REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
09-02-2004	FINAL	

4. TITLE AND SUBTITLE Reassessing Tanker Employment CONOPS and Command and Control to Maximize Air Mobility Capacity

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Joint Military Operations Department
Naval War College
686 Cushing Road
Newport, RI 02841-1207

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Distribution Statement A: Approved for public release; Distribution is unlimited.

13. SUPPLEMENTARY NOTES A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.

14. ABSTRACT: Analyses of recent air mobility commitments such as the Global War on Terror, Operation Iraqi Freedom, Operation Noble Eagle, and the DOD's 1-4-2-1 force structure defense strategy have concluded that air mobility forces, particularly airlift forces, are entirely insufficient in quantitative terms. Operational commanders, whether functional or regional combatant commanders, JTF commanders, or various component commanders bear the brunt of the negative effects caused by lack of airlift. In executing their OPART skills while planning and conducting operational functions such as movement and maneuver, fires or logistics, commanders rely upon air mobility to fully exploit advantages in factors time, space and force. Since operational-level commanders do not normally have strategic-level aircraft acquisition or apportionment authority, they need to leverage all available options within their force structures. Operational commanders should be given greater C2 authority (and feel the freedom to exercise that authority) over assigned/attached aircraft flying a wide array of missions. KC-135s can be used for airlift, though are best left in a tactical employment role. KC-10s have immense untapped airlift capability, and should be focused more on the deployment, redeployment and intertheater airlift roles, and deemphasized in the tactical realm. Once accessioned, planners should maximize the KC-767's tremendous flexibility within the tactical employment role. JTF staff and AOR air mobility C2 structures and organizational and command relationships should be reassessed and retuned such that operational level Directors of Mobility Forces (DIRMOBFORs) have a larger role in recommending and directing the use of tankers in both intra- and intertheater airlift roles if necessary.

15. SUBJECT TERMS
Air mobility, airlift, air refueling, aerial refueling, KC-10, KC-135, C-5, C-17, tanker, airlifter, cargo, maneuver, strategic mobility, DIRMOBFOR

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Chairman, JMO Dept
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED		40	19b. TELEPHONE NUMBER *(include area code)* 401-841-3556

NAVAL WAR COLLEGE
Newport, R.I.

REASSESSING USAF TANKER EMPLOYMENT CONOPS AND COMMAND AND CONTROL TO MAXIMIZE AIR MOBILITY CAPACITY

By

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

9 February 2004

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ABSTRACT

Analyses of recent air mobility commitments such as the Global War on Terror, Operation Iraqi Freedom, Operation Noble Eagle, and the DOD's 1-4-2-1 force structure defense strategy have concluded that air mobility forces, particularly airlift forces, are entirely insufficient in quantitative terms.

Operational commanders, whether functional or regional combatant commanders, JTF commanders, or various component commanders, bear the brunt of the negative effects caused by lack of airlift. In executing their OPART skills while planning and conducting operational functions such as movement and maneuver, fires, or logistics, commanders rely upon air mobility to fully exploit advantages in factors time, space and force. Since operational-level commanders do not normally have strategic-level aircraft acquisition or apportionment authority, they need to leverage all available options within their force structures.

Operational commanders should be given greater C^2 authority (and feel the *freedom to exercise* that authority) over assigned/attached aircraft flying a wide array of missions. KC-135s can be used for airlift, though are best left in a tactical employment role. KC-10s have immense untapped airlift capability, and should be focused more on the deployment, redeployment and intertheater airlift roles, and deemphasized in the tactical realm. Once accessioned, planners should maximize the KC-767's tremendous flexibility within the tactical employment role. JTF staff and AOR air mobility C^2 structures and organizational and command relationships should be reassessed and retuned such that operational level Directors of Mobility Forces (DIRMOBFORs) have a larger role in recommending and directing the use of tankers in both intra- and intertheater airlift roles if necessary.

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Air Mobility Forces: Contributions and Expectations

MANEUVER PRINCIPLE OF WAR: Maneuver is the movement of forces in relation to the enemy to secure or retain positional advantage, usually in order to deliver—or threaten delivery of—the direct and indirect fires of the maneuvering force. —Joint Publication 3-0

AEROSPACE MANEUVER WARFARE: In the strategic sense, aerospace power conducts maneuver through global mobility and global attack. At this level of war, maneuver concerns such issues as…deployment [and] intertheater airlift…A theater [commander] positioning forces so operational commanders can use them to the greatest possible effect exemplifies strategic maneuver…In simple terms, strategic maneuver involves deployment while operational and tactical maneuver concerns employment. Some missions involve all three types of maneuver. —Air Force Doctrine Document 2

The overall combat power of the United States military is unmatched anywhere in the world. Much of what now makes and will continue to make the United States a *global* power is the U.S. military's unparalleled ability to fight anywhere on the globe…and to get to the fight with a large force in a short time. Current and future American military power, therefore, rests heavily on its ability to project power. "Air mobility forces," states Joint Publication 3-17, "are a national resource."[1] But, air mobility forces, while superb, are under equipped for current and projected national strategy.

The United States Air Force's Air Mobility Command (AMC)[*] assessed that the Department of Defense's 1-4-2-1 force structure defense strategy[†] in conjunction with current Global War on Terror, Operations Noble Eagle (ONE), Enduring Freedom (OEF) and other operations will require air mobility forces far beyond current or projected inventories.[2]

As this paper will examine, current and projected air mobility forces cannot now *fully* support U.S. military strategies and operations because of insufficient aircraft inventories. Since operational-level commanders do not normally have authority to purchase new aircraft

[*] AMC is the AF component of U.S. Transportation Command, and is the lead command for air mobility issues.

[†] 1-4-2-1…is defined as defending the U.S. homeland and territory against external attacks; deterring aggression and coercion in critical regions of NE Asia, East Asian Littoral, Middle East/Southwest Asia, and Europe; and

or reprioritize apportionment at the national-strategic level, the question arises, "aside from simply buying more aircraft, can current airlifters or air refueling aircraft be *employed* or *controlled* differently with regard to a commander's operational art that will increase their overall air mobility contribution?" Simply put, "yes."

Although modified air refueling (tanker) employment CONOPS won't completely relieve all air mobility shortfalls, they can give operational commanders more options to mitigate repercussions within their AORs should they not get the full airlift assets they need or desire. By reassessing and reprioritizing aspects of tanker concepts of operations and C^2, combatant commanders can more efficiently exploit *existing* air mobility capacity, while gaining flexibility and a range of options for their OPART "pallet" needed to win wars and maintain peace. Specifically, operational commanders and staffs should be educated on the breadth of tankers' air mobility capabilities, and be given greater latitude to allocate tankers such as the KC-10 and KC-135 in both intra- and intertheater airlift missions as well.[*]

Current CONOPS *do* allow measures for operational commanders to use their tankers in the airlift role, though most commanders do not do so, particularly for intertheater missions. Reluctance to retask tankers stems in part from a fear that once a strategic air mobility asset leaves the AOR, a combatant commander will "lose it," and in part from the inefficient and often confusing C^2 functions within the joint forces staff relative to air mobility, particularly regarding the role and authority of the Director of Mobility Forces (DIRMOBFOR).

The following paper examines air mobility requirements and capabilities; and data, analysis and published recommendations regarding the employment of currently inventoried

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swiftly defeating the efforts of an adversary in two overlapping wars while preserving the President's option to call for a decisive victory in one of those conflicts—including the possibility of regime change or occupation.

[*] This author has served as a KC-135R aircraft commander, and KC-10 squadron operations officer, as well as instructor and evaluator pilot.

tankers in an airlift role, as well as air mobility C^2 structures. The paper then recommends increased airlift roles for tankers, as well as DIRMOBFOR roles and interaction.

Chapter 2

New Defense Strategies…New Air Mobility Requirements

Under the direction of Secretary of Defense Donald Rumsfeld, the Department of Defense (DOD) is undergoing a process of "transformation." As President Bush said,

> The need for military transformation was clear before the conflict in Afghanistan and before September the 11th…What's different today is our sense of urgency—the need to build this future force while fighting a present war. It's like overhauling an engine while you're going at 80 miles an hour. Yet we have no other choice.[3]

The DOD transformation approach lists six critical operational goals that include projecting and sustaining forces in anti-access environments. "New approaches for projecting power are needed to meet these threats," said the Force Transformation Office."[4]

The Air Force presented a "Transformation Flight Plan" to highlight its ongoing transformation efforts to support the DOD's six critical operational goals. Included in the Flight Plan are Air Force efforts to continue to develop and field its six core competencies, which include *global attack* ("the ability to attack any target, any place, at any time from anywhere rapidly, precisely, and persistently") and *rapid global mobility* ("the ability to rapidly develop and validate Time Phased Force Deployment Data (TPFDD) for any contingency in coordination with theater combatant commanders and rapidly deliver the right forces to the right locations at the right times").[5] Both of these core Air Force competencies rely heavily upon air mobility forces, as do the Army and Navy's plans.

In its "Transformational Roadmap," the U.S. Army is focusing on its "Objective Force," which will be "organized into more deployable, smaller formations [that will] exploit all military and commercial strategic lift to arrive in theater ready to fight, fully synchronized with other elements of the joint force."[6] The "Naval Transformation Roadmap" describes the

Navy's look ahead, which includes the concept of Expeditionary Maneuver Warfare (EMW). EMW's integrating concept of deployment requires that, "deployment of forces will involve any combination of amphibious platforms, strategic sealift and airlift, prepositioned assets, and self-deployment options to rapidly project forces throughout the world."[7]

In terms of the operational commander, his capacities to acquire, and abilities to leverage global air force competencies efficiently and effectively are critical to exploiting factors time, space and force. The commander relies heavily upon air mobility to deploy, employ and redeploy Air Force, Army, and Naval capabilities, such as Objective Force and Expeditionary Maneuver Warfare units, to or between bases of operation. Based upon finite strategic mobility forces, operational commanders, in devising, preparing and conducting their campaigns or major operations, constantly prioritize and reprioritize the aspects of their operational functions they'll assign air mobility forces against. For example, they must decide whether to use their C-17s to haul tanks to a main base of operations (Operational Movement and Maneuver), or airdrop Rangers on an enemy's decisive point (Operational Fires/Maneuver). They can task a given KC-10* to escort four F-18s to perform close air support near the forward edge of the battle area (Operational Fires), or fly an airlift mission to retrieve critical, time-sensitive munitions replenishments stocks (Operational Logistics).

But, today's reality is that the U.S. does not have air mobility assets in the necessary quantity as required by either service transformational objectives, or current DOD force structure strategies. Operational commanders will have to make difficult air mobility apportionment decisions, sometimes before the fight starts, and sometimes while combat rages. They must have maximum possible command and control flexibility in terms of both airframes and delegated control to fully exploit air mobility in a dynamic combat environment.

Air Mobility Shortfall

The most recent comprehensive mobility and tanker requirements studies (MRS-05 and TRS-05 respectively) were completed in early FY01. Both studies were finalized before the terrorist attacks of September 11th, and do not reflect requirements based upon today's 1-4-2-1 force structure defense strategy, "transformational" plans, doctrine or requirements, or current operations such as Noble Eagle, Enduring Freedom or Iraqi Freedom.

In August, 2003, AMC mobility requirements analysts estimated the 1-4-2-1 strategy, combined with the Global War on Terror, ONE, OEF and other operational commitments will require 302 C-17s, 52 modernized C-5s[†], 716 KC-135R equivalents[‡] and a full Civil Reserve Air Fleet Stage III call-up of approximately 922 civilian aircraft.[8]

As part of the Army's Objective Force plans, they want to move one strategic brigade in 96 hours, and a division in 120 hours. A KC-135 Combat Employment School student study estimates a strategic brigade airdrop will require 96 C-17s and 192 air refuelings.[9] According to an Army briefing, moving the 82nd Airborne Division will require approximately 505 C-17, 47 C-5 and 22 Civil Reserve Air Fleet (CRAF) 747 sorties.[10]

Moving a single strategic brigade will tie-up 83% of the total fleet of C-17s. The 82nd Airborne lift, in order to move within 120 hours (assuming to Southwest Asia (SWA)), would take nearly 230 C-17s flying virtually non-stop for all of the requisite 120 hours. With an unrefueled range less than half that required to fly from the United States to SWA di-

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[*] Aircraft designation prefix "K" denotes Air Refueling Tanker, while "C" denotes Cargo/Transport.
[†] If the 52 modernized (including re-engined) C-5s are not available, AMC estimates 353 C-17s will be needed.
[‡] "KC-135R equivalent" is a term used for comparison of air refueling aircraft. It is based upon several aircraft performance and mission related factors, though is strongly weighted toward offload capacity. Using a baseline of 1.0 for a KC-135R, a KC-10 has an "R-model equivalency" of 1.95, meaning it has 195% of the R-model's capacity. A KC-135E has an equivalency factor of 0.84.

rectly, the C-17s flying the 82nd lift would easily require over 1,000 tanker sorties.*

In broad terms, current air mobility forces have the capacity to move 46.9 million ton-miles per day (MTM/D).† The pre-September 11th MRS-05 reported that "54.5 MTM/D was the minimum level of capacity that assures moderate risk in a single major theater war."[11] Before the 1-4-2-1 shift, as well as ONE, OEF and other Global War on Terror endeavors, the U.S. was already 7.6 MTM/D short of requirements. As reported in a 2003 Rand Report, "In the aftermath of September 11, however, General John Handy, Commander in Chief of the U.S. Transportation Command, said that the new airlift requirement will undoubtedly be higher than 54.5 MTM/D in light of increased lift needs for a "'world war on terrorism.'"[12]

Current AMC Strategic Mobility Aircraft

This paper focuses on strategic air mobility aircraft—those jets with the largest cargo and/or fuel capacities—the C-5, C-17, C-141, KC-10 and KC-135.

Recall the AMC analysis of air mobility forces needed to support 1-4-2-1 et al.: 302 C-17s, 52 modernized C-5s, 716 KC-135R equivalents and a full CRAF Stage III call-up. The following table details the *actual* current AMC strategic air mobility inventory.

	Airlifters			**Tankers**	
# in inventory (all models); includes active, guard and reserve forces	**C-5**	**C-17**	**C-141**	**KC-10**	**KC-135**
	126‡	116§	62**	59	543††
Maximum takeoff weight (lbs)	769,000	585,000	323,100	590,000	322,500
Normal passenger seats	73	102	200	75	53
Maximum cabin (cargo) load/pallets	270,000/36	170,900/18	68,725/13	170,000/27	83,000/6
Maximum range with cargo (nm)*	2,150	2,400	3,130	4,400	4,500

* Example: Ft Bragg to Bagram, Afghanistan is approximately 9,000 nm. The Air Mobility Planning Factors guide (AFPAM 10-1403) notes a C-17 would require two KC-135s for each 9,000 nm leg.

† MTM/D (millions of ton-miles per day) are data based primarily on a multiple of cargo weight in tons by miles flown. The 46.9 MTM/D total includes military and CRAF aircraft capacities combined.

‡ AMC plans to retire the first of 14 C-5s this year.

§ A total acquisition of 180 C-17s has been authorized. The final aircraft is expected to be operational in FY07.

** All C-141s are expected to be retired by FY06.

†† The Air Force planned to begin retiring 68 KC-135s this year based upon acquisition of the KC-767.

Fuel capacity (lbs)[†]	332,500	182,000	158,066	356,000	200,000
Offload at 1,000 nm radius (lbs)	--	--	--	195,200	99,400

Table 1: Current strategic air mobility assets[13/14/15/16/17]

The comparison of required numbers of 1-4-2-1 C-17s (302-353) to actual (116) and projected (180) inventories speaks for itself. The U.S. doesn't have enough organic airlift. With respect to the 1-4-2-1 requirement for KC-135R tanker equivalents, analysis of KC-10, KC-135R and KC-135E aircraft yield 628 R-model equivalents, which is 88 aircraft short.[18]

Tankers as Airlifters…A Zero Sum Game?

The thesis of this paper proposed that combatant commanders can more efficiently exploit *existing* air mobility capacity by reassessing and reprioritizing aspects of tanker aircraft concepts of operations and control, with an emphasis on operational commanders' latitude and *willingness* to allocate the KC-10 and KC-135 to both airlift and refueling missions. This operational reallocation allows a commander to better use his tanker resources in either filling a potential airlift deficiency of critical troops and/or materiel, or for air refueling.

But, the AMC analysis of the 1-4-2-1 strategy shows a 13% deficit of tankers in addition to the 40% deficit in C-17s.[‡] When testifying before Congress in June, 2003, Major General Paul Essex, AMC's Director of Plans and Programs stated that, "TRS-05 identified both a tanker aircraft and crew shortage."[19] During Congressional testimony in September, 2003, the General Accounting Office's Director of Defense Capabilities and Management said, "Aerial refueling is critical…In its report to Congress, the Air Force stated that 'our National Security Strategy is unexecutable without air refueling tankers.'" [20]

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[*] All aircraft listed, except for the KC-135, can be refueled in-flight, greatly increasing range capabilities.
[†] The KC-10 and KC-135 useable fuel total can be fuel to either use, or offload to receivers.
[‡] 40% is based upon the full 180 C-17 accession as related to the 1-4-2-1 need for 302 C-17s. In a worst case example, if the C-5 fleet is not re-engined, AMC estimates 353 C-17s will be needed. At 180 C-17s authorized, the latter 1-4-2-1 requirement of 353 C-17s means AMC will have only *50%* of the required aircraft.

An obvious counterargument to the proposal to give operational commanders greater authority and flexibility in allocating airlift missions to tankers is that of a "zero sum game." That is, since tankers are already short, it would be counterproductive to further reduce their numbers by assigning them airlift missions within a given AOR or operation. Further examination will show this paper's proposal does not intrinsically "rob Peter to pay Paul," but merely emphasizes the operational commander's flexibility in the conduct of his operational art skill-set. The operational commander will have more latitude in determining his (though not another theater's) force employment and operational factor prioritization, in part by further using tankers already assigned/attached to him to haul cargo and passengers, and in part by redefining the role played by the Director of Mobility Forces (DIRMOBFOR) and the DIRMOBFOR's interaction with the joint forces commander's staff, and AMC and USTRANSCOM regarding intertheater air mobility missions.

One may look at this thesis and proclaim it to be mostly strategic in nature (i.e. strategic-level mobility force allocations), or tactical (i.e. how to use a particular airframe on a specific sortie). But, as stated in Air Force Doctrine Document 2, Organization and Employment of Aerospace Power, "In the strategic sense, aerospace power conducts maneuver through global mobility and global attack…In simple terms, strategic maneuver involves deployment while operational and tactical maneuver concerns employment. *Some missions involve all three types of maneuver* [author's emphasis]."[21] Air mobility missions are often strategic, while employing those forces both supporting and during combat is usually operational or tactical.[*]

[*] During Operation Iraqi Freedom, this author served as a deployed KC-10 squadron operations officer in Southwest Asia. During one approximately 24-hour period, I simultaneously directed four KC-10s redeploying the Combined Forces Air Component Commander and his primary staff from SWA back to the CONUS

In order to understand both the objective and subjective reasons that the tanker as an airlifter thesis is feasible, it's necessary to first examine tanker capabilities and missions, as well as the command and control structures that govern them.

(strategic); oversaw two KC-10's providing "airbridge" escort to forces repositioning in the AOR (operational); while also directing daily combat sorties over Iraq (tactical).

Chapter 3

Tankers as Airlifters…Capabilities Based Perspectives

The Air Force's principal air refueling platforms are the KC-135 Stratotanker and KC-10 Extender.[*] Though both aircraft are used primarily for air refueling, both are used in varying degrees of airlift roles. While the KC-135's cargo capacity is relatively modest, the KC-10 has an enormous airlift capacity that generally remains underutilized, especially when subjected to a change of operational control ("CHOP'd") to a combatant commander other than the tanker fleet's primary functional combatant commander, the "dual-hatted" commander of USTRANSCOM and AMC. (See Appendix A for historical air mobility data, and Appendices B through D for more detailed discussions of the KC-10, KC-135 and KC-767).

During Desert Storm, 262 KC-135s offloaded 812 millions pounds of fuel, though a 1993 U.S. Government Accounting Office (GAO) analysis stated that almost 42% of the deployed KC-135 fleet's airborne fuel went unused.[22] This highlights large inefficiencies in the tanker planning process that can be leveraged to free-up tankers for airlift missions.[†]

The KC-10 was always envisioned as a dual role aircraft, meaning it was designed for both the airlift and tanker missions. A majority of the KC-10 fleet, 61%, was deployed to OIF and served exclusively in the tanker role, though the KC-10 was initially envisioned to carry a heavier *airlift* burden than refueling mission when first purchased. A 1985 Congressional Budget Office report on the aerial tanker fleet was even then noting a tanker shortfall of 200 aircraft, and said, "for the most part, KC-10s have been procured to expand capacity

[*] The USAF also operates 28 MC-130P special operations tankers for exclusive use on SOF missions.
[†] According to the General Accounting Office, KC-135Rs were the most inefficient tankers of Desert Storm, dumping and/or returning to base with 42% of their initial fuel loads. "Areas that contributed to inefficiencies in air refueling operations included receiver requirements, tanker planning, refueling equipment, communication,

in the airlift fleet…the administration would buy [more] KC-10 tanker/cargo aircraft primarily to improve airlift capabilities, not tanker resources."[23] For analysis purposes, AMC counts only 37 of the total KC-10 force of 59 toward airlift mission MTM/D contributions.

A Congressional Budget Office study notes the KC-10s have nearly a 4.0 MTM/D capacity, which currently accounts for 14% of AMC's total organic airlift *capability*.[24] As noted in Appendix B, other studies show that in certain circumstances and mission profiles, the cargo load and ramp efficiency of the KC-10 outperforms that of the C-5, C-17 or C-141.

Additionally, a 2003 Rand Corporation study commissioned by the Air Force (also referenced in Appendix B) recommended shifting some KC-10s to a passenger carrying mission due to both economic efficiencies as well as security and reliability concerns when and where CRAF carriers may be either unable or unwilling to enter a hostile zone due to threats such as missiles, anti-aircraft artillery or chemical, biological or nuclear weapons. Rand cited a Desert Storm example when "several commercial air carriers refused to permit flights" into areas where Scud missile attacks had occurred.[25]

The successful surface-to-air missile strike on a DHL Airlines civilian aircraft in Baghdad in 2003 exemplified dangers to civilian aircraft and companies for which those crews and companies are usually unprepared to handle. Operational commanders rely heavily on CRAF airlift for both inter- and intratheater passenger airlift (70-80% of duty passengers). The Security Principle and Operational Protection Factor of war must be considered when determining optimal methods to move assigned combat and support troops around. Because of their lack of defensive systems and crews trained to operate in combat environments, CRAF aircraft and crews are extremely vulnerable to enemy military actions

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and aerial refueling doctrine." (See GAO report "Operation Desert Storm: An Assessment of Air Refueling Efficiency" as noted in bibliography.)

(such as SAMs or chemical, biological or nuclear attack), and the DOD is extremely vulnerable to civilian airlines' unwillingness or inability to land at threatened vital aerial ports of debarkation (APOD) or embarkation (APOE).

Tanker Use Recommendations

The KC-135 is an outstanding tactical refueler, and should be kept mainly in the intratheater air refueling employment role. While the KC-10 provides a significantly larger air refueling capacity than the KC-135, geographic and functional combatant commanders should maximize the KC-10's cargo and passenger airlift capacities in the deployment, redeployment, inter- and intratheater airlift regimes, vice employment and intratheater air refueling roles as they are now heavily used. When accessioned, the KC-767's strengths should be exploited in the employment role, leveraging its inherent refueling flexibility. *

Command and Control of Air Mobility Forces in the AOR

While the KC-135 and KC-10 already perform both airlift and air refueling roles, the current C^2 structure, from AMC through the JFACC staff, does not always necessarily allow geographic combatant commanders the flexibility that they need or desire in order to allocate and task the air mobility forces levied to them for operational or tactical control.

An Air University (AU) publication noted that, "Both airlift and sealift have become the orphans of military planning within the Air Force and USN…"[26] while another recent AU publication stated, "The mindset that 'tankers will always be there' and 'tankers are assumed'

* In FY02, Congress authorized the Air Force to lease 100 KC-767s, taking first delivery in 2006. But, as of early 2004, debate within Congress has delayed final funding or approval for the plan. While this author believes the Air Force will likely start receiving KC-767s within five years, there is much to be worked out in Congress beforehand. No initial date of delivery has been announced, pending funding approval.

have become part of the Air Force's lexicon."[27] Planning and organization of tanker forces, whether airlift or refueling, is often made more in "crisis mode" than deliberate pre-activity.

Air mobility force C^2 within a combatant commander's AOR follows the model as established in Air Force Doctrine Document (AFDD) 2, Organization and Employment of Aerospace Power, as well as AFDD 2-6.2, Air Refueling. Due in large part to the "national asset" status of much of the air mobility fleet, the air mobility force command relationships (as depicted in Figure 1) can easily become both confusing and convoluted as they are commanded or controlled by several different and diverse organizational structures, staffs, and directors.

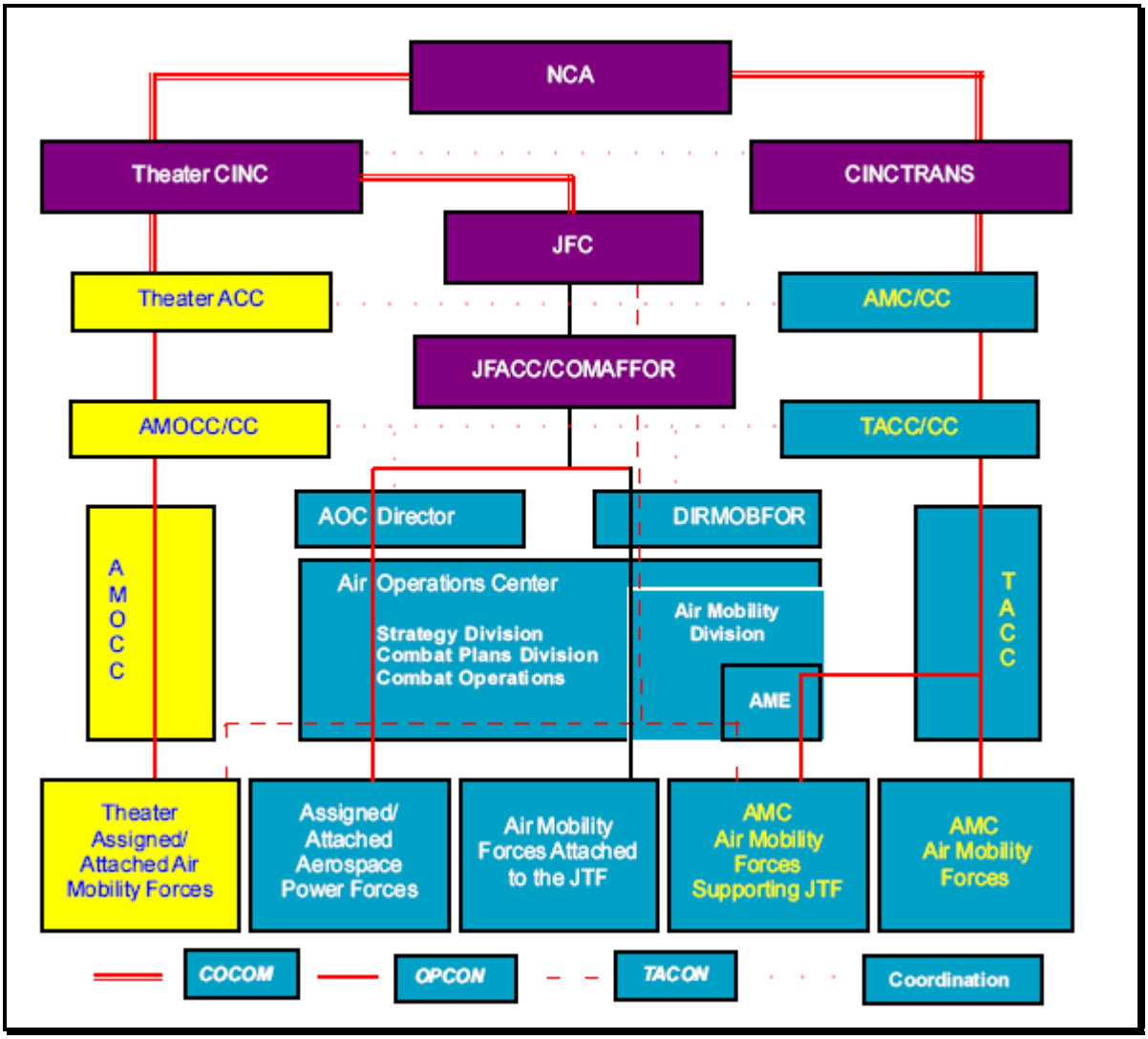

Figure 1: Sample Command Relationships for Air Mobility Forces[28]

A *detailed* examination of the airlift requirements, validation, and worldwide C^2 systems is well beyond the scope of this paper, though the following paragraphs briefly and broadly summarize AOR airlift and air refueling C^2 process and structures as defined in AFDDs 2 and 2-6.2.

It's important to note that virtually all references, whether explicit or implicit in AFDDs 2 and 2-6.2, revolve around the paradigm that only the "C" designated aircraft such as the C-5 and C-17 are capable or apportioned to airlift, and that "K" designated aircraft, such as the KC-10 and KC-135 serve exclusively as tankers. This paradigm helps, to a large

extent, account for the lack of understanding or willingness by JFACCs and their staffs to use tankers as lifters, and for the doctrinally framed C^2 organization's failure to fully account for, or simplify using tankers in the lift role, particularly intertheater lift. With that in mind, the following summarizes the general air mobility C^2 structure.

When called upon, the USTRANSCOM/AMC commander transfers COCOM, OPCON and TACON of *select* air mobility forces to a theater combatant commander. The theater combatant commander commands his assigned/attached air mobility forces via delegation to the joint forces commander, who in turn normally delegates operational command to the joint forces air component commander (JFACC)/commander Air Force forces (COMAFFOR). The JFACC/COMAFFOR exercises OPCON over assigned/attached mobility forces via the air operations center (AOC) director and his staff.

Tankers such as the KC-10 and KC-135 are routinely CHOP'd to the regional combatant commander, where they are considered assigned/attached to the joint force (normally for air refueling missions). Strategic airlifters such as the C-5 and C-17 are *not* normally assigned or attached to a theater commander. Their OPCON remains with AMC since they fall into a specialized structure (that in many circumstances the KC-10 belongs in also):

> The USAF has increasingly become a CONUS-based force with global responsibilities. To fulfill these responsibilities, the U.S. Air Force has increased the number and intensity of intertheater operations in both plans and practice. Operations such as global attack, strategic brigade airdrop, and Aerospace Expeditionary Task Forces deployment require the close coordination of many commands… Intertheater operations normally involve concurrent action by combat assets under OPCON of the JTF commander and air mobility forces under OPCON of the AMC commander. During transit between theaters, the AMC commander normally will exercise OPCON over the mission until it reaches the boundaries of the JTF commander's JOA or the geographic commander's AOR. Upon entry into the JOA/AOR, the JFC will assume TACON of those forces in the flight that have been assigned or attached to the JTF.[29]

Essentially, for strategic airlift, USTRANSCOM delegates COCOM of the intertheater forces to the AMC commander, who in-turn delegates OPCON to the Tanker-Airlift Control Center (co-located with AMC headquarters). OPCON may be further delegated to the Air Mobility Element (AME), within the Air Mobility Division (AMD). The JFACC/COMAFFOR normally exercises TACON over intertheater forces via the DIRMOBFOR and the AMD and AME for the duration of a specified sortie or mission.

Again, the structure is much more complex than abridged above. AFDD-2 expends a large section to attempt to explain and expound the expected C^2 schemes. In very broad terms, the JFACC/COMAFFOR has COCOM, OPCON and TACON of the KC-10s and KC-135s, though possibly only OPCON, and likely only TACON of the C-5, C-17 and C-141 airlifters. The common linkage on the JFACC/COMAFFOR staff is the DIRMOBFOR:

> The DIRMOBFOR is the COMAFFOR's or JFACC's designated coordinating authority for air mobility with all commands and agencies both internal and external to the JTF.[*] The DIRMOBFOR provides direction to the Air Mobility Division (AMD) in the AOC and normally will be a senior Air Force officer familiar with the AOR. When intertheater air mobility forces are employed in support of a JFC, the DIRMOBFOR should have experience in intertheater air mobility operations.[†]

The JFACC needs a robust and efficient means to apportion tankers under his OPCON to intra- and intertheater airlift roles, based upon priorities he sets vis-à-vis the pace and requirements of combat refueling operations. But, using his assigned/attached tankers particularly in an intertheater role will require an organizational structure and paradigm shift.

Several authors have proposed changes to all or part of the C^2 scheme because of the "muddiness" regarding OPCON and TACON of air mobility forces, depending upon their

[*] Note that while the DIRMOBFOR is the pivotal air mobility link on the JFACC/COMAFFOR staff, they currently have only coordinating and/or directing (not command) authority.
[†] See Appendix E for details regarding the DIRMOBFOR's specific duties and responsibilities

tasked mission, geographic location or phase of flight, or other relevant feature. The following discussion briefly examines two of the proposed changes.

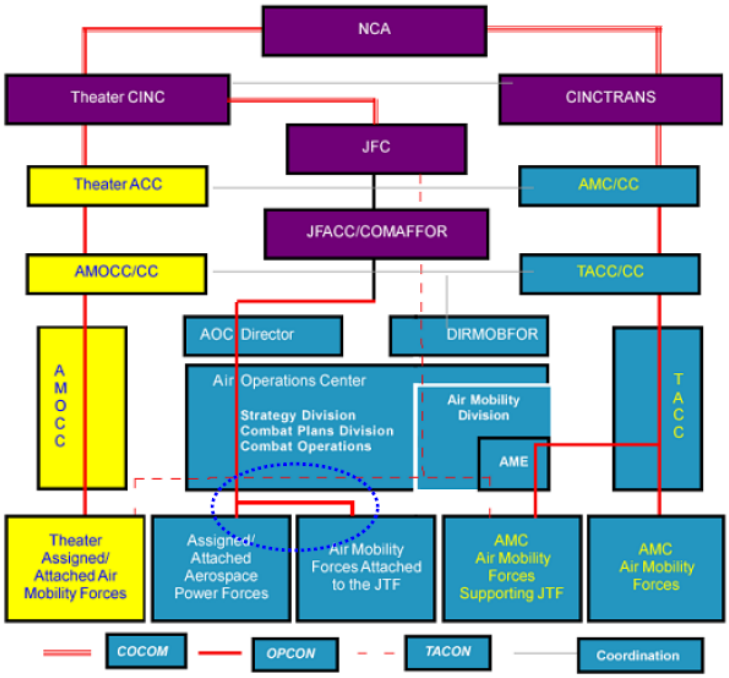

Figure 2: Proposed Change (#1) to DIRMOBFOR responsibilities.

A KC-135 Combat Employment School student recommends detaching the DIRMOBFOR and AMD from any coordinating/directing role relative to intratheater (attached/assigned) forces (see "Change #1," Figure 2). He recommends the AOC director be the only "link in the intratheater chain-of-command."[30] His construct has the DIRMOBFOR essentially as an intermediary between the JFACC/COMAFFOR and TACC for intertheater issues only. This proposal isn't quite comprehensive enough vis-à-vis intertheater capacity.

An Air Command and Staff College award winning research paper published by Air University Press recommends a similar approach, delegating only "non-combat" air refueling as well as *attached* airlift control to the DIRMOBFOR (see "Change #2," Figure 3).[31]

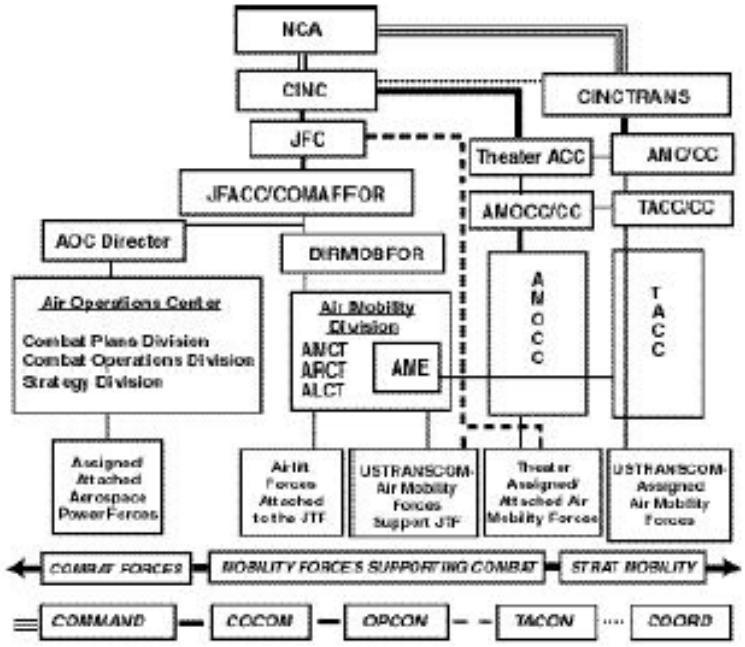

Figure 3: Proposed Change (#2) to DIRMOBFOR responsibilities.

In this construct, though the DIRMOBFOR does not control combat air refueling aircraft, he has a role in recommending and coordinating the reallocation of assigned tanker assets to be used for airlift missions as necessitated and directed by the JFACC/COMAFFOR's operational factor priorities. Though aspects of DIRMOBFOR involvement exist in current doctrine, the latter proposed C^2 change (Change #2) more succinctly specifies and supports the notion that,

> The tankers in theater executing combat air refueling are under the operational control of the JFACC/COMAFFOR and dedicated to that mission. These tankers and their planners are dedicated to the combat theater just like the fighters and bombers. Should the DIRMOBFOR or TACC need any of them to support theater or strategic mobility operations, the JFACC will set priorities and decide if they can be spared for noncombat operations.[32]

The last sentence, describing that the JFACC will set priorities is essentially the heart of this paper's thesis. At the direction and advisement of the JFC or combatant commander, the JFACC should be able to further task assigned/attached tankers for airlift roles without

necessarily asking or receiving AMC/TACC approval. The operational commander should have this flexibility with his assigned forces, through coordination with the DIRMOBFOR.

The DIRMOBFOR, at the direction of the JFACC, needs to be able to coordinate with AOC planners, and direct JFACC requests for intra- and intertheater airlift that TACC and AMC cannot meet. Acknowledging the overall OPART prioritization that the JFACC has allocated to his assigned/attached tankers, and the underutilized airlift contribution they bring to the operation or campaign, the AOC combat planners must be willing to temporarily "re-lease" the tankers to DIRMOBFOR control while they are tasked for airlift support. Additionally, acknowledging that those tanker aircraft have likely been CHOP'd to the combatant commander for his use, TACC and AMC staffs should understand that those forces should not automatically return to TACC or AMC TACON or OPCON as would normally be the case for non-attached/assigned forces who leave the JOA or AOR on a round-trip mission.

Clearly, there will need to be close coordination between the DIRMOBFOR and TACC to establish the necessary enroute and APOE/APOD support structures and logistics flow. But, since the forces remain CHOP'd to the JFC, TACC should not task them for non-JFC support missions without the expressed consent of the JFC through the JFACC.

Though this essay did not probe the depths of all details and nuances of the change, suffice it to say that Change #2 (Figure 3) most closely resembles a C^2 structure that enables more leeway for, and coordination involving use of the KC-10 for operational commander directed missions other than its normal intratheater refueling job (when assigned/attached to a specific JTF or AOR). The expertise and theater commander-to-functional commander (JFACC-to-TACC) interaction manifest in the expanded intertheater coordinating role of the DIRMOBFOR greatly enhances the operational commander's OPART options.

Additionally, DIRMOBFORs should continuously communicate and coordinate with AMC and TACC when temporarily directing reallocation of assigned/attached assets to intertheater roles, in order to assuage any concerns the JFACC or JFC may have regarding "losing" the air mobility aircraft from his command. Operational commanders, geographic combatant commander in particular, are loathe to let a high demand/low density mobility aircraft out of their respective JOA or AOR, even temporarily, for fear that they may "lose it to the AMC system," and never get it back. This absolutely doesn't have to be the case.

Chapter 4

Maximizing Air Mobility Capacity

In conclusion, analyses of recent air mobility commitments such as the Global War on Terror, Operation Iraqi Freedom, Operation Noble Eagle, and the DOD's 1-4-2-1 force structure defense strategy have concluded that air mobility forces, particularly airlift forces, are entirely insufficient in quantitative terms.

Operational commanders, whether functional or theater combatant commanders, JTF commanders, or various component commanders, bear the brunt of the negative effects caused by lack of airlift. In executing their OPART skills while planning and conducting operational functions such as movement and maneuver, fires, or logistics, commanders rely upon air mobility to fully exploit advantages in factors time, space and force. Since operational-level commanders do not normally have strategic-level aircraft acquisition or apportionment authority, they need to leverage all available options within their force structures.

Operational commanders should be given greater C^2 authority (and feel the *freedom to exercise* that authority) over assigned/attached aircraft flying a wide array of missions. KC-135s can be used for airlift, though are best left in a tactical employment role. KC-10s have immense untapped airlift capability, and should be focused more on the deployment, redeployment and intertheater airlift roles, and deemphasized in the tactical realm. Once accessioned, planners should maximize the KC-767's tremendous flexibility within the tactical employment role. JTF staff and AOR air mobility C^2 structures and organizational and command relationships should be reassessed and retuned such that DIRMOBFORs have a larger role in recommending and directing the use of tankers in both intra- and intertheater airlift roles if necessary.

What the preceding thesis and examination, and concomitant recommendations were meant to provide to operational commanders was a set of tools—an option for flexibility—that they can use when applying OPART in planning or executing combat operations. There may be times when it would be unwise to shift tankers from refueling to lifting cargo or passengers, based upon the sequencing, synchronization and requirements levied by the commander. But, with an air mobility force shortfall a stark reality for the foreseeable future, commanders must have at their disposal all manner of transformational ideas and methodologies by which they can flexibly use their assigned forces, and command and win wars.

APPENDIX A

Historical Air Mobility Statistics

The following table details airlift throughput from World War II until Desert Storm.

Peak Period of Desert Shield/Storm	17 MTM*/day
1973 airlift to Israel during Arab-Israeli War	4.4 MTM/day
Operation Just Cause to Panama, 1989	2.0 MTM/day
Berlin airlift, 1948-1949	1.7 MTM/day
"Hump" airlift of WWII	0.9 MTM/day

Table 2: Historical airlift levels [33]

During Desert Storm, airlifters moved over 500,000 people and 540,000 tons of cargo (15% of *all* dry cargo delivered during the deployment phase of Desert Shield).[34] Though over 340 U.S. and allied tankers flew during the conflict, the 46 KC-10s and 262 KC-135s alone flew 20,000 combat sorties, offloading 1.1 billion pounds of fuel to 50,000 receivers.[35]

Operation Allied Force saw airlift forces delivering 7,745 passengers and 22,000 tons of cargo just for Task Force Hawk†.[36] U.S. tankers, comprising "nearly 90% of the NATO tanker force," flew 5,000 sorties offloading 250 million pounds of fuel to 24,000 receivers.[37]

For Operations Enduring Freedom and Iraqi Freedom (OIF), AMC's forces alone moved 1,038,097 troops and 827,657 tons of cargo.[38] For just the first month of Iraqi Freedom, 182 KC-10 and KC-135 tankers allocated to the U.S. Central Command Air Forces comprised 68% of the total U.S. and allied tanker force, contributing to 6,193 refueling sorties offloading over 417 million pounds of fuel.[39] As of January, 2004, tankers have flown more than 17,050 OIF refueling sorties.[40]

* MTM (millions of ton-miles) are data based primarily on a multiple of cargo weight in tons by miles flown.

† Task Force Hawk included 24 Apache helicopters, 36 M-1 Abrams tanks and 52 Bradley fighting vehicles.

APPENDIX B

KC-10 Extender

A military variant of the DC-10 airliner*, KC-10s were delivered to the USAF from 1981–1990. The 59 KC-10s in the inventory can lift 170,000 pounds of cargo on 27 pallets, 356,000 pounds of fuel, or a combination of lesser amounts of both. The KC-10 can refuel virtually all air refuelable U.S. and allied aircraft through either its permanently installed boom or drogue systems, and is itself air refuelable. Normally, it can carry 75 passengers.

In terms of tanker airframes in the USAF inventory, the KC-10 accounts for 10% of the air refueling fleet.[41] During Desert Storm, 46 KC-10s were deployed to the AOR. Though they comprised just 15% of the total U.S. refueling force, they offloaded 26% of the fuel.[42] Additionally, KC-10s flew 379 cargo-only missions in the five months preceding the start of the air war.[43] During OIF, 33 KC-10s were deployed to the AOR, under the COCOM of the Commander, U.S. Central Command. Though the KC-10 comprised only 12% of the total tanker force in the AOR, there were several days when KC-10s supplied 50% of the offloaded fuel during a given 24-hour period.[44]

As noted in one study, "The cargo loading capacity of the KC-10, measured purely by the maximum number of standard 463L pallets and maximum payload weight is greater than that of the C-141 or C-17."[45] As compared to the C-5, C-17 and C-141, "for unrefueled ranges over approximately 3,750 nautical miles, the KC-10 has the highest payload."[46] In

* FedEx, the world's largest express transportation company, flies 22 DC-10 cargo aircraft virtually identical to the USAF's KC-10 (less air refueling capability). Their fleet of 126 heavy-lift aircraft is completely comprised of DC-10 variants, including the MD-11. (From a FedEx fact sheet, see biography for citation.)

terms of ramp space use efficiency[*], the KC-10 should be the preferred cargo aircraft at unrefueled ranges from 2,250 to 4,500 miles.

Additionally, a 2003 Rand Corporation study commissioned by the Air Force said,

> It would be even more advantageous to use KC-10s as dedicated passenger carriers because C-17s are better suited to carrying cargo, while KC-10s have a larger passenger-carrying capacity[†]…In times of shortage, AMC should switch C-17s to this cargo-flying role and equip some KC-10s to [carry] passengers instead.[47]

The bottom line for the KC-10 is that it has an unmatched capacity to combine both the airlift (cargo and passenger) and air refueling missions. While it has served extremely well in tactical situations, its dual role capabilities are best matched to the deployment and redeployment stages of hostilities, matched to "airbridge" operations escorting fighter, bomber or other aerial forces in-toto, whether inter- or intratheater, from APOE to APOD. Though the KC-10 manifests great capabilities for flexibility, the current C^2 structure of the KC-10 doesn't always allow the operational commander the operational or tactical control necessary to fully exploit rapidly changing requirements or maneuver priorities.

[*] Ramp space use efficiency is measured by the maximum bulk payload weight divided by the ramp space required, and plotted against the unrefueled range.

[†] In current configurations, the KC-10 can carry 75 passengers. With relatively minor modifications to include palletized seating and other physiological equipment, Rand noted the KC-10 can easily carry 200 passengers.

APPENDIX C

KC-135 Stratotanker

With a production run that began in 1957 and ended in 1965, the KC-135 fleet of 543 aircraft is the oldest in the Air Force. First ordered in 1954 while General Curtis E. LeMay was commander-in-chief of Strategic Air Command, the "primary mission for [KC-135s] was to support the B-52s in their nuclear single integrated operational plan (SIOP) missions."[48] Discussing the KC-135's role in Vietnam, one author wrote, "The KC-135 was born to support long-range strategic nuclear attack missions. It is doubtful that in the 1950s anyone could have anticipated the tactical employment of the airplane in a low intensity conflict over the jungles of Southeast Asia"[49] It is likely just as doubtful that designers would have anticipated tactical employment over the deserts of South*west* Asia either.

Because of the KC-135's initial Cold War design to serve exclusively as a force extender for the B-52, little consideration was given to any significant role it might play in airlift missions. Though the cargo compartment fuselage cross-section is relatively small, the KC-135 can routinely carry 54 passengers and up to 83,000 pounds of cargo on six pallets. The KC-135 comprises approximately 90% of the USAF tanker fleet. AMC does not factor the KC-135 in to airlift MTM/D calculations.

Approximately 262 KC-135s were deployed to the Desert Storm AOR during the 1991 war. Though the KC-135s flew 17,000 sorties offloading 812 million pounds of fuel[50], a 1993 U.S. Government Accounting Office (GAO) analysis stated that during Desert Storm, almost 42% of the deployed KC-135 fleet's airborne fuel went unused.[51] The Gulf War Air Power Survey (GWAPS) notes that KC-135s also participated in airlift missions, though those missions only deployed with their own, and limited Strategic Air Command cargo.[52]

Designed and flown predominantly for air refueling missions since its inception, the KC-135 has proven itself a vital link in the tactical, operational-tactical and operational-strategic levels of war by principal virtue of its aerial refueling (vice airlift) capability. While it has potential for use in the airlift role, it will and should likely remain primarily a tanker.

And, noting the Desert Storm statistics[*] regarding a 42% unused fuel inefficiency, the full capability of the KC-135 in an operational AOR has room for exploitation and growth. Owing to its strength as a pure tanker, combatant commanders should focus the KC-135 on the employment phase of operations.

[*] This author has not been able to locate more recent KC-135 refueling efficiency statistics, such as OEF/OIF.

APPENDIX D

KC-767

The Boeing Company began designing the KC-767 tanker in 1999, based upon the 767-200ER civilian airliner platform. Japanese and Italian Air Forces have ordered the KC-767, which will begin flight testing in 2004.[53]

Boeing reports that the KC-767's maximum takeoff weight will be 396,000 pounds (in between the KC-10 and KC-135), with a total fuel capacity of 201,666 pounds. The basic aircraft capabilities will closely mirror those of the KC-10, with the ability to refuel both boom and drogue receivers on the same mission. The KC-767 is air refuelable itself, and in the convertible combination ("combi") model, can carry combinations of 77,000 pounds of cargo on 19 pallets, or up to 200 passengers with 20,000 pounds of lower lobe (below the main deck) cargo.[54]

Like the KC-10, the KC-767 will be an extremely flexible aircraft. But, with the KC-767's smaller payloads and fuel offloads, the KC-10 is still better equipped for long haul (long lines of communication) deployment and redeployment missions, though the KC-767 can fit nicely into the tactical air refueling missions (requiring great flexibility such as same mission boom and drogue refueling) currently performed by the KC-10. When the KC-767 joins the Air Force's tanker inventory, it will free-up the KC-10 to perform more airlift-oriented functions as desired by either the USTRANSCOM functional combatant commander, or geographic commander, as required.

APPENDIX E

DIRMOBFOR duties

The DIRMOBFOR's specific authorities and responsibilities include:

1. Direct the integration of intertheater air mobility support provided by USTRANSCOM-assigned mobility forces.

2. Coordinate the tasking of USTRANSCOM intertheater air mobility forces (air and ground) attached (TACON) to the JFC.

3. Direct the tasking of intratheater air mobility forces (air and ground) attached (either OPCON or TACON) to the JFC.

4. Coordinate with the AOC director to ensure all air mobility operations supporting the JFC are fully integrated with the ATO cycle and deconflicted with all other air operations.

5. Coordinate with the tanker airlift control center (TACC), through the AMD, all intertheater air mobility missions to ensure the most effective use of these resources in accomplishing the JFC, theater, and USTRANSCOM missions.[55]

NOTES

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