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**AIRLIFT:
THE STRATEGIC ACHILLES HEEL
OF THE UNITED STATES**

BY

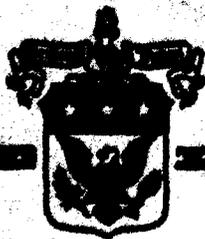
**LIEUTENANT COLONEL RAYMOND R. DRUMMOND
United States Army**

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This study project reviews current established National Security Strategy and examines the "ways and means" available to accomplish the stated ends. The focus is primarily on the US ability to project power in furtherance of its national security interests. Critical to this examination is a thorough review of available strategic airlift assets and the ability of the US to conduct forced entry operations. Given the study's not too optimistic conclusions, some recommendations to address shortcomings are made.

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AIRLIFT: THE STRATEGIC ACHILLES HEEL OF THE UNITED STATES

AN INDIVIDUAL STUDY PROJECT

by

Lieutenant Colonel Raymond R. Drummond
United States Army

Doctor James W. Williams
Project Adviser

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U. S. Army War College
Carlisle Barracks, Pennsylvania 17013

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This study project reviews current established National Security Strategy and examines the "ways and means" available to accomplish the stated ends. The focus is primarily on the US ability to project power in furtherance of its national security interests. Critical to this examination is a thorough review of available strategic airlift assets and the ability of the US to conduct forced entry operations. Given the study's not too optimistic conclusions, some recommendations to address shortcomings are made.

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INTRODUCTION

The Army may be unique among the services in its acceptance in peacetime of national strategies it is both utterly committed to execute and unlikely to be able successfully to prosecute in wartime.¹⁾

Only one who has slept through the past four years would have missed the dawning of a New World Order. The magnitude of this change to the strategic global balance of power is unparalleled in recent decades. For those of us in the West (particularly in the United States) that change has initially brought a perception of enhanced security. Yet in the long run the added responsibilities of remaining the only "complete" superpower leaves those in the United States with many unanswered questions.

In this new role the United States faces increased global responsibilities, interests and commitments. Concomitantly, the cost of the Cold War helped to exacerbate raging budget deficits at home. Partly in response to the reduced threat, but also largely owing to domestic budgetary considerations, the US military is undergoing massive force reductions. These translate not only into troop reductions in excess of a million personnel, but also into significant reductions in our forward presence. As such, our new National Military Strategy (NMS) necessarily puts much faith in our ability to respond to crises and project power into areas of the globe where our vital interests are threatened.

This power projection element of our strategy would argue that, given global interests and reduced forward presence, we must merely be able to deploy the right package of forces to contested areas quickly enough to

make a difference. It has been duly recognized by both the previous administration and Congress that strategic mobility -- now more than ever -- is the foundation for success. We must have the necessary strategic sea and airlift assets to get our forces to the critical areas of the globe and do it much more quickly than in the past.

The Mobility Requirements Study examined this need at a macro level (in terms of million-ton-miles/day). A more detailed approach to viewing the same requirements may identify vulnerabilities that may not have surfaced previously. This paper will partly address that need by looking for critical nodes that may not have been discernible at the macro level. The study will specifically examine airlift required for initial entry forces. Initial entry forces are the critical link in our new military strategy. They may have to secure lodgements through which the remaining contingency forces may flow into the theater. If we cannot successfully conduct forced entry operations, we will fail to meet our NMS-mandated requirement to be able to project combat power globally.

BACKGROUND

The National Security Strategy of the United States published in January 1993 very clearly mandates the aforementioned critical element of our strategy in the New World Order:

... In response to crises project power if deterrence fails ... capability to generate decisive combat power to end conflict quickly on our terms.¹²¹

So, we can reasonably infer that tasks such as conducting forced entry op-

erations to establish lodgements for the arrival of follow-on forces, were assumed to be part of the power projection function.

Reviewing levels down through the chains of strategic thinking, we can validate the inference: the US National Military Strategy (NMS) specifically requires amphibious forces capable of conducting forcible entry operations. Additionally, there is a stated requirement for an airborne division that can be airdropped or airlanded on short notice. The document goes on to say that "any weak link along this complex chain can disrupt or even halt a deployment."¹³⁾ An airdrop assumes a forcible entry option, though not specifically stated.

A prerequisite for meeting these requirements is rapid, high-capacity transportation for initial entry forces. This prerequisite has repeatedly been validated but not met. The 1982 Congress produced the Mandated Mobility Study. This document called for greater lift capability at a time of "robust" defense budgets. Yet even under those favorable conditions its recommendations were largely unmet. The most positive outcome of this undertaking was the inception of the C-17 program and the rebuilding of the "stretch" C-141 fleet.¹⁴⁾ Given the lack of success in more robust budgetary times, one wonders how much strategic lift enhancement we will see in the times ahead.

In 1992, reviewing the experience of Operation Desert Shield/Desert Storm, the Congressionally mandated Mobility Requirements Study very clearly articulated what the military component to strategic airlift would have to be:

109	C-5	Heavy Lift
120	C-17	Heavy Lift w/ short field capacity
230	C-141	Medium Lift ¹⁵⁾

This package intended to specify the minimum number of airframes that could be expected to fly in harm's way -- in other words, what would be required beyond the Civil Reserve Air Fleet (CRAF).

The NMS requires the Army to provide a CONUS based contingency Corps that is able to deploy within 75 days of notification, in its entirety, by both sea and air to anywhere in the world. Again, assuming that our interests might be opposed, we may have to conduct a forced entry option. The U. S. Marine Corps argues boldly that they can conduct forcible entry operations into 70% of the regions of the globe. What is unsaid is that it may take up to 11-12 days to steam Marines to the appropriate location. What then do we have available to meet a true crisis situation (one demanding military action within hours rather than days) and/or for the other 30% of the globe. The only capability to answer this call resides with the Army -- the 82d Airborne Division. Only they are the true crisis response capability that can go anywhere in the world to conduct forcible entry operations and establish a lodgement for follow-on forces. They, however, are totally dependent on USTRANSCOM -- more specifically Air Mobility Command -- to provide the essential strategic airlift.

PROBLEM DEFINITION

Though some vague notion of a forced entry requirement exists in these national level strategic documents, there is no mandate to compel the services to prepare to do these jointly. Despite that omission the previous Army Chief of Staff, General Carl E. Vuono, had a vision that perhaps even presaged General Powell's "Base Force":

In the future the United States will have to maintain an unquestionable ability to conduct an opposed entry into combat in defense of vital interests anywhere In many contingencies, a forced entry will only be possible or best achieved by air Army Airborne and Ranger forces, supported by strategic airlift, are uniquely capable of performing this function.¹⁶¹

The Army must be prepared to provide from CONUS a sustainable, tailorable Corps, consisting of five divisions, that is capable of forcing an entry into an overseas theater the lead Brigade within four days, and the lead Division by C+12.¹⁷¹

Clearly, GEN Vuono possessed a vision of how the Army intended to meet its requirements in support of the NMS. Even TRADOC Pamphlet 525-5, Airland Operations, specifies that as an integral component of power projection that the Army must "... be prepared to enter by force."¹⁸¹ It appears that only Army doctrinal literature contains this requirement for the Army to conduct power projection and forced entry operations. An example from FM 100-17 follows,

Force projection will usually begin as a contingency operation ... may be required for combat or non-combat situations and may be opposed or unopposed. Contingency operations may involve forcible entry with simultaneous deployment and employment in depth of joint and/or combined forces in combat operations.¹⁹¹

In fairness, one obscure reference to these "joint forced entry capabilities" was found in the Joint Net Military Assessment, "... forced entry capabilities for conducting NEOs and hostage rescue, as well as, securing airheads and beachheads."¹¹⁰¹ All of these references are merely remonstrations of what ought to be, and regrettably do not compel the establishment of the requisite force structure within the services to create the

capability, or more importantly, fund those assets.

Providing such a capability is somewhat easier in the naval service: both the means to execute the forced entry and the means to deploy the forces are in the same service. The Marines contend that they can conduct forced entry across the shore in 70% of the regions of the world. Accepting that contention without challenge, the nation is still faced with difficulty in at least 30% of the globe. Perhaps more importantly (as mentioned earlier), if the crisis is truly time sensitive the Marines may not be able to generate sufficient combat power off shore for as much as eleven days. Also given that sort of time delay the Marine operation could be further delayed by mines (which would have complicated operations in Kuwait), conventional submarines and antiship missiles. Both of these latter systems are proliferating and are very accessible to potential adversaries.

The Army can provide a credible, more rapid forced entry capability that can deploy anywhere (100% of the globe) in 18-36 hours. However, unlike the naval service option this option requires a genuine joint effort because of the strategic airlift needed from the Air Force. A medium Brigade Task Force of the 82d Airborne Division would require 128 C-141 equivalents (57 of which would be configured for airdrop).¹¹¹ The 71 remaining aircraft that could airland would require a runway that had sustained no damage during the preassault fires. If some damage occurs or more rapid introduction of forces is required, all 128 C-141's would have to be capable of airdrop. This package will introduce a combat force of about 3000 paratroopers, with four lightweight tanks, eight to twelve 105mm howitzers, multiple mobile anti-armor systems, an engineer

airfield repair package and a 15-day sustainment package.¹¹²⁾

Both the Army and Marine forced entry capabilities described above provide credibility to our NMS and serve as a significant deterrent to countries opposed to our interests. The two means are complementary and significantly complicate the defensive planning requirements of potential adversaries. This redundant capability provides our national command authorities (NCA) increased latitude to formulate alternative (in timing and technique) means to introduce US military forces where our national interests are threatened. Clearly, to maintain this depth in our rapid crisis response capability, strategic airlift is the critical component.

STRATEGIC AIRLIFT

The congressionally-mandated Mobility Requirements Study caused the Army, Navy and Air Force to unite in terms of strategic lift. In a macro-sense this study provided the requisite lift to accomplish the NMS. By 1999, with the acquisition of the 120 C-17's, our nation would possess 57 million-ton-miles/day in contrast to the 48 we have now (includes CRAF). More importantly, beginning within a decade the gradual retirement of the C-141 fleet will have created a growing shortfall in specific mission capable strategic airlift.¹¹³⁾ These assets though, in a macro sense, will still be able to accomplish the following: deploy the lead brigade (by air) by C+4, the lead division (by air) by C+12, two heavy divisions (by sea and air) by C+30 and the remaining two divisions of the Contingency Corps (by sea and air) by C+75.¹¹⁴⁾ The Chief of Staff of the Army, General Gordon R. Sullivan, added impetus by stating in testimony before the House Armed

Services Committee:

Early fielding of sufficient numbers of C-17's and fast sea-lift ships to support the deployment of at least two armored and one light division, simultaneously, anywhere in the world in about 30 days must be of the highest national priority.¹¹⁵⁾

As we examine the fielding schedule for strategic airlift in the out years some concerns arise. The chart reflects total in inventory.

<u>Year</u>	<u>C141</u>	<u>C17</u>	<u>C5</u>	<u>Net</u>	<u>Million Ton-miles/Day</u>
1992	234	0	109	343	31.903
1993	214	6	109	329	31.495
1994	214	12	109	335	32.395
1995	214	16	109	339	33.003
1996	203	20	109	332	32.897
1997	182	27	109	318	32.575
1998	170	39	109	318	33.607
1999	152	53	109	314	34.547
2000	136	66	109	311	35.467
2001	128	81	109	318	37.219
2002	121	95	109	325	38.885
2003	115	102	109	326	39.553

These figures were provided in a briefing slide used by the Strategic Mobility Officer in the Department of the Army, Deputy Chief of Staff for Logistics' office. As stated earlier the desired end state for strategic airlift in the Mobility Requirements Study called for 230 C-141s, 120 C-17s and 109 C-5s. We'll not quibble with the 102 versus 120 C-17s, because the latter figure includes trainers. The concern emanates from the awareness that there is always a significant difference between projected and available assets. When there are 230 C-141s in the fleet (as required in the MRS) there are no C-17s; when we have 102 C-17s we have only half of the required C-141s. Some of this shortfall could be made up by CRAF

assets, but only for non-hostile operations. Furthermore, the numbers identified above were to be in excess of CRAF, as the MRS directed. Regardless, a serious shortfall exists, particularly if the C-141 retirement schedule were accelerated owing to extensive flying hours committed in support of Desert Shield/Storm. Another potential problem would ensue if anything delayed fielding of the C-17.

As recently as December 1992 experience indicated that some of our aging and overtaxed C-141 fleet began to demonstrate mission performance problems in the strategic deployment of Army forces. It took ten days to deploy a battalion Task Force from Ft. Drum, NY to Somalia. This delay was largely attributable to maintenance difficulties "... scrambled by a series of technical difficulties that forced Air Force transports to put down in airfields from New Jersey to Greece." Besides maintenance problems, the availability of only two airfields capable of handling C-141s in the objective area severely hampered the flow into country.^{116]} This last factor would have been much less harmful had the C-17 been available: the C-17's capabilities to go into restricted fields improves by 300 percent airfield accessibility for US strategic airlift.^{117]}

USTRANSCOM revisited the acquisition of the C-17 with a recent C-17 cost effectiveness study. This study looked at three alternatives to make up the shortfall identified in the Mobility Requirements Study: buy the programmed 120 C-17s, pursue life extension for the C-141 (to be replaced in the future with an unspecified airlift asset) or buy an additional 118 C-5s. The first option remained the clear favorite in large measure owing to the versatility of the C-17.^{118]} The simple fact that at least 6438 more airfields in the world are accessible to the C-17 than to the C-5 and

C-141 heavily influenced the study's outcome. Furthermore, during Desert Shield, the enhanced lift the C-17 provides would have allowed the United States to deploy the initial brigade to Saudi Arabia in just 54 hours using just 93 sorties. Much better than the 82 hours and 158 C-141s that it took in August 1990.¹¹⁹ Certainly the extra capability this aircraft provides will greatly enhance bringing rapid deployment forces into austere environments.

Beyond simply airframes, the need to be able to conduct forced entry operations by air raises some unsettling issues. At present, the Air Force maintains 89 airdrop-qualified C-141 aircrews and hopefully will add up to 12 C-17 airdrop crews sometime after January 1995.¹²⁰ As the C-141 inventory shrinks the question arises as to whether or not the inventory of airdrop-qualified crews will too. Such a decline seems likely, since the Air Force maintained 102 --almost 25 percent more C-141 drop qualified crews in 1988 as it has now. Furthermore, crews will normally be spread over the globe in support of AMC's worldwide missions. The airborne operations during Just Cause in 1989 were allegedly delayed simply to assemble just 24 airdrop-qualified C-141 crews. If so, future shrinkage in qualified manning poses a serious threat to our national military capability.

So, does the United States possess a credible forced-entry airborne insertion capability? The answer seems to be a qualified "yes." The shortfall in the aggregate lift improves somewhat with the fielding of the C-17, at the same time we begin to lose the C-141s which have most of the airdrop qualified crews. If a smooth transition to the C-17 occurs, this airframe will offset many of the difficulties that the austere conditions in many likely contingency areas pose. So, it is worthwhile to see where

we really stand with the C-17.

FIELDING PROBLEMS OF THE C-17

COL Dave Lyon, is reputedly the Army's strategic mobility "guru." According to Lyon, the C-17 is moving ahead on schedule quite nicely, despite a few minor problems with funding. For instance in FY93 only five of the six aircraft authorized actually had targeted appropriations. The FY94 budget calls for eight C-17s; however, this may change given Secretary Aspin's demand to reduce the DOD budget by \$11 billion. The literature put out by McDonnell-Douglas and the Air Force on the whole is very complimentary and even promising. COL Lyon also acknowledges that there are several "minor" problems with the contractor meeting specifications, but these all seem within the realm of being rectified. He thinks the Army proponent for conducting the airborne reliability/serviceability testing of the C-17 is a little harsh and premature in its initial report.¹²¹¹

Not all within the Army are as satisfied as COL Lyon. The Army's Airborne and Special Operations Test Board (ASOTB) at Ft. Bragg, NC published a report in December 1992 that identified serious shortcomings of the C-17 in four major areas: of flaps/stats, the aircraft floor, ability to airdrop personnel safely, and ability to operate in small airfields. Some other significant shortcomings were identified. The C-17 could not transport the M1A2 tank, because it was too heavy for the ramp. The C-17 could not drop the required heavy equipment loads. Inflight communications hookups were incompatible with the new Army radios. There were fuel leaks, and seats were not strong enough to handle paratroop-loaded

soldiers. Lastly, in their opinion the ASOTB felt that parachutist doors and the towed parachutist retrieval system were inadequate and could jeopardize airborne testing scheduled for April 1993.¹²²⁾ While some of the criticism may be premature, the report certainly raises some concerns about this highly touted aircraft's ability to meet the Army's near-term future strategic airlift requirements.

The US Air Force has been evaluating the development and performance of the C-17 for the past five years. In September 1992 they published an Early Operational Assessment Summary (EOA). This document also identified some significant deficiencies:

- 1) Mission Performance (payloads vs. ranges specified)
- 2) Operations at low altitude
- 3) Landing performance with payload
- 4) Turning and backing
- 5) Air refueling subsystem
- 6) Avionics (weather radio/autopilot)
- 7) Mission systems (cargo handling subsystems, cargo and personnel airdrop, and combat offload)¹²³⁾

This last category most adversely affects the Army's ability to utilize the C-17 as a strategic airlift platform. The inability to load the M1A2 main battle tank and the incompatibility of radios are attributable to changes in the Army after the initial design specifications for the C-17 were set. These changes apparently were never factored into the development of the aircraft by the manufacturer. While these deficiencies can certainly be overcome, they increase the complexity of fielding an airlift platform compatible with Army needs. Lastly, these deficiencies may degrade the Army's ability to carry out its forced entry airborne operations to an alarming degree.

CONCLUSIONS

... lack of sufficient lift may be the most critical shortcoming as it relates to the new National Military Strategy based as it is on power projection from the CONUS base...¹²⁴⁾

This paper has argued that there is now and will likely continue to be, for the foreseeable future, a shortfall in strategic airlift capabilities. Furthermore, the ability to close the early-deploying forces within an acceptable time is at least in doubt. Serious questions remain about the ability of the C-17 to perform to standard in its critical intended role. These reservations, at least in the short term, compel the United States to use the aging C-141 fleet if forced entry by air is required. A subtler shade of the problem remains the lack of recognition about the need to do *forced entry operations as a precursor to contingency operations*. If adequate assault forces cannot be parachuted into contingency areas in a timely manner, the deficiency could unhinge US national military strategy. So, this lack of adequate, reliable airdrop assets, the inability to operate in austere Third-World airports, and the inability to early on introduce heavy armored systems by air create an Achilles heel that certainly warrants attention at the highest levels.

RECOMMENDATIONS

A myriad of quick-fix solutions may seem evident, but the apparent impetus for reducing Defense budgets make most politically infeasible. The idea must surface in the ongoing debate that part of retrenchment and

the related new National Military Strategy with its heavy reliance on crisis response/power projection may demand some short-term expenditures to upgrade critical capabilities. Enhancements must enable the US military to prosecute successfully the new strategy in wartime, not in ten years but in the near future. Power projection must be articulated in the national debate in a more thorough and complete manner. Short notice forced entry capability, in areas inaccessible to the Marine Corps must be clearly and ardently articulated at the highest levels as an integral part of the National Military Strategy. Only by virtue of such initiative will the Army - Air Force joint forced entry capability survive the impending budget battles and overcome an "Achilles heel" in our strategy.

A mandate at the JCS level will gain the necessary political and service commitment to the changes required. The Air Force must increase the number of airdrop qualified crews initially in the C-141 fleet, then in the C-17 fleet. This action will enhance operational flexibility and create a timely availability of crews for real-world, time-sensitive missions. For the short-term, the Air Force must be given both the requirement and the resources to immediately slow the retirement schedule of the C-141 fleet. Additionally, the Air Force must get the additional funding to enable McDonnell-Douglas to meet quickly C-17 design specifications. The United States must have a C-17 with the capabilities addressed earlier. The national leadership must remain immovable in its commitment both to acquire the 102 C-17's programmed and given the uncertain life of the remaining C-141's a commitment to acquire more rapidly these C-17's.

The next crisis for the United States is unlikely to be in a Third World area that possesses the superior sea and air ports like those afforded by

Saudi Arabia. Furthermore, the United States can no longer safely assume that the first contingency forces to deploy into an objective area can be ferried by CRAF carriers, as with some of the elements of the 82d Airborne Division in August 1990. Power projection requires the real and viable capability to conduct forced entry. Though forward presence of US forces must diminish, the desire for stability in flashpoints around the globe remains fervent. A credible power projection strategy on the part of the United States will minimize power vacuums in critical regions and thereby promote stability. There is no cheap alternative. The United States must invest in the right mix of strategic airlift capability or put the nation at risk. The argument for the assets to assure mission accomplishment must be argued at the same time and by the same leaders who have so compellingly articulated the new National Military Strategy.

ENDNOTES

- [1] Carl H. Builder, The Masks of War (Baltimore: Johns Hopkins Univ Press, 1989), p. 87.
- [2] The White House, National Security Strategy of the United States, January 1993, Washington, DC , p. 14.
- [3] Joint Chiefs of Staff, National Military Strategy of the United States, Washington, DC, January 1992, pp. 21-24.
- [4] LCDR Robin E. Rathbun, "Strategic Mobility for the 1990's: The Mobility Requirements Study," Strategic Review (Summer 1992), p.49.
- [5] *Ibid.*, p. 52.
- [6] General Carl E. Vuono, A Strategic Force for the 1990's and Beyond, January 1990, Washington, DC , p. 13.
- [7] MG Fred E. Elam and LTC Mark Herdes, "The Army's Strategic Mobility Plan," Army Logistician (May-June 1992), p. 3.
- [8] Daniel P. Bolger, "A Power projection Force:Some Concrete Proposals," Parameters (Winter 1992-93), pp. 48-52.
- [9] Department of the Army, FM 100-17 Mobilization, Deployment, Redeployment, Demobilization (28 October 1992), p. 1-3.
- [10] Joint Chiefs of Staff, 1992 Joint Military Net Assessment (21 August 1992), p. 9-13.
- [11] CPT Bernie Ratio, G3Air 82d Abn Div, Interview conducted at Ft Bragg, NC on 4 Jan '93.
- [12] *Ibid.*
- [13] Peter Grier, "The Ton-Mile Gap", Air Force (November 1992), p. 31.
- [14] FM 100-17, p.1-3.
- [15] Neil Munro, "US Army Steps Up Efforts to Bolster Rapid Deployment", Defense News (24-30 August 1992), p.10.
- [16] Sean D. Naylor, "Broken Air Bridge Makes for Wheezing Deployment," Army Times (4 Jan '93), p. 27.
- [17] Elam and Herdes, pp.3-4.
- [18] "Desert Shield/Desert Storm: USTRANSCOMs First Great Challenge," Defense Transportation (June 1991), pp. 15-16.
- [19] USTRANSCOM Briefing Slides, November 1992.

- [20] CPT Jeff Hurdley, US Air Force Air Mobility Command (XOTTD), telephonic interview conducted 12 Feb '93.
- [21] COL Dave Lyons, Strategic Mobility Officer, DA,DCSLOG, telephonic interview conducted 12 Feb '93.
- [22] COL Jeff White, "Major Deficiencies, C-17," Airborne and Special Operations Test Board, Ft Bragg, NC , pp. 1-7.
- [23] US Air Force, C-17 Early Operational Assessment Summary Matrix , September 1992.
- [24] Hon Michael P.W. Stone and GEN Gordon L. Sullivan, "Strategic Force, Strategic Vision For the 1990's and Beyond," US Army Posture Statement FY93, p. 29.

BIBLIOGRAPHY

BOOKS

Builder, Carl H. The Masks of War. Baltimore: Johns Hopkins University Press, 1989.

Hines, Thomas. Facing Tomorrow. New York: Alfred A. Knopf, 1991.

FM 100-17. Mobilization, Deployment, Redeployment, Demobilization. Washington, DC : Headquarters, Department of the Army, 28 Oct 1992.

REPORTS (PUBLISHED)

Joint Chiefs of Staff. National Military Strategy of the United States. Washington, DC : U. S. Government Printing Office, January 1992.

Joint Chiefs of Staff. 1992 Joint Military Net Assessment. Washington, DC : U. S. Government Printing Office, 21 Aug 1992.

Joint Chiefs of Staff. Mobility Requirements Study (U). Washington, DC: 1992.

Kutter, COL (Ret) Wolf-Dietrick. "The U. S. Army at the Crossroads to the 21st Century," AUSA Landpower Essay Series, No. 92-3, August 1992.

Rothman, Harry E. Forging A New Military Strategy In a Post-Cold War World: A Perspective From the Joint Staff. Carlisle Barracks, PA: U. S. War College Strategic Concepts In National Military Strategy Series, February 1992.

Secretary of Defense. Annual Report of the Secretary of Defense to the President and the Congress. Washington, DC: U. S. Government Printing Office, January 1993.

Stone, HON Michael P.W. and Sullivan, GEN Gordon R. "Strategic Force, Strategic Vision for the 1990's and Beyond," U. S. Army Posture State-

ment FY 93. Testimony to the Committees and Subcommittees of the House and Senate, 2d Session 102d U. S. Congress, Washington, DC.

U. S. Congress. Senate. Senator Sam Nunn speaking on "A New Military Strategy," 19 April 1990. Congressional Record, vol. 136, no. 43.

Vuono, GEN Carl E. "A Strategic Force for the 1990's and Beyond" Chief of Staff White Paper. Washington, DC: Department of the Army, January 1990.

White House. The National Security Strategy of the United States. Washington, DC: U. S. Government Printing Office, January 1993.

REPORTS (UNPUBLISHED)

Airborne and Special Operations Test Directorate. Major Deficiencies, C-17. Fort Bragg, NC, 16 Dec 1992.

Page, LTC Don. Visit of TRADOC, DCG to C-17 Plant, 10 Dec '92. Fort Monroe, VA: 16 Dec 1992 (Message).

U. S. Air Force. C-17 Early Operational Assessment Summary, Matrix. September 1992.

PERIODICALS

Aspin, Rep. Les. "With the Soviets and the Cold War Gone, What is the Future of US Forces?" ROA National Security Report (November 1992): 21-26.

Bartlett, Henry C. and Holman, G. Paul. "Grand Strategy and the Structure of US Military Force." Strategic Review (Spring 1992): 39-50.

Bolger, Daniel P. "A Power Projection Force: Some Concrete Proposals." Parameters (Winter 1992-93): 48-60.

"Desert Shield/Desert Storm: USTRANSCOM's First Great Challenge." Defense Transportation Journal (June 1991): 14-19.

Elam, MG Fred E. and Herdes, LTC Mark. "The Army's Strategic Mobility Plan." Army Logistician (May-June 1992): 2-6.

Grier, Peter. "The Ton-Mile Gap." Air Force (November 1992): 30-33.

Hyde, James C. "Current Roles and Missions Skirmish, Just the Latest Battle In a Lengthy War." Armed Forces Journal International (September 1992): 6.

"Mobility: Future Protection." Defense 92 (March-April 1992): 29-32.

Munro, Neil. "US Army Steps Up Efforts to Bolster Rapid Deployment." Defense News (24-30 August 1992): 10.

von Creveld, Martin. "High Technology and the Transformation of War, Part I." RUSI (October 1992): 76-81.

NEWSPAPER

"Broken Air Bridge Makes for Wheezing Deployment." Army Times, 4 January 1993, p. 27.

INTERVIEWS

Hurdley, CPT Jeff. US Air Force Air Mobility Command - XOTTD, Scott AFB, IL., 12 Feb '93 (Telephonic).

Lyon, COL Dave. US Army, DCSLOG, Washington, DC, 12 Feb'93(Telephonic).

Ratio, CPT Bernie. 82d Airborne Division, 63 Air, Fort Bragg, NC, 4 Jan'93.