

Strategic Airlift and the Interim Brigade Combat Team

**A Monograph
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14. ABSTRACT

Planning is perhaps the most difficult human activity. It is even more problematic when that future is uncertain and the implications of today's decisions endure for years. For the military, planning is particularly consequential, since poor military planning may result not in a poor financial result, but substantial damage to national security. Choices of force structure arguably cast the longest shadow of any military decision. The US Army is embarking on a path of transformation to a future force. Therefore, it is important to examine the underpinnings of the operational concept for this force. At its heart is the desire to increase strategic mobility without sacrificing combat power. The deployment timeline for the lead unit of the transformation, the interim brigade combat team (IBCT), requires airlift. This fact logically leads to the question: "Can the airlift system deploy the IBCT in the timeline required by the operational concept?" The impetus for transformation was a dramatically altered security environment. The 1990s saw the collapse of the Soviet Union, conclusion of the Persian Gulf War, and demands for decreased defense spending. In response, the national security strategy shifted significantly and overseas forces were brought home. This dramatic series of events coupled with an increasingly complex and unpredictable international security environment provided the catalyst. Transformation is the Army's vision to structure itself to operate more effectively in this new security environment. Army force structure has struggled with heavy forces that are too heavy to arrive in time and light forces that are too light to affect the battle. To remedy this shortfall, the Army Chief of Staff proposed a bold vision of a medium weight option, enabled by technology and innovative doctrine, which aspires to full-spectrum dominance through improved strategic mobility without sacrificing lethality or survivability. The basic building is the IBCT, the first of which becomes fully operational in 2007. The airlift system used for analyzing the IBCT must be available in 2007. In 2007, the strategic airlift system will not be significantly changed from the present fleet. While there are promising futuristic concepts for dramatically increased global lift, the timeline for acquiring these capabilities exceeds the time available prior to IBCT rollout. Section three depicts the airlift fleet of 2007, along with the air mobility support system necessary to facilitate any strategic air deployment. Planning for future force projection must be based on these airlift realities. Quantitative analysis demonstrates the airlift system programmed for 2007 cannot deploy the IBCT within the required 96-hour timeline. In fact, using USTRANSCOM-apportioned lift, it takes 7.3 days or 175 hours. In fact, to produce a set of parameters that would result in a 96-hour deployment, the IBCT needed over twice the aircraft allocated by USTRANSCOM and a 33 percent increase in aircraft handling capacity at the departure and destination airfields. This scenario also ignored additional difficulties with airlift required for support functions and the inevitable factor of aircraft maintenance problems. The value of the IBCT as a fighting unit must be decided on its own merits—there is much more at issue than just strategic mobility. Still, the deployment timeline is a critical element of the operational concept. Consequently, the strategic mobility shortfalls of the IBCT must be addressed. The product of further analysis may lead to proposals for increased strategic airlift, decreased IBCT forces structure, reduced vehicle weights or a variety of other remedies to the disconnect identified in this monograph. This battle will likely be fought in the upcoming Quadrennial Defense Review with dueling concepts for the future of short-notice force projection battling

for their share of the dwindling budget resources. In the midst of the politics, it is essential that a coherent strategy based on realistic assumptions prevails, regardless of parochial service interests. The security of the nation may depend on it.

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Abstract

STRATEGIC AIRLIFT AND THE INTERIM BRIGADE COMBAT TEAM by MAJ William R. Ward, United States Air Force, 42 pages.

Planning is perhaps the most difficult human activity. It is even more problematic when that future is uncertain and the implications of today's decisions endure for years. For the military, planning is particularly consequential, since poor military planning may result *not* in a poor financial result, but substantial damage to national security. Choices of force structure arguably cast the longest shadow of any military decision.

The US Army is embarking on a path of transformation to a future force. Therefore, it is important to examine the underpinnings of the operational concept for this force. At its heart is the desire to increase strategic mobility without sacrificing combat power. The deployment timeline for the lead unit of the transformation, the interim brigade combat team (IBCT), requires airlift. This fact logically leads to the question: "Can the airlift system deploy the IBCT in the timeline required by the operational concept?"

The impetus for transformation was a dramatically altered security environment. The 1990s saw the collapse of the Soviet Union, conclusion of the Persian Gulf War, and demands for decreased defense spending. In response, the national security strategy shifted significantly and overseas forces were brought home. This dramatic series of events coupled with an increasingly complex and unpredictable international security environment provided the catalyst.

Transformation is the Army's vision to structure itself to operate more effectively in this new security environment. Army force structure has struggled with heavy forces that are too heavy to arrive in time and light forces that are too light to affect the battle. To remedy this shortfall, the Army Chief of Staff proposed a bold vision of a medium weight option, enabled by technology and innovative doctrine, which aspires to full-spectrum dominance through improved strategic mobility without sacrificing lethality or survivability. The basic building is the IBCT, the first of which becomes fully operational in 2007.

The airlift system used for analyzing the IBCT must be available in 2007. In 2007, the strategic airlift system will not be significantly changed from the present fleet. While there are promising futuristic concepts for dramatically increased global lift, the timeline for acquiring these capabilities exceeds the time available prior to IBCT rollout. Section three depicts the airlift fleet of 2007, along with the air mobility support system necessary to facilitate any strategic air deployment. Planning for future force projection must be based on these airlift realities.

Quantitative analysis demonstrates the airlift system programmed for 2007 cannot deploy the IBCT within the required 96-hour timeline. In fact, using USTRANSCOM-apportioned lift, it takes 7.3 days or 175 hours. In fact, to produce a set of parameters that would result in a 96-hour deployment, the IBCT needed over twice the aircraft allocated by USTRANSCOM and a 33 percent increase in aircraft handling capacity at the departure and destination airfields. This scenario also ignored additional difficulties with airlift required for support functions and the inevitable factor of aircraft maintenance problems. The value of the IBCT as a fighting unit must be decided on its own merits—there is much more at issue than just strategic mobility. Still, the deployment timeline is a critical element of the operational concept. Consequently, the strategic mobility shortfalls of the IBCT must be addressed. The product of further analysis may lead to proposals for increased strategic airlift, decreased IBCT forces structure, reduced vehicle weights or a variety of other remedies to the disconnect identified in this monograph. This battle will likely be fought in the upcoming Quadrennial Defense Review with dueling concepts for the future of short-notice force projection battling for their share of the dwindling budget resources. In the midst of the politics, it is essential that a coherent strategy based on realistic assumptions prevails, regardless of parochial service interests. The security of the nation may depend on it.

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INTRODUCTION

I am tempted indeed to declare dogmatically that whatever doctrine the Armed Forces are working on now, they have got it wrong. I am also tempted to declare that it does not matter that they have got it wrong. What does matter is their capacity to get it right quickly when the moment arrives... Still it is the task of military science in an age of peace to prevent the doctrines from being too badly wrong.

Michael Howard, *Military Science in an Age of Peace*

In contemplating any endeavor, planning is perhaps the most difficult human activity. Plotting a course to the future is even more problematic when that future is uncertain and the implications of today's decisions endure for years. For the military, planning is particularly consequential. In business, a bad decision may lead to a poor quarterly result, at the very worst, bankruptcy. By contrast, poor military planning may result *not* in the loss of a company, but the country. Choices of force structure arguably cast the longest shadow of any military decision.

The US Army is embarking on a path of transformation to a future force. Progress toward improved capabilities is essential, but many have argued the first step in this transformation is a doozy.¹ Therefore, it seems important to examine the underpinnings of the operational concept that forms the foundation for this force. At the heart of transformation is the desire to increase strategic mobility without sacrificing combat power. The desired deployment timeline for the lead unit of the transformation, the interim brigade combat team (IBCT), requires airlift. This fact logically leads to the question: "Can the airlift system deploy the IBCT in the timeline required by the operational concept?"

The scope of this monograph is restricted to airlift feasibility. Two important areas of contention are excluded from the analysis presented herein. There are numerous methods of projecting power in the interest of national security and numerous forces that can be used. At the Defense Department level there is an ongoing discussion of roles and missions, which bears on

¹ Reference the ongoing dialogue in such periodicals as *Army*, *Military Review*, and *Joint Forces Quarterly*.

the question of which is the best force (or combination) to serve this purpose. This question is outside the boundaries of this composition. Moreover, the transformation concept encompasses the full spectrum of considerations for design, deployment and employment of ground forces. Issues range from fire support to combined arms at the company level to dependence on joint assets to overdependence on technology, etc. Description of the transformation vision lays a foundation for understanding the importance of the research question, but the analysis presented here excludes the multitude of substantive considerations that address the employment effectiveness of different configurations of Army forces. These two areas of study are left to other concerned members of the defense community.

The analysis is structured in five sections. The first section characterizes the security climate that provided impetus for transformation. The 1990s saw the collapse of the Soviet Union, conclusion of the Persian Gulf War, and demands for decreased defense spending. In response, the national security strategy shifted significantly and overseas forces were brought home. This dramatic series of events coupled with an increasingly complex and unpredictable international security environment provided the catalyst for transformation.

Section two outlines the vision for transformation. Throughout recent history, Army force structure has struggled with heavy forces that are too heavy to arrive in time and light forces that are too light to affect the battle. To remedy this shortfall in response to the present security environment, the Army Chief of Staff proposed a bold vision of a medium weight option, enabled by technology and innovative doctrine. This new force aspires to full-spectrum dominance through improved strategic mobility without sacrificing lethality or survivability. The basic building block of the transformed Army is the IBCT, the first of which becomes fully operational in 2007.

Airlift has its own vision of the future with dramatic materiel advances. But the siren song of quantum leap technology may leave us with a capability gap between the force projection strategy selected and the ability to carry it out. The lift system used as the baseline for analyzing

the IBCT must be a system that will be available in 2007 to meet the first IBCT off the assembly line. In 2007, the strategic airlift system will not be significantly changed from the present fleet. While there are promising futuristic concepts for dramatically increased global lift, the timeline for acquiring these capabilities exceeds the time available prior to IBCT rollout. Section three depicts the airlift fleet of 2007, along with the air mobility support system necessary to facilitate any strategic air deployment. Planning for future force projection must be based on these airlift realities.

The *quantitative* analysis of the paper seeks to combine the lift requirements of the IBCT with the lift capabilities of the programmed airlift system in a deployment scenario. Computer programs are perfectly suited for simulating and analyzing such a deployment flow. Section four describes the Joint Flow and Analysis System for Transportation (JFAST) and presents the output results of several deployment parameter sets. It is this section that directly answers the research question. Conclusions are stated in the final section. They flow logically from the quantitative analysis, building on the foundational understanding of the airlift system, the transformation vision and the modern security environment.

Security Environment: the Impetus for Transformation

" The future ain't what it used to be "

Yogi Berra²

Though frequently charged (most often by its members) with changing simply for the sake of change, the military actually endeavors to anchor its planning in an analysis of the threat facing the nation. The decade of the 1990s witnessed tectonic changes in the security environment that were unforeseen even just a few years earlier.

Death of the Cold War and Loss of a Best, Worst Enemy

On November 9, 1989, officials of the German Democratic Republic opened the wall separating East and West Germany. It was the beginning of the end for the Cold War.³ From this first visible chink in the iron curtain, the crack progressed quickly. The regimes of Eastern European satellites of the Soviet bloc were soon falling like icicles during a spring thaw.

Two days after Germans began travelling freely from East to West, Todor Zhikov, Bulgarian dictator since 1954, resigned as the people, sensing the possibility of revolution, staged mass protests against communist rule.⁴ Just one month later, Czech president, Gustav Husak chose to resign rather than accept a cabinet dominated by a noncommunist majority.⁵ Not three weeks afterward, newspapers published perhaps the most shocking line in the obituary of the Cold War. On December 27, Romanian president Nicolae Ceausescu and his wife were executed as punishment for their conviction of crimes against their country and its people.⁶

² This quote attributed to Yogi Berra appears in numerous books on dozens of websites, e.g. <http://thinktank.virtualave.net/quotes.html>.

³ Kenneth L. Hill, *Cold War Chronology: Soviet-American Relations, 1945-1991* (Washington: Congressional Quarterly Inc., 1993), 318.

⁴ Ibid.

⁵ Ibid., 319

⁶ Ibid.

The epidemic spread to the Baltic republics of Estonia, Latvia and Lithuania. In March 1990, Lithuania declared itself an independent, sovereign state.⁷ The Baltics were critical to the Soviet defense structure, as they provided port access for naval operations and strategic movement of troops and logistics. Accordingly, Moscow attempted to preserve control of these three rogue republics through military intervention, but internal struggles prevented the long-term maintenance of power. On September 6, 1991, the Baltic states gained independence as a reluctant Soviet Union acknowledged their sovereignty.⁸

These events were the external symptoms of a collapse from within. The USSR's socialist system was failing economically. To revive the ailing Soviet bear, leader Mikhail Gorbachev instituted a series of reforms. The first step, called "*glasnost*" (Russian for "openness"), was a program to liberalize speech and increase public participation in the debate for reform.⁹ Its companion was "perestroika" (Russian for "restructuring"), a set of political and economic reforms instituted between 1985 and 1991.¹⁰ These programs, intended to rejuvenate the Soviet system, actually unleashed the forces that led to the dissolution of the union, culminating on Christmas Day, 1991, when Gorbachev resigned as president and President Bush announced the demise of the USSR.¹¹

Reciprocation: Retreating to the Continental United States (CONUS)

During the course of the USSR's reforms and subsequent decline, American foreign policy shifted from adversarial to engaging in an effort to encourage Soviet moves toward openness. A significant element of that effort was the Conventional Forces in Europe (CFE) treaty. CFE was an agreement between nations of the North Atlantic Treaty Organization (NATO) and the Warsaw Treaty Organization (WTO) to significantly reduce the conventional

⁷ Ibid., 322.

⁸ Ibid., 333.

⁹ Grolier Incorporated, *Academic American Encyclopedia* (United States of America: Grolier Incorporated, 1996), 197.

¹⁰ Ibid., 163.

¹¹ Hill, 336.

forces and equipment stationed in Europe. Though the USSR fractured shortly after the 1990 signing, its successor states agreed to the limitations of the treaty in 1992.¹² President George Bush announced the end of the "...military confrontation that has cursed Europe for decades."¹³

Despite the loss of its best enemy, the United States was uncomfortable with the prospect of dismantling a defense apparatus that was built up over half a century. There was a latent skepticism about the true future of the former Warsaw Pact and a perceived need for more emphatic closure. That need was fulfilled in Southwest Asia against Saddam Hussein and his army. Desert Storm served as the exclamation point at the end of a long paragraph of military history dominated by the prospect of major conventional war with a monolithic peer competitor using known methods based on familiar doctrine.

All these factors converged with political promises for lower defense spending and the realization of a *peace dividend* for the sake of domestic prosperity. The impact of the resulting drawdown on forward basing of US military units was dramatic. According to the Defense Department's Annual Report to the President and the Congress, the end strength of the active component in 1988 was 2,138,200¹⁴; by 1999 it had been cut by 35% to 1,385,700.¹⁵ During the same period, the number of troops stationed outside the continental United States was slashed by 54% from 541,000 in 1988 to 247,000 in 1999.¹⁶ In other words, the majority of the drawdown was accomplished by cutting forward-based forces.

Post Cold War Realities

Unfortunately, the scarcity of forward positioned personnel did nothing to curb the appetite for them. Coincident with the drawdown was a shift in national strategy from global

¹² Jeffery D. McCausland, *The CFE Treaty: A Cold War Anachronism?* (Carlisle PA: US Army War College, Strategic Studies Institute, 1995), 4.

¹³ *Ibid.*, 1.

¹⁴ William S. Cohen, *Annual Report to the President and the Congress*. (Washington: Department of Defense, 1997), C-1.

¹⁵ William S. Cohen, *Annual Report to the President and the Congress*. (Washington: Department of Defense, 2000), C-1.

¹⁶ *Ibid.*, C-2.

containment of communism to regional engagement¹⁷. While containment was accomplished largely with the deterrent effect of our national strategic forces, engagement is dependent on actual contact with the different countries and defense establishments in each region. This method requires not less, but more forces. A useful metric to illustrate the point is the number of exercises conducted overseas annually to further the goal of engagement. During fiscal year 1990 there were 90 overseas exercises; by 1995 that number had increased to nearly 200.¹⁸ Engagement is a time and personnel intensive approach to national defense, especially in an increasingly fractioned world.

The power vacuum left by the shrinking influence of the former USSR further magnified the impact of the strategy shift. As the Soviet lid was removed from the pressure cooker of political, religious and ethnic unrest, conflict seemed to explode on the international scene. Between the end of the Vietnam War and 1990, the Army deployed to crises overseas 10 times.¹⁹ During the next decade, the Army deployed 33 times.²⁰ Though some of those deployments were to Europe, the trend is for intervention in areas where we do not have troops stationed. In his book, *The Coming Anarchy*, Robert Kaplan describes a new strategic landscape with West Africa as its poster child. “Disease, overpopulation, unprovoked crime, scarcity of resources, refugee migrations, the increasing erosion of nation-states and international borders, and the empowerment of private armies, security firms, and international drug cartels...”²¹ Though the possibility of major theater war still exists, the proliferation of smaller regional conflicts/crises is even more troublesome. From sub-Saharan Africa, to the Indian subcontinent to Indonesia the challenge of engagement is stretching thin our military resources with little hope future

¹⁷ William J. Clinton, *A Strategic Alliance with Russian Reform*. (Annapolis Maryland: White House Office of the Press Secretary, 1993) [online]; available from <http://www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/1993/4/1/6.text.1>, accessed 2 December 2000.

¹⁸ US General Accounting Office, *Overseas Presence* (Washington: GAO, 1997), 23.

¹⁹ Laura Sullivan, *Military Loss, Private Sector's Gain* (Baltimore MD: Baltimore Sun, September 27, 2000), 1.

²⁰ Ibid.

²¹ Robert D. Kaplan, *The Coming Anarchy*. (New York: Random House, 2000), 7.

contingencies will neatly line up with our current basing structure or deconflict themselves in time.

What does all this mean for the US military? The Cold War is over with its familiarity and predictability. Abundant budgets, sufficient forces and well-defined threats have been replaced with scarcity, uncertainty and the conviction that global engagement is the only option for security. The customary pattern of American post-war isolationism did not occur after the Cold War and it seems less likely as time passes. Globalization of economy, if not culture, drives an increasingly interdependent world in which our national interests are expanded regionally to include any conflict that might threaten stability. Such an enlarged defense sphere requires an extremely robust forward presence. Since the US bases fewer forces overseas, it must have a proportionately larger capability to project power.²² The US Army's contribution to this capability exists as the product of two interrelated elements: lift capacity and tailored forces.²³ This equation is complicated for the Army by the reality that while it can directly affect its tailoring of forces, the lift capacity to project those forces is provided by other services. Thus, structuring units, materiel and doctrine to enhance strategic mobility is an essential consideration for Army force development.

²² The *1995 National Military Strategy* provides a clear discussion of the two complementary strategic concepts of overseas presence and power projection.

²³ Power projection is practiced by all the services. The Air Force conducts global air strikes within hours of alert, launched from CONUS bases; Marine Amphibious Ready Groups stand poised forward to intervene within hours or days of alert (depending on location); and Navy carrier battle groups provide the most continually visible element of US forward presence. Again, the scope of this paper is limited to the Army's contribution to power projection, and more specifically to the airlift feasibility of the IBCT.

The Transformation Concept

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.

Brigadier General William “Billy” Mitchell, *Winged Defense*

Generally, he who occupies the field of battle first and awaits his enemy is at ease; he who comes later to the scene and rushes into the fight is weary.

Sun Tzu, *The Art of War*

Since power projection is composed of lift capacity and tailored forces and the Army depends on other services to provide strategic lift, the Army affects the power projection equation most directly by structuring forces that are strategically agile. Although the realities of the emerging security environment have made *more urgent* the imperative to field a force optimized for deployment efficiency without sacrificing employment effectiveness, this fundamental clash of competing requirements is not unique to the twenty-first century.

Transformation: Its Origins

Power projection has always been an integral component of military power. According to *American National Security*, one of the key determinants of military capability and subsequently national power is mobility.²⁴ The authors describe mobility as “How quickly and by what means could [weapon systems] be moved to strategically and tactically important locations? How much airlift and sealift are available for overseas operations?”²⁵ This is not a new concept. From the earliest times, imposing one’s will on an adversary required transporting combat forces to the place where this enemy could be found. The Peloponnesian Wars of the fifth century BC

²⁴ Amos A. Jordan, William J. Taylor, Jr., and Michael J. Mazarr, *American National Security, Fifth Edition* (Baltimore and London: The Johns Hopkins University Press, 1999), 28.

²⁵ *Ibid.*

were essentially exercises in power projection.²⁶ The task of moving forces in that age was relatively uncomplicated since armies were essentially groups of armed men.²⁷

The industrialization and mechanization of warfare complicated the task of power projection by creating forces that were significantly more lethal and survivable, but by the same token, less strategically responsive. In simple terms, they were just too heavy and bulky to move easily from theater to theater. Not only were the forces themselves prohibitively large, they also required an enormous logistics tail of fuel, ammunition, and spare parts. Of course, there were still light forces capable of rapid deployment, but with reduced combat punch, staying power and survivability.

The US Army is no exception. Since World War II it has been characterized by very heavy armored/mechanized units and extremely light formations composed of foot-mobile infantrymen.²⁸ This “barbell” characteristic endures to the present with three light infantry divisions, six heavy divisions, and one airmobile division which, though unencumbered by armored vehicles, is still as strategically ponderous as a heavy division due to a large number of helicopters unable to self-deploy.²⁹

Three examples serve to illustrate the strategic *immobility* of current forces. The Gulf War was an overwhelming success, but the circumstances beg the question, were we just fortunate to have an enemy who hesitated? Perhaps it would have turned out differently had Saddam Hussein not afforded us nearly 5 months to mobilize and deploy forces.³⁰ Operation JOINT ENDEAVOR further portrays the strategic immobility of heavy forces. To support the

²⁶ Thucydides, *History of the Peloponnesian War*, trans. By Rex Warner (London: Penguin Books, 1972), 245. The entire narrative of the Peloponnesian War is replete with examples of power projection by overland travel or sea transport.

²⁷ In reality, even ancient armies were composed of more than just armed men. They too, required a support structure of some sort, many employed horses and there were other considerations that complicated force projection, especially in the context of their mobility capabilities. Nonetheless, in contrast to a fully mechanized force, the armies of antiquity were relatively uncomplicated.

²⁸ John Gordon IV and Peter A. Wilson, *The Case For Army XXI “Medium Weight :Aero-Motorized Divisions: A Pathway to the Army of 2020* (Carlisle PA: Strategic Studies Institute, 1998), 4.

²⁹ *Ibid.*, 5.

contingency, a reinforced brigade consisting of only four battalions deployed from southern Germany to Bosnia via rail and roads. It took nearly two months to arrive.³¹ Finally, Task Force Hawk, an ad hoc organization of attack helicopters and support personnel and equipment, deployed near the end of the 1999 conflict in Kosovo. After 1,271 C-17 sorties and 30 days, it closed in theater, but even then was not prepared for operations.³²

Obviously, light forces would have deployed much more quickly in each of these scenarios (in fact they were part of the Gulf War team), however they would not have had the firepower, protection or tactical mobility to survive and execute the mission on their own. World War II is replete with examples of light Italian, British, American and German units who were overrun or bypassed by armored and mechanized forces.³³ Clearly, the missing piece of the puzzle is an elusive amalgam of both ends of the spectrum: a medium weight force with responsive strategic mobility but packing enough firepower and survivability to hold its own once committed. This is what the Army's current transformation is all about.

The Chief's Vision

In October 1999, new Army Chief of Staff (CSA), General Eric Shinseki, presented a bold vision of a transformed Army. He described an objective force that transcends the light/heavy paradigm of the current force structure to become more strategically agile, gain a credible early-entry capability and maintain the lethality and survivability of the current heavy units to achieve full-spectrum dominance. This new Army would be able to put a brigade-size combat force anywhere in the world by airlift 96 hours after liftoff, a division on the ground in 120 hours and five divisions in 30 days. More urgently, Gen Shinseki resolutely announced the

³⁰ John W. Leland, *Air Mobility in Operation DESERT SHIELD/DESERT STORM: An Assessment* (Washington DC, US GPO, 1997), 143.

³¹ Gordon, 5.

³² John D. Becker, *Getting to the Fight: The Mobility Perspective* [Microsoft PowerPoint presentation] (Scott AFB: Tanker Airlift Control Center, obtained from Maj Bill Isler, September 1999), slide 9.

³³ *Ibid.*, 21.

transformation would begin immediately.³⁴ This bold new vision, complemented by planning directives and related documents, is more than flowery words. It is a path to the Army of 2020 with specific aims for doctrine, organization and technology.

In the expedition toward the Objective Force, Army Transformation balances three competing imperatives. It must invest in the research and development to produce technology enablers for the future. At the same time, it must maintain a credible and ready force for deterrence and warfighting. Finally, it endeavors to field quickly a medium-weight, early-entry force for the near-term. This three-pronged approach is presented graphically in Figure 1.

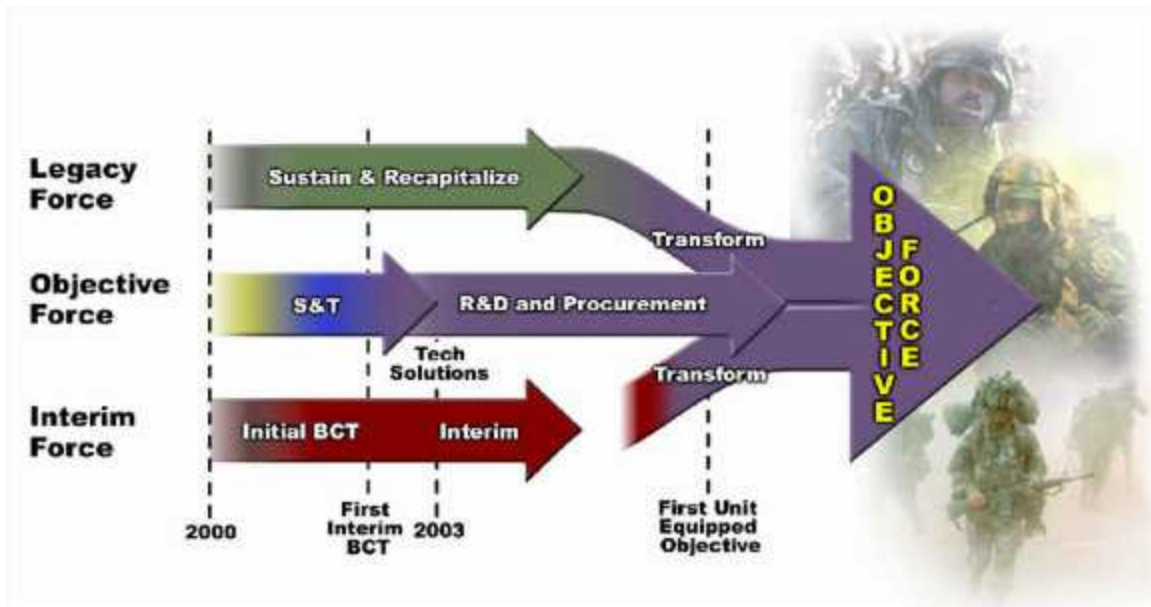


Figure 1 Army Transformation³⁵

The top arrow portrays the legacy forces that will maintain the Army’s high-end warfighting capability during the transformation. It consists of systems currently in use (e.g. M1A1 Abrams, AH-64 Apache, M2A1 Bradley, etc.) and those systems and enhancements

³⁴ Eric K. Shinseki, “*The Army Vision: Soldiers On Point for the Nation...Persuasive in Peace, Invincible in War,*” [on-line]; available from http://www.tradoc.army.mil/transformation/Data%20Pages/csa_vision.htm; Internet; accessed 1 August 2000.

³⁵ *The Army Transformation*. (Washington: Department of the Army, 2000) [online] available from <http://www.army.mil/armyvision/transform.htm> accessed 3 December 2000.

funded and projected for fielding prior to the objective force (e.g. M1A1 Abrams Integrated Management, Apache Longbow upgrades, Comanche helicopters, upgraded HEMTTs, etc.).³⁶

The middle arrow bridges the science and technology gap between current capabilities and the materiel solutions required for the objective force. Unfortunately, futuristic gadgets do not automatically generate combat power; they must be integrated with appropriate doctrine to produce results. Lieutenant General Paul Kern, senior advisor to CSA on all research, development and acquisition programs, proudly states, “In the US Army today, however, doctrine is leading technology.”³⁷ Precision engagement, dominant maneuver and information operations are aspects of this doctrine.³⁸ Examples of supporting technologies under development include: precision munitions, wide-area surveillance, manned and unmanned delivery platforms, low-observability, fuel cells, directed energy weapons, robotics and ceramic armor.³⁹ As these innovations materialize, they will be matched with the maturing doctrine of the objective force to enable full implementation of the transformation vision.

Clearly, this process will be iterative with feedback loops to allow doctrine to maintain influence on the research and development and to keep doctrine grounded in the realm of the possible. The third arrow in the transformation graphic represents the vehicle for that feedback.

IBCT

At the heart of the transformation lies the IBCT. It is the basic unit of Army combat power and the building block for the objective force. This organization serves two purposes: it fills the gap between heavy and light forces to provide an interim early-entry capability for national decision makers; and provides a working laboratory to refine the doctrinal and organizational concepts that will mature into the objective force.

³⁶ Duncan Hunter, et al, *US Representative Duncan Hunter (R-CA) Holds Hearing With the Research and Development Subcommittee on the Army Program Transformation* (Washington DC: FDCH Political Transcripts, 9 March 2000), 7.

³⁷ Paul J. Kern, “The Future Battlefield,” *Army Magazine*, July 2000, 20.

³⁸ Ibid.

³⁹ Ibid, 21 and Hunter, et al, 11.

In order to fulfill both roles, the first IBCT had to begin the transition as soon as possible. Accordingly, in November 1999, the 3rd Brigade, 2nd Infantry Division began its metamorphosis to the first *initial* brigade combat team.⁴⁰ During this *initial* stage of development, the brigade is using Canadian LAVIII wheeled combat vehicles as a surrogate for the eventual interim armored vehicle. The initial brigade will use these vehicles to develop the tactics, techniques and procedures to be used by the interim brigades to accomplish their mission. However, as is frequently stressed by proponents, the IBCT is not a concept for a new vehicle, but a new way of fighting. Major General James M. Dubik, US Army Training and Doctrine Command (TRADOC) deputy commanding general for transformation, elaborates, “We want to move from a general rule of making contact with the enemy, developing the situation and then maneuvering the force, to one of understanding the situation, maneuvering the force and then making contact at the time and place of our choosing.”⁴¹ Training leaders to think according to this new model is one of the primary responsibilities of the initial brigades. Of course, they are receiving help from all over the Army. Once the first unit becomes operational in December 2001, it will be redesignated *interim* brigade combat team and will serve as the model for five to eight total IBCTs to be fielded on the way to the objective force.⁴²

The IBCT is organized around three motorized, infantry battalions with combined arms implemented at the company level. A reconnaissance, surveillance and target acquisition (RSTA) squadron and military intelligence company support the situational understanding necessary to develop a situation out of contact. An antitank company adds a standoff weapon capability to increase flexibility and survivability. The field artillery battalion’s vital mission is proactive counterbattery fire to reduce casualties of the highly vulnerable infantry battalions. The brigade also contains an engineer company, signal company, and a brigade support battalion. Other

⁴⁰ Tom Bradbury, *Fort Lewis Readies for Initial Brigade Testing*, [on-line]; available from http://www.tradoc.army.mil/transformation/Data%20Pages/fort_lewis_readies_for_initial_bct.htm; Internet; accessed 31 October 2000.

⁴¹ Dennis Steele, “Soldiering Outside the Box,” *Army Magazine*, September 2000, 22.

traditional support capabilities would be part of a supporting divisional structure or task-organized into the unit for a specific mission profile.⁴³

Although the essence of the IBCT is its doctrine and organization, the choice of vehicles is certainly a non-trivial issue. The interim armored vehicle (IAV) will be chosen from off-the-shelf options and modified into several variants to serve the needs of the brigade. This concept will not only speed fielding, but will simplify the logistical support for the unit. The variants will include an infantry carrier vehicle (ICV), mobile gun system and howitzer and several configurations of the ICV to support other battlefield functions.⁴⁴ In order to enhance theater mobility, all IBCT equipment (to include the IAV) will be C-130 transportable.

Army Transformation aims to remedy the gap between lethal, survivable heavy forces and rapidly deployable light forces to give the national command authority an early entry, full-spectrum force option. The ultimate solution is the objective force, enabled by science and technology advancements produced over the next 10-20 years. In the meantime, the IBCT will exploit off-the-shelf technology and an innovative operational concept to provide an interim, medium weight alternative. This transformation effort attempts to address the tailored forces component of force projection. The next step is to examine the airlift system on which it depends for global mobility.

⁴² Theodore G. Stroup, Jr., "The Ongoing Army Transformation," *Army Magazine*, July 2000, 7.

⁴³ Michael Mehaffey, "Vanguard of the Objective Force," *Military Review*, September-October 2000, 11-12. All information contained in this paragraph is taken from this article.

⁴⁴ US Army Training and Doctrine Command, *OPERATIONAL REQUIREMENTS DOCUMENT FOR A FAMILY OF INTERIM ARMORED VEHICLES (IAV)*, [on-line]; available from <http://contracting.tacom.army.mil/majorsys/brigade/formalrfp/iavord/ord.zip>; accessed 20 August 2000.

The Airlift System

There aren't a lot of movies made about airlifters. There's no '12 O'clock High' or 'Top Gun'... [B]ut, despite their lack of glamour, they are arguably the most potent tool this nation has for shaping the international arena.

Sheila E. Widnall, Former Secretary of the Air Force
As quoted in *Air Mobility Command, Backbone of America's Defense*

Tailoring forces (along with their doctrine, organization and equipment) for an early-entry, robust-employment concept addresses only one of the elements in the force projection equation. The other element is the airlift system required to transport forces into theater. Obviously, the most visible component of the airlift system is the aircraft fleet.

Airlifters: The Future

The Army's objective force is a vision for the future. The forces do not exist now; technology has not even been developed to make them possible. Conventional wisdom then requires that the planning scenario for deployment of this future force must *also* consider the airlift fleet projected forward in time. Exciting technologies for airlift aircraft advancements are currently in the concept development phase.

One of these advanced concepts outlines the vision for a trans-atmospheric vehicle (TAV).⁴⁵ This version of the airlifter of the future would launch in rocket-like fashion, exit the atmosphere and reenter according to the desired landing location and descent profile. The TAV design achieves the primary benefit of reducing en route time to one hour or less for any destination on the globe.⁴⁶ Unfortunately, its enormous infrastructure requirements and resultant inflexibility make it unsuitable for most military applications. A less ambitious attempt at global mobility builds on the Concorde SST notion to develop a supersonic military transport.⁴⁷ While

⁴⁵ David W. Allvin, *Paradigm Lost: Rethinking Theater Airlift to Support the Army After Next*, (Maxwell AFB, AL: Air University Press, 1999), 4.

⁴⁶ James A. Fellows, Michael H. Harner, Jennifer L. Pickett, and Michael F. Welch, *Airlift 2025: The First with the Most*, (Maxwell AFB: Air University Press, 1996) [online]; available from <http://www.au.af.mil/au/2025/volume2/chap04/vol2ch04.pdf>; Internet; accessed 10 November 2000.

⁴⁷ *Ibid.*

much more achievable than a shuttle-like TAV, current supersonic airlifter designs are range-limited by fuel and require 13,000-foot runways. Other advanced concepts include airships with a 500-ton lift capability, maximum airspeed of 250 knots and 12,500 mile range⁴⁸ and C-130 sized tilt-rotor aircraft capable of vertical takeoff and landing.⁴⁹

Advanced technology solutions like these hold great promise for the Air Force of 2025 and the Objective Force. In fact, in 1999, officers from the Army's Advanced Operational Art Studies Fellowship program were charged with analyzing the deployability of the future army using capabilities projected to be available in 2015.⁵⁰ Units were flowed from the continental United States (CONUS) to the Middle East using the assumed capabilities of advanced rotorcraft and airships. The results were quite encouraging, but entirely dependent on research and development to deliver the required solutions. Unfortunately, without even addressing the relative merits of specific future airlift concepts, it is easy to demonstrate they are *a priori* moot for the sake of the question at hand.

The first hurdle for Transformation is an IBCT with a time horizon (and associated airlift requirement) of seven years in the future, not 25. Even an extremely optimistic view of science and technology does not allow for research, development, and fielding of new weapon systems in seven years. To illustrate the point, consider development of the Lockheed C-17 Globemaster III. Although the request for proposal was issued to contractors on 15 April 1980⁵¹, the first operational aircraft was not delivered until June 1993, and the fleet will not be complete until the last aircraft is delivered in 2005.⁵² Some may argue there were specific causes for this delayed development schedule (e.g. disagreements in Congress over the best philosophy for the structure

⁴⁸ Ibid.

⁴⁹ Alexander P. Shine, "Theater Airlift 2010," *Airpower Journal* 1988 [journal on-line]; available from <http://132.60.140.12/airchronicles/apj/apj88/shine.html>; Internet; accessed 6 February 2000.

⁵⁰ Col John Walden, Advanced Operational Arts Studies Fellow, School of Advanced Military Studies. 2000. Interview by author, 27 November, Ft Leavenworth, Kansas.

⁵¹ Charles E. Miller, *Airlift Doctrine* (Maxwell AFB, AL: Air University Press, 1988), 377.

⁵² *C-17 Globemaster III Fact Sheet* [on-line]; available from http://www.af.mil/news/factsheets/C_17_Globemaster_III.html; Internet; accessed 12 November 2000.

and procurement of an airlift fleet). It would be naïve, however, to assume those difficulties would be absent during the next acquisition effort, particularly considering the level of technological advancement that is under consideration.

Airlifters: The Relevant Future

Since the Transformation timeline projects an IBCT to be operational in 2007, what will the airlift fleet of 2007 look like? The short answer—not dramatically different from our current fleet. There are no new airlift aircraft acquisitions projected for the next seven years. As stated in the previous section, proposed futuristic airlift concepts cannot meet the time horizon for the IBCT; it is questionable whether they will even be available for the dawn of the objective force on its currently envisioned evolution. The only substantive change in the fleet is the retirement of 266 1960s-era⁵³ C-141 Starlifters and their replacement by 120 C-17s⁵⁴. That said, the relevant airlift fleet is comprised of the C-5B Galaxy, the C17 Globemaster III and the C-130X Hercules.

C-5B Galaxy⁵⁵

The C-5 is the largest aircraft in the world. Its specialty is inter-theater airlift of outsized⁵⁶ cargo. Although it can takeoff and land on relatively short airfields, loading, servicing and payload requirements dictate that it operate primarily to and from large conventional airports.

C-141B Starlifter Fact Sheet [on-line]; available from http://www.af.mil/news/factsheets/C_141B_Starlifter.html; Internet; accessed 16 November 2000. The first C-141A was delivered to the AF in 1964, arguably with 1950s design technology. The AF completed the conversion of all aircraft to the B model in 1982. The major enhancements were stretching of the cargo compartment and installation of air refueling equipment.

⁵⁴ The final number of C-17s currently programmed is 135, however 15 of those aircraft will be modified for and dedicated to special operations missions and will be unavailable for general strategic airlift missions.

⁵⁵ C-5 Galaxy Fact Sheet [on-line]; available from http://www.af.mil/news/factsheets/C_5_Galaxy.html; Internet; accessed 16 November 2000. Except where additionally cited, all information in this paragraph is taken from the C-5 fact sheet.

⁵⁶ *AMC Strategic Plan 2000* [on-line]; available from <http://www.amc.af.mil/> (restricted to .mil domain); Internet; accessed 12 July 2000. “Outsize Cargo. Any single item that is smaller than 1,453 inches in length, 144 inches in width, and 156 inches in height and 1,453 inches in length, 216 inches in width, and 114 inches in height, but exceeds 1,090 inches in length, 117 inches in width, or 105 inches in height. Typically, this equipment is limited to the C-5 and C-17 aircraft which were specifically designed to accommodate these cargo types. An example of an outsize piece of cargo, which is also roll-on/roll-off, is an M1A1 Abrams Tank.”

Crews can load and unload simultaneously from the front and rear when the nose section is rotated vertically to allow front access to the cargo compartment. The Galaxy is capable of uploading 102 tons, flying a distance of 2150 nautical miles, offloading, and returning to a landing point within 500 miles of its original departure airport without air refueling. With aerial refueling that distance can be extended to the limits of crew endurance.

While it is uniquely capable for the mission for which it was designed, the C-5 is an old airframe. The first aircraft was delivered in June 1970 and the last in March of 1989. Consequently, it is struggling with declining maintainability, reliability and supportability, while operating costs escalate. Its mission capable (MC) rate (percentage of aircraft able to fly at any given time) is currently in the low 60 percent range, as compared to a programmed MC rate of 75 percent.⁵⁷ To remedy the situation and extend the service life of the aircraft, Air Mobility Command (AMC) is planning a phased modernization plan that will include engine turbine replacement, avionics modernization, re-engining and reliability improvement.⁵⁸ Regrettably, the modifications will not be completed until 2011.⁵⁹ The C-5 is augmented by the C-17 Globemaster III.

C-17 Globemaster III⁶⁰

The C-17 is the newest addition to the airlift fleet. As previously stated, it entered active service in June 1993, with the first squadron mission ready in Jan 1995. Boeing is projected to deliver the final aircraft of the programmed procurement in 2007 to complete the buy of 135 aircraft.⁶¹ The Globemaster III is uniquely capable of delivering outsize cargo to small, austere landing strips (as small as 3000 feet long and 90 feet wide). Direct delivery—the ability to

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ *C-17 Globemaster III Fact Sheet*. Except where additionally cited, all information in this paragraph is taken from the C-17 fact sheet.

⁶¹ *AMC Strategic Plan 2000*. This is 15 more than the original program. The additional aircraft will be dedicated to supporting Special Operations Command missions using Special Operations Low Level II procedures.

deliver cargo to its final destination without cross-loading at a main theater operating base—enhances the deployment effectiveness and efficiency of this aircraft. The C-17 can upload 80 tons of cargo and travel 2400 nautical miles unrefueled. Like the C-5, it is air refuelable, extending the practical range to the limit of aircrew endurance. Strategic lift is only part of its repertoire, as the C-17 is also airdrop capable, delivering both equipment and up to 102 paratroopers.

The retirement of C-141s and replacement by fewer C-17s will result in a net loss of 131 aircraft tail numbers. The completed C-17 fleet will have a greater overall strategic airlift capacity than the current C-141 fleet, due partly to a greater aircraft capacity and higher crew ratio. However, concentrating the same (or greater airlift) into fewer discrete packages reduces the number of locations that can be served by airlift during any given time period. The result is a significant loss in flexibility due to the simple fact that unlike the three C-141s they replaced, two C-17s cannot be in three places at once. Moreover, each C-17 down for maintenance equates to a larger percentage of the overall lift capability. Although the C-17 is capable of direct delivery it is augmented in the intra-theater lift role by the C-130 Hercules.

C-130 Hercules⁶²

The venerable C-130 Hercules, or “Herk,” is the workhorse performing the bulk of the intratheater portion of the airlift mission. It specializes in combat aerial delivery and airland missions to rough dirt strips. The bulk of the Herk fleet is in the Air National Guard and the Air Force Reserve Command (64 percent).⁶³ In its different configurations, the C-130 performs missions as diverse as airlift support, Arctic ice resupply, aeromedical evacuation missions, aerial spray missions, fire-fighting duties for the U.S. Forest Service and natural disaster relief.

⁶² *C-130 Hercules Fact Sheet* [on-line]; available from http://www.af.mil/news/factsheets/C_130_Hercules.html; Internet; accessed 16 November 2000. Except where additionally cited, all information in this paragraph is taken from the C-130 fact sheet.

⁶³ C. Kevin Hyde, Unpublished essay on C-130 Fleet Structure written in fulfillment of graduation requirements for United States Navy Intermediate Service School, 2000, p. 9, delivered as an email attachment to the author on 15 July 2000.

After four decades of continuous production, the Herk fleet is composed of numerous different models with different technical data and operating characteristics. In 1998, an AMC “Tiger Team” of experts was commissioned to identify problems with the system and develop an integrated, long-term plan to solve them.⁶⁴ The result was an overall strategy to replace the oldest C-130Es with new C-130Js and modify the remaining models to a common C-130 X configuration.⁶⁵ This blueprint will simplify the maintenance and reduce logistic requirements for sustaining the C-130 fleet.

One of the explicit requirements of the IBCT is that all equipment must be C-130 transportable.⁶⁶ This condition enhances operational mobility by enabling the IBCT to move within the theater of operations on CINC-owned aircraft to destinations that may be served only by unimproved airfields. Unfortunately, the Herk is as unsuited for inter-theater mobility missions as it is perfectly designed for theater airlift operations. Its lack of range and small payload remove it completely from the picture for deployment between theaters. The Herk, like all airlifters, is dependent on the Global Air Mobility Support System for sustainment and support.

The Enabler: Global Air Mobility Support System (GAMSS)

No matter how capable the fleet is, aircraft do not just take off from a departure base and land at their destination. There is a lot more to the picture than the actual flight activities; just as with any military operation, there is a robust support mechanism required to generate and sustain movement. For airlift, this mechanism is the Global Air Mobility Support System (GAMSS). GAMSS is an integrated system, stretching from CONUS aerial ports of embarkation (APOEs) to aerial ports of debarkation (APODs), that facilitates the movement of combat and support forces. The GAMSS is not a fixed structure or a standard template. It is comprised of permanent support locations throughout the world and support units capable of rapid deployment to augment the

⁶⁴ *AMC Strategic Plan 2000.*

⁶⁵ *Ibid.*

infrastructure and personnel at permanent locations, or to create support facilities in locations where none exist.⁶⁷

In the simplest scenario, a strategic deployment would fall within the capabilities of permanent overseas support locations. Minimal augmentation would be required to support the throughput of strategic airlift. The parent organization providing en route support at permanent bases is the Air Mobility Support Group (AMSG). As the largest command element, the AMSG plans, establishes procedures and orchestrates the activities of subordinate units to ensure air mobility operations are properly supported within its area of responsibility (AOR).⁶⁸ The Air Mobility Support Squadron (AMSS) is the subordinate unit directly responsible for providing services to transiting AMC forces. Each AMSS operates an air mobility control center (AMCC) to provide command and control of global air mobility forces in direct coordination with AMC's Tanker Airlift Control Center (TACC).⁶⁹ The AMSS's air terminal operations center (ATOC) directs port activities, including passenger and cargo onload/offload and servicing of aircraft, either with organic assets or through contract relationships with host nation or other vendors.⁷⁰ The final major element of the AMSS is the maintenance support flight, which is configured to provide maintenance functions (including some system repair) to certain aircraft, depending on which weapon systems commonly transit that location.⁷¹

Regrettably, the airlift en route infrastructure suffered from the same drawdown that affected the rest of the military machine. In 1990, AMC operated a worldwide en route system boasting 45 permanent overseas locations supported by nearly 5,500 personnel. Over the last decade, the number was slashed to 12 locations and less than 4,000 people while optempo

⁶⁶ Mehaffey, 9.

⁶⁷ *Air Force Doctrine Document 2-6.3, Air Mobility Support* (Maxwell AFB AL: AF Doctrine Center, 1999), 2.

⁶⁸ *Air Force Doctrine Document 2-6, Air Mobility Operations* (Maxwell AFB AL: AF Doctrine Center, 1999), 72.

⁶⁹ *Air Force Doctrine Document 2-6.3, Air Mobility Support*, 14.

⁷⁰ *Ibid.*

⁷¹ *Ibid.*

increased for the same period.⁷² When support at permanent locations is insufficient for a deployment, AMC uses the global reach laydown (GRL) strategy to augment permanent capability and initiate operations at additional (perhaps austere) fields, as required for a specific deployment concept.⁷³

According to the GRL strategy, air mobility support elements rapidly deploy wherever necessary to augment permanent bases or establish support operations in locations that may have little or no infrastructure or organic capabilities. A short list of some of the services these units provide includes: command and control; crash, fire and rescue; force protection; aerial port operations; material handling equipment (MHE); weather information; intelligence; airbase defense; refueling, aircraft maintenance; and airspace control.⁷⁴ The AMC organizations fielded to provide these support elements are air mobility operations groups (AMOG), airlift control squadrons (ALCS) and their air reserve component equivalent, the airlift control flight (ALCF).

While these organizations (broadly referred to as air mobility control units, or AMCUs) do not themselves deploy, they send configured modules of capability to en route locations.⁷⁵ In support of a contingency movement, an ALCS will deploy a tanker airlift control element (TALCE) configured to provide the augmentation and support specifically required for the situation. If the augmentation requirement is relatively small (in the range of an aircraft MOG of 4), the ALCS will send a mission support team (MST) with expertise tailored to the specific situation.⁷⁶ When functionality is required beyond what is available in the ALCS, AMC will task an AMOG or mobility flying wing to provide the necessary expertise in the form of a purpose-specific mission support element.⁷⁷

⁷² *AMC Strategic Plan 2000.*

⁷³ *Ibid.*

⁷⁴ *Joint Publication 4-01.1, Joint Tactics, Techniques and Procedures for Airlift Support to Joint Operations* (Washington DC: Joint Chiefs of Staff, 1996), III-2.

⁷⁵ *Air Force Doctrine Document 2-6, Air Mobility Operation*, 63.

⁷⁶ *Air Force Doctrine Document 2-6.3, Air Mobility Support*, 16.

⁷⁷ *Air Force Doctrine Document 2-6, Air Mobility Operation*, 63.

Once all the pieces of the puzzle are in place, this global reach conglomeration is commonly referred to as an *air bridge*, spanning the gulf between CONUS-bases and theater ports. Control of the air bridge is a cooperative effort between TACC, the deployed TALCEs, and mobility control in theater. This theater control is performed by the theater air mobility operations control center (AMOCC— essentially the theater’s TACC). The global mobility mission is further integrated into the joint force commander’s (JFC) operation by placing an air mobility division (owned by the theater) in the joint air operations center,⁷⁸ along with an air mobility element (AME), which reports to TACC.⁷⁹ This system of command and control works to ensure a seamless line of support from CONUS, through en route locations, into theater and throughout the theater to responsively support the JFC’s operational concept.

⁷⁸ *Air Force Doctrine Document 2-6.3, Air Mobility Support*, 18.

⁷⁹ *Joint Publication 3-56.1, Command and Control for Joint Air Operations* (Washington DC: Joint Chiefs of Staff, 1994), B-2.

Analysis: Can the Air Force Lift the IBCT

Air Mobility is the linchpin to national security.

General Ronald Fogleman, Former Air Force Chief of Staff
USTRANSCOM White Paper, 1992

Methodology

Having described the two elements of force projection, tailored forces and lift capability, all that remains is to combine them in a meaningful way to answer the question, “ can the Air Force lift the IBCT in 96 hours.” The most reliable method would be to marshal the unit with all its associated equipment, activate the defense transportation system and execute a strategic movement to another theater. This, of course, is infeasible given the cost, effort, and the fact that most of the equipment does not yet exist.⁸⁰ Fortunately, an air movement is something that is easily modeled, depending on the level of fidelity required. Given an appropriate scenario with associated facts, assumptions and allocated airlift assets, there are a number of computer programs available to provide an analyst the means to evaluate the deployability of a unit. The tool used by the Joint Operations Planning and Execution System (JOPES) is known as JFAST, the Joint Flow and Analysis System for Transportation.

The Tool: Joint Flow and Analysis System for Transportation (JFAST)

JFAST is the application of JOPES automated data processing suite specifically designed to simulate strategic or operational movements. Operations planners use this tool to generate detailed estimates of transportation resource requirements.⁸¹ It is also useful in estimating the impact of varying lift resource allocation and support system characteristics on closure of a specific movement plan. JFAST provides detailed information about every aspect of the movement, including: closure estimates, congestion points, optimum transportation mode,

⁸⁰ In fact, the analysis *should* be accomplished before the units have been fielded in order to validate the operational concept.

⁸¹ *Joint Publication 3-35, Joint Deployment and Redeployment Operations* (Washington DC: Joint Chiefs of Staff, 1999), V-7.

attrition effects, lift utilization, gross lift capability and shortfalls.⁸² The tool presents this information in a variety of reports, charts and graphs that are extremely flexible. It is also the US Transportation Command (USTRANSCOM) standard for evaluating the transportation feasibility of all OPLAN/CONPLAN Time Phased Force Deployment Data (TPFDD).⁸³

In order to evaluate a proposed movement, the JFAST operator requires three primary elements of information. First, the user must develop a TPFDD, which describes the elements of the unit(s) to be deployed and their movement priority. Next, the deployment will have an allocation of lift resources either from the governing documents, higher headquarters orders or set by the user to evaluate different scenarios for iterative refinement of a plan. Finally, the operator must have a concept of operations detailing how the user wants to conduct the movement, to include constraints on the transportation system (e.g. must operate daytime only at certain airports, cannot overfly specific countries, etc.). With this information, the JFAST operator can simulate a variety of movements to give the planner an understanding of the feasibility and characteristics of the movement he is proposing.

IBCT Deployment Scenario

For analysis of deployments and deployment processes, the Army relies on the Deployment Process Modernization Office (DPMO) at Ft Eustis, Virginia.⁸⁴ Within the DPMO, the Force Projection Battle Lab Support Element (FPBLSE) provides (among other competencies) JFAST expertise to accurately model transportation scenarios for analysis and process improvement.⁸⁵ Since the operational concept of the IBCT hinges on strategic mobility,

⁸² US Army Command and General Staff College, *Advanced Global Command & Control System (JOPES) Advance Book/Syllabus*, (Ft Leavenworth KS: US Army Command and General Staff College Department of Multinational and Combined Operations, 1999), C-7.

⁸³ Ibid.

⁸⁴ *Deployment Process Modernization Office* (Ft Eustis, Virginia: Deployment Process Modernization Office, 2000) [online]; available from <http://www.deploy.eustis.army.mil/>, Accessed 3 December 2000.

⁸⁵ *Force Projection Battlelab Support Element* (Ft Eustis, Virginia: Deployment Process Modernization Office, 2000) [online]; available from <http://www.deploy.eustis.army.mil/BattleLab/BATTLELAB.htm> Accessed 3 December 2000.

FPBLSE analysts have been involved in simulating movement of the IBCT since early in its conceptual development.

The TPFDD

The FPBLSE used the IBCT's table of organization and equipment to fill out the TPFDD with weights, dimensions and numbers of personnel.⁸⁶ The next step was to determine how to simulate loading aircraft with the unit's equipment and personnel. To be useful, a deployment simulation must accurately model the load efficiency of the aircraft. JFAST does not have the ability to load individual items on individual aircraft. Moreover, some equipment is heavy but compact, while other items are bulky but light. Consequently, placing a standard number of short tons on each aircraft would not accurately represent actual aircraft loads. To characterize accurately the load efficiency of this deployment, FPBLSE turned to HQ AMC studies and analysis flight (XPY).⁸⁷ XPY uses a detailed, industrial strength airlift simulation called airlift flow model (AFM) to model fully mobilized, two major theater war scenarios. AFM contains a loading module that takes individual pieces from a TPFDD and loads them on aircraft before simulating the aircraft movement. XPY took the actual IBCT TPFDD, ran it through the AFM loading module to determine the load characteristics of the IBCT.⁸⁸ FPBLSE then used an average load efficiency for each aircraft type from the AFM output as the standard for the JFAST simulation. As FPBLSE conducted their analysis, they refined the TPFDD and subsequently re-analyzed the load efficiency with AFM in an iterative process to maintain precision in the simulation of aircraft loading. With the TPFDD and its characteristics defined, the next issue is determining the number of aircraft available to be loaded.

⁸⁶ Rick White, Mobility Analyst with Force Projection Battle Lab Support Element, email to author, dated 27 November 2000.

⁸⁷ Force Projection Battlelab Support Element, *Deployment Analysis, Interim Brigade Combat Team Deployment* (Ft Eustis, Virginia: Deployment Process Modernization Office, 2000); Microsoft PowerPoint presentation emailed to the author on 23 September 2000, slide 2.

⁸⁸ Ibid.

Aircraft Allocation

Allocating aircraft for a notional contingency detached from an international and domestic context is not as simple as it may sound. Airlift aircraft perform a peacetime function beyond just training for conflict. The peacetime military has a continuous requirement for movement, from PCS shipments to aircraft parts to carrier battle group personnel. Even absent a competing national emergency, a small-scale contingency (SSC) will be competing for available strategic airlift capacity with sustainment lift requirements in other theaters. This reality and a host of other intervening variables force an element of subjectivity into the allocation of aircraft for analysis.

FPBLSE began its study with a 60-60 allocation assumption—60 percent of the strategic airlift fleet would be mission capable at any given time and the IBCT portion of a small-scale contingency would receive 60 percent of those available aircraft.⁸⁹ 60-60 in 2007 equates to 46 C-5s and 54 C-17s. While a 60-60 allocation of aircraft may seem reasonable to Army planners, it is an arbitrary assumption that does not consider the variables that will affect aircraft availability in a given situation. Included among those variables are actual/programmed MC rates, competing force airlift requirements, sustainment airlift dedicated to other theaters, actual location of aircraft, etc. Although all of the conditions that will affect an actual deployment cannot be known ahead of time, many can be estimated to provide a more rational planning assumption. The agency charged with assessing this transportation feasibility is USTRANSCOM.

USTRANSCOM, in conjunction with HQ AMC, Directorate of Operations (HQ AMC/DOV), Plans Division and HQ AMC Plans and Programs Directorate (HQ AMC/XP), provided a more judicious appraisal of aircraft availability. The USTRANSCOM estimate considered past contingencies, planning factors consistent with the Joint Strategic Capabilities

⁸⁹ Rick White, Mobility Analyst with Force Projection Battle Lab Support Element, email to author, 24 November 2000.

Plan (JSCP) for similar situations, and the judgment of subject matter experts.⁹⁰ It also included some assumptions: two to three days warning time for movement, a presidential selective reserve callup, no competing national emergency and programmed MC rates for C-5s and C-17s.⁹¹ This script yielded 26 C-5s and 30 C-17s at day four of the contingency, ramping up to 48 C-5s and 51 C-17s by day 14. Since the IBCT 96-hour requirement is measured from first takeoff, not when the order is issued, the lead time was excluded from the analysis timeline. Consequently, FPBLSE used 26 C-5s and 30 C-17s on day one with a steady ramp-up to the final numbers on day 13. With aircraft allocated, the next step in the modeling effort is to define the concept of operations that governs the way the aircraft are used.

Concept of Operations (CONOPS) for Deployment

Clearly, the most fundamental element of the CONOPS is the deployment location. Many of the constraints affecting aircraft movement will be determined by the real world characteristics of the location. Training and Doctrine Command Analysis Center, Fort Leavenworth (TRAC-LVN), under direction from the deputy chief of staff for combat development, selected the Balkans, specifically Kosovo, as the proving ground for the IBCT.⁹² This scenario is a logical choice for a number of reasons: it is the location of historic conflict with the promise of continuing unrest; the US military has recent experience there, including the deployment of Task Force Hawk for comparison; and it presents a deployment with limited ports and infrastructure. Additionally, the region contains complex terrain and a primitive road/rail network to challenge tactical mobility and employment, thereby providing the opportunity to evaluate equally difficult deployment and employment circumstances with the same scenario. Since the first IBCT resides at Fort Lewis, Washington, the concept requires the IBCT to deploy

⁹⁰ Matthew Gorevin, US Transportation Command Concepts and Technology Team, email to author, 11 September 2000.

⁹¹ Force Projection Battlelab Support Element, *Deployment Analysis, Interim Brigade Combat Team Deployment*, slide 7.

⁹² Rick White, Mobility Analyst with Force Projection Battle Lab Support Element, telephone interview by author, 20 November 2000.

from Fort Lewis (ground movement to McChord Air Force Base) to airfields within feasible tactical range of their employment location in Kosovo.

FPBLSE fleshed out the concept with more of the details of the deployment. They determined the maximum on ground (MOG, the maximum number of aircraft that can physically operate on the real estate of an airfield at any one time) to be six aircraft at McChord and two each at three different airfields to be used in the Balkans: Skopje, Yugoslavia; Tirana, Albania; and Ohrid, Former Yugoslav Republic of Macedonia.⁹³ To simplify the data input for JFAST, FPBLSE aggregated the destination as a single APOD with a MOG of six.⁹⁴ The operation runs 24 hours per day in order to build combat power as quickly as possible.

Another aspect of the CONOPS is the choice to use en route fueling bases or aerial refueling or a combination of the two. When MOG at the destination is unrestricted, aerial refueling speeds up the flow by reducing the time required for each aircraft to make a round trip and pick up its next load. However, a movement plan dependent on aerial refueling is complicated by competition for another limited resource, tanker aircraft. These assets are particularly scarce during a large-scale military action, since they are required for the deployment of Air Force, Navy and Marine combat aircraft. In the Kosovo scenario, the restricted MOG deletes any benefit that would be gained by aerial refueling; even if the aircraft were aerial refueled to reduce their cycle time, they wouldn't have a spot on the destination airfield.⁹⁵ Consequently, the CONOPS used an en route refueling base to support the deployment. This choice carries with it the requirement for air mobility support personnel and equipment to operate the en route location as an additional footing in the air bridge.

⁹³ Rick White, email to author, 24 November 2000.

⁹⁴ Ibid. While this may adequately represent the feasibility of deployment, the task of accomplishing the debarkation in theater is much more complicated in three locations versus one. There are implications for command and control, and airfield support personnel and equipment, as well as, the tactical assembly of units that are arriving at three geographically separated locations.

⁹⁵ Force Projection Battlelab Support Element, *Deployment Analysis, Interim Brigade Combat Team Deployment*, slide 8.

Results

FPBLSE JFAST analysis began with the baseline scenario and used the varying airlift allocations described above to investigate the impact on closure time for the IBCT TPFDD.

USTRANSCOM Recommended SSC Allocation

The first (and arguably most appropriate) analysis used the USTRANSCOM/AMC coordinated estimate of actual aircraft availability for the IBCT in an SSC mobilization in 2007. This set of parameters included the real-world MOG estimate of six aircraft at APOE and APOD, and an aircraft allocation that began with 26 C-5s and 30 C-17s and ramped up to 48 C-5s and 51 C-17s on day 13. Under these constraints, the IBCT closed in 7.3 days or 175 hours—79 hours longer than the required 96-hour deadline.⁹⁶

60-60 Airlift Allocation

With a baseline established by the USTRANSCOM recommended allocation, FPBLSE began altering variables in attempt to determine what it would take to be able to fulfill the CSA's 96-hour requirement. The first step was to use the 60-60 allocation of aircraft: 46 C-5s and 54 C-17s. This analysis maintained the APOE/APOD MOG at six aircraft. This set of conditions resulted in a total deployment timeline of 6 days or 144 hours—48 hours longer than the required 96-hour deadline.⁹⁷

Maximum Number of C-5s with APOE/APOD MOG of 6

Although C-5s and C-17s both use the same average planned cruising speed, each has a different cycle time, due to different standard planning factors for ground refueling time and onload/offload times. C-5s average 4 hours for loading and 3.25 hours for offloading, as compared to the C-17 average of 2.25 hours each for both loading and offloading.⁹⁸ These factors yield a cycle time of 40 hours for the C-17 versus 46 hours for the C-5. The impact of different

⁹⁶ Ibid., slide 10.

⁹⁷ Ibid., slide 12.

⁹⁸ *AF Pamphlet 10-1403, Air Mobility Planning Factors* (Washington: Department of the Air Force, 1998), 15.

cycle times on the overall closure profile is not immediately apparent, since each aircraft also has a different load capacity. The average load sizes for the IBCT extracted from the AFM loading module were 36 passengers and 66 short tons for the C-5, as compared to 12 passengers and 49 short tons for the C-17.⁹⁹ In order to determine if one aircraft type has a deployment advantage over the other, FPBLSE conducted a JFAST simulation using the maximum number of each the APOE/APOD MOG could support. The C-5 only scenario used 61 aircraft and closed in 6.4 days or 154 hours—58 hours longer than the required 96-hour timeline.¹⁰⁰

Maximum Number of C-17s with APOE/APOD MOG of 6

One other difference between the C-5 and C-17 is in passenger load characteristics. The C-5 has a dedicated passenger cabin above the cargo compartment. As a result, the C-5 can carry 36 passengers without sacrificing cargo capacity. The C-17, by contrast, has no dedicated passenger seats. Passenger seats will subtract from cargo capacity, depending on the specific configuration of the cargo compartment and actual dimensions of cargo. To accommodate the difference and keep the C-17 loaded with as much cargo as possible, the C-17 only scenario uses Boeing 757 aircraft to move the majority of the passengers on the TPFDD. This combination used 94 C-17s and three 757s, closing in 5.0 days or 120 hours—24 hours longer than the required 96-hour timeline.¹⁰¹

Maximum Number of C-17s with APOE/APOD MOG of 7

The C-17 (with three 757s) closed the TPFDD faster than the other aircraft allocations. Unfortunately, with the maximum number of aircraft allowed by the MOG, this allocation still failed to meet the requirement. The next logical alternative is to increase the MOG to allow more aircraft into the flow. In reality, increasing the MOG may not be feasible. There may not be another usable airfield in range and the construction required to increase the ramp space of the

⁹⁹ Force Projection Battlelab Support Element, *Deployment Analysis, Interim Brigade Combat Team Deployment*, slide 6.

¹⁰⁰ *Ibid.*, slide 14.

¹⁰¹ *Ibid.*, slide 16.

available airfields may be prohibitive in cost, time, manpower or equipment. Nevertheless, determining the effect of an increased MOG will provide information about the most restrictive conditions under which the IBCT could meet the deployment timeline. With the MOG increased to seven aircraft at both the departure and arrival airfields, the scenario supports 109 C-17s and closes in 4.4 days or 106 hours—10 hours longer than the required 96-hour timeline.¹⁰²

Optimal Number of C-17s with APOE/APOD MOG of 8

Increasing the MOG at the departure and destination to eight aircraft supports the required timeline. Using 123 C-17s (augmented with three 757s for passengers), the IBCT TPFDD closes in exactly 96 hours.¹⁰³ Although significantly increasing the available aircraft and the airfield capacity eventually produced a set of parameters that would enable the IBCT to deploy in the allotted time, there are several other considerations that must be addressed.

Additional Considerations

The JFAST simulation adequately represents the behavior of a deployment, provided there are no problems in the execution. JFAST assumes all aircraft take off when scheduled, fly in the allotted time and land when expected. It allows no room for maintenance attrition, or even maintenance delays.¹⁰⁴ The programmed MC rate for C-17s, as stated earlier, is 75 percent. That factor affects not only the airframes available at the beginning of the deployment, but also their behavior during its execution. The normal method employed to mitigate the effect of aircraft that break during the flow is to use spare aircraft to fill the holes. This is fine, provided there are aircraft available, and at the right place. If an aircraft were to break at an en route location and the only spare available was at McChord, that load would be setback by a number of hours waiting for the spare to arrive and get loaded. Even when a spare is available at the right location, the time required for trans-loading from the broken aircraft to the spare could amount to

¹⁰² Ibid., slide 18.

¹⁰³ Ibid., slide 19.

¹⁰⁴ Rick White, email to author, dated 27 November 2000.

several hours. A slip of several hours can cause significant problems when an arrival base MOG is restricted. Besides maintenance difficulties, delays or diverts caused by adverse weather will also contribute to the friction of a deployment. These factors and a host of other potential complications reveal a JFAST deployment as an unachievable ideal that is useful for planning, but insufficient to describe the likely character of the execution. Like maintenance attrition, another difficulty encountered in the real world, but ignored by JFAST, is the movement requirement for support personnel and equipment.

The airlift system presented in the previous section is dependent on the global air mobility support system to effect strategic deployment. As described, the permanent facilities in place around the world are insufficient to support a major deployment. While AMC has the personnel, equipment and processes required to augment the en route system, this action takes time and its own dedicated airlift. The IBCT 96-hour clock begins ticking at takeoff of the first aircraft. To validate this start time there must be unambiguous warning and strategic lift necessary to deploy an appropriate global reach laydown package *before* deployment of the IBCT is required. Due to the absence of warning, indecision of senior decision-makers, or simply the vagaries of international diplomacy, the GAMSS may not be activated until the deployment of the IBCT is already desired. In this case, the GRL deployment flow would append to the front end of the IBCT TPFDD. A situation similar to the analysis CONOPS could demand as much as 785 personnel and 1,176 short tons of equipment.¹⁰⁵ This package equates to three 747s and 30 C-17 loads and would likely require most of a day to move (depending on the aircraft allocation immediately available in a situation without advanced warning). While the CSA's 96-hour constraint technically excludes actions necessary to activate an air bridge, reality may turn this into a case of false advertising when decision-makers are counting on a 96-hour response.

¹⁰⁵ Maj Steve Westerback, HQ AMC/DOX, email to author, 21 November 2000. This requirement assumes bare base infrastructure at all en route locations and APODs. Deploying through/to established locations would reduce the size of this package. Use of established en route airfields may pare the GRL support

package to as low as 468 passengers and 741 short tons (Rick White, mobility analyst with FPBLSE, email to author, 27 November 2000).

Conclusions

If we do not build a transportation system that can meet our needs of tomorrow, then it doesn't matter much what kind of force we have because it won't be able to get there.

General John Shalikashvili, Former Chairman of the Joint Chiefs of Staff
As quoted in *Air Mobility Command, Backbone of America's Defense*

The familiar military dictum, "In peace, prepare for war," is a compelling sentiment, but easier stated than accomplished. Before preparation can take place, the "war" to be prepared for must be defined, a task that is becoming increasingly difficult. Contemporary views of the nature of future conflict are shaped by the international and domestic events of the past decade. The Cold War, for all its fear of global nuclear annihilation was a simple and familiar threat. While the prospect of major theater war was terrifying, it provided a stable, predictable scenario upon which to base military force structure and planning. The fall of the Soviet Union brought relief from the specter of World War III and the arms race that had dominated defense spending for generations, but left in its wake an uncertain security environment. Nevertheless, in response to warming relations with the former Soviet Union and domestic appeals for a peace dividend, the US government slashed overseas force levels and the budgets that accompanied them.

As the US national security strategy shifted from global containment of communism to a policy of regional engagement, it soon became evident that conflict would become more the rule and less the exception. At the same time, globalization of economic interests and enlargement of alliances gave rise to a broadened defense sphere increasingly sensitive to any threat of instability. Intervening in this complicated world with CONUS-based forces presents a real challenge in force projection. Force projection can be viewed as the product of tailored forces and lift capacity.

Current Army forces come generally in two flavors. Light forces are strategically agile, but lack the combat punch and staying power needed to force a decision in battle. Heavy forces are unmatched in killing power and survivability but take months to deploy. General Shinseki's

bold vision of transformation aims to remedy the situation. Enabled by science and technology solutions and guided by innovative doctrine, the objective force seeks to achieve full spectrum dominance by concentrating more power in a lighter, leaner package. The basic unit of this force is a brigade combat team capable of strategic deployment in 96 hours. The first of these units, the IBCT, is scheduled to become operational in 2007.

The national airlift system has futuristic concepts of its own. From trans-atmospheric transports to dirigible-type airships, research and development is alive and well in the business of intertheater lift. Unfortunately, seven years is not nearly enough time to develop, acquire and field a new airlift platform. Consequently, the airlift fleet of 2007 will not vary significantly from the airlift fleet of today. The strategic airlifters available to carry the IBCT in 2007 will be the C-5 and C-17. The only significant change will be the completion of the programmed C-17 buy.

Matching up the lift requirements of the IBCT and the lift capabilities of the relevant airlift system is a simple task for a computer simulation. Given a TPFDD, a CONOPS and allocated aircraft, JFAST describes in detail the characteristics of a deployment. JFAST outputs from a simulated deployment to Kosovo clearly demonstrate the challenges of force projection for an early entry force. Can the IBCT deploy from CONUS in 96 hours? Using real world constraints on destination infrastructure and competing demands for airlift, the simple answer is “no, by a factor of nearly two.” In fact, to produce a set of parameters that would result in a 96-hour deployment, the IBCT needed over twice the aircraft allocated by USTRANSCOM and a 33 percent increase in aircraft handling capacity at the departure and destination airfields. Failing to account for maintenance and weather attrition that is inevitable during the course of any deployment diminishes even this achievement. The airlift requirement for air mobility support system personnel and equipment further degrades the response time by adding a day to the front of the flow in situations where lack of strategic warning prevents pre-deployment preparation of the air bridge.

The value of the IBCT (and ultimately the Objective Force) as a fighting unit must be decided on its own merits—there is much more at issue than just strategic mobility. Still, the deployment timeline is a critical element of the operational concept. The fact is the IBCT cannot deploy in 96 hours under conditions currently envisioned for 2007. Consequently, the strategic mobility shortfalls of the IBCT must be addressed. The product of further analysis may lead to proposals for increased strategic airlift, decreased IBCT forces structure, reduced vehicle weights or a variety of other remedies to the disconnect identified in this monograph. This battle will likely be fought in the upcoming Quadrennial Defense Review with dueling concepts for the future of short-notice force projection battling for their share of the dwindling budget resources. In the midst of the politics, it is essential that a coherent strategy based on realistic assumptions prevails, regardless of parochial service interests. The security of the nation depends on it.

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