Services purchase. We need to ensure that security, access, reliability, and vulnerability challenges are met as we increase our reliance on COTS.

8-54. Future information system architectures will evolve to capture *JV 2010*'s key enabler of information superiority. To gain the maximum advantage from information superiority, the human-machine interface will require improvements, especially in displaying information to decision makers to allow them to review and understand large quantities of data quickly.

8-55. A technological solution that would reduce our requirements for fossil fuels would enable a logistics revolution. If we are to minimize the disadvantages associated with forces that are tethered to a heavy logistics support structure, reductions in the sizes of chemical propellants and weapons fillers are needed.

8-56. If the responsiveness of our transportation systems is enhanced because of technological improvements and information superiority, we need to understand whether we can rely more on commercial sector rapid production capabilities and inventories rather than stockpiling spare parts and consumables.

8-57. Whether an increased reliance on high-tech weapons equates to diminished stockpiles is unclear. Periodic maintenance cycles for high-tech weapons may preclude prepositioning. We must find the proper balance between high-tech weaponry and more traditional systems to ensure efficiency, readiness, and sustainability.

8-58. The ability to collect data may far outstrip the ability to process it. We need to explore automated tools that can screen new data and determine what can be passed directly to the warfighter.

8-59. Since countermeasures historically begin to appear soon after any new technology or weapon is first used or initially revealed, the advantage of precision engagement may begin to erode over time. If counters for each new system begin to appear then we need to determine ways to maintain our precision advantage.

Conclusion

8-60. The goal of the *JV 2010* implementation process is to co-evolve the joint doctrine, organization, training and education programs, leadership development, advanced materiel, and high quality people so that, by 2010, all of the changes are in place to fully realize the capabilities described in the new operational concepts. However, we cannot focus only on 2010. At every stage along the way, the organization, doctrine, training, and systems must be fully integrated and mutually supportive. The challenge, then, is to remain fully ready at every step along the path, while focusing on distinctive new and improved capabilities. The implications addressed in this chapter represent a starting point from which to launch our all-out joint effort to implement *JV 2010* and achieve our goal of Full Spectrum Dominance.

Glossary

Part I—Acronyms and Abbreviations

3-D	three dimensional
ABIS	Advanced Battlespace Information System
ACTD	advanced concept technology demonstration
AOR	area of responsibility
ATD	advanced technology demonstration
BRP	basic research plan
C2	command and control
C3I	command, control, communications and intelligence
C4ISR	command, control, communications, computers, intelligence, surveillance and reconnaissance
CC&D	concealment, camouflage, and deception
CFJO	*Concept for Future Joint Operations*
CINC	Commander in Chief
CJCSI	Chairman Joint Chiefs of Staff Instruction
COA	course of action
CONUS	continental United States
CSS	combat service support
DBA	dominant battlespace awareness
DDR&E	Director, Defense Research and Engineering
DII	defense information infrastructure
DOD	Department of Defense
DODD	Department of Defense Directive
DSB	Defense Science Board
DSTS	Defense Science and Technology Strategy
DTAP	Defense Technology Area Plan
DTO	defense technology objective
DTS	Defense Transportation System
FYDP	future years defense program
GCCS	global command and control system
GCSS	global combat support system
GDP	gross domestic product
GIE	global information environment
GII	global information infrastructure
GPS	global positioning system
HNS	host nation support
HUMINT	human intelligence

IO	information operations
IW	information warfare
JFC	Joint Force Commander
JOA	joint operations area
JPME	joint professional military education
JROC	Joint Requirements Oversight Council
JRSOI	joint reception, staging, onward movement, and integration
JSR	Joint Strategic Review
JSTARS	joint surveillance and targeting system
JTF	joint task force
JV 2010	*Joint Vision 2010*
JWCA	Joint Warfighting Capabilities Assessment
JWCO	joint warfighting capability objective
JWSTP	Joint Warfighting Science and Technology Plan
LOC	line of communication
LOMT	low observable/masking technologies
NCA	National Command Authority
NGO	non governmental organization
NII	national information infrastructure
NMS	*National Military Strategy*
NSS	*National Security Strategy*
OODA	observe, orient, decide, act
OSD	Office of the Secretary of Defense
PGM	precision guided munitions
PME	professional military education
PSTN	public switched telephone network
Pub	publication
PVO	private volunteer organization
RC	reserve components
RMA	revolution in military affairs
ROE	rules of engagement
RSTA	reconnaissance, surveillance and targeting
S&T	science and technology
TD	technology demonstration
UAV	unmanned aerial vehicles
USG	United States Government
WMD	weapons of mass destruction

Part II—Terms and Definitions

Advanced Battlespace Information System (ABIS). A set of underlying information services, technologies, and tools that enable us to achieve the broad operational warfighting capabilities described in *Joint Vision 2010*. Visualized as a collection of distributed data and applications, integrated through a grid of supporting services, ABIS acquires, processes, and delivers information, as needed, to enhance decision making at all echelons involved in operational functions such as sensor-to-shooter correlation, real-time battle management, and multidimensional battlespace awareness. (ABIS Task Force Report, May 1996)

awareness. Combining pieces of information with context produces ideas or provides awareness. (*Concept for Future Joint Operations*) (See figure 13)

battlespace: The air, land, sea, and space and the included enemy and friendly forces, facilities, weather, terrain and the electromagnetic spectrum within the area of influence and area of interest. (*Concept for Future Joint Operations*)

battlespace awareness. Awareness of the battlespace yielding an interactive "picture" which provides timely, relevant and accurate assessments of friendly and enemy operations within the battlespace. (*Concept for Future Joint Operations*)

C4ISR. Command, control, communications, computers, intelligence, surveillance and reconnaissance. Term generally used to describe all of the systems and functions associated with the command and control system and the intelligence function. This term is not useful within the *CFJO* information superiority construct and is used only in Chapter 4. (*Concept for Future Joint Operations)* (See figure 14)

command and control. The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. (Approved DOD Terminology) (See figure 14)

commander's intent. The commander's intent describes the desired end state. It is a concise expression of the purpose of the operation, not a summary of the concept of operations. It may include how the posture of units at that end state facilitates transition to future operations. It may also include the commander's assessment of the enemy commander's intent. (Joint Pub 3-0)

data. Representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means. Any representations such as characters or analog quantities to which meaning is or might be assigned. (Approved DOD Terminology) (See figure 13)

decisive operations. Application of an overwhelming joint capability, by the proper balance of the four new operational concepts in any specific operation. The ability to conduct decisive operations in every assigned mission across the range of military operations is full spectrum dominance. (*Concept for Future Joint Operations*)

defense information infrastructure. The shared or interconnected system of computers, communications, data applications, security,

people, training and other support structures serving DOD's local, national and worldwide information needs. It includes C2, tactical, intelligence and commercial communications systems used to transmit DOD data. (Joint Pub 3-13.1)

dominant battlespace awareness. An interactive "picture" which will yield much more accurate assessments of friendly and enemy operations within the area of interest. Although this will not eliminate the fog of war, dominant battlespace awareness will improve situational awareness, decrease response time, and make the battlespace considerably more transparent to those who achieve it. (*Joint Vision 2010*) Dominant battlespace awareness will permit visibility over the militarily significant events in the battlespace to such a degree that the commander is able to make informed decisions and employ weapons and systems precisely. Awareness includes knowledge and status of both enemy and friendly forces, facilities, weather, terrain, and the electromagnetic spectrum. (*Concept for Future Joint Operations*)

dominant maneuver. The multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish the assigned operational tasks. (*Joint Vision 2010*)

focused logistics. The fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while en route, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical level of operations. (*Joint Vision 2010*)

full-dimensional protection. The multilayered offensive and defensive capability to protect our forces and facilities at all levels from adversary attacks while maintaining freedom of action during deployment, maneuver, and engagement. (*Concept for Future Joint Operations*)

Full Spectrum Dominance. The synergy of these four concepts [dominant maneuver, precision engagement, full-dimensional protection and focused logistics] transcends intense conventional warfighting. Without overspecialization, the development of these new operational concepts has great potential to fulfill more effectively the full range of tasks assigned to us. That is, taken together these four new concepts will enable us to dominate the full range of military operations from humanitarian assistance, through peace operations, up to and into the highest intensity conflict. (*Joint Vision 2010*)

- and -

The ability to dominate any adversary and control any situation in any operation across the range of military operations. (*Concept for Future Joint Operations)*

global information environment. Worldwide network of information sources, information archives, information consumers, and the architecture that provides the framework for this new global setting. (*Concept for Future Joint Operations)*

global information grid. The foundation of the Advanced Battlespace Information System (ABIS) framework. It provides infrastructure and services that establish a supporting information environment. Grid capabilities fall into three general areas: distributed environment support, universal transaction services, and assurance of services. They provide warfighters and their systems the ability to exchange information and work collaboratively unimpeded by differences in connectivity, processing, or interface characteristics. The grid provides generic, robust services to support warfighters

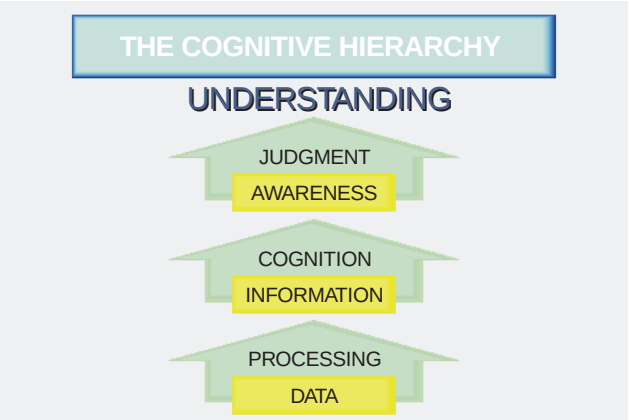

Figure 13. The Cognitive Hierarchy

as they tailor their information environment to include local and remote organizations, people, and assets. (ABIS Task Force Report, May 1996)

global information infrastructure. A 21st century web of computer controlled telecommunications grids that transcend industry, media, government, military, and other non-government entities. (Joint Pub 6-0)

-or-

The interconnection of communications networks, computers, data bases, and consumer electronics that make vast amounts of information available to users. Personnel who operate and consume the transmitted data constitute a critical component of the GII. (Joint Pub 3-13.1)

information. data collected from the environment and processed into a usable from . (Joint Pub 6-0) (See figure 13).

information infrastructure. Linkages of individual information systems in a myriad of direct and indirect paths that transcend industry, media and the military and include both government and non-government entities.

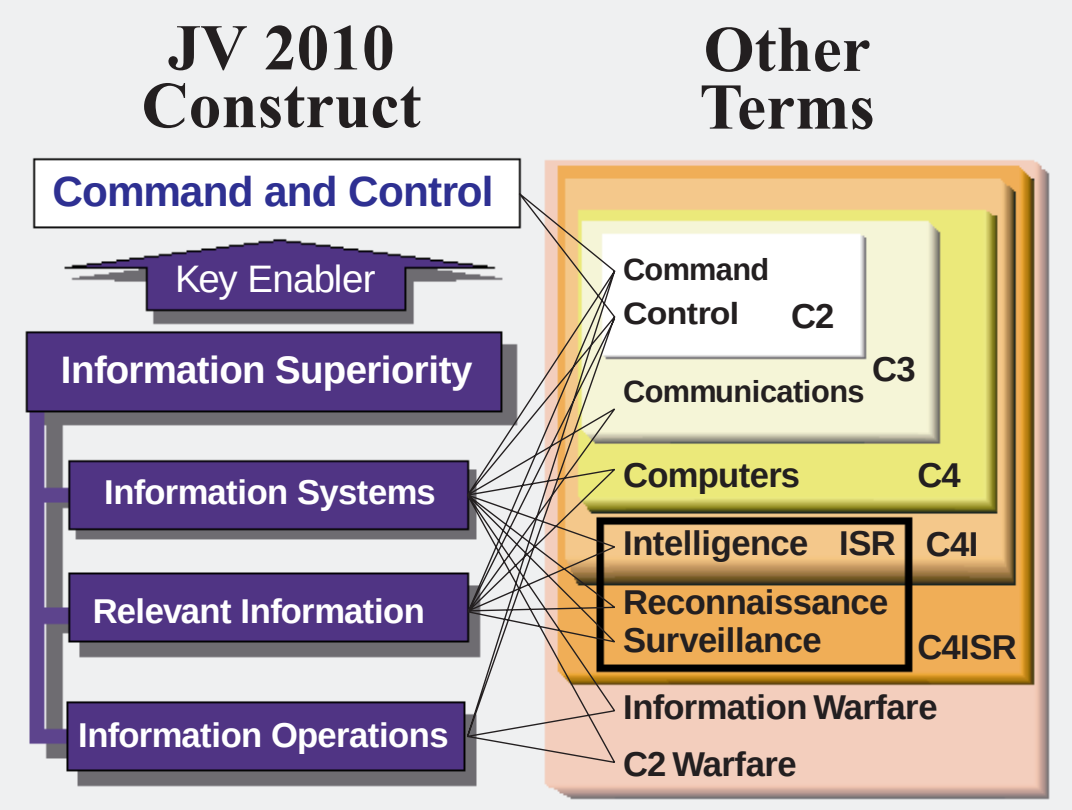

Figure 14. Information Superiority: JV 2010 Construct

Human collection, processing, and dissemination of information is an integral part of the information infrastructure. Includes 3 categories: global information infrastructure (GII), national information infrastructure (NII), and defense information infrastructure (DII). (Joint Pub 3-13.1)

information operations. Actions taken to affect adversary information and information systems while defending one's own information and information systems. Also called IO. (DODD S-3600.1 of 9 Dec 96) (See figure 14)

information superiority. The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. (*Joint Vision 2010*)(See figure 14)

information systems. Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations, by collecting, processing, analyzing, archiving, and disseminating information. (*Concept for Future Joint Operations*) (See figure 14)

information warfare. Information operations conducted during time of crisis or conflict to achieve or promote specific objectives over a specific adversary or adversaries. Also called IW. (DODD S-3600.1 of 9 Dec 96)

key enablers. Technological Innovation and Information Superiority are the two key enablers that will, "magnify the advantages provided by our high quality force," and, "enable us to achieve the desired effects through the tailored application of joint combat power." (*Joint Vision 2010*)

national information infrastructure. National linkages of individual information systems in a myriad of direct and indirect paths that transcend industry, media and the military and include both government and non-government entities. Human collection, processing, and dissemination of information is an integral part of the national information infrastructure. (adapted from Joint Pub 3-13.1)

near real-time. Pertaining to the timeliness of data or information which has been delayed by the time required for electronic communication and automatic data processing. This implies that there are no significant delays. See also real-time. (Approved DOD Terminology)

new operational concepts. The four new operational concepts described by the Chairman in *Joint Vision 2010*: Dominant Maneuver, Precision Engagement, Full Dimensional Protection, and Focused Logistics. (*Concept for Future Joint Operations*)

precision engagement. A system of systems that enables our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required. (*Joint Vision 2010*)

real-time. Pertaining to the timeliness of data or information which has been delayed only by the time required for electronic communication. This implies that there are no noticeable delays. See also near real-time. (Approved DOD Terminology)

relevant information. All of the information of importance to the JFC (or any of his senior or subordinate commanders) in his exercise of Joint Command and Control. Includes information about friendly forces, the enemy, and the

operations area, and results from (1) the collection, processing, fusing, and analysis of information concerning friendly forces, the enemy, neutrals, operations area, and other critical areas, and (2) responses to specific information requests such as imagery, or mapping. (*Concept for Future Joint Operations*) (See figure 14)

strike. An attack which is intended to inflict damage on, seize, or destroy an objective. (Approved DOD Terminology)

supporting concept. *Joint Vision 2010* supporting concepts will expand the ideas in the *Concept for Future Joint Operations* in specific areas to fully describe how emerging systems and architectures can be fully leveraged to most effectively provide the capacity to achieve Full Spectrum Dominance. Supporting concepts will focus on JFC employment of forces at the operational level, and describe potential implications in terms of six critical considerations: high quality people, innovative leadership, joint doctrine, joint education and training, agile organizations, and enhanced materiel. (*Concept for Future Joint Operations*)

Table 6. Taxonomy of Terms Used Within the *CFJO*

Two Key Enablers: Technological Innovation and Information Superiority.

Four New Operational Concepts: Dominant Maneuver, Precision Engagement, Full-Dimensional Protection, and Focused Logistics.

Six Critical Considerations: High quality people, Innovative Leadership, Joint Doctrine, Joint Training and Education, Agile Organizations, Enhanced Materiel.

Decisive Operations: Dominating the adversary and controlling the situation by applying the new operational concepts in the right balance in a specific mission.

Full Spectrum Dominance: The ability to dominate any adversary and control any situation, that is to conduct decisive operations, in any mission across the range of military operations.

Capabilities: Qualities or characteristics necessary to give the Joint Force the ability to conduct decisive operations.

Technologies: Existing or emerging developments that could provide, enable or improve a required capability.

Systems: Combinations of hardware, software, and technologies procured for the purpose of providing one or more required capabilities to the joint force.

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History does not long entrust the care of freedom to the weak or the timid.

President Dwight D. Eisenhower
Inaugural address, 20 January 1953

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