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JOINT AIR OPERATIONS CENTER: C4I STRUCTURE STUDY

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DISCLAIMER

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PREFACE

"You've got it just right!" was how General Joseph W. Ashy, Commander in Chief of USSPACECOM, described this research project's overall proposal of developing a truly Joint Air Operations Center concept.[1] Because of his previous experiences as a Joint Force Air Component Commander (JFACC), General Ashy stated a vested interest in this concept when he replied to our letter addressed to the various CINCs and Service Chiefs requesting their opinions and experiences in the realm of joint warfighting requirements. We would like to thank those senior officers who took the time out of their very busy schedules to respond to our inquiries either personally, or by providing a point of contact within their command. Based upon their feedback, getting joint air operations 'right' is still a major concern for senior leaders of all services that are intimately involved in the command and control of forces throughout the continuum of military operations. General Ashy's experiences as the JFACC in Operation Deny Flight highlighted some of the problems associated with the application of airpower in evolving, non-traditional roles.

This project was developed without the benefit of access to the recently released Joint Pub 3-56.1, *Command and Control of Joint Air Operations*, 14 November 1994. Numerous attempts to obtain this document in final draft form were unsuccessful; however, this project's proposed JAOC C4I Structure and the notional JFACC Organization (JAOC) suggested in Joint Pub 3-56.1 are very similar. While this research

[1] Gen Joseph W. Ashy, Commander in Chief US Space Command, personal interview and briefing with JAOC research team, Air Command and Staff College, Maxwell AFB AL, 21 February 1995.

project does not contradict the suggested organization, it does offer some differences in organization, requirements, manning and employment philosophy.

Research methods utilized in this paper included literature reviews, formal inquiries to the above-mentioned CINC's, telephone interviews with designated points of contact, personal experiences, and discussions with several senior (O-6 and above) officers. Unfortunately, funding was not available to personally visit the various commands to assess their Air Operations Center organization and functional employment.

The research team would like to thank Lt Col Thomas 'Buck' Buchanan, USAF, Joint Staff, J-6 Integration Division, who provided us the opportunity to examine this complex and interesting topic. The decision to sponsor an academic research effort (with a somewhat different focus) that parallels the analysis of a contractor study is noteworthy. His support in forwarding documents, lessons learned, and names of various subject matter experts was extremely beneficial in our research endeavor.

Finally, the team would like to thank Col John Warden for his vision, interest, and support of our 'academic freedom' to author this paper. The recent emphasis on conducting academic research at Air Command and Staff College has made the faculty and students think harder and smarter about the lethal and nonlethal employment of airpower in a wide variety of situations and missions.

Table of Contents

Page

DISCLAIMER ii

PREFACE iii

LIST OF FIGURES vii

EXECUTIVE OVERVIEW viii

CHAPTER 1: INTRODUCTION 1
- Research Project Focus 4

CHAPTER 2: THE NEED TO CHANGE THE JOINT AIR OPERATIONS CENTER 10
- Service Control of Air Power Assets 10
- Strengths in the Current System 21
- Shortfalls in Current Joint Air Operations C4I Structure 23
- Needs 31

CHAPTER 3: JAOC 2000/2010—PROPOSED SOLUTION 34
- JAOC REAR 35
- JAOC FORWARD 39
- JAOC 2010 42
- Recommended Plan Of Action 43

CHAPTER 4: CONCEPT APPLICATION 46

CHAPTER 5: KEY ISSUES 49
- Support Issues 50
- Service and Doctrinal Issues 54
- Coalition Integration 54
- Emerging Technologies 57
- Summary 61

CHAPTER 6: CONCLUSION 63

APPENDIX A: DOCTRINE 71
- Comparison of Service Doctrinal Requirements 74
- Current Joint Organizational Example 86

APPENDIX B: POSITION REQUIREMENTS FOR JAOC STAFFING 91

GLOSSARY 93

BIBLIOGRAPHY 96

VITA 103

List of Figures

Page

Figure 1: Navy Tactical Air Control System (Amphibious Operations) 13

Figure 2: Marine Air Ground Task Force Air Command and Control 14

Figure 3: US Army A2C2 System 16

Figure 4: Air Operations Center Organization 18

Figure 5: 32nd Air Operations Group 22

Figure 6: US Military Command and Control Structure 37

Figure 7: JAOC Rear Organization 39

Figure 8: JAOC Cadre Members 40

Figure 9: Notional USSOUTHCOM Scenario 49

Figure 10: Expanded Air Component Organization 58

Figure 11: Navy Tactical Air Control System (Amphibious Operations) 76

Figure 12: Navy Tactical Air Control System (Carrier Battle Group) 77

Figure 13: Marine Air Ground Task Force 78

Figure 14: A2C2 System 81

Figure 15: Air Force Air Operations Center 82

Figure 16: 32nd Air Operations Group 87

EXECUTIVE OVERVIEW

In July 1994, the Joint Staff Command, Control, Communications, Computers, and Intelligence (C4I) Directorate (J6) initiated a Statement of Work (SOW) to explore the feasibility of a joint Air Operations Center (AOC) concept. The impetus for this examination is the proliferation and worldwide installation of Contingency Theater Air Control System (TACS) Automated Planning System (CTAPS) terminals being installed worldwide and the number of commands/services/units purporting an AOC capability. "This study will look at the pros and cons of this proliferation and determine if AOCs can, and should, be consolidated into Joint AOCs."[2] This report starts with a clean slate and examines the possibilities of a standardized, truly joint C4I structure for the Joint Air Operations Center (JAOC) to support the appointed Joint Force Air Component Commander (JFACC). Our intent is to provide a single source document containing both historical examples and some recommendations for optimizing the employment of joint and combined air power assets in a variety of future scenarios.

Why is this important? As highlighted in the 1994 RAND/Project Air Force research report *A League of Airmen: US Air Power in the Gulf War*: "Significant progress was made in improving jointness during Desert Storm. If 'we had to do it over again,' we would have a prepackaged truly joint JFACC staff (at least in cadre status) ready to deploy. This is one objective that has apparently been realized during the

[2] Joint Staff/J6I, C4 Planning and Assessment, Action Processing Form, contract MDA903-93-D-0019, September 1994.

postwar period."[3] While we concur that improvements have been made, our research shows there are no standing, truly joint JFACC staffs to provide a comprehensive joint AOC capability. Some commands come close to this concept, but our research indicates a significant variance in equipment, personnel, support, procedures, and capabilities.

In order to take an unbiased look at the joint air power employment issue, this research team is composed of representatives from all four US services and one international officer whose country was a coalition member during the Gulf War. Most members of the team have recent experience, including Desert Storm, in air power employment, command and control operations, or C4I systems support. Many have completed a joint duty tour. Those not having an extensive C4I background helped provide an objective, untainted view of the recommended JAOC structure.

The following highlights provide a snapshot of the salient critical issues and recommendations.

Chapter One. Despite the reduction in the number of US air power assets, the military is supporting a growing number of peacetime commitments. Therefore, unity of effort becomes increasingly critical. This paper focuses on a joint structure geared toward maximizing airpower through unity of effort.

Chapter Two. Currently, joint use of US Air Force, Navy, and Marine Corps air assets is complicated by each service having differing doctrines and organizations to support the use of air power. Diverging service viewpoints have impacted integration of a

[3] James A. Winnefeld, Preston Niblack, and Dana J. Johnson, *A League of Airmen: US Air Power in the Gulf War,* (Santa Monica, CA: RAND, 1994), 273.

joint air power team, standardization of the tasking process, and standardization of supporting assets.

Chapter Three. A standardized, standing *joint* air operations center organization should be created at each geographical theater CINC headquarters to support contingencies, exercises, and training within the area of responsibility (AOR). This paper presents an organizational, and command and control (C2) based concept to meet the challenge of warfare in the next century utilizing C2 systems based on emerging technologies. The thrust of this concept includes a rear contingent based in the US and a forward contingent located in theater. In 2010, the air campaign planning effort and air tasking order (ATO) generation effort will occur at CINC headquarters JAOC Rear. In-theater control will be accomplished with a JAOC Forward. This structure will evolve as advances in communications technology are implemented and as current service C4I architectures migrate from current concepts through an intermediary concept called JAOC 2000 and ultimately to this JAOC 2010 concept. At this point, each JAOC Rear will be standardized, and each service JAOC Forward capability is designed to dovetail with that of the JAOC Rear.

Chapter Four. The 2010 concept is applied to a notional scenario in the USSOUTHCOM AOR to demonstrate how the proposed C2 structure will operate.

Chapter Five. The JAOC 2000/2010 concept implementation relies upon action in support areas, service doctrine, coalition integration, and emerging technologies.

Chapter Six. The JAOC 2000/2010 concept will allow the armed forces to use air power assets more effectively in response to changes in the use of the military instrument of power and the global environment.

JOINT AIR OPERATIONS CENTER: C4I STRUCTURE STUDY

Chapter 1: Introduction

A vital ingredient for bolstering and defending our national security is the ability of joint force commanders (JFC) to successfully exploit the full range of military capabilities at their disposal. One of the premier challenges facing JFCs today is how to organize air assets.[1] Unity of command and unity of effort through a single unified chain of command is the most effective way to employ air power.[2] Joint doctrine supports the need for one airpower expert in charge with clear and direct lines of communications and an organizational structure to support it; these requirements are the same for a land component commander and a maritime component commander. "Opting for a strong, empowered joint force air component commander under current and emerging doctrine is a first, and essential, step toward victory."[3] "From the President and the National Command Authorities (NCA) to the Commanders in Chief (CINC) of the unified and specified commands, to the strategic and conventional theater forces, airpower is crucial to deterrence and if required, to swift and effective retaliation."[4]

Since the collapse of the Soviet Union nearly six years ago, US officials have poured tremendous energy into finding ways of doing business more efficiently with fewer resources. In other words, what is the best way to reduce the Department of Defense (DOD) budget while maintaining a high state of readiness? Today, no issue influences the DOD more than the strain of matching limited resources to national security

commitments. While programs continue to be canceled and the number of personnel continues to fall, the number of missions continue to rise. *Air Force Magazine* reports:

> . . . humanitarian relief has strained airlift resources, with USAF crews delivering more than 52,000 tons of food and medicine in the Balkans alone. In the Persian Gulf region, US military aircraft enforcing the no-fly zone over northern Iraq have flown more than twice the sorties USAF units flew during the whole of Desert Storm. Despite the force draw down, the military is more engaged today than during any period of 'peace' in recent years.[5]

This means there will be many significant changes in the way we have traditionally done business, and the command, control, communications, computers and intelligence (C4I) business will not be exempt. In future conflicts, we are not likely to have the luxury of being able to use the large and airlift-intensive C4I structure like the one the coalition had during Desert Storm. We must find a better, more cost-effective way to provide C4I for joint air operations while striving to eliminate demonstrated weaknesses and capitalizing on known strengths.

The United States military posture has been restructuring since the end of the cold war. As each service downsizes in response to the perceived reduction in global threat, each is struggling to determine what mix of personnel and equipment will best meet the challenges of tomorrow.[6] Wars and operations other than war are becoming faster paced, more mobile, and are almost always joint or coalition in nature. Historically, the individual services and CINCs have evolved different concepts and structures for managing air operations day-to-day and for contingencies. These differences occur in procedures, facilities, organizations and C4I systems. As a result, a truly joint air operations concept, with a consolidated C4I structure to support the Joint Force Air Component Commander (JFACC), is required.

Since the end of Desert Storm, the services have taken various measures to increase the interoperability of air power assets that are available to the warfighting CINCs. Recent joint exercises (Tandem Thrust, Ocean Venture, Atlantic Resolve, Trailblazer 94, etc.) and numerous real world contingency operations have demonstrated an increased capability to command and control these air assets, but further improvements can be made to better integrate the JFACC organization. Among the problem areas that have been addressed include: the lack of true jointness, inconsistent team integration, lack of staff standardization, multiple contingencies, communications, intelligence, coalition dichotomies, multiple 'hatting,' and unresponsiveness. As stated in a 1993 Center for Naval Analyses study, "An integrated staff is not only the heart of the JFACC organization, but it is also the key to transferring JFACC responsibilities from one component command to another in response to changing operational situations. It provides the 'corporate memory' that allows air operations to maintain their continuity even in the midst of such changes."[7] This process could be greatly improved by the implementation of a truly joint air operations center (AOC) C4I structure with its supporting core competency requirements.

This study examines what is required to effectively and efficiently support service, joint, and coalition air operations in day-to-day and regional conflict settings. The research team conducted the necessary technical and functional analyses to develop a prototype joint, global-standard concept of operations for a Joint Air Operations Center (JAOC) C4I structure. To be responsive to future demands, the JAOC must be robust enough to provide support for both normal and contingency operations from a fixed site

well outside the theater of operations, or forward deployed within the theater of operations.

The foundation of this proposal lies in the development of a joint cadre of individuals permanently assigned to the theater warfighting CINC and located at the headquarters. These personnel form the core of the *JAOC Rear*, a non-deployed staff trained in and primarily responsible for planning joint air campaigns with development of associated master attack plans and air tasking orders (ATO). By performing the bulk of this manpower, information, and equipment-dependent planning at the non-deployed JAOC Rear, the existing/emerging command and control (C2) structures organic to each service (outlined in Chapter 2) can perform as the deployed *JAOC Forward.* Primary responsibility will be receipt and dissemination of the ATO (from the JAOC Rear), making dynamic inputs into the execution of the current war, and secondary responsibility for limited autonomous operations in theater. In this way, the JFC and the JFACC have either immediate response capability with forces established in theater or near-immediate response with rapidly deployable forces that bring an organic JAOC structure. The suggested JAOC organization is based on the lessons learned from recent joint exercises and from general officer feedback. To validate the proposed concept, the JAOC structure will be applied to a notional scenario in Chapter 4.

Research Project Focus

Early in the research process, it was necessary to determine the depth and scope of the main research effort. The latitude afforded to academic research allows for a nearly endless variety of approaches that can be followed in pursuit of a proposed theme. The intricacies of a C4I system for air operations that is jointly interoperable and provides a

global capability represents many possible approaches to research a 'concept of employment' recommendation. Imbedded within the C4I 'system' is the C2 'process.' In his book *Command and Control: The Literature and Commentaries*, Dr. Frank M. Snyder describes the differences between a process and system as they relate to the commander. "The command and control process includes the methods that the commander uses to gather information on which to base decisions, as well as the methods used to insure the decisions are carried out."[8] Snyder further states " . . . the current joint term—C4 (is used) to refer to the systems that support the C2 process."[9] This becomes an important distinction when determining where improvements need to be made, what courses of action are feasible, when such a proposal could be implemented, and how it might be accomplished. Why such a proposed improvement has been solicited is easily answered by any impartial look at the lessons learned from nearly every joint air operation or exercise. The need to improve is clear.

The possible improvements could suggest either a view of the process or the system. Within the process of command and control, the commander needs information to effectively make his decisions. "To accomplish these transitions—from information to directives and from directives to action—commanders make decisions of three types: operational, organizational, and informational."[10] Our research group concluded that our approach must select from the areas of organization, operational (process), information, or the technical systems that would support an improved JAOC concept. While it is imperative to understand the impact of each of these areas, it is unfeasible to suggest a wholesale redesign of the entire JAOC. To do so would needlessly tear down existing capabilities, add tremendous unnecessary costs and years of delay. Our suggested

approach considers each area, and provides a viable, achievable and realistic concept of employment tailored to meet both service and theater needs.

To determine the scope of our efforts, we considered how technical systems would support any proposal and whether these systems, by themselves, represented the answer to the problem. Today, systems in support of command and control are guided by an overarching design and employment philosophy that did not exist until recently. Joint guidance and mandate are an important first steps in coordinating a common operating environment. The C4I for the Warrior (C4IFTW) initiative provides a mandate for each service to adhere to, and has an interoperable end state for systems design, testing and implementation. We feel this commitment to C4IFTW is long overdue and will eventually produce a 'joint' system. The command and control 'process' that any such C4I system must support needs to be identified.

Process characteristics of the current service air command and control agencies were considered to identify operational, informational and organizational alternative requirements. The operational process of each service agency when in the joint air arena results in a coordinating product, the ATO. While we fully grasp the variance in service perspectives of the ATO (or air tasking message or air coordination message) and its generation, production, dissemination and underlying controversies, the associated *process* is currently under extensive study by RAND Corporation.[11] Efforts are ongoing to modernize the ATO to meet changing service requirements in a joint forum of operational level users and providers. Standing groups such as the ATO Interoperability Working Group (AIWG) will eventually ensure the ATO product conveys needed operational data. Joint sponsorship and mandate once again are already in place to coordinate

improvements.[12] Therefore, we determined that addressing specific changes to the ATO process was beyond the scope of this project.

The 'information' requirements for the command and control process are a common denominator that must be addressed in any proposal. General Joseph W. Ashy, Commander in Chief of US Space Command (USSPACECOM), stated that, "Collection and dissemination of information is the key."[13] Our study approached information requirements with an eye to the future. It is this area that has shown the greatest change and certainty of continued growth. National Defense University's Martin Libicki pronounced:

> Information technology doubles roughly every one and a half to three years. Each successive generation is both faster but cheaper, smaller, and less power-hungry as well. Free silicon is inevitable; more precisely, unlimited amounts of information acquisition, processing, storage, and transmission capability will be available from indefinitely small and inexpensive packages. Limitations on information processing capability will constrain the conduct of neither military and civilian operation.[14]

The improvements in computer processing and communications capability that enable virtual presence in the theater of operations and the formation of virtual organizations are rapidly becoming a reality. Futurist George Gilder asserts, "One thing is for certain. Over the next decade, computer speed will rise about a hundredfold, while bandwidth increases a thousandfold or more." [15] While information requirements are interwoven throughout our study, it is the final command and control 'process' area of organization that we suggest should be a central focus for improvement. Command and control 'organization' represents a realistic focus to improve joint warfighting capabilities. It also represents a viable mechanism to allow continued responsiveness to service needs, in military operations other than war, or as partners in theater-level joint and coalition operations.

Responses from several senior commanders and CINCs suggest significant improvements can be made in organizational structures. The choice of current 'organization' as a key to potential improvement was based upon the critical impact it has upon all other 'process' and 'system' requirements. This rationale is developed throughout this work, and provides the focus for a proposed concept of employment that supports the JFACC concept, provides unity of effort, and promotes a common joint capability among the services. To fully understand these differences, the following chapters will briefly identify some major service differences with respect to air operations and supporting requirements, programs and systems.

Chapter 2 identifies why current C4I structures need to be changed. To accomplish this, we look at the primary doctrinal differences between services. Specific areas of interest include jointness, team integration, multiple contingencies and roles, communications, intelligence, coalition dichotomies, and concerns in dealing with unresponsiveness. In order to ensure a balanced view, the chapter includes a section on strengths in the current systems.

Chapter 3 proposes our concept for a JAOC projected 15 years into the future. This concept develops the ability to migrate from current systems in the near term (2000) organized to capitalize on current strengths in the theater CINC's organizations. In the long term (2010), the concept takes advantage of benefits and cost savings to be gained from emerging technologies and organizational resizing. The proposal breaks the structure into a rear and forward echelon. Each element is designed to mirror image the structures in the other.

Chapter 4 develops a notional scenario based on the proposed concept of operation outlined in Chapter 3. In the scenario, conflict develops in the area of operation for US Southern Command. It demonstrates the capability to deploy a JFACC, develop supporting plans and taskings from the rear echelon, and conduct operations in theater.

Chapter 5 discusses current contextual elements affecting the development of a JAOC. Major areas of concern include support, service and doctrinal issues, coalition issues, and emerging technologies. Support concerns are further refined into: personnel, to include manning and joint duty; training; and facilities.

Chapter 6 concludes that the JAOC 2000/2010 concept is viable and is not dependent on the outcome of the current roles and missions debate.

Appendix A expands the existing structures first explored in Chapter 2. It goes into greater detail on how each service currently deals with the management of air assets.

Appendix B provides greater detail on the core competencies, organizational structure, and functional responsibilities of the proposed JAOC concept.

Chapter 2: The Need to Change the Joint Air Operations Center

When considering future C4I structures, researchers should first look at the doctrinal variations among the service components holding air assets to identify why the current structures may need to be changed. Doctrine establishes the basic tenets that we apply to conduct our military duties in order to achieve national objectives. Doctrine is reflected in organizational structure and is the foundation for each service's command and control requirements. All services have valid concerns that are addressed by parochial application. However, in a joint arena, differences must be resolved and capabilities maximized across the board to result in the best air campaign possible and to achieve the synergy of our combined forces. This is not the case today, and is *why* current joint air operations center C4I structure needs to be examined and changed.

This chapter looks at the current Service philosophies on the employment and control of air assets. Further, it provides a brief examination of the strengths and shortfalls of the various military structures that perform air operation functions.

Service Control of Air Power Assets

Navy. The Navy utilizes two air operations structures. The first, is a more formalized structure known as the Navy Tactical Air Control System (NTACS) and is the Navy's principle air command and control system afloat throughout all phases of an amphibious operation. NTACS through its subordinate components, the Tactical Air Control Center/Tactical Air Direction Center (TACC/TADC) afloat and the Helicopter Direction Center (HDC) addresses the planning and execution requirements of Fleet air assets in an amphibious operation. The TACC is the senior aviation command and control

agency for the Navy and is usually located aboard the Amphibious Task Force flagship.[16] Physical space aboard ship is limited, and the organization and manning of the TACC reflects this austere environment. An officer from the Tactical Air Control Group or Squadron (TACGRU/TACRON) is usually nominated the Tactical Air Officer (TAO) and exercises control over all aircraft during Naval Expeditionary Force (NEF)-size operations within the amphibious operating area. Manning for the TACC is provided by the Tactical Air Control Squadron (TACRON) and normally consists of approximately 15 officers and 40 enlisted personnel. The Carrier Battle Group differs from the Amphibious Task Force in command and control organization, and distributes responsibility to perform specific warfare functions throughout the Battle Group as depicted in Appendix A. Basic organization for the USN TACC/TADC within an Amphibious Task Force/Ready Group is depicted in Figure 1 below. By necessity, the Navy has relied upon small-scale decentralized planning for air operations. It uses a 'bottom up' strike planning approach that does not lend itself to centralized control of large numbers of air assets.[17] Typically, the missions are planned by a small cadre of individuals for a particular operation to achieve a single goal. This system has worked well in independent flight operations in support of the fleet and works in coordinated strike packages with ample pre-planning time such as Eldorado Canyon.[18] In large scale operations such as Desert Storm, the centralized requirements of planning and conducting joint air operations stresses the organic capabilities of the Navy TACC. Winnefeld and Johnson state that,"Some have acknowledged that the Navy did not have a command, control and planning system that could have undertaken the task faced by a JFACC in August 1990."[19]

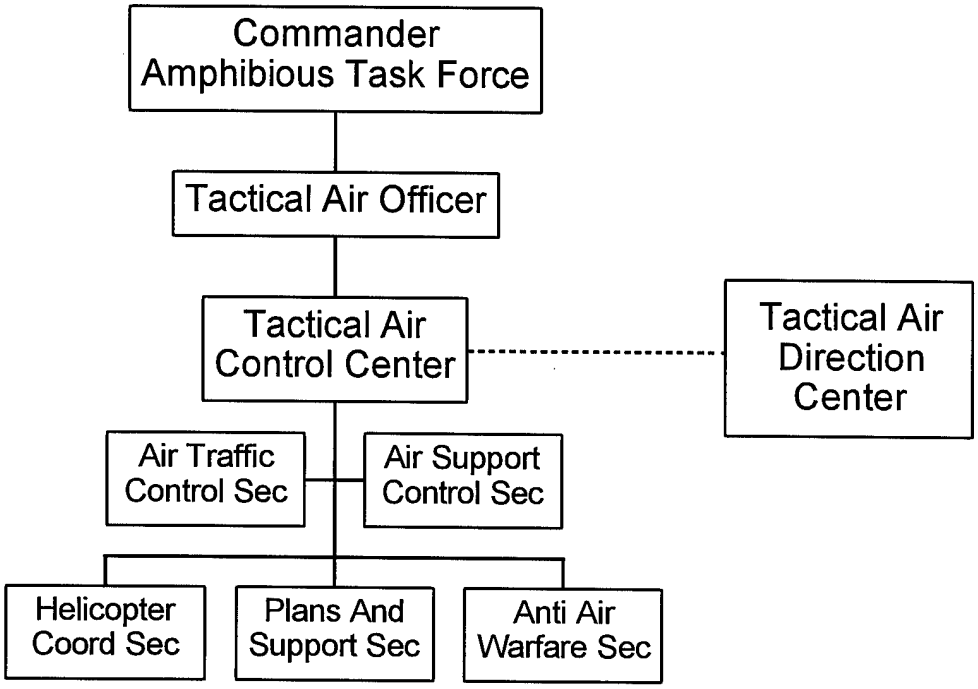

Figure 1. Navy Tactical Air Control System (Amphibious Operations)

USMC. The Marine Air Ground Task Force's (MAGTF) Air Combat Element (ACE) provides a Tactical Air Command Center (TACC) as the senior Marine air command and control agency and provides the operational command post for the ACE commander. From the TACC, the ACE commander and his battlestaff can plan, supervise, coordinate, and execute current and future air operations. The TACC is functionally divided into a current operations section (COS) and a future operations section (FOS). Although there are equipment groups that can be associated with these functions, the nature and scope of Marine Corps operations demands flexibility, mobility, and transportability. For these reasons, the TACC may operate in a variety of locations and physical configurations. Since the MAGTF is primarily an expeditionary force, aviation command and control capabilities and supporting facilities must be capable of setting up operations quickly and tactically anywhere in the theater of operations.[20] The

Marine Corps TACC can echelon certain capabilities, but generally must be operationally established in 24 hours, with capability for full integration (including all external data links) within 48 hours. The basic organizational relationships of the MAGTF's TACC are depicted in Figure 2.

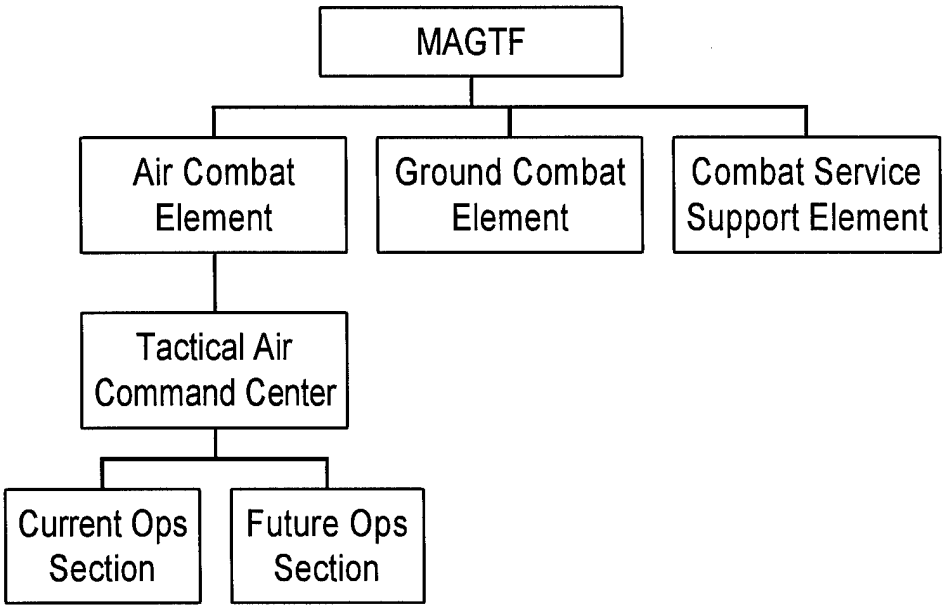

Figure 2. Marine Air Ground Task Force Air Command and Control

The TACC was designed to provide the organic capabilities necessary to plan and execute MAGTF air operations and phase responsibility for air operations between adjacent agencies (e.g., assuming landward command from the Navy once the MAGTF is established ashore). By nature of this capability, the TACC is versed in both providing input to and coordinating with other service command and control agencies in addition to its primary role of planning and executing independent MAGTF responsibilities. (One example of a Marine TACC/ACE functioning as JFACC for a limited time was at the onset of operations in Somalia.)[21]

Because the MAGTF is both a consumer and provider of aviation support, the planning process has evolved along with service-unique doctrine to provide timely, responsive support for MAGTF operations. This process is strained at times when available assets fall on either extreme of requirements. A lack of assets may require extensive external connectivity to request outside air support, which may be delayed in arriving, while an over-abundance of air assets may require detailed coordination and extensive internal connectivity that can tax the austere manning of the TACC. The USMC TACC however, provides an excellent capability to coordinate and run a joint air operation up to the limits of NEF operations. Tasking the TACC to support sustained operations in excess of a NEF-level operation will likely over-saturate the normal TACC staff and require either transfer of Air Operations Center (AOC) operations to a larger organization or expansion of the existing TACC with the required personnel and equipment to handle the additional tasking.

Army. Basic Army doctrine emphasizes an offensive spirit based upon gaining the initiative through the ability to maneuver.[22] Airspace doctrine is used to support current warfighting doctrine in that Army Aviation forces are maintained and employed as organic maneuver units. Although FM 100-103 is a relatively dated doctrine (1987), it recognizes airspace as a joint medium and, as such, focuses on Army requirements, procedures, and C2 tasks in the planning, coordination, and execution of airspace control. Army Airspace Command and Control (A2C2) structure consists of the Joint Land Component Commander (JLCC) who is primarily responsible for planning and executing the land campaign in support of the JFC objectives. The primary agency responsible for

coordinating between the staff of the JFACC and the JLCC is the Battlefield Coordination Element (BCE). FM 100-103 lists four primary missions of the BCE:

- processing the JLCC's tactical air (TACAIR) requests monitoring and interpreting the land battle situation
- ensuring continuous exchange of current intelligence and operations data
- coordinating air defense and airspace control matters[23]

The US Army A2C2 organizational relationship is depicted in Figure 3.

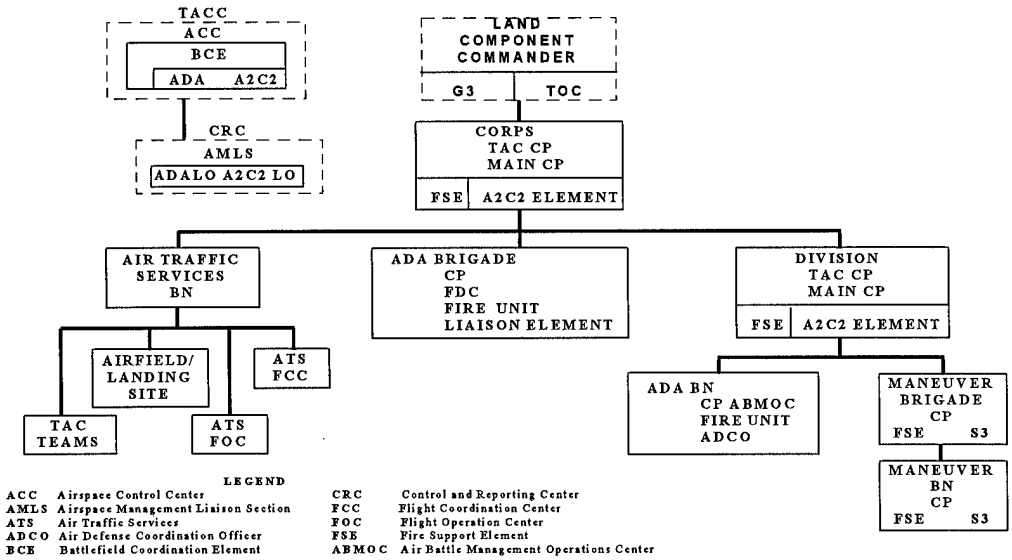

Figure 3. US Army A2C2 System[24]

In addition to the BCE, each command level, from corps through battalion, has an A2C2 element responsible for working associated unit airspace issues. Present Army doctrine does not envision the requirement for developing and running a JAOC organization, however, it is critical that all JAOC structures incorporate BCE element connectivity in order to facilitate Army battlefield success and to optimize the use of the joint battlespace.

Air Force. When the JFACC's role is delegated to the Air Force, the primary means of executing assigned duties is through the Theater Air Control System (TACS).

The AOC, which is part of the TACS system, is the "operational facility in which the JFACC has centralized the functions of planning, direction, and control over committed air resources,"[25] and is normally considered the JFACC's command post. The AOC provides the JFACC "with the capability to supervise the activities of assigned or attached forces and to monitor the actions of both enemy and friendly forces."[26] The AOC consists of six functional elements: combat plans division (CPD), combat operations division (COD), combat intelligence division (CID), systems control center (SYSCON), logistics readiness center (LRC), and combat service support center (CSSC). Manning within the AOC can swell to well over 1,000 individuals needed to staff the various divisions. USAF AOC organizational diagram is depicted in Figure 4.

The Air Force developed the TACS to implement its doctrine of centralized control and decentralized execution. This concept enables a single point of direction for the air effort, the JFACC, under whose master attack plan theater air assets are employed. Supporting equipment and staffing is linked to anticipated contingency requirements by progressively sized response packages. C4 needs for a combined wing operational requirement, for example, are met by deploying a quick response package and can be expanded with the addition of a limited response package. Theater requirements are met by the theater response package and its extensive staffing requirement. The composite wing concept has a task-organized command and control capability that utilizes equipment short of the quick reaction package but meets the unique, limited requirements of composite wing operational tasking.

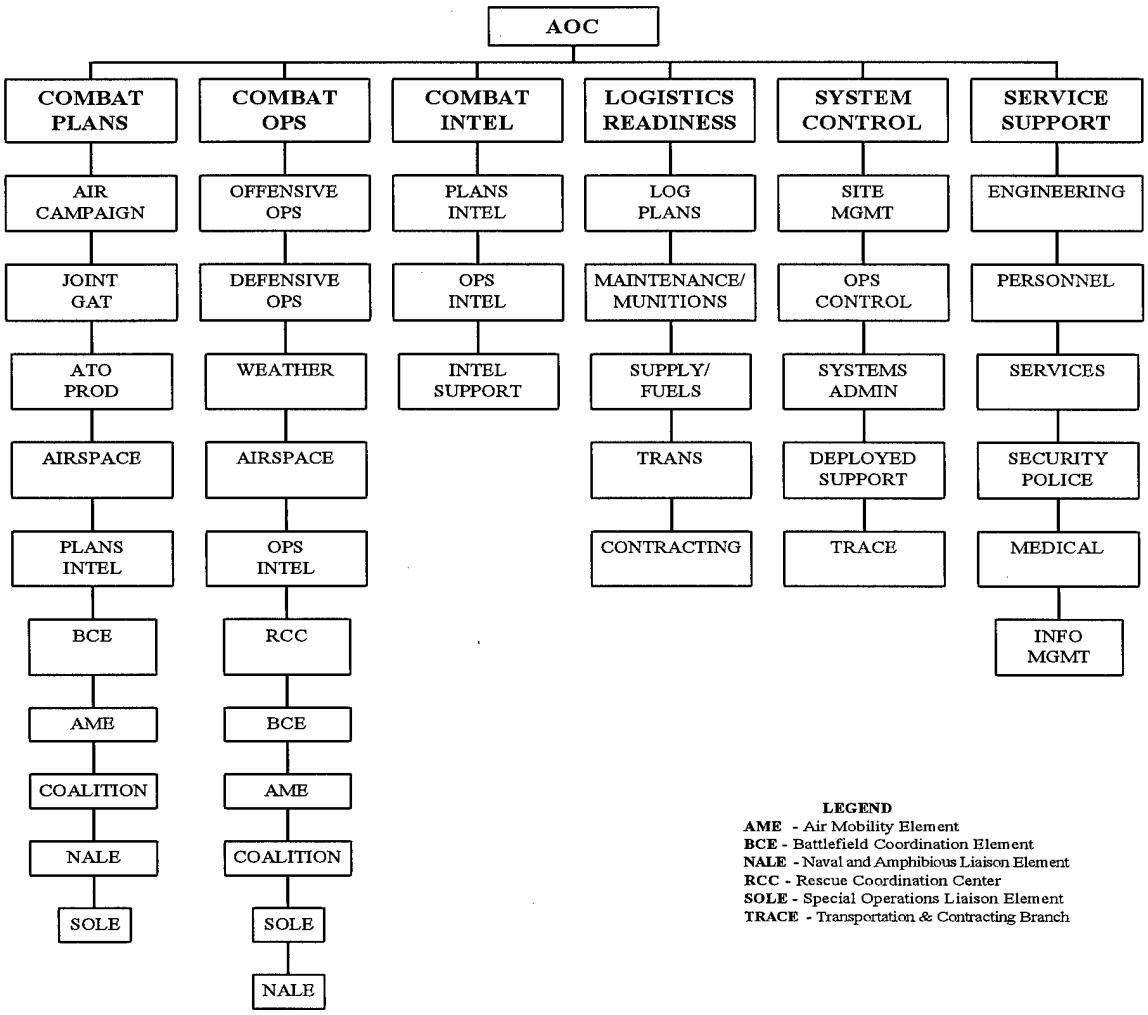

Figure 4. Air Operations Center Organization

Having looked at the doctrine for each component service, and understanding that unique situations face each geographic CINC to meet joint force requirements, we conclude that different command and control agency structures and configurations have been independently developed to meet specific area of responsibility (AOR) needs at the behest of the CINC. Many of these post-Desert Storm developments have attempted to create a hybrid joint force organization, or at least address joint concerns that surfaced after the Gulf War.[27] These attempts have been implemented during major exercises

starting with Ocean Venture 92 and Tandem Thrust 92 and their successors. Exercises such as Trail Blazer 94 and Atlantic Resolve 94 provided opportunities to assess specific concept of operations (CONOPS) developed within a geographic AOR, as was the case for EUCOM.[28] Each exercise builds upon lessons learned from the Air Force dominated JFACC concept application used during Operation Desert Storm, to more increasingly 'joint' *concepts* of JFACC application.[29] While each service, each component and each CINC appear to be striving for the same goal (an effective C4I structure to support joint air operations), problems remain which are characteristic of organizational structure. These characteristics are aptly described in the 1993 Center for Naval Analyses study entitled: "The Joint Force Air Component Commander: Theory and Practice" that was conducted at the request of the Deputy Chief of Naval Operations for Plans, Policy and Operations. The study identified the command relationships of the designated JFACC within four identified organizational models, and the possible influences upon JFACC performance.[30] It is from these four organizational models that US forces currently field command and control organizations to support the JFACC. Literature review and our own questionnaire letter response from the geographic commands, indicates notable improvements in joint air planning and operations capabilities, with exceptions.[31]

Each organizational model is subject to the limitations identified by the Center for Naval Analyses (CNA) study. Specifically, a model where the JFACC (and staff) is a staff function of the JFC, is characterized by the JFACC role as an 'additional duty.' As noted by CNA, this model is best suited for small-scale, short duration operations.[32]

A second model is one where the JFACC is a subordinate arm of the JFC, and remains independent of the services. This provides that the missions of the JFACC are unique, and as such allows for a dedicated staff to accomplish those missions.[33]

CNA's third model is based on a service component commander, dual-hatted as the JFACC. This model is indicative of many of the existing 'JAOC' capabilities fielded by the services today. CNA indicates that a blurring of mission objectives could result from 'dual-hatting,' when missions assigned to the component are in competition with objectives and missions assigned to the JFACC.[34] Such an organizational model has service specific air planning and execution practices, which dominate the JFACC (JAOC) staff.[35]

The fourth model in the CNA study identifies the JFACC as an equivalent to the service component commanders. This would once again acknowledge the unique nature of JFACC missions and provide for a dedicated JFACC staff.[36]

As a nominative example of how joint considerations of a particular AOR are addressed, we have selected the organization under the control of US European Command (EUCOM).[37]

EUCOM's concept of employment was selected because it represents common concerns that have been improved by re-thinking organizational structure and associated responsibilities within the organization. Its Air Operations Group reflects a hybrid organization that although single service hosted, incorporates provisions for joint staffing and augmentation and a standing core staff for daily planning. Major General Jerrold P. Allen, Director, Plans and Policy, Headquarters US European Command (USEUCOM)

replied to our inquiry concerning how a Joint Air Operations Center concept would support their command by stating:

> We have worked hard over the past year to improve the process of integrating and employing the Joint Force Commander's joint air assets. The 32 Air Operations Group, based at Ramstein Germany, has been tested in several challenging exercises. We have incorporated the lessons learned from those exercises, as well as our real world contingencies, into day-to-day operations and contingency planning.[38]

While EUCOM does not have a 'standing' JAOC, it has established the Air Operations Group concept of employment to provide an ability to respond to crises as a deployable core JFACC staff. Current manning is provided by USAF personnel only, augmented by trained personnel from other services when deployed for contingencies or exercises.[39] US Air Force Europe's (USAFE) briefing package on the 32nd Air Operations Group concludes that their concept of employment works, replacing what was previously a "pick-up team approach," with a "dedicated operational level warfighting organization to focus on and advise JFACCs and train augmentees and build on lessons learned."[40] The 32nd Air Operations Group (AOG) consists of three squadrons: Operations, Intelligence, and Communications. Figure 5 depicts EUCOM's 32nd AOG organizational relationships.

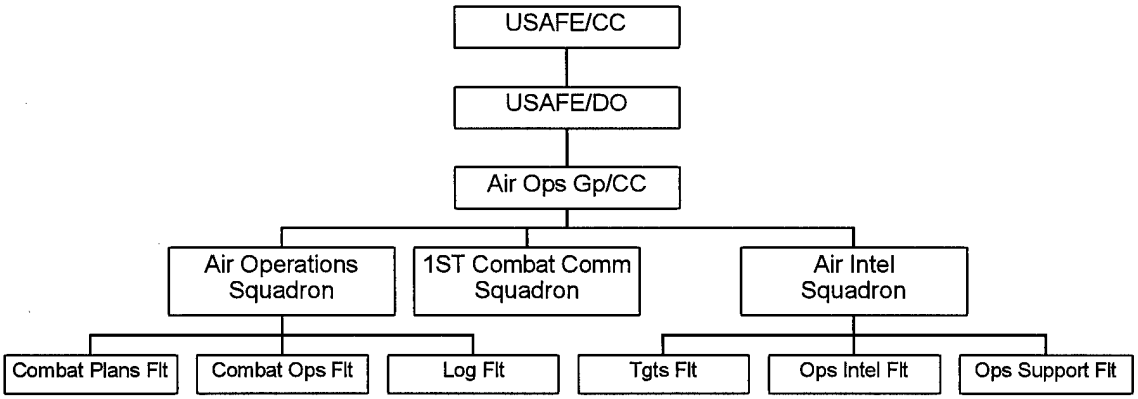

Figure 5. 32nd Air Operations Group

The 32nd AOG has a core staff that can rapidly deploy and begin controlling and coordinating air operations within 24 hours. This core staff not only understands air operations and their own staff interface with other components, but also knows the process for developing a joint air strategy. They are also responsible for producing and executing an ATO for EUCOM's AOR. However, these staff positions are not permanent, joint billets.

For a more detailed discussion of the specific service air command and control structures and doctrinal considerations, see Appendix A. Although resolution of doctrinal differences is beyond the scope of this study, differences in operating practices do provide a basis for examination of the primary strengths and shortfalls of the current C4I structures supporting joint or theater air operations.

Strengths in the Current System

The need to identify strengths in existing service air command and control capabilities for conducting joint air operations is in keeping with the 'best of breed' concept contained in the overarching C4IFTW philosophy. Contingency TACS

Automated Planning System (CTAPS) is an example of an Air Force-specific system that was identified as a 'best-of-breed' capability for ATO generation and dissemination and mandated as the joint standard. Migration of CTAPS and other equipment components will build upon the baseline system capabilities to fulfill evolving requirements within a common operating environment. Joint guidelines are in place to mitigate the trauma and cost of new systems and equipment implementation.[41] Similar guidelines are not in place to focus the JAOC structure and organization. Rather than concentrate on specific equipment-related issues that may fall within the scope of other studies underway, we will look at structure and organizational strengths. Service capabilities to provide flexible and responsive air command and control to meet specific service requirements, short of large-scale joint operations, are sound. This basic requirement—to first meet service needs—should be preserved in any proposal to suggest an improved C4I capability specific to air operations functions. No ground-up restructuring master plan for all services could address parochial needs to the satisfaction of the services, or cost effectively meet joint requirements. An effective concept must therefore build upon existing service C4I capabilities using joint guidance for systems improvements (C4IFTW) and establish similar joint guidance for JAOC organization from a 'best of breed' model.

Restructuring efforts such as EUCOM's development of the 32nd AOG demonstrated an evolution from the basic AOC concept of employment to a structure responsive to identified joint operating requirements. EUCOM's example illustrates service requirements that have been augmented and adjusted to meet joint requirements in the area of operations; however, they do not go far enough in defining a truly joint AOC capability. Bottom line, AOR concerns can be met in concert with service-specific

operational requirements. The joint operating environment places unique requirements on service C4I structures operating together. Shortfalls impact optimization and identify potential improvement options.

Shortfalls in Current Joint Air Operations C4I Structure

Lack of True Jointness. How 'truly joint' any organization or structure will appear to the services may be subject to wide interpretation. How such a structure is manned, what organization has been modeled, and where the structure is located may influence how widely the concept is accepted. Common ground for joint C4I must be identified as a starting point. The concept of the JFACC controlling air assets centrally is fundamentally sound by most accounts.[42] Joint doctrine calls for the JFACC to be nominated from the service component with the preponderance of air assets in theater and who has the adequate C2 infrastructure to support the function at the time. The Tactical Air Control Center model used as a 'JAOC' in the Gulf War was the Air Force version of an aviation command and control headquarters structure in effect since the Vietnam War, assisted by a relatively old computer system. Based on Desert Storm, the other services may argue the JAOC was only an Air Force organizational structure with joint trappings.[43] In addition, the JFACC support function, with its equipment and staffing requirements, has become a large and unwieldy beast to bring together and deploy. If we are to employ the JAOC effectively from the initiation of any operational requirement, we must be able to employ it quickly and with a minimum of confusion and resource expenditure. If such an organizational model is established in peacetime and comprises a truly joint staff, some may be concerned that personnel originally selected to represent service concerns will lose their distinctive allegiances to their own services, as a RAND study reports was General

Horner's opinion.[44] In order to establish a universal capability, the JAOC model must be supported by joint, standardized training. Training should preserve service relationships and joint responsibilities within the JAOC. The alternative to permanent joint staffing and standardized training presents problems we repeatedly experience when trying to meld liaisons and temporary duty personnel into a skeleton of a JAOC organizational structure.[45]

Team Integration. The most effective team is the one which has worked and trained together for an extended period, not one that has just been brought together *ad hoc*. It was noted that during Operation Just Cause, the orchestration of air operations was complicated by difficulties stemming from creating an *ad hoc* AOC from an assembly of local service personnel rather than utilizing a permanently established and functioning AOC.[46] This then resulted in, due to inexperience, the BCE being hastily considered and virtually ignored.[47] Lack of a permanent core cadre of JAOC staff available to each CINC highlights a reduced capability to maintain deliberate plans and their associated data bases as well as immediately provide continuity in the crisis action planning response needed within each AOR. The difficulty in integrating personnel and outside systems and processes into the AOC also adds to the many problems faced by the intelligence community.

Intelligence. Although during the Gulf War the TACC (JAOC) was located near the JFACC and CINC; the community that provided the bulk of the daily intelligence assessments to the planners in the 'JAOC' was located back in the continental US (CONUS). In fact, much of the intelligence coordination was done between the 'Black Hole' in Riyadh, Saudi Arabia, and 'Checkmate' in Washington, DC, largely bypassing the

intelligence personnel located in the 'JAOC.'[48] In the *Gulf War Air Power Survey Summary*, Keaney and Cohen state, in part:

> By the middle of Desert Shield, Checkmate had become an ad hoc fusion center for intelligence and operational information and maintained contact with national intelligence agencies and a number of specialized planning cells in Washington. It did not take Black Hole personnel long to realize that they could obtain more current information by calling Washington on their STU-III secure telephones and secure faxes than they could get from in-theater intelligence sources.[49]

This did not seem to be so much a problem for the planners, as for the amalgam of in-country intelligence personnel who felt it was being bypassed. Because extensive communications permitted it, this geographically separate arrangement worked well. Side-stepping or by-passing the true integration of intelligence and planning personnel within the JAOC would not occur if the JAOC was made truly joint and standardized. The Gulf War Airpower Survey Summary Report indicates that while some of the intelligence integration problems were likely 'personality issues,' it stated after interviews with intelligence officers in January 1992:

> Perhaps the single biggest factor that contributed to the rift was the initial inability of theater intelligence to produce imagery of potential targets for General Glosson's planners in a timely fashion. This failure had a variety of sources, beginning with the generally incomplete and out of date national database on Iraq before the crisis.[50]

Integration and coordination between intelligence and air planning personnel can be improved in a proposed JAOC concept of employment by having a permanent cadre staff that updates databases and target lists, as well as maintaining information exchange between requesters and providers. This relationship should also diminish the negative effects of physical separation between intelligence facilities and the air planning effort. Where the joint intelligence collection/fusion activities will be located and how those

activities should be organized will be influenced by the type of future conflict scenarios we may face and not restricted by a lack of responsibility delineation within the JAOC itself.

Standardization. Another significant limitation that surfaced during the Gulf War was the lack of standardization in the ATO-generation/dissemination process and terminology, even within the Air Force. US Pacific and European-based forces used means and procedures in the ATO process that differed from each other, as well as from those used by units based in the US and deployed to Southwest Asia.[51] Additionally, there was no planned backup to the vulnerable, highly structured, complex, centralized, computerized method used to develop and generate the ATO.[52] Although the Navy is presently installing a higher capacity satellite system on its ships and is working hard to become interoperable with the current ATO-production and dissemination system, CTAPS, there is still the limitation of space aboard ship to accommodate a large planning cell or additional operators. The Marine Corps is in the development and initial operational capability implementation phases of enhancements to the Advanced Tactical Air Command Center. Utilizing a phased approach to these enhancements, Phase I provides a baseline CTAPS capability and partial digital-capable voice communications. Initial versions within Phase I implementation are characterized by physically distinct platforms with limited data integration. Equipment and software that will provide joint connectivity from each workstation to access data links, intelligence sources and the evolving Global Command and Control System, within C4IFTW goals, will be implemented in Phase II. Phase III will meet all remaining and developing operational requirements, allowing full migration from 1999 into the next century. How best to apply limited funds to address the operational requirements of the Fleet Marine Force and assure

connectivity to evolving joint systems is a constant quandary facing program managers.[53] The lack of interservice systems redundancy and standardization are known problems that are being worked by the military establishment in concert with civilian contractors. In addition to finding solutions to enable the military to communicate jointly, we must address some other problems relevant to achieving a truly joint AOC.

Multiple Contingencies. In accordance with the US National Security Strategy, we must be ready to operate JAOCs for two concurrent major regional conflicts (MRC). The outlook for the near and distant future portends response to smaller, less conventional operations that might overlap or occur simultaneously. A JAOC must respond flexibly and proportionately to any contingency. If the best solution is to establish one or more standing JAOCs, we must decide how many are needed, what functions must be included (i.e., intelligence, planning, operations, logistics, etc.), where they should be located, and what function they should perform day-to-day. This is complicated by the very nature of wartime organization that often necessitates assigning one person many functions to perform.[54]

Communications. A significant problem to overcome in any joint C4I structure is physical limitations of the communications system. At present, the communications equipment that supports the US Air Force's AOC and its integral subsystems is too large and cumbersome to deploy easily and quickly, and requires considerable sea and/or airlift. Therefore, to provide immediate, long-haul communications, we must rely heavily upon host nation communications support, and satellite access that is already in the area or located nearby. This communications requirement puts a heavy burden on a vulnerable and already over-tasked satellite constellation.[55]

During Desert Shield/Storm, satellite orbits were changed to accommodate heavy operational traffic. Considering the lessons learned in Desert Storm, the ability to support the communications requirements of two MRCs in different theaters of operation is questionable. On the terrestrial side in Desert Storm, the communications pipeline between the various units was not large enough nor fast enough for all subscribers to easily obtain the ATO without resorting to other, more esoteric means, such as transmission between secure-capable desktop computers connected by secure telephone units.[56] The communications limitations aboard on-station aircraft carriers during the Gulf War restricted the effectiveness of full employment of the Computer-Aided Force-Management System (CAFMS) used to process the joint ATO.[57] This lack of standardization resulted in extensive manual work-arounds for an 'automated' system.

Coalition Dichotomies. Future conflicts will almost certainly require multinational efforts. We must be able to take advantage of the coalition's unique contributions, and yet satisfy our own operations security needs to produce a coordinated and effective campaign. The problem of exerting command and control over another country's assets is one that continues to be a contentious issue. Rast and Sturk comment upon one such situation as it occurred during Desert Storm:

> . . . in many cases the mere existence of allied cooperation did not always result in cooperation amongst Coalition [sic] air forces nor adherence to JFACC guidance. In particular, the British government kept the Royal Air Force in check regarding the types of targets their forces could strike . . . . Thus, while the JFACC exhibited extensive control over the air campaign, he still did not exercise exclusive control over all Coalition [sic] air assets.[58]

This is only one example of the type of coalition problems that can be expected to continue to occur. Rast and Sturk conclude, "For future campaigns to be successful, we

must bridge this gap within the multinational airpower command and control structure."[59] Some other considerations are in compatibility in culture, equipment, and objectives. What should be the role of each coalition partner, and how should that role be determined? At the least, we must have an idea of what we believe is the best way to incorporate coalition partners into the JAOC operation. The shortfalls of US and coalition command and control clearly identify needs that any improved system concept should address and attempt to correct.

Multiple Roles. Double- and triple-hatting of the JFACC and the deputy JFACC was a problem perceived both internally and externally to the Air Force during the Gulf War. During Desert Shield/Storm, the JFACC was also the Ninth Air Force Commander and COMUSCENTAF, while the deputy JFACC was the Fourteenth Air Force Commander and CENTAF Director of Campaign Planning. After the war, Air Force Chief of Staff, General Merrill McPeak, cited dual responsibility command arrangements within the deployed Air Force component as "unacceptable."[60] In most cases envisioned, the JFACC from any service branch will likely be required to fill multiple roles as well. Colonel J. L. Whitlow points out:

> At first blush it seems that a JFACC should inherently head a purple organization, but there are several reasons why this is usually not the case. First of all joint doctrine embraces the notion of dual hatting. It is stated that a JFC will 'normally designate a JFACC from the component that has both the preponderance of air assets in the joint operations area and the capability to command and control joint air operation.' Conflict of interest in a dual hat situation is inevitable—if not in deed, certainly in perception, which is therefore detrimental to the joint force. You can argue that a JFC can augment the JFACC organization with personnel from other services and make it joint, or that it is really the only way to organize since components own all the necessary C2 assets; but you cannot argue that it is *purple*[emphasis in original].[61]

Some experts question the wisdom of this practice saying that the end result is service favoritism, which could jeopardize the effectiveness of the air campaign.[62] The alternative is that dual roles can contribute to shortening the 'decision loop' by investing several different decision-maker roles in the same person, thus making the decision process more responsive. Four organizational schemes were identified in the CNA "Joint Force Air Component Commander: Theory and Practice" study, which depicted a service component commander double-hatted as the JFACC. In that 'dual-hatting' situation the study states:

> Such a scheme might result in a situation in which any distinction between objectives and missions assigned to the service component commander and those assigned to the JFACC could become blurred. In this model there is the possibility that the service component's staff would serve as the JFACC staff. Such an arrangement could result in a JFACC staff dominated by one service planning and executing air operations by procedures and practice common to that service but unfamiliar to other services.[63]

Dual-hatting of JFACC and service component responsibilities may continue to be a normal operating procedure in the future, but the disadvantages cited above can be offset by a change in the supporting organizational structure. Service core competencies required to host the JFACC in the proposed JAOC Forward concept would offset 'single service' characteristics. Joint training and standards will further contribute to equalizing host capabilities for the JFACC.

Unresponsiveness. Although our recent experience in Southwest Asia did not tax our ability to work within an externally compressed decision loop, we cannot expect such generosity from our future enemies. Our strength in possessing a 'quick' decision loop, one in which we can respond quickly to changes on the battlefield, represents an area that our potential enemies may try to interrupt. The Observe, Orient, Decide, Act, (OODA)

loop is a conceptual model of the decision making process.[64] This process or 'OODA loop' must be streamlined and shortened and protected as much as possible with respect to the air campaign planning and execution process. Each time a change or new decision response is introduced into the cycle, JAOC planners or operators may have to take more time than shooters can afford to lose to incorporate the change into the plan. Response to the dynamic air support needs of our ground components should be fast enough to ensure a unified and synergistic effort. We face even more difficult questions in reconciling differences between the US JAOC operation and individual country practices of our coalition partners and their command and control authority.

Needs

The focus that should guide the development of an improved JAOC concept results from the 'needs' identified by current shortfalls. The process and deliberation required to 'boil down' numerous aspects of both system and structure can yield a laundry list of 'needs' that are too specific to guide concept development. The services have responded to some of these 'needs' and are working on improvements to systems or procedures. Additionally, geographical commands are tailoring the C4I structures that support the CINC. While these efforts are making improvement, the 'joint' solution to an improved air operations center must be more universal, jointly accepted, coordinated and complementary to service initiatives. Instead, a 'needs' list that captures the common denominator of identified shortfalls leads to more creative approaches and achievable solutions. Needs have been identified as follows:

Standardization must exist across command and service lines and must be supported through doctrine, structure, and training.

Flexibility must be key in responding to the complete range of military requirements of the present and future. This flexible response capability must be seamless.

Mobility and lift dependence should be minimized by JAOC options that are smaller and smarter.

Emerging technologies must be exploited, with emphasis on space, information management, and improved bandwidth utilization and communications technology.

Access to supporting agencies and information such as Space, Intelligence and Theater Missile Defense must be effectively incorporated in a concept proposal.

Cost effectiveness of any proposal should be assessed, with redistribution of assets and migration from current capabilities and equipment utilizing emerging technology and open systems design strongly considered.

The effective operation of a future JAOC will depend upon the ability to counter the shortfalls briefly outlined in this chapter, while capitalizing on the strengths that already exist. Even while preserving the strengths of the current agencies, the shortfalls must be addressed when attempting to determine the best C4I structure for the JAOC of the future. The services must work together to overcome parochial service doctrine that affect the optimal prosecution of joint air operations. As a result of recent contingencies, all services involved in the employment of joint air power have recognized shortcomings in the command and control agencies that support joint operations, and are making needed changes in equipment, facilities, and processes. However, the tough questions pertaining to operational structures still remain. Issues such as establishing 'standing' versus 'ad hoc' JAOCs, its organization, location, support component locations, and functional responsibilities are of critical importance. How can the JAOC be best structured to handle multiple contingencies, and preserve the joint focus when the JFACC has 'dual-hatted' command responsibilities? What is the best way to ensure the joint air command and

control process is effective and provides as short an OODA loop as possible? How should we integrate coalition partners into the JAOC structure? Some of these issues are being dealt with today, and some will persist into the future. However, the 'Shortfalls' of current capabilities provide requirements for an improved concept, while the 'Needs' provide a focus for improvement which incorporates the inherent strengths of the current systems and forms the basis for the evolutionary concept outlined in the next chapter.

Chapter 3: JAOC 2000/2010—Proposed Solution

Eliminating the deficiencies of the current system and using the stated needs for future JAOC capabilities as a foundation, this chapter outlines the proposed JAOC concept. The outlying years of 2000 and 2010 were chosen as milestones based on development of a structure with *existing* technology in the near future (i.e., 2000) and maximizing the use of *emerging* technology in the distant future (i.e., 2010). The focus is on providing the JFC in theater with the capability to respond immediately with joint application of airpower in a coordinated effort over a variety of possible contingencies. Further, the proposal incorporates the strengths associated with existing and emerging individual service AOC-capable structures while limiting reliance on decreased lift assets. Finally, the JAOC 2000/2010 concept incorporates emerging technology in order to maximize efficiency while reducing operating costs and manpower requirements. In this way, the JAOC 2000/2010 concept provides a framework for the standardization of joint air operations center organization and function across command and service lines.

In order to describe the JAOC 2000/2010 concept fully, this chapter is divided into four sections: JAOC Rear, JAOC Forward, JAOC 2010, and Recommended Plan of Action.

JAOC REAR

Joint Pub 5-00.1, *Doctrine for Joint Campaign Planning*, states:

> . . . the National Command Authorities (NCA) provide military strategic direction to the *theater* [italics added] Joint Force Commander (JFC). This direction includes the national military objective(s) to be achieved, as well as the strategic tasks, forces, materiel resources, strategic guidance, and limitations. The JFC augments this strategic planning by developing a theater war plan—the theater campaign—which implements the strategic direction of the NCA. . . . Campaigns are conducted in theaters of war and theaters of operations; they are based on theater strategic estimates and resulting theater strategies.[65]

It is relatively clear that current doctrine places the responsibility for planning and executing joint campaigns at the *theater* level. The command and control structure was delineated in the 1986 Goldwater-Nichols Defense Reorganization Act which specifies the relationships and responsibilities of political and military leadership as indicated in Figure 6.

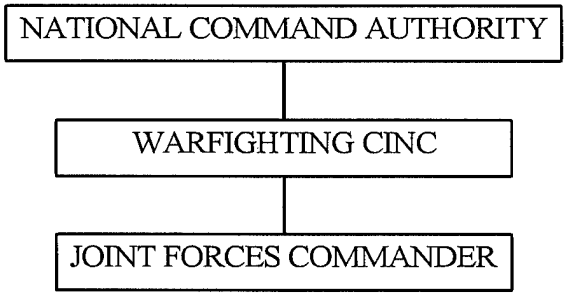

Figure 6. US Military Command and Control Structure

Based on the command relationship and the associated philosophy supporting theater CINC autonomy in planning and executing military campaigns, the JAOC 2000/2010 concept places the JAOC Rear under, and collocated with, each theater warfighting CINC. By doing this, the proposal makes maximum use of each CINC's in-place supporting architecture (such as the Joint Intelligence Center (JIC) and an

established communications network). As previously mentioned, the JAOC Rear staff does not deploy thus significantly reducing the lift requirements and cost associated with moving these personnel and their extensive equipment into the theater of operations. Should the CINC and/or JFACC choose to deploy into the theater, the JAOC Rear staff would continue to function at the CINC headquarters as the primary planning and execution agency for the air campaign. Daily guidance from the JFACC would be used to ensure JFC objectives are being adequately met.

Developing the JAOC Rear concept further, there are five specific core competency areas involved in the process of planning and executing an air campaign, master attack plan and associated ATO. These are as follows: combat plans, combat operations, combat intelligence, combat logistics, and combat command and control (see Figure 7). The responsibilities of each of these directorates are outlined in Appendix B. In order to assure the required redundancy for 24-hour operations, the JAOC 2000/2010 proposal recommends staffing each core competency area with a permanently assigned chief and deputy. These ten individuals serve as the core cadre and as such form the heart of the JAOC Rear that provides the CINC with immediate crisis response capability, deliberate planning for regional contingencies, and an in-place training cadre for theater exercises. In order to best fit the JAOC Rear into the existing theater CINC staff, the core cadre should be placed under the existing J3 as indicated in Figure 7 (note: the "A" designation after J3 designates the agency as part of the CINC's JAOC). The J3 was chosen based on the overriding operational flavor of the JAOC function.

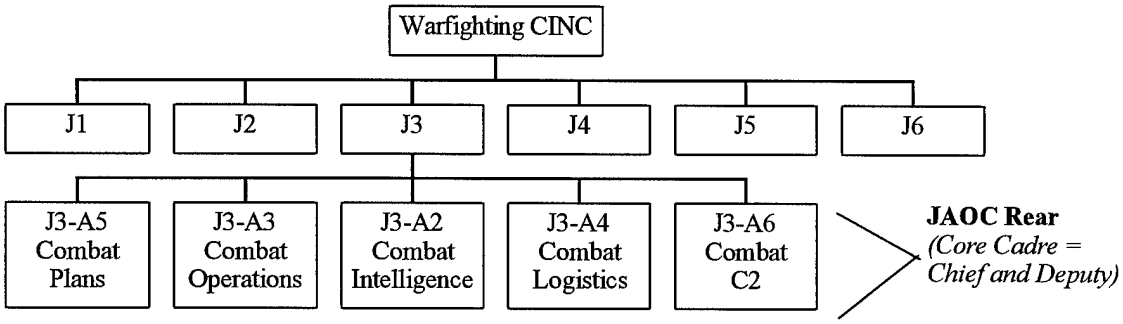

Figure 7. JAOC Rear Organization

Although similar on the surface to the existing "J3A" organizations currently established at the CINC headquarters, the JAOC Rear concept addresses the shortfalls associated with the current system as well as the needs predicted for future contingencies (outlined in the previous chapter). As such, the JAOC Rear must be organized as a joint organization with manning from each of the services that provide airpower assets to the theater CINC. Additionally, to ensure standardization across commands, JAOC cadre members must be schooled in a joint training program focused on the optimization of airpower in support of theater objectives. These two key issues are covered in detail in Chapter 5 of this proposal. Obviously, these ten individuals alone cannot develop and execute any significant air campaign without additional support staffing and expertise. Based on an analysis of each core competency and its role in the air campaign and ATO production process, it was determined that certain specialized functional areas warrant a permanently assigned expert. These additional JAOC Rear members are depicted in Figure 8.

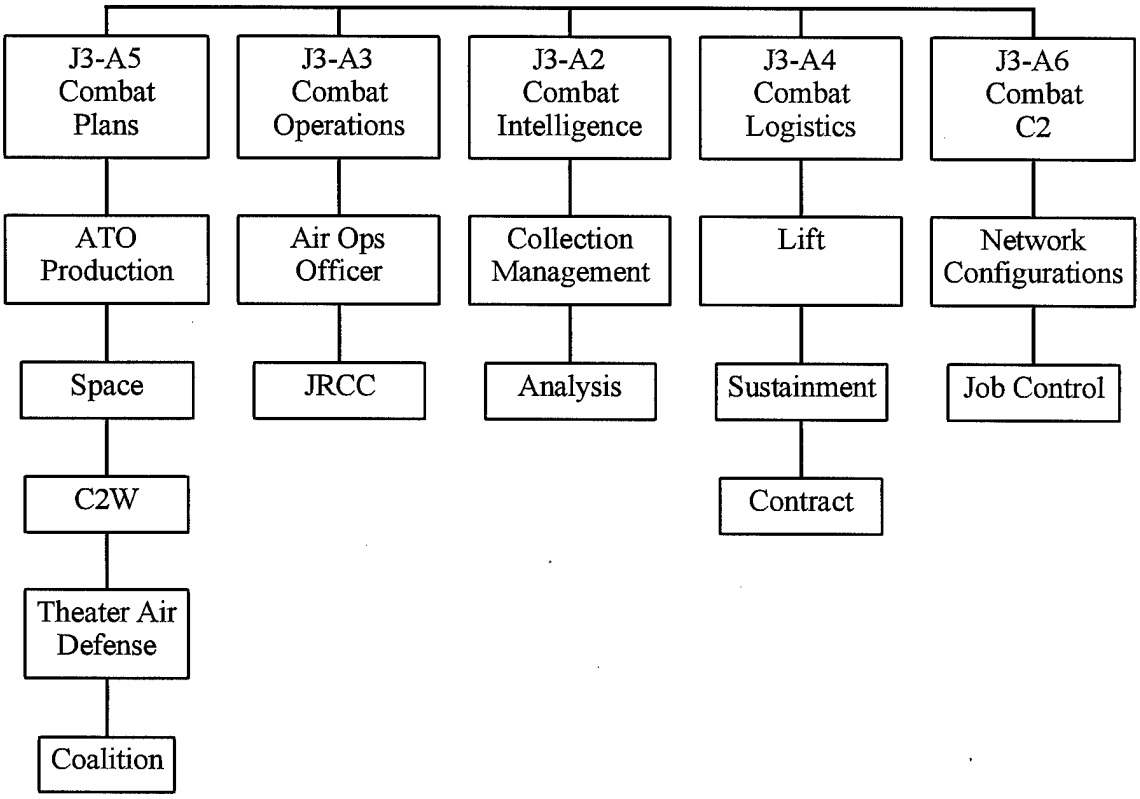

Figure 8. JAOC Cadre Members

Note that many of these positions can be effectively filled by enlisted personnel. The key is to have full-time capability in each of the specialized functional areas in order not only to respond to immediate tasking, but also to work continuing airpower-related issues specific to their areas of expertise. Descriptions of each of the functional areas with associated responsibilities in the JAOC Rear can be found in Appendix B.

This brings the total number of *permanently assigned* cadre to 24 individuals required to form the core of the JAOC Rear at each of the five current theater CINC's headquarters. The remainder of the JAOC Rear supporting staff will grow as needed to meet the operational requirement of a contingency by utilizing "dual-hatted" members of the CINC staff plus additional augmentation as required from within the theater. When required, augmentation from trained Reserve IMA personnel will allow the JAOC to meet

larger scale operational requirements. This concept allows the CINC, JFC, and JFACC to expand the core cadre only as much as is required to meet the level of specific tasking, thus optimizing flexibility and use of in-place assets while limiting deployment costs. By incorporating emerging communications-related technology in the proposed concept, much of the additional JAOC Rear staff can be electronically linked thereby eliminating much of the in-place augmentation requirement. This concept is discussed further in the JAOC 2010 section of this chapter. It cannot be overemphasized that this concept provides the theater CINC with more than just immediate response capability for theater contingencies. Just as important, the JAOC Rear provides the CINC with a permanent *joint* core cadre of trained professionals who are available for developing and executing joint training exercises that will increase combat readiness, effectiveness and interoperability.

JAOC FORWARD

As a result of lessons learned in Desert Storm, each service that contributes airpower forces to the theater and doctrinally provides AOC-capable C2, (namely the USAF, USN, and USMC), has been actively moving to develop or improve an existing capability to provide an operational command post to support a JFACC. While the manning and structure may change with air tasking commitments, these agencies are required to meet service-specific command and control needs and, when directed, participate in joint operations. Of the services, the Air Force demonstrated the most robust capability to field an AOC that can handle the increased volumes of data, information, and communications necessary to support joint force air operations. The Navy and Marine Corps usually reach operational saturation during this heavy tasking due to limitations in physical space,

communications access, and data processing equipment. The seemingly redundant capability among services actually provides the JFC with an excellent rapid and flexible response option when used as the forward presence element of the JAOC team. Because there will always be a requirement for some level of centralized command and control of airpower in the theater of operations, the development of these C2 service structures should be continued albeit with guidelines to ensure required joint standardization. This is not intended to significantly alter the services' focus for their air command and control capability. It remains to first meet individual service functional needs, with the additional manning and flexibility to increase the capability for joint air operations. Resistance at the service levels should be absent or minimal, as it represents a focus of effort and not a restriction of function, equipping, or staffing. The following list encompasses the JAOC 2000/2010 proposed guidelines for further JAOC Forward development:

- Each organization must structure itself as essentially a mirror of the proposed JAOC Rear. The establishment of core competency areas at the JAOC Forward will have numerous advantages for developing joint capability. There are three additional reasons that support this mirror structuring requirement:
    - As each service downsizes and returns to a more home-based force, rarely will individual units be assigned specific areas of responsibility (AORs). Most units today have worldwide commitments and as such must be able to work immediately within the command and control structure of each theater CINC.
    - Mirror structuring assures that transfer of JAOC Forward responsibility from one agency to another in theater, if required, can be quickly achieved via mutual understanding of similar organization and responsibility.
    - In the event connectivity is severed between the JAOC Rear and Forward, mirror structuring enables a transition to autonomous operations by either agency with the least effect on assigned forces and mission accomplishment.
- Each JAOC Forward agency must be capable of sustained independent operations in theater. This requirement not only provides redundancy in command and control as previously mentioned, it provides the theater CINC

> with the option of assigning operational control (OPCON) or tactical control (TACON) to the JAOC Forward as required for smaller contingency operations. For example, as the Haiti invasion changed from a hostile military operation to a peaceful occupation, requirements for air campaign planning were immediately reduced. The JAOC 2000/2010 concept would have allowed CINC US Atlantic Command (USACOM) to stand down the JAOC Rear, transfer OPCON to the JAOC Forward and immediately scale the operation down to meet the specific requirements of the contingency.

The attainment of core competency requirements at the JAOC Forward is phased to allow for migration towards the 2010 proposed concept of operations. Phase 1 would identify the standardized competencies (mirror of JAOC Rear as indicated) and associated milestones. Services will then be required to train to these standards, adjusting staffing as appropriate. It is envisioned that the services will initially 'dual-hat' the position requirements by continued or additional training of operational crew members. Once the level of joint and/or combined airpower activity exceeds organic C2 capabilities, each JAOC Forward agency must be able to rapidly integrate a joint cell, external to its organization, that is manned with individuals from each participating service (to include coalition representatives).

The second phase of core competency fulfillment will require dedicated staffing of the five joint coordinators for the functional areas, as opposed to continued 'dual-hatting.' This will optimize continued training and understanding of the various capabilities each service brings to the airpower table. Additionally, organic joint command and control capability further reduces mobility requirements and increases immediate response options for the theater CINC.

These requirements should be established in joint publications as well as in individual service manuals as an authoritative guide for the development of JAOC

Forward capability. In this way, the JAOC 2000/2010 concept provides a road map for JAOC Forward evolution supported by published doctrine, standardized structure, and established training. The next section highlights the integration of emerging communications and information technology in order to further develop the JAOC 2010 concept.

JAOC 2010

Information exchange and communications connectivity are essential elements required to make the two-tiered JAOC concept achievable. As previously mentioned, US National Security Strategy recognizes that future military operations will likely be fast-paced and information-intensive. As in industry, the military is looking to communications and information processing technologies to provide access to the experts and information needed to solve diverse problems. American corporations are embracing the capabilities of the Internet, often called the information superhighway, to provide collaborative research capabilities.[66] This worldwide network is used increasingly to share many forms of information including simple electronic mail, data bases, voice products, images, and video products. For millions of individuals already connected to global networks, traditional limitations of time and distance no longer apply.[67] Virtual organizations and even corporations of individual experts gather together electronically for specific projects and opportunities. Some predict that lumbering bureaucracies prevalent in this century will be replaced by fluid, interdependent groups of problem solvers with no need for conventional work environments.[68] These 'cyberspace' or virtual corporations will be fast-acting and transient, made up of experts who coalesce into work units for dynamic market opportunities.[69] Whether conducting collaborative research or working in a virtual

corporation, network technology is the key to instantaneous growth capability where virtually any needed expertise can be added to the group electronically.

Network technology can provide similar, and appropriately secure, collaborative problem solving capability to a JAOC staff when responding to the dynamic and diverse environment associated with conflict and/or contingency planning. By integrating emerging communications technology into the proposed concept, the 'virtual' JAOC staff of 2010 can expand and contract instantaneously as required to respond in proportion to the operational requirements of the contingency. Although currently an issue, future communications technology must incorporate a capability for the required secure information flow in the time frame required by the JAOC. The concept of maintaining a core cadre of permanently assigned JAOC-Rear members collocated with the CINC while supporting a JAOC-Forward element in theater provides the tailored level of support needed by the JFACC regardless of the size of the immediate staff, or location. The permanent cadre provides the expertise, experience, connectivity, and network of contacts needed to grow the JAOC 2010 staff to function electronically in real time, in order to respond to new situations or problems. Not only does integrating this network technology result in more efficient and responsive capabilities, it significantly cuts costs in manpower and deployment requirements.

Recommended Plan Of Action

The plan of action outlined below is intended to list those initial tasks required in order to restructure the existing airpower command and control system into the JAOC 2000/2010 concept:

- Key joint billets must be identified and established at each of the five theater CINC headquarters in order to form the JAOC Rear core cadre. These positions should be staffed according to the guidance given for each billet in Appendix B. In order to ensure core competency in each critical position identified, these billets must not be dual-hatted with additional responsibilities on the CINC staff. Further discussion of joint staffing is given in Chapter 5.
- Each service must identify joint billets and exchange individuals to those agencies taskable as a JAOC Forward. This provides a phase 2 requirement to organize the joint portion of each JAOC Forward agency as an integral part of its structure. As mentioned previously, this significantly increases response capability for joint tasking and reduces reliance on limited mobility assets.
- Joint training for JAOC personnel must be established and assigned to a service as executive agency. Assignment as executive agency denotes responsibility for curriculum development and on/off-post instruction. Once established as a joint school, attendance must be mandatory prior to individuals filling key joint billets on the JAOC staff. Detailed analysis of existing service training doctrine is given in Chapter 5.
- Current development of JICs at each theater CINC headquarters must be reoriented to provide the JAOC Rear and JAOC Forward with time-critical information necessary for air campaign planning, ATO development, and current operations.
- Current and emerging communications technology must be analyzed to determine supportability of timely and redundant information flow to the JAOCs Rear and Forward from supporting agencies as well as from the JAOC Rear to the JAOC Forward and to deployed forces in theater.
- Emerging technology associated with video telecommunications and virtual reality must be analyzed to determine potential integration that will reduce in-place manpower and equipment requirements. This technology offers the most potential for increased flexibility and responsiveness by enhancing the assembly of the JAOC Rear staff via electronic means vice relocation and augmentation. This maximization of emerging technology offers the most significant distinction between the JAOC 2000 and JAOC 2010. Joint doctrine and training must evolve in order to integrate and thus optimize the use of this emerging technology.
- Currently accepted joint computer-based command and control systems (e.g., CTAPS) must be analyzed to ensure the current system and future upgrades support the communications-dependent aspects of the JAOC 2000/2010 concept. Additionally, in accordance with the C4IFTW concept, all future information and communications systems must be compatible and interoperable between all agencies tasked to support the operation.[70] A more detailed discussion of CTAPS is given in Chapter 5.

- Each agency taskable as a JAOC Forward must be identified as such in joint publications. Once identified, each service *must* adhere to established guidelines for further development. This structure and the associated responsibilities of core competency and functional area personnel must be documented and published as joint doctrine thus assuring continuity and standardization across service lines.
- Both the JAOC Rear and the JAOC Forward must establish billets for the integration of coalition members in the team. Issues associated with coalition integration are covered in Chapter 5.

The plan of action serves as a starting point for development of the JAOC 2000/2010 concept. The following chapter provides a notional scenario that showcases many of the concepts proposed.

Chapter 4: Concept Application

The previous chapter presented a proposal designed to address the need for an expandable, cost-effective approach to obtaining a flexible JAOC capability. It capitalizes on existing service doctrine and structures, while taking advantage of emerging technologies to improve the conduct of joint and coalition air warfare.

The following notional scenario (see Figure 9) showcases the proposed concept in action during a hypothetical theater contingency. The scenario is applicable to any stage of migration of the proposed JAOC implementation from the year 2000 through full implementation in 2010. This scenario is merely an illustration, reflects current unified command structures, and does not represent planned or anticipated military actions.

- In response to a degrading political situation and dramatic increases in military aggression by Country A against Country B, the Commander-in-Chief, US Southern Command (CINC SOUTH) receives direction from the NCA to begin planning joint, combined military operations against Country A. National strategic and military objectives are provided by CINC SOUTH and his staff to guide the planning process.[71]
- In accordance with joint doctrine, CINC SOUTH appoints a JFC and provides theater objectives.[72]
- The JFC appoints a JFACC who then briefs the air campaign objectives. The JFC, in consultation with the JFACC, the Joint Force Maritime Component Commander (JFMCC), and the Joint Force Land Component Commander (JFLCC) apportions the airpower effort, delegating OPCON of the majority of air assets to the JFACC.[73]
- OPCON of the JAOC Rear is transferred from the J-3 to the JFACC who assembles the JAOC Rear core cadre, requests Country B to send a planning staff to populate the coalition cell, and initiates immediate air operations planning. The JFACC decides to remain at the JAOC Rear to orchestrate campaign planning activities. Regardless of the location of the JFC, the JFACC can be physically collocated with, or as in this scenario, maintain electronic (e.g., video) coordination with the JFC, JFLCC, and JFMCC. The JAOC Rear is augmented physically by additional members of the US Southern Command (USSOUTHCOM) staff and by geographically separated national experts via wide area networks in response to specific planning needs.

- The JFC and JFACC determine that, of available JAOC Forward taskable units, the 366th Air Intervention Composite Wing will deploy to the theater of operations to assume JAOC Forward responsibilities in accordance with its deployed intervention concept plan (CONPLAN). The JFC designates the Commander, 366th Composite Wing (366 CW/CC) as Deputy JFACC and delegates TACON of airpower assets in theater. Ecuadorian officers are integrated into the JAOC Forward to facilitate TACON of their air assets.

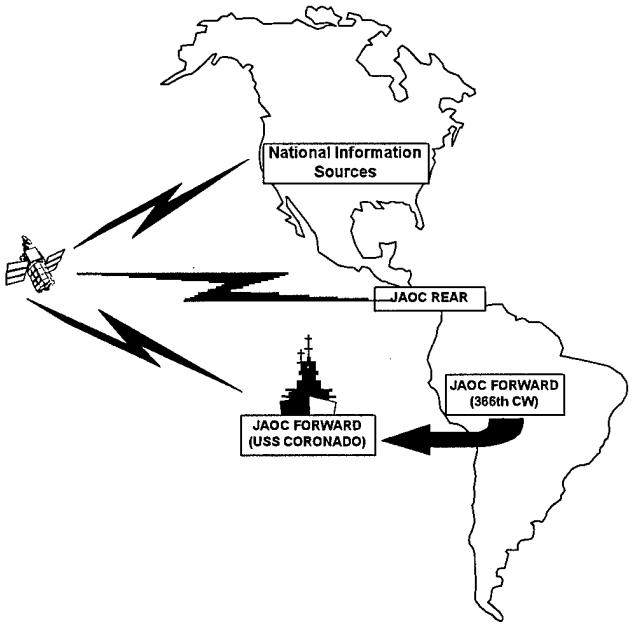

Figure 9. Notional USSOUTHCOM Scenario

- The JAOC Rear develops the air campaign, master attack plan, and ATO shell. The ATO is transmitted to JAOC Forward for dissemination to forces in theater. The JAOC Forward provides on-scene feedback to the JAOC Rear as input to future ATOs. If communications between the JAOC Rear and Forward are lost or degraded, the JAOC Forward has the capability to continue to fulfill critical functions autonomously. The JAOC Rear continues to electronically tap needed expertise to respond to changing requirements or specific problems.
- Based on an increase in airpower requirements supporting the campaign, the USS *Coronado* is deployed to the theater of operations. The JFACC determines that air campaign planning is well under way and that his presence is needed in theater. Therefore, he deploys to the USS *Coronado* and redesignates it as JAOC Forward. Transfer of JAOC Forward responsibility is seamless due to mirrored organizational structure, shared data, and integrated command and control architecture. Personnel from the 366 CW JAOC

augment USS *Coronado* as required. The JFACC continues to direct JAOC Rear activities via electronic means (e.g., video teleconferencing). This implementation provides the JFACC with the flexibility to be physically located where he is most needed, while maintaining coordination and control of all JFACC components, either in person or electronically.

- Hostilities commence upon direction from the NCA. The JFACC continues to prosecute the air war from USS *Coronado*, or has the option to relocate JAOC Forward ashore as desired. Regardless of the developing nature of the operation (non-combatant evacuation operation, humanitarian relief operation, major conflict, etc.), this organizational structure serves to support any air power coordination requirement.

This notional scenario provides one example of the JAOC 2000/2010 concept in action. It is significant to note that when not actively involved in a contingency, the core cadre at JAOC Rear is available for continued training, coordination of joint exercises, and deliberate planning. This concept provides the warfighting CINC with a flexible option for the centralized control and decentralized execution of airpower in support of a wide variety of regional contingencies.

While this scenario illustrates the proposed JAOC 2000/2010 concept in action, there are key issues that must be addressed before the proposal is accepted and implemented. The next chapter will address these issues.

Chapter 5: Key Issues

The purpose of this chapter is to discuss many of the key issues associated with not only the JAOC 2000/2010 concept, but also the employment of airpower by the services in a joint arena. Where possible, this chapter offers thought on how a JAOC structure may penetrate service parochialism and doctrinal issues. The focus, however, is not to provide in-depth solutions to these issues, but to highlight them as such and suggest how the JAOC 2000/2010 concept addresses each.

As a result of Desert Storm, the JFACC concept has been generally accepted by all services and formalized in joint doctrine. The air operations C2 architecture used during the Gulf War was relatively simple compared to the convoluted command chains in effect during the Vietnam conflict. More importantly, lessons learned on unity of air effort during Korea and Vietnam were applied and resulted in a JFACC who was responsible for planning, coordination, allocation, and tasking based on the JFC's apportionment decision. The ATO approved by the JFACC, supported his Master Attack Plan, was directive in nature and guided the actions of the relevant service component commanders. The JFACC's position was a manifestation of TACON, while exercising centralized control and decentralized execution by services and unit commanders. For the first time in US military history, we achieved unity of effort for an air operation that provided a single joint force air commander, a single air tasker, and a focal point for air planning and employment decisions.[74]

The question must be asked: Did Desert Storm fix all the problems associated with joint air operations? Most would contend that the answer is an unequivocal, 'NO!'

Some will argue that "the US fought 'big' but not necessarily smart."[75] Others contend, "that US forces bought their way out of C2 problems by the mass of its tactical air forces."[76] Desert Storm was a resounding success for both the application of air and ground forces, but it also reaffirmed many issues the services have either side-stepped, ignored, or simply not resolved because of either service specific views or doctrinal guidance.

While developing a JAOC concept, one must keep in mind the service issues and offer some thought on how this proposal will help penetrate parochialism and doctrine. "A truly joint [AOC] staff provides the necessary balance against any parochialism on the part of the commander, senior members of the staff, and individual supporting commanders. But even more important, it ensures that [the] JFACC is presented with a broad range of views and expertise as he arrives at and executes his decisions."[77]

Support Issues

Personnel. In the personnel arena, several elements will have a bearing on the implementation of this JAOC concept. The recent drawdowns in the DOD force structure will add pressures to limit what could be perceived as new requirements. The personnel needed for the JAOC cadre must meet full criteria for joint duty. In fact, this concept of a JAOC absolutely depends on manning from all the services. The Goldwater-Nichols Department of Defense Reorganization Act of 1986 directed the Secretary of Defense to ". . . establish policies, procedures, and practices for the effective management of officers of the Army, Navy, Air Force, and Marine Corps on the active-duty list who are particularly trained in, and oriented toward joint matters."[78] Use of joint officers ensures each service perspective is considered during joint operations. As Senator Nunn stated in

a speech before the United States Senate, "We must reshape, reconfigure and modernize our overall forces—not just make them smaller. We must find the best way to provide a fighting force in the future that is not bound by the constraints of the roles and missions outlined in 1948."[79] The implementation of a truly joint capability hinges on the commitment of joint personnel.

Training. A multiservice organization exists to identify and centralize core requirements for interservice training. Each service has an Interservice Training Review Organization (ITRO) organic to specific training commands. This falls under the control of the Air Education and Training Command (AETC) for the Air Force, the Training and Doctrine Command (TRADOC) for the Army, Chief of Naval Education and Training (CNET) for the Navy, and the Marine Corps Combat Development Command (MCCDC) for the Marine Corps. In spite of the existence of ITRO, each service is conducting command and control training tailored to its specific requirements. Specifically, current training for personnel assigned air operations center duties varies by service.

The Air Force takes the most proactive approach for air operations center training of each of the services. The Air Ground Operations School (AGOS) at Hurlburt Field, Florida is tasked with the development and presentation of Air Force courses of instruction in the various facets of joint air operations. The USAF AGOS is currently manned with instructors from all services; courses address a variety of topics including: Joint Air Operations Staff Course, CTAPS Operator/Technician Course among others. Armed Forces Staff College offers the Joint C2W Staff Officers' Course. Each of these courses is offered several times a year and is open to members of each service.[80] Air

University provides a Joint Doctrine Air Campaign Course for air campaign planners that includes sister services.

The Army has no internal course to train its air operations center personnel, opting to utilize the Air Force's AGOS to train Army personnel in air center operations.[81]

The Navy does not offer any formal courses of instruction designed to train personnel in air operations center procedures.[82] The majority of training provided to aircraft carrier and tactical control squadron personnel is on-the-job training (aside from initial air traffic controller training courses) which occurs during the many at-sea training periods and exercises. Navy and Marine Corps aviators attending the Strike Leaders Attack Training Syllabus (SLATS) at the Naval Strike Warfare Center, Fallon, Nevada are briefly exposed to the elements of CTAPS, with little practical exposure during the three-week course and no formal training in air operations center interaction.

The Marine Corps utilizes Navy training courses for air-traffic controllers, with tactical air control training conducted at Marine Corps Communications-Electronics School in Twentynine Palms, California. The Marine Corps Weapons and Tactics Instructor (WTI) Course is a select 7 week training course that provides general command and control training, and tactical application. Other than these courses, Marines assigned to the TACC receive no other formal joint training. Instead, the Marine Corps concentrates on training its personnel through an extensive on-the-job training regimen.

The scope of the JAOC 2000/2010 project assumes that core competencies exist, and will continue to be developed under the auspices of ITRO. Those areas to be specifically addressed are in the areas of campaign planning, communications systems, message processing, ATO preparation, transmission, and implementation, service-unique

strike training courses (such as SLATS and WTI) and Tomahawk weapons system employment courses. These areas and courses need to be addressed in order to ensure both the JAOC Forward and Rear staffs fully understand the operations and employment of the joint assets to be made available in time of conflict. Once the JAOC concept is approved and is in place, the JAOC Rear staff will maintain its level of expertise by routinely coordinating and conducting exercises within the AOR to exercise the staff and C4I linkages to ensure sustained readiness and ability to respond to actual crisis. Without a robust continuum of training through exercises and formal joint courses, both the staff and C4I architectures may not be capable to respond readily to the challenge of the gamut of future taskings. In light of the fragmentation of current air operations training, it may be the correct time for assignment of one school responsible for teaching JAOC certification in a truly joint environment.

Facilities. As stated previously, each service component (except the Army) has unique, specialized organizations that will function as JAOC Forward when so designated. These organizations have their own unique infrastructure and equipment that have proven effective for the service components' use as an AOC. It is necessary, however, to address the facility requirements of the CINC-level JAOC Rear component. Each JAOC Rear will have its own physical space configurations and facilities based upon the permanent assets available to the CINC. Initially as each JAOC Rear is implemented at the theater CINC headquarters, proximity to the CINC's JIC will alleviate some of the communications burden. As the JAOC Rear matures and procurement of new communications systems occur, the amount of collocated physical facilities is expected to decrease. In support of planning and operations, each JAOC Rear will require the use of at least one large, secure

space, certified for special compartmented information (SCI). To facilitate rapid sharing and exchange of information, a secure, top secret-level local area network (LAN) should be installed, conforming to established security guidelines.

Service and Doctrinal Issues

In the ongoing roles and missions debate, there are several issues related to the command and control of airpower that are being hotly debated. Among these are: the role of the JFACC as commander or coordinator; allocation of airpower assets to the JFACC to include Army Tactical Missile Systems (ATACMS) and Navy Tomahawk Land Attack Missiles (TLAM); JFACC control of the deep battle space; theater air and missile defense; and target selection process. A key strength in the JAOC 2000/2010 proposal is that decisions made on these contentious issues will have little if any effect on the concept or its ability to optimally support the JFC and the JFACC.

Coalition Integration

General. As the US looks to future contingencies, it has become clear that "coalition efforts are increasingly viewed worldwide as a desirable method of dealing with global crises or issues. In the long term, there will be less tolerance worldwide for unilateral US action, and a large US presence may become less significant than security arrangements that are more cooperative."[83]

In order to integrate coalition members into the JAOC 2000/2010 concept, the JAOC Rear should be manned with a permanently assigned US officer responsible for coalition integration (see Figure 8). This individual is responsible for all aspects of coalition integration to include system interoperability, asset utilization, and host-nation

support issues. In placing the JAOC Rear at each theater CINC headquarters, the coalition expert can narrow the focus sufficiently to plan for potential coalition members in the theater of operations.

Once a coalition is formed, key members of the participating nations must send representatives to participate in the air campaign planning and ATO development at the JAOC Rear. These individuals will serve under the JFACC in an ad hoc liaison cell formed to meet the specific requirements of the operation. Additional members of this cell might include various service representatives when required (special operations, logistics, etc.). Organizationally, the location of the coalition cell is within the expanded air component organization depicted in Figure 10. At the JAOC Forward, capability must exist to integrate a minimally staffed coalition cell in order to assure required redundancy in the theater of operations. Additionally, the coalition cell will ensure that required expertise associated with integrating coalition assets is available to the deputy JFACC at initial deployment or standup of the organization. Because the JAOC Forward is structured as a mirror of the JAOC Rear, placement of the coalition cell is the same.

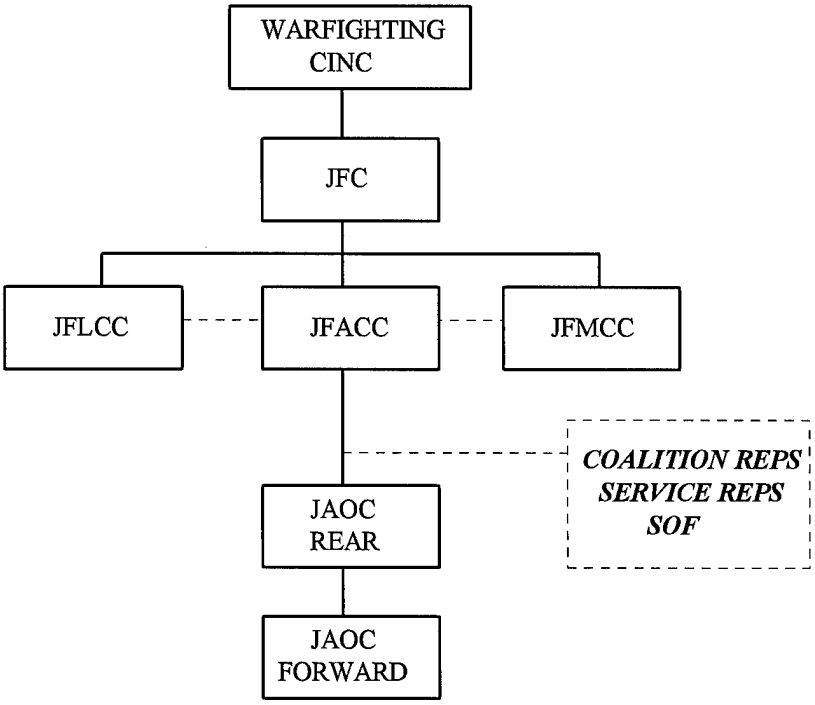

Figure 10. Expanded Air Component Organization

Emphasis must be placed on ensuring billets are available for coalition team members. This becomes especially critical when the JAOC is embarked aboard amphibious shipping where living facilities and physical workspace is limited.

A key issue in all coalition activities is intelligence sharing which, in any framework, will be complicated by "national sensitivities and military caution. Without intelligence sharing as part of a coalition, it may be difficult to convince coalition allies of our trust and friendship, and to influence coalition partners. Bilateral agreements related to intelligence sharing can establish a necessary framework and begin to answer questions related to coalition intelligence functions."[84]

There is little question that coalition warfare will be a critical part of any future regional contingency. It follows then that due to the "nature of ad hoc coalition

operations, the US military needs to plan to face an unknown enemy, with unknown allies, in an unknown conflict, and on short notice."[85]

Emerging Technologies

Technology's integration into the military is evident, as was seen in Desert Storm. Chairman of the Joint Chiefs of Staff, General Shalikashvili states, "What we set in motion is an entirely new era in warfare . . . what is changing is the very nature of modern battle."[86] Emerging technologies will greatly impact the C4I structure for all types of military operations. It can easily be the cause of our success or failure in future regional conflicts. Information intensive capabilities are becoming decisive elements of military power.

Interoperability will be the key to the success of all future operations. Defined as "the capability of people, organizations and equipment to operate effectively and efficiently together for successful mission accomplishment,"[87] the search for interoperability may never be fully attained. We have seen problems associated with this issue for quite some time. Due to dwindling budgets, service rivalries and commercial equipment, interoperability has remained an elusive target. To compound the challenge, combined operations involving land, sea and air forces from different services and sometimes with different countries have been an issue that continues to be dealt with by DOD. Lt Gen Albert Edmonds, Director of Defense Information Systems Agency (DISA), stated that interoperability is "not a free ride; we must use resources smartly. Interoperability is not a destination—it's a continuing journey. The adaptive joint force structures require joint networks and systems that are fully interoperable. No matter what the mission: peace keeping, humanitarian relief, regional crisis, etc., joint forces can't

function without interoperability."[88] Without interoperability, joint air component commanders could lose critical information needed to make timely, accurate decisions. Therefore, it is imperative that interoperability considerations be foremost in the implementation of this JAOC and its supporting systems.

C4I for the Warrior (C4IFTW). All participants need to share a single, common view of the future military C4I establishment. This common vision focuses on a global C4I infrastructure that satisfies the total information requirements of the warfighters.[89] The vision of C4IFTW is to create and support a central joint C2 system connected to a network of standard joint systems that provide a common and total picture of the battlespace. Joint force commanders, including air campaign planners will be able to "plug in" and obtain or disseminate information (e.g., ATO, Intelligence, etc.) required to carry out the mission.

The C4IFTW concept was derived from the increasingly complex joint and combined interoperability requirements that became evident during the past few years. There are basically two major problems in the way information and services are exchanged on the battlefield today. "Existing C4I resources are redundant and provide insufficient interoperability. Many C4I systems were designed and developed to meet individual CINC and Service organizational structures and mission needs. These systems effectively support 'stovepipe,' hierarchical, vertical military chain of command structures, but are not designed to support fully integrated joint or combined force operations."[90] Consequently, at the grass roots level of the JAOC, C4IFTW must evolve into a coherent, seamless communications support infrastructure. By doing so, the warfighter will be able to determine and shape the battlespace and do it in a secure manner. The information

medium of 'infosphere' provides the joint forces access to a worldwide communications backbone and information support system. The Warrior will literally be able to "plug in" and "pull" relevant information from databases and fusion centers anywhere in the world at anytime.[91]

Contingency TACS Automated Planning System (CTAPS). CTAPS has been accepted as the joint standard to provide a common system for transmission of the ATO. CTAPS provides a common view of the air, land, and space for commanders at each level. CTAPS eventual interoperability features are of particular interest, including its ability to integrate easily with other force-level service C3I systems, such as the Maneuver Control System (Army), the Naval Tactical Command System Afloat (NTCS-A) and the Advanced Tactical Air Command Center (USMC ATACC).[92] This concept of a joint system must be carried forward as C4IFTW migrates to support the JAOC Forward and Rear.

Emerging Systems. The services are incorporating newer technologies into their modernization programs. Like C4IFTW, US Army's Force XXI modernization program revolves around information. General Sullivan stated to Congress March 1993: "During the Civil War, Grant received information by telegraph and messenger . . . . The 21st century commander will have real time information from all dimensions of the battlefield and must be capable of decisive action within hours if not minutes. As we insert digital technology into our battlefield systems, we are building an Army of unprecedented capability."[93] The goal is to equip the first brigade-size element with a digital capability by the turn of the century. This will have a profound effect on the joint air operations center for it will allow the Army to tap into the already technical network of systems to see the battlefield from all aspects.

As technology moves toward increasing miniaturization and infinite bandwidth, it will support an increasingly virtual JAOC organization. Bill Gates of Microsoft Corporation stated "We'll have infinite bandwidth in a decade's time."[94] Even with mass production volumes, microprocessor designs and silicon technology, it does no good if the information cannot be transmitted across communications lines at an accurate, timely rate. Bandwidth is communications power—the capacity of an information channel to transmit bits without error in the presence of noise.[95] Bandwidth management is available today through manual and automated means but infinite bandwidth is not far away.

As the volume of data available increases exponentially, the capability to transmit it will become more and more critical. New methods must be fielded to respond to this. Every day, new technologies in transmission media are designed to shorten the travel time and increase the signal power along a line. One new technology called optical phase conjugation will significantly increase the distance between two signal repeaters in a communications transmission line. The criticality will become more important as systems transition to virtual reality.

Howard Rheingold noted in his book, *Virtual Reality*: "If necessity is the mother of invention . . . the Defense Department is the father of technology; from the Army's first digital electronic computer in the 1940's to the Air Force research on head-mounted displays in the 1980's, the US military has always been the prime contractor for the most significant innovations in computer technology." Future improvements in technology will allow us to create a virtual organization. One that does not require the physical collocation of assets and personnel.

The information revolution reflects the advance of high bandwidth and high speed communications technologies. The on-demand nature of remote access coupled with increasing bandwidth requirements has spurred the growth for high-speed packet switching options.

Summary

A JAOC emphasizes unity of command and effort. Such command and coordination structure will become even more critical as the military down-sizes. "A future war that catches the United States with fewer air resources at hand may lead to a more direct confrontation with the issue of unity of command. The JFACC will be forced to make hard choices between missions for scarce assets."[96] Operational decisions will be easier with a JAOC that is standardized, trained, and capable of synchronizing the capabilities and strengths that each service component brings to the battlefield. We must also realize and accept the force enhancement capability coalitions bring to any contingency. JAOC 2000/2010 in itself will provide the direction necessary to solve issues between services, doctrine, and training.

It is also imperative that we consider emerging technologies in the new concept of joint operations. It is with information that we will be able to dominate the battlespace. Secretary of Defense William Perry stated, "We live in an age that is driven by information. It's an age which Alvin Toffler has called the Third Wave. The ability to acquire and communicate huge volumes of information in real time, the computing power to analyze this information quickly, and the control systems to pass this analysis to multiple users simultaneously—these are the technological breakthroughs that are changing the face of war and how we prepare for war." The more we understand what

our requirements are, the better we will be able to insert technology into our systems. Joint air operations planners and operators must be familiar with information technology and how the emergence of new technologies can increase our decision cycle. It is by no accident that America leads the way in information dominance—it is now only a question of whether we can remain in the forefront.

Chapter 6: Conclusion

Throughout the course of researching this proposal, it became clear that conflicts in the future will undoubtedly be fast paced and information intensive. Military leaders in the future will face a variety of theater contingencies across the conflict spectrum. The task for this project was to develop a proposal that provides the Joint Force Commander with a capability to respond immediately with the joint application of airpower. This response must be capable of handling a variety of possible operations with rapid crisis response in addition to deliberate planning for regional contingencies. Additionally, the proposal should maximize the use of existing or emerging service C2 structures capable of controlling joint airpower. The concept should allow the incorporation of emerging technology and look toward future joint airpower issues.

After an in-depth analysis of the existing doctrines and structures present in the services, and a look at the current trend in joint airpower control, a list of strengths, shortfalls, and needs associated with these systems were developed. Using this list as a foundation for concept evolution, the research team developed the JAOC 2000/2010 proposal that serves as a realistic and workable solution to the complex issues associated with airpower employment. A notional scenario was provided in order to showcase the concept in action. Key issues associated with, or related to, the JAOC 2000/2010 proposal were discussed and included as a separate chapter. The research team noted that in the ongoing roles and missions discussion, there are several contentious issues that are being hotly debated. A significant strength of the JAOC 2000/2010 concept is that the outcome of these debates will have no effect on the capability to implement the proposal.

Without question, the armed forces must look for innovative means to best serve the joint force commander with a capability for optimizing airpower in support of his objectives. The JAOC 2000/2010 concept is the first step in realizing a truly joint capability to respond immediately, with both fixed and rapidly deployable assets. As Admiral Paul D. Miller (former CINC USACOM) stated recently, "the armed forces must not concentrate on doing *more with less*, rather we must focus on doing *better with what we have*."[97] The JAOC 2000/2010 proposes just that.

Notes

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[2] Department of the Air Force, Deputy Chief of Staff, Plans and Operations, *JFACC Primer*, second edition (Washington DC: GPO, February 1994), 1.

[3] Stambaugh, 169.

[4] Paul Brady, *C3I Report*, (Maxwell AFB AL: Air War College, November 1992).

[5] Peter Grier, "What's Left of the Air Force Program?" *Air Force Magazine*, December 1994, 27.

[6] National Security Council, "A National Security Strategy of Engagement and Enlargement," (Washington DC: GPO, July 1994).

[7] Peter P. Perla et. al., *The Navy and the JFACC: Making Them Work Together*, Center for Naval Analyses Report 202 (Alexandria VA: Center for Naval Analyses, April 1993)

[8] Frank M. Snyder, *Command and Control: The Literature and Commentaries*, (Washington DC: National Defense University, 1993), 12.

[9] Ibid.

[10] Ibid., 12-13.

[11] Daniel Gonzales, *Evolution of the Air Campaign Planning Process, and the Contingency Theater Automated Planning System (CTAPS) (Draft)*, DRR-810-2-AF, (Santa Monica CA: RAND, November 1994.

[12] David H. Wessner, Air Tasking Order Interoperability Working Group (AIWG) Trip Report, Unpublished, November 1994.

[13] David Goldfein and David H. Wessner, "*Joint Air Operations Center, ACSC Research Project 95-006F*," briefing for General Ashy, command in chief of USSPACECOM, and Lieutenant General Kelley, commandant of Air University, Air Command and Staff College, Maxwell AFB AL, 21 February 1995.

[14] Martin C. Libicki, *The Mesh and the Net: Speculations on Armed Conflict in a Time of Free Silicon,* McNair Paper 28, (Washington DC: Institute for National Strategic Studies, National Defense University, 1993), 7.

[15] George Gilder, "The Bandwidth Tidal Wave," *Forbes ASAP*, 154:13, 5 December 1994, 162.

[16] Department of the Navy, *Antiair Warfare,* FMFM 5-50 (Quantico VA: Marine Corps Combat Development Command, 22 June 1994), 2-14.

[17] Winnefeld, Niblack, and Johnson, *League of Airmen,* 138.

[18] James A. Winnefeld and Dana J. Johnson, "Joint Air Operations: Pursuit of Unity in Command and Control, 1942-1991," RAND Research Study, (Annapolis MD: Naval Institute Press, 1993), 115-116.

[19] Ibid., 114.

[20] Department of the Navy, *Control of Aircraft and Missiles,* FMFM 5-60 (Quantico VA: Marine Corps Combat Development Command, 1994).

[21] The 3rd Marine Aircraft Wing (MAW) functioned as the JFACC ashore during the initial stages of Operation Restore Hope.

[22] Department of the Army, *Army Airspace Command and Control In a Combat Zone,* FM 100-103 (Washington DC: Headquarters United States Army, October 1987), iii. The FM integrates the concepts of airspace command and control into the pretext of the Airland Battle doctrine. This is a combined arms concept the Army is currently revising.

[23] Ibid., 4-3, 4-4.

[24] Ibid., 1-15.

[25] Headquarters Air Combat Command, *Air Operation Center* , ACCI 13 Vol. 3, (Langley AFB VA: Headquarters ACC, 15 November 1994), 18.

[26] Ibid.

[27] Peter P. Perla et. al., *The Navy and the JFACC,* 3.

[28] Maj Gen Jerrold P. Allen, Director, Plans and Policy, USEUCOM, Personal correspondence, 18 January 1995. 32d AOG points out the TrailBlazer 94, 5-24 July 1994, was the first exercise with the 250 man AOC. It validated the USEUCOM JFACC CONOPS and was also the first test of CTAPS in USAFE. Further, Atlantic Resolve 94, 19 Oct-8 Nov 1994, utilized full JTF and component staffs. It was the first integration of all AOG functions. Both exercises provided lessons learned that were helpful in refining the concept application.

[29]Perla et. al., *The Navy and the JFACC,* 3-4.

[30] Maureen A. Wigge, "The Joint Force Air Component Commander: Theory and Practice", Center for Naval Analysis CRM 92-195 (Alexandria VA, Center For Naval Analyses, March 1993), 1-4.

[31] R. C. Macke, Commander in Chief, USPACOM. Personal Correspondence. 24 February 1995; Gen Carl E. Mundy, Commandant of the Marine Corps, personal correspondence, 11 January 1995; Gen Joseph J. Sheehan, Commander in Chief, United States Atlantic Command, personal correspondence, not dated; Gen Jerrold P. Allen, Director Plans and Policy, United States European Command, 18 January 1995. CENTAF's "Air Employment Planning Process", 11 January 1994; Twelfth Air Force's "Standard Operating Procedures", 18 February 1994; and USEUCOM's 32d Air

Operations Group, brief summary dated 13 January 1995, are significant refinements to joint air operations C4I. Each application has been exercised, and areas for improvement noted or observed. The organizational models depicted by CNA may shed light on areas that must be addressed by re-thinking organizational structure, establishing joint, standardized guidelines, and establishing a core capability among the services to host the JFACC function.

[32] Wigge. *The Joint Force Air Component Commander*, 6. CNA points out that this model incorporates additional duties for the JFACC and his staff, who must plan and execute joint operations in addition to the regular duties they are responsible for on the JFC staff. The result is that type and duration of operations can be limited by this organizational model.

[33] Ibid., 7. CNA indicates that this model identifies the complexity and unique nature of the JFACC's mission. It implies that because of this, a dedicated staff (joint and independent of the services) is necessary.

[34] Ibid. CNA points out that not only is competition between roles possible in a 'dual-hatted' JFACC, but the JFACC staff and organization is generally planning and executing air operations using service unique procedures. Any augmentees from other services added to provide a joint perspective would seem to face many practices unfamilliar to them.

[35] Ibid.

[36] Ibid., 8. CNA here draws an analogy between the JFACC and special operations components. This is explained by the mix of service assets under a single commander.

[37] Colonel J.L. Whitlow, "JFACC Who's in Charge?," *Joint Force Quarterly*, 5:69 (Summer 1994).

[38] Allen.

[39] Ibid.

[40] Ibid. 32d Air Operations Group (32 AOG) Command Briefing was attached.

[41] Joint Chiefs of Staff, *C4I for the Warrior: Global Command and Control System From Concept to Reality* (Washington DC: GPO, June 1994), 7.

[42] Whitlow, "JFACC", 64-70.

[43] Winnefeld, Niblack, and Johnson, *League of Airmen*, 104.

[44] Ibid., 107.

[45] Whitlow, "JFACC", 69.

[46] David Tillotson III, Lt Col, USAF, "Restructuring the Air Operations Center—A Defense of Orthodoxy", Research Report No. AU-ARI-92-1 (Maxwell AFB AL: Air University Press, April 1993), 35.

[47] Ibid.

[48] Maj Brunner, CADRE Faculty member, "Master Attack Plan," briefing for Air Command and Staff College, Maxwell AFB AL, 21 February 1995.

[49] Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington DC: GPO, 1993), 131.

[50] Ibid., 130. GWAPS study personnel conducted field interviews with intelligence personnel after the Gulf War. Exerpt is the unclassified highlights of their interview with Capt John Glock and Maj John Heidrick, 9th TIS/INT, 7 January 1992.

[51] Ibid.

[52] Lt Col J. Taylor Sink, "Rethinking the Air Operations Center: Air Force Command and Control in Conventional War," (Maxwell AFB AL: Air University, 1994), 31.

[53] Maj Paul Stenger, ATACC Program Manager, Office of Program Management for Air Defense and Command Information Systems, Marine Corps Systems Command, Quantico VA, telephone interviews, 8 and 30 March, 7 April 1995.

[54] Whitlow, "JFACC," 69.

[55] Alan D. Campen, ed., *The First Information War* (Fairfax VA: AFCEA International Press, 1992), 2, 27, 139.

[56] Winnefield, Niblack, and Johnson, *League of Airmen*, 149.

[57] Ibid., 111.

[58] Capt Vicki J. Rast and Maj Bruce R. Sturk, "Coalitions: The Challenge of Effective Command and Control in Support of the Air Campaign," *Operational Structures, Volume 5A*, ed. Yuna Braswell and Gwen Story (Maxwell AFB AL: Air Command and Staff College, November 1994), 220.

[59] Ibid.

[60] Winnefeld, Niblack, and Johnson, *League of Airmen*, 100.

[61] Whitlow, "JFACC," 68.

[62] Winnefeld, Niblack, and Johnson, *League of Airmen*, 109.

[63] Wigge, *JFACC*, 7.

[64] John R. Boyd, "Organic Design for Command and Control," Air University, Maxwell AFB AL, May 1987.

[65] Joint Chiefs of Staff, *Doctrine for Joint Campaign Planning,* Joint Pub 5-00.1 (Washington DC: Defense Printing Service, June 1992), I-2, I-4.

[66] Mary J. Cronin, *Doing Business on the Internet: How the Electronic Highway is Transforming American Companies,* (New York: Van Nostrand Reinhold, 1992), 142-143.

[67] Ibid., 2.

[68] Tom Peters, *Crazy Times Call for Crazy Organizations* (New York: Vintage Books, Random House, Inc.), 149-150.

[69] Ibid., 151.

[70] Joint Chiefs of Staff, *Global Command and Control System*, 2.

[71] Joint Chiefs of Staff, *Doctrine for Joint Operations*, Joint Pub 3-0 (Washington DC: Defense Printing Service, 9 September 1993), I-5 through I-7.

[72] Joint Chiefs of Staff, *Joint Task Force Planning Guidance and Procedures*, Joint Pub 5-00.2 (Washington DC: Defense Printing Service, September 1991), II-1, II-2.

[73] Headquarters Air Force Publication, *JFACC Primer*, 11.

[74] James A. Winnefeld and Dana J. Johnson, "Unity of Control: Joint Air Operations In the Gulf," *Joint Force Quarterly* (Summer 1993), 89.

[75] Ibid., 99.

[76] James A. Winnefeld and Dana J. Johnson, *Joint Air Operations* (Annapolis MD: Naval Institue Press, 1993), 126.

[77] Winnefeld and Johnson, *Joint Air Operations*, 135.

[78] United States Congress, *Goldwater-Nichols Department of Defense Reorganization Act of 1986*, Title 10 USC, Chapter 38 Joint Officer Management, sec. 661 & 662 (Washington DC: GPO, 1986).

[79] Sam Nunn, U.S. Senator, Georgia, "The Defense Department Must Thoroughly Overhaul the Services Roles and Missions" delivered July 2, 1992. Reprinted in *Vital Speeches of the Day*, August 1, 1992 v58 n20 p617-624. Senator Nunn is referring to the Key West Agreement of 1948 in which the service heads and Secretary of Defense James Forrestal set out various roles and missions for the services.

[80] Department of the Air Force, *USAF Formal Schools*, Air Force Catalog 36-2223, (Washington DC: Headquarters Air Force, 1 June 1994), Chapter 8.

[81] Department of the Army, *US Army Formal Schools Catalog*, Army Pamphlet 351-4, (Washington DC: Headquarters U.S. Army, October 1993), 361-362.

[82] Department of the Navy, *CANTRAC- Catalog of Navy Training Courses*, NAVEDTRA 10500, (Washington DC: Chief Naval Operations, September 1994).

[83] Martha Maurer, *Coalition Command and Control*, (Washington DC: National Defense University Press, July 1994), 4.

[84] Ibid., 113.

[85] Ibid., 13.

[86] Bradley Graham, "Revolutionary Warfare", Washington Post, 6-12 Mar 1995, 6.

[87] Joint Chiefs of Staff, *Global Command and Control System*.

[88] Albert J. Edmonds, Director, Defense Information Systems Agency, "Delivering the Power of Information Technology to the Warfighter," address to Air Command and Staff College, Maxwell AFB AL, 6 January 1995.

[89] Chairman of the Joint Chiefs of Staff, *Compatibility, Interoperability, and Integration of Command, Control, Communications, and Computer Systems*, Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6212.01 (Washington DC: GPO, 30 July 1993), B-1.

[90] Joint Chiefs of Staff, *C4I for the Warrior*, (Washington DC: GPO, 1993), 2.

[91] Ibid., 10.

[92] Department of the Air Force, *JFACC Primer*, 51.

[93] Lt Gen William H. Forster, " The Toughest Challenge We Face," *ARMY*, 32 (February 1995).

[94] George Gilder, "The Bandwidth Tidal Wave", *Forbes ASAP*, 154:13, 163 (5 December 1994).

[95] Ibid., 164.

[96] Winnefeld and Johnson, *Joint Air Operations*, 138-140.

[97] Admiral Paul D. Miller, Commander in Chief, United States Atlantic Command, address to senior joint leadership in major exercise planning meeting, Norfolk VA, May 1994.

Appendix A: Doctrine

Doctrine establishes the basic tenets of how we conduct our daily business in order to achieve national objectives. It is reflected in organizational structure, and is a foundation. It serves as a starting point and a bridge to the operational environment, yet must be flexible and dynamic. It is based on favorable and unfavorable experiences, reflective thought, systematic research, and advances in technology. To cite General of the Army Dwight D. Eisenhower it is "stripping it down to its essentials, determining for yourself what is important and what you can emphasize to the advantage of your side; what you can emphasize that will be to the disadvantage of the other; making a plan accordingly—and then fighting just as hard as you know how; never letting anything distract you from the prosecution of that conception."[1] Currently, all four service components have established doctrine, and the Joint Chiefs of Staff (JCS) also have published a volume, *Joint Warfare of the US Armed Forces*. One underlying current of the service doctrines and a central theme of the JCS is the need for the four components to work together. While this is a desirable effort, it is not always achieved. It is not our intent to do a comparative analysis of these various structures. Rather, by comparing the various organizations to stated specified tasks, we can better determine whether our force structure is capable of meeting future tasking.

Few issues have received as much press, attention, or debate as that of the role of the JFACC in joint air operations. While the services are not in complete agreement regarding the degree of control the JFACC should maintain over theater air assets, the JFACC concept is codified in joint doctrine, has been successfully road tested in Desert

Storm,[2] and will continue to be the most effective means to "exploit the capabilities of air power in a theater campaign."[3]

The primary role of the JFACC is to optimize airpower for the JFC. Centralized JFACC control of these theater assets allows their integration into the JFC's campaign plan. The JFACC develops the air portion of the campaign and applies the available assets to achieve the desired effects. "Centralized control enables a level of asset integration not otherwise possible."[4] Further, the primary purpose of the JFACC is to provide unity of effort for employing air power for the benefit of the joint force as a whole. The benefits gained by this unity of effort are situation dependent; having one 'commander' or 'coordinator' enhances the synergistic effects of an integrated campaign at specific points in time or locations throughout the entire theater of operations. As McNamara pointed out in *Air Power's Gordian Knot*, "The JFACC brings the entire spectrum of theater air power and expertise of senior airmen to the JFC and the ground component commander. Because the JFACC centrally plans and controls theater air warfare in support of the CINC's campaign, the CINC is better able to direct air forces to achieve war and campaign objectives through independent or auxiliary air action."[5]

Joint Pub 3-0, *Doctrine for Joint Operations*, states the JFACC will recommend apportionment to the JFC, will be the supported commander for counterair and air interdiction operations, and for conducting direct attacks on enemy strategic centers of gravity. Apportionment is the division of the total expected air effort, into by a percentage and/or priority, into mission categories for a given period of time. The JFACC makes apportionment recommendations to the JFC. Once the JFC makes the apportionment decision, the JFACC allocates specific air sorties to the missions they support.[6]

The JFACC will normally be designated the Area Air Defense Commander (AADC) and the Airspace Control Authority (ACA). Joint Pub 3-52, *Doctrine for Joint Airspace Control in a Combat Zone*, contains the following guidance concerning these responsibilities. The AADC is responsible for the successful conduct of air defense operations requiring the integrated operation of all available component air defense systems. Air defense operations must be coordinated with other operations, both on and over land and sea; these systems remain subject to the fire control measures of the AADC. The ACA is responsible for coordinating, integrating, and deconflicting the use of the airspace control area responsive to the needs of the JFC and the host nation. The ACA develops the airspace control plan (ACP) which is implemented by the airspace control order (ACO) and promulgates it throughout the AOR.

The essence of the JFACC's responsibilities centers on the development of a concept of air operations to meet the objectives set by the JFC. The concept of air operations is embodied first in the JFC's air campaign plan, subsequently in the master attack plan, and finally in the execution of the ATO.[7] The following products, prepared by the JFACC's staff, are essential inputs to the JFC's higher level planning effort. The intelligence preparation of the theater (Strategic Appreciation) is critical at the initial planning stage and continues throughout the campaign period. "The JFACC's Estimate of the Situation helps identify enemy centers of gravity to attack and friendly centers of gravity to defend."[8] This is followed by a recommended Course of Action that, when approved, becomes the JFACC's mission. The JFACC's Estimate states *what* the JFACC intends to do, and the concept of operations/master attack plan fleshes out *how* air component forces will accomplish the course of action. "The JFACC's Daily Guidance

ensures that the concept of air operations effectively supports the strategic objectives while retaining enough flexibility to adjust to the dynamics of war."[9] The Logistics Concept provides the glue to make the whole plan gel by establishing operational constraints and limits.[10] From this point on, the AOC staff continues to significantly support the JFACC in developing and executing the Concept of Air Operations.

As stated earlier, the JFACC will normally come from the service component that "owns the preponderance of air assets and the ability to control them."[11] According to Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms*, the JFC is not *required* to appoint a JFACC, nor is there a requirement for the JFACC to be an Air Force officer. In certain circumstances, a naval service officer may be designated as the JFACC-afloat or ashore as the situation dictates.[12] Regardless of the service designation, the responsibilities of the JFACC include, but are not limited to "planning, coordination, allocation, and tasking based on the JFC's apportionment decision."[13] But the services differ on how they view the JFACC.

Historically, the JFACC has been located near or with the JFC and/or AOC, but this is due to requirements and preferences and is not regulation based. The overall assumption is that due to the increased emphasis on purple' and coalition warfare, a JFACC will be designated with no radical change to the current joint philosophy.

Comparison of Service Doctrinal Requirements

USN. Naval air operations are inseparable from overall naval operations. Naval air assets resist being tied down to a single battle area because of the range and mobility required to provide defense in depth for the naval expeditionary force. Mobility is the key to providing a responsive naval power projection capability. Self-protection of the battle

group Naval Expeditionary Force is one of the principal responsibilities of organic carrier aviation. Strike and air power projection are also paramount roles for naval aviation characterized by tactical flexibility, strategic mobility, and its self-contained operating base afloat. The overarching requirement to protect the fleet requires the majority of naval air assets to usually be under the command of the overall naval commander and not subordinated to a ground or air commander.[14]

As stated in Chapter 2, the NTACS (Figures 11 and 12) is the Navy's principal air command and control system afloat throughout all phases of amphibious operations. In contrast, the air operations center of a carrier battlegroup is far less structured than that of the amphibious ready group. Air operations in a carrier battle group center around the composite warfare commander concept, with the key warfare commanders requesting air assets from the Air Element Coordinator (AREC), who is normally the commanding officer of the aircraft carrier. The warfare commanders request air assets from the AREC 18-24 hours in advance, who then allocates aircraft to support the warfare commander's requirements based upon aircraft availability. When conflicts arise between warfare commanders' requests or requirements, the AREC attempts to resolve them. This attempt at resolution is either through coordination with the respective warfare commanders, or if necessary, through the battle group commander.

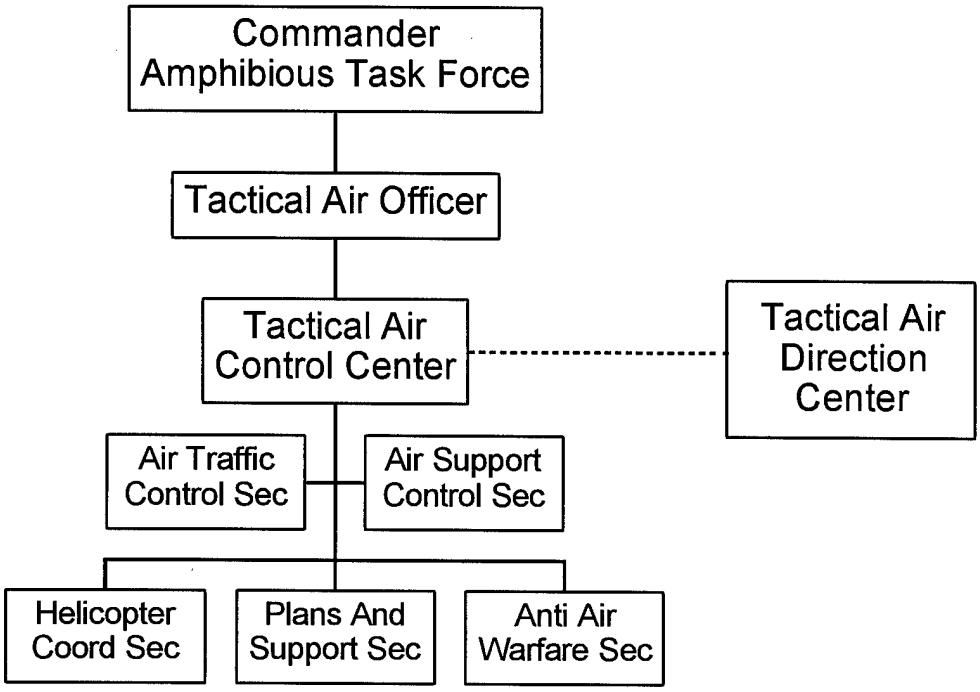

Figure 11. Navy Tactical Air Control System (Amphibious Operations)

The Navy has recently attached a great deal of importance to joint teamwork. Concept development and fielding of systems such as the shore based prototype fleet mobile operations command center, reflect innovative efforts to improve joint coordination. First employed during exercise Ocean Venture 92 the modular shelter provides twice the communications and displays capability of a typical aircraft carrier.[15] Greater emphasis has been placed on training with systems such as CAFMS to produce large-scale ATOs. Even in the controlled environment of an exercise, it is difficult to produce and disseminate ATOs that match the magnitude of high tempo air campaigns. Training also entails coordination with other service command and control agencies.[16]

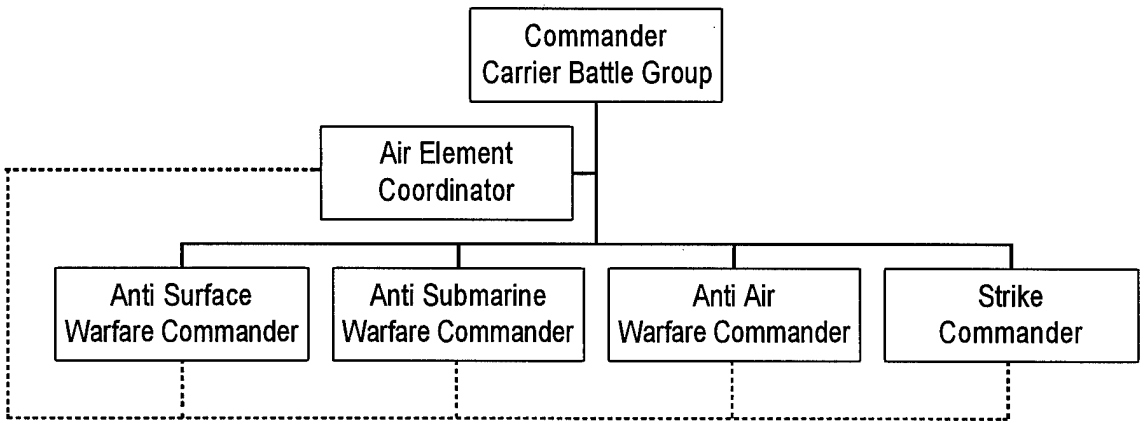

Figure 12. Navy Tactical Air Control System (Carrier Battle Group)

USMC. "Controversy and discussion has continued to plague the Marine Corps since the early beginning of its air arm. In periods of war and peace, control of the aviation element of the Marine Air-Ground Task Force (MAGTF) has inevitably led to the debate: Who controls Marine Corps aviation assets in a sustained theater of operations?"[17] The MAGTF (Figure 13) is the operational concept that guides all Marine Corps employment. Its foundation is the National Security Act of 1947, and Title 10, U.S. Code. These establish an organic air component of not less than three aircraft wings.[18] The MAGTF's Air Combat Element (ACE) provides a TACC as the senior Marine air command and control agency, and provides the operational command post for the ACE commander. From the TACC, the ACE commander and his battlestaff can plan, supervise, coordinate, and execute current and future air operations. The TACC is functionally divided into a current operations section and a future operations section.

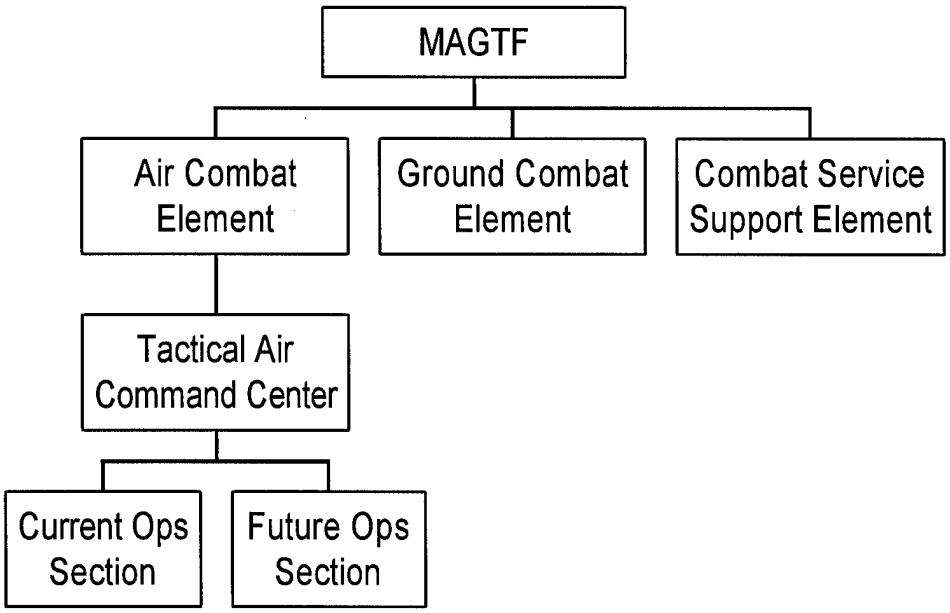

Figure 13. Marine Air Ground Task Force

The TACC was designed to provide the organic capabilities necessary to plan and execute MAGTF air operations and phase responsibility for air operations between adjacent agencies (e.g., assuming landward command from the Navy once the MAGTF is established ashore). By nature of this capability, the TACC is versed in both providing input to and coordinating with other command and control agencies, in addition to its primary role of planning and executing independent MAGTF responsibilities. The Marine Wing staff mans the Future Operations Section and associated working cells. Detailed mission planning is conducted at the tactical unit level upon mission assignment. Joint tasking identifies the other players with whom that USMC units must coordinate. The future operations section matches Joint Surveillance Target Attack Radar System (JSTARS) on approved targets with available assets and forms the ATO. Thus formulated, the ATO is turned over to TACC current operations section where it is compiled and completed. The finished product is then disseminated to required agencies

and parties. The ATO is the end product along with internal and external reports from operational summaries. The watch staff brief provides continuity between watches to help ensure that the Commander's Intent remains intact. The Marine Corps, with air assets acquired to operate as part of a combined arms force, is not prepared to hand over its air assets wholesale to the JFACC at the expense of the MAGTF. In 1986, the Joint Chiefs of Staff released an agreement entitled, *1986 Omnibus Agreement for Command and Control of USMC Tactical Aircraft in Sustained Operations Ashore*. The purpose was to establish a thorough understanding on who controls Marine air assets. The omnibus agreement discusses the release of "excess" sorties, but is clearly not supportive of the centralized control of Marine air assets outside the MAGTF.[19]

USA. Basic Army doctrine emphasizes an offensive spirit based on gaining the initiative through the ability to maneuver.[20] Airspace doctrine is used to support current warfighting doctrine in that Army Aviation forces are maintained and employed as organic maneuver units. The current Army airspace control doctrine is outlined in FM 100-103, *Army Airspace Command and Control In A Combat Zone*. It is commonly refereed to as A2C2. Although this is a relatively dated doctrine (1987), it recognizes airspace as a joint medium and, as such, focuses on Army requirements, procedures, and C4I tasks in the planning, coordinating, and execution of airspace control. Some fundamental aspects of this doctrine are as follows:

- Airspace is used by all; it is a truly joint medium.
- The Army recognizes three dimensional battlefield.
- Maximum freedom consistent with the degree of risk set by JFC.
- Airspace control is performed in congruence with air defense.

- Airspace control systems must be responsive to the JFC and his component commanders.
- Allows close coordination and integration between surface force operations, supporting fires, supporting air operations, air defense operations, and airspace control activities.
- Accommodate US, host nation, and allied airspace control activities within the joint combat airspace control system.[21]

Army A2C2 (Figure 14) structure consists of the JLCC, who is primarily responsible for planning and executing the land campaign in support of the JFC objectives. The primary agency responsible for coordination between the staff of the JFACC and the JLCC is the BCE.

The Army is concerned about receiving enough nonorganic sorties to effectively support its operation with close air support. During Desert Storm, the Army interpreted attempts to include helicopters and long-range missiles flying beyond the fire support coordination line (FSCL) in the air tasking order as a means to take control of these assets away from the Army.[22] The long-range surface-to-surface missiles the Army plans to use for deep battle traverse the airspace under the control of the JFACC, placing all air assets beyond the FSCL at risk without proper coordination, which the Army states is desired, but not required.[23]

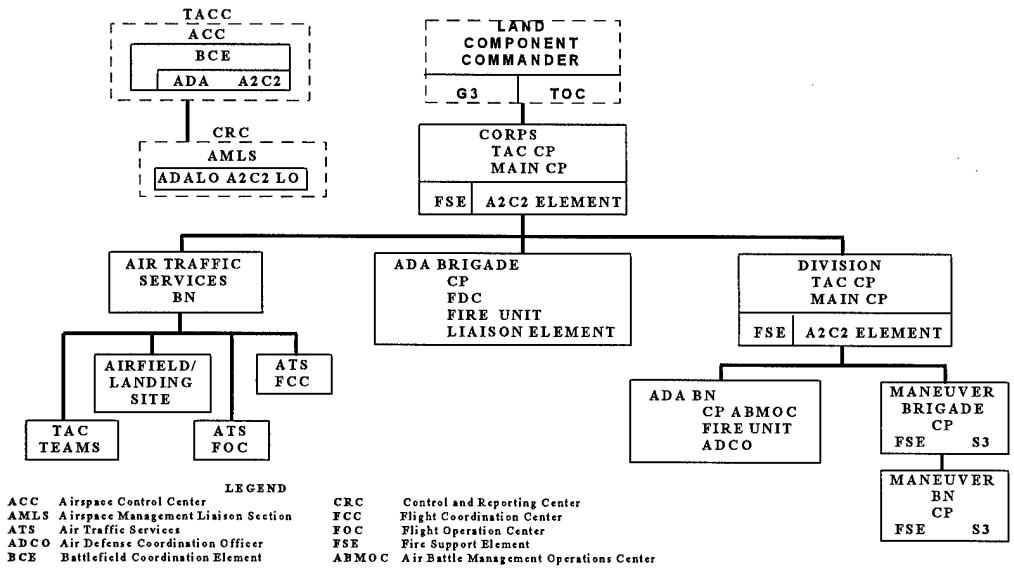

Figure 14. A2C2 System[24]

USAF. The AOC (Figure 15) consists of six functional elements: combat plans division, combat operations division, combat intelligence division, systems control center, logistics readiness center, and combat service support center.

The Combat Plans Division is responsible for the air campaign planning function of the AOC and is divided into the air campaign branch (ACB), the joint guidance, apportionment, and targeting (JGAT) cell, the ATO branch (ATOB), the airspace control branch, and plans intelligence branch. The CPD's main responsibility is to develop the overall air campaign strategy. The joint target coordination board (JTCB) starts by taking the requests each component command's prioritized target list and merges them together into the joint integrated prioritized target list (JIPTL) which is then forwarded to the JGAT. From this point, developing the ATO is a three-step process. In step one, the JGAT develops the overall air campaign strategy and the master attack plan (MAP) based on bomb damage assessments (BDA) from previous sorties, a prioritized list of targets, strategic and operational objectives, and the JFC/JFACC's guidance. Force packages are

then developed to attack priority targets along with the supporting forces of tankers, electronic warfare, and defense suppression assets. The airspace control branch deconflicts and specifies how the airspace will be allocated among the various users to conduct offensive and support missions. Step two starts after the MAP is produced which is then used as a "skeleton" to produce the air battle plan (ABP). The JGAT also takes weaponeering data—munitions assignments and aim points—and includes it with the strategic target information. The process ends with step three when the ABP is combined with the ACO and the special instructions (SPINS) to form a flyable ATO. This whole ATO process requires two days of planning for each day of execution with the ATO ready for transmission not later than 12 hours before execution.[25] CTAPS is the system for disseminating the ATO to its many users, including the Marines, Navy, Army, and allied forces. Once the ATO is transmitted, the COD shifts to directs and monitors execution of the plans.

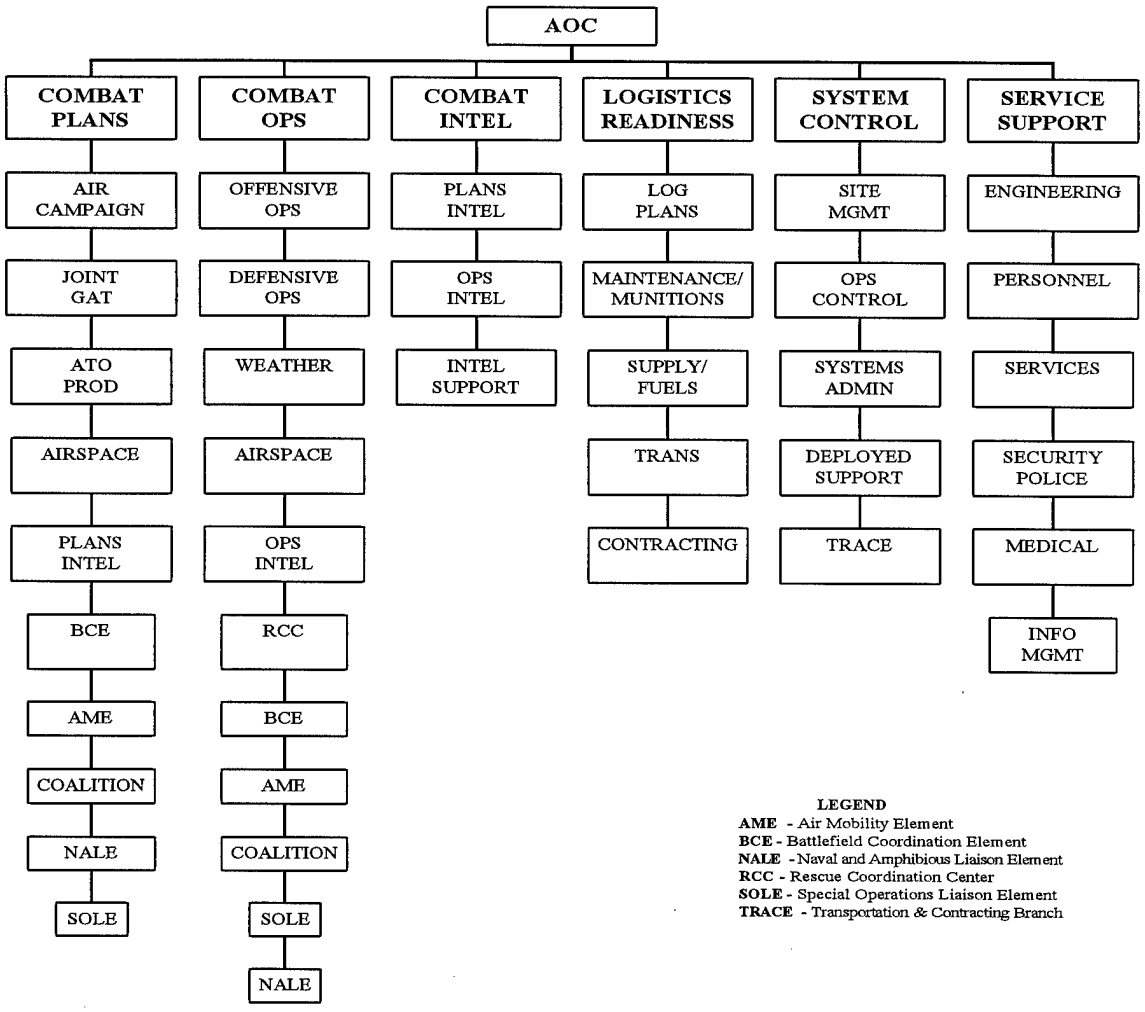

Figure 15. Air Force Air Operations Center

The COD is responsible for the execution of the current ATO and preserves responsiveness. It is divided into the offensive operations branch (OOB), the defensive operations branch (DOB), airspace control branch, the weather support branch (WSB), operations intelligence, and may also include a rescue coordination center (RCC). Since the ATO is developed some 36-48 hours prior to execution, revisions due to target changes, enemy activity, and actual status of friendly forces will be inevitable. The COD directs these revisions through either formal changes to the ATO (rare), or by verbal orders directly to tasked units. The COD is basically a group receiving information in the

form of intelligence updates, radar air picture information, mission reports from tasked units, and status reports from assigned units to monitor execution of missions and their results. This information is then passed along to agencies requiring the information that puts a premium on real-time communications among higher and lateral headquarters, assigned units, and intelligence sources.[26]

The CID directs the activities of plans intelligence and operations intelligence that are physically and functionally integrated with the CPD and the COD, respectively. Intelligence plays a critical role in planning and executing air operations to include providing overall theater situation awareness, helping the JFACC identify and exploit the enemy's centers of gravity, helping to formulate objectives, sustaining the planning and execution of the ATO by providing timely and air-focused intelligence to combat planners and combat operators, and supporting the commander's forces. Targeting personnel support target nomination list compilation and ATO development while providing inputs to the weaponeering effort. Personnel analyze mission effectiveness through BDA and make follow-on attack/reattack recommendations as necessary. Finally, personnel supporting combat operations provide near-real-time assessments about changes to the battle situation and evaluate/recommend targets for immediate tasking.[27]

The SYSCON directs the employment and connectivity of Air Force communications-computer systems elements within the theater of operations and consists of the site management branch, operations control branch, systems administration branch, deployed systems support branch, and the total risk assessment cost estimate team/engineering branch.[28]

The LRC is the single focal point for all logistics issues within a specified theater of operations and is responsible for the centralized direction and control of the deployment, reception, and redeployment of the logistics assets and the execution of logistics functions. In addition, the LRC supervises all mobility operations, aircraft serviceability, munitions, aerospace ground equipment, readiness spares packages, and POL. The LRC consists of the logistics plans branch, aircraft maintenance branch, supply/fuels branch, transportation branch, and the contracting branch.[29]

The CSSC is responsible for theater beddown support functions and consists of the engineering branch, personnel branch, services branch, security police branch, medical branch, and the information management branch.[30] There are certain other specialized elements that are incorporated into the CPD and the COD which enhance the overall air campaign process. The first is the air mobility element (AME) which centralizes control of all airlift by conducting the detailed planning, coordinating, tasking for, and monitors the conduct of theater airlift operations. The next set of elements support the AOC to enhance operations and improve interoperability. The BCE supports the integration of air operations with groundmaneuver units. The naval and amphibious liaison element (NALE) supports the JAOC in integrating naval air, naval surface fire support, and amphibious operations into the theater air campaign. The special operations liaison element (SOLE) provides personnel to coordinate and integrate all special operations forces (SOF) activities in the deep battlefield. The coalition/allied liaison team is another very important element in today's warfighting scenarios designed to improve the JAOC's situational awareness regarding the disposition of friendly forces, contributes to unity of effort for coalition air defense operations and airspace deconfliction, and helps

overcome language barriers. Last, depending upon the scenario, the AOC may require additional liaison augmentation from such agencies as the US Coast Guard (rescue), USSPACECOM, Defense Intelligence Agency, Central Intelligence Agency, Federal Aviation Administration, and allied personnel in various operational and support areas.[31]

The TACS is designed to handle a large air operation, like Desert Storm, and therefore is an excellent system for planning and executing JFACC duties. Since the JFACC has often been an Air Force officer, the primary means of executing these duties and responsibilities has typically been through the TACS system.

Current Joint Organizational Example

As an example of how the particular process can be conducted, we have reviewed the organization under the control of EUCOM.

While EUCOM does not have a standing JAOC, it has established an air operations group (Figure 16) to provide an ability to respond to crises as a deployable core JFACC staff.[32] The 32nd AOG consists of three squadrons; 32nd Air Operations Squadron (AOS), 32nd Air Intelligence Squadron (AIS), and 1st Combat Communications Squadron (CCSQ). It has a core staff that can rapidly deploy and begin controlling and coordinating air operations within 24 hours. The 32nd OS would prepare for, plan, task, and direct air operations in-garrison or deployed in an AOC. The AOC is under the command of a JFACC. The 32nd AOS includes combat operations, combat plans, logistics, and search and rescue sections.

The 32nd AIS is tasked to provide timely, focused, fused intelligence to the AOG and deployed units in support of planning, tasking, and directing execution of airoperations.

Also the AIS will support US joint and combined operations to provide core intelligence for the Air Force component commander.

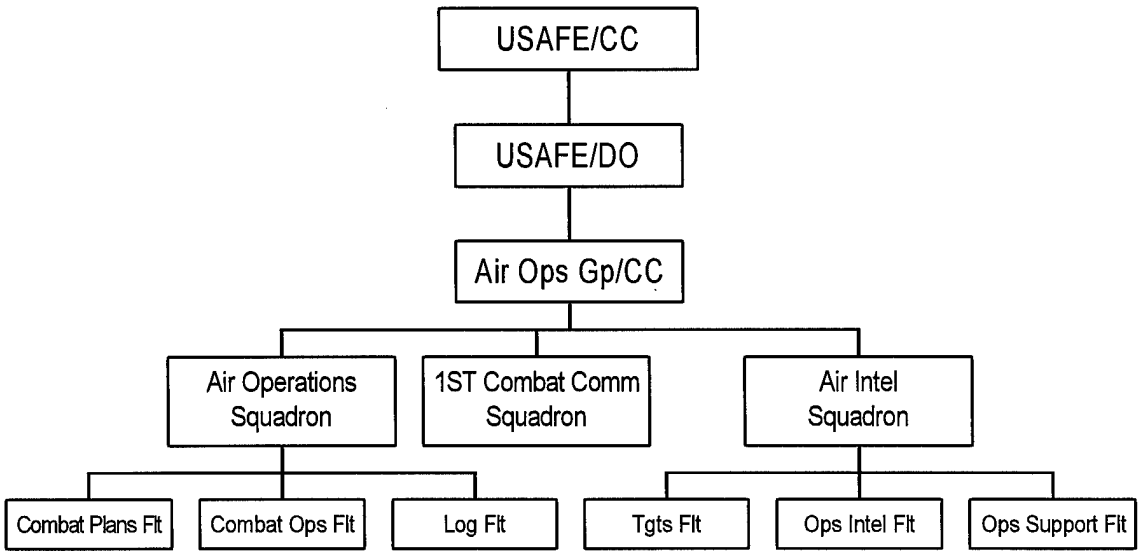

Figure 16. 32nd Air Operations Group

The CCSQ provides worldwide communications-computer and air traffic control systems support to the AOG. The CCSQ is composed of a base systems flight, network systems flight, and a combat support flight. Some of the CCSQ capabilities include communications center, telephone hook ups, satellite hubs, UHF SATCOM, HF/VHF/UHF radio, CTAPS, Tactical Secure Data Communications (TASDAC), portable technical control, and wideband tropospheric scatter radio.

The 32 AOG also acts as the executive agent for joint air operations training. The AOG conducts training each quarter for approximately 50 personnel. Some areas of training include: JFACC orientation, JAOC operations such as the functions of each section, and use of the CTAPS. Trained personnel are then tracked and utilized to augment the AOG during exercises and contingencies. The AOG is also augmented by

elements of the BCE, 26 Intelligence Group liaison officer, and combat search and rescue (CSAR). Personnel from each of these organizations are integral to all of the AOG functions.[33]

When asked to identify strengths and weaknesses to the system, the EUCOM representative listed the concept strengths as the ability to coordinate theater air assets in a single ATO, consolidate theater air defense and airspace control under one commander, and help develop a joint integrated prioritized target list. Significant identified weaknesses were: no permanent joint billets, modular flaws in CTAPS which increase workload, functions such as joint targeting coordination board that are duplicative in nature and potentially counterproductive to producing a quality air operations plan and ATO.[34]

Notes

[1] General of the Army Dwight D. Eisenhower, "Command in War," speech given at the National War College, 30 October 1950 cited in Joint Chiefs of Staff, *Joint Warfare of the U.S. Armed Forces*, Joint Pub 1 (Washington DC: National Defense University Press, November 1991).

[2] For an excellent objective assessment of the JFACC function, see discussion of "JFACC: A Step on the Long Road to Jointness" from *A League of Airmen*, 263-265.

[3] Department of the Air Force, *JFACC Primer*, 1.

[4] Stambaugh. 100.

[5] Stephen J. McNamara, Air Power's Gordian Knot: Centralized Versus Organic Control, Maxwell AFB AL: Air University Press, August 1994, 151. He discusses alternatives to the USAF concepts of centralized control.

[6] Joint Chiefs of Staff, *Doctrine For Joint Operations*, Joint Pub 3-0 (Washington DC: Defense Printing Service, 9 September 1993), III-18, III-36-37.

[7] Department of the Air Force, *JFACC Primer*, 20.

[8] Ibid., 25.

[9] Ibid., 36.

[10] Ibid., 25.

[11] Joint Chiefs of Staff, Pub 3-01.2 *Joint Doctrine for Theater Counter Air Operations*, Washington DC: JCS/J3, 1 December 1986, 100.

[12] See "Time for a Joint Ship", *Proceedings*, Jan 94 for an assessment of the Navy's capabilities and limitations for conducting JFACC operations at sea.

[13] Joint Chiefs of Staff, *Department of Defense Dictionary of Military and Associated Terms*, Joint Pub 1-02 (Washington DC: Denfense Printing Service, December 1989).

[14] Winnefeld and Johnson, *Joint Air Operations*, 135.

[15] Lieutenant General John H. Cushman (USA Ret), "Ocean Ventured, Something Gained," *Proceedings* (September 1992), 84.

[16] Ibid., 87.

[17] Bray and Murrow, "Marine TACAIR and the 1986 Omnibus Agreement," (Maxwell AFB AL: AU University Press, April 1990), 1.

[18] US Marine Corps, *Marine Air-Ground Task Force Pocket Guide*, (Quantico VA: Headquarters United States Marine Corps Combat Development Command, August 1989), 1.

[19] Department of the Navy, FMFM 5-50. *1986 Omnibus Agreement for Command and Control of USMC Tactical Aircraft in Sustained Operations Ashore*. It reads in part: "The Marine MAGTF commander will retain operational control of his organic air assets. The primary mission of the MAGTF air combat element is the support of the MAGTF ground element. During joint operations, the MAGTF air assets will normally be in support of the MAGTF mission. The MAGTF commander will make sorties available to the Joint Force Commander, for tasking through his air component commander for air defense, long-range interdiction, and long-range reconnaissance. Sorties in excess of MAGTF direct support requirements will be provided to the Joint Force Commander for tasking... Nothing herein shall infringe on the authority of the theater or joint force commander, in the exercise of operational control, to assign missions, redirect efforts..."

[20] Department of the Army, *Army Airspace Command and Control In a Combat Zone*, Field Manual (FM) 100-103 (Washington DC: Headquarters United States Army, October 1987), iii. The FM integrates the concepts of airspace command and control into the pretext of the Airland Battle doctrine. This is a combined arms concept the Army is currently revising.

[21] Ibid., 1-2, 1-3.

[22] Keaney and Cohen, *Gulf War Air Power Survey*,149.

[23] Department of the Air Force, *JFACC Primer*, 33.

[24] US Army, FM 100-103, 1-15.

[25] Tillotson, 29.

[26] Ibid.

[27] Department of the Air Force, *JFACC Primer*, 28.

[28] HQ ACCI 13, 22.

[29] Ibid., 23.

[30] Ibid.

[31] Ibid.

[32] Allen.

[33] Ibid., 1.

[34] Ibid., 2.

Appendix B: Position Requirements for JAOC Staffing

The responsibilities of the key JAOC Rear core cadre and functional area personnel are outlined below:

Combat Plans (J3-A5): Chief and deputy are individuals responsible for integrating all aspects of air campaign planning, master attack plan, and associated air tasking order production. Serves as the chief of the JAOC in the absence of the JFACC. Recommend both individuals have a broad background in fighter/bomber operations in order to understand allocation and apportionment.

- **ATO Production:** Responsible for coordinating all aspects of ATO production and dissemination.
- **Space:** Responsible for integration of space assets into air campaign.
- **Command and Control Warfare:** Responsible for ensuring continuity of information flow between tasked agencies plus planning for disruption of enemy C2 and coordinate the fulfillment of JFC C2W objectives.
- **Theater Air Defense:** Responsible for coordinating all air defense assets as well as establishing joint air defense procedures.
- **Coalition:** Responsible for coordinating all aspects of coalition integration into air campaign planning to include asset utilization and connectivity issues.

Combat Operations (J3-A3): Chief and deputy are individuals responsible for executing the ATO produced by J3-A5. Both individuals must have broad background in fighter/bomber operations in order to make informed recommendations for immediate tasking or retargeting of assets.

- **Air Operations Officer**: Responsible for the integration of electronic warfare assets in theater.
- **Joint Rescue Coordination Center (JRCC)**: Responsible for planning and coordinating rescue of downed personnel in and out of hostile territory.

Combat Intelligence (J3-A2): Chief and deputy are individuals responsible for integration of all intelligence assets in support of JAOC operations. Serves as link between CINC J2, information sources, and JAOC. Responsible for the security of information utilized by JAOC.

- **Collection Management**: Responsible for management and utilization of all aspects of intelligence collection assets and information requests in support of air operations.
- **Analysis**: Responsible for the continual analysis of intelligence information requested and received in support of air operations.

Combat Logistics (J3-A4): Chief and deputy are individuals responsible for all aspects of the deployment, sustainment, and redeployment of airpower assets in the theater of operations.

- **Lift:** Responsible for all aspects related to deployment and beddown of airpower forces in theater.
- **Sustainment:** Responsible for working issues related to sustaining forces in theater once deployed.
- **Contract:** Responsible for working with potential host nations as required, to secure support for air operations and airpower assets in the theater of operations.

Combat C2 (J3-A6): Chief and deputy are individuals responsible for the integration of all command and control equipment necessary to operate effectively between information sources, JAOC Forward and Rear elements, and deployed forces in theater.

- **Network Configuration:** Responsible for the technological support of communications equipment essential to JAOC operations.
- **Job Control**: Responsible for coordinating the various repair requirements to ensure continued operation of essential equipment.

Glossary

A2C2	Army Airspace Command and Control
AADC	Area Air Defense Commander
ABP	Air Battle Plan (USAF)
ACA	Airspace Control Authority
ACB	Air Campaign Branch (USAF)
ACE	Air Combat Element (USMC)
ACO	Airspace Control Order
ACP	Airspace Control Plan
AETC	Air Education and Training Command (USAF)
AGOS	Air Ground Operations School
AIS	Air Intelligence Squadron (USAF)
AIWG	ATO Interoperability Working Group
AME	Air Mobility Element (USAF)
AOC	Air Operations Center (USAF)
AOG	Air Operations Group (USAF)
AOR	Area of Responsibility
AOS	Air Operations Squadron (USAF)
AREC	Air Element Coordinator (USN)
ATACC	Advanced Tactical Air Command Center (USMC)
ATACM	Army Tactical Missile
ATO	Air Tasking Order
ATOB	Air Tasking Order Branch (USAF)
BCE	Battlefield Control Element (USA)
BDA	Bomb Damage Assessment
CAFMS	Computer-Aided Force Management System
C4I	Command, Control, Communications, Computers, Intelligence
C4IFTW	C4I For The Warrior
C2	Command and Control
CCSQ	Combat Communications Squadron (USAF)
CID	Combat Intelligence Division (USAF)
CINC	Commander in Chief
CNA	Center for Naval Analyses
CNET	Chief of Naval Education and Training
COD	Combat Operations Division (USAF)
COMUSCENTAF	Commander US Central Command Air Force
CONOPS	Concept of Operations
CONPLAN	Concept Plan
CONUS	Continental United States
COS	Current Operations Section (USMC)

CPD	Combat Plans Division (USAF)
CSAR	Combat Search and Rescue
CSSC	Combat Service Support Center (USAF)
CTAPS	Contingency TACS (Theater Air Control System) Automated Planning System
DISA	Defense Information Systems Agency
DOB	Defensive Operations Branch (USAF)
DOD	Department of Defense
FOS	Future Operations Section (USMC)
FSCL	Fire Support Coordination Line
JAOC	Joint Air Operations Center
JCS	Joint Chiefs of Staff
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JGAT	Joint Guidance, Apportionment, and Targeting cell (USAF)
JIC	Joint Intelligence Center
JIPTL	Joint Integrated Prioritized Target List (USAF)
JLCC	Joint Land Component Commander
JRCC	Joint Rescue Coordination Center
JSTARS	Joint Surveillance Target Attack Radar System
JTCB	Joint Target Coordination Board
HDC	Helicopter Direction Center (USN)
INTERNET	Information Network
IMA	Individual Mobilization Augmentee
ITRO	Interservice Training Review Organization
LAN	Local Area Network
LRC	Logistics Readiness Center (USAF)
MAGTF	Marine Air Ground Task Force
MAP	Master Attack Plan (USAF)
MCCDC	Marine Corps Combat Development Command
MRC	Major Regional Conflict
NALE	Naval and Amphibious Liaison Element (USN/USMC)
NCA	National Command Authorities
NEF	Naval Expeditionary Force
NTACS	Navy Tactical Air Control System
NTCS-A	Navy Tactical Command System Afloat

OOB	Offensive Operations Branch (USAF)
OODA	Observe, Orient, Decide, Act
OPCON	Operational Control
RAND	Research and Development Corporation
RCC	Rescue Coordination Center (USAF)
SCI	Special Compartmented Information
SLATS	Strike Leaders Attack Training Syllabus (USN)
SOF	Special Operations Force (s)
SOLE	Special Operations Liaison Element
SOW	Statement of Work
SPINS	Special Instructions
SYSCON	Systems Control Center (USAF)
TACAIR	Tactical Air
TACC	Tactical Air Command Center (USMC)
	Tactical Air Control Center (USN)
TACGRU	Tactical Air Control Group (USN)
TACON	Tactical Control
TACRON	Tactical Air Control Squadron (USN)
TACS	Theater Air Control System (USAF)
TADC	Tactical Air Direction Center (USN/USMC))
TAO	Tactical Air Officer (USN)
TASDAC	Tactical Secure Data Communications
TLAM	Tomahawk Land Attack Missile (USN)
TRACE	Transportation and Contracting Branch (USAF)
TRADOC	Training and Doctrine Command (USA)
USACOM	US Atlantic Command
USAFE	US Air Forces in Europe
USEUCOM	US European Command
USSOUTHCOM	US Southern Command
USSPACECOM	US Space Command
WSB	Weather Support Branch (USAF)
WTI	Weapons and Tactics Instructor course (USMC)

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Vita

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Herman Baker: Major Baker received his commission in the United States Air Force through the US Air Force Academy in 1984. After an initial tour flying EC-130E's with the 7 ACCS as an Air Weapons Controller, Major Baker did a remote tour at Osan Air Base Republic of Korea. In Korea he worked in the Master Control and Reporting Center (MCRC) as a Weapons Assignments Officer. After Korea, Major Baker completed SOS in residence and was assigned to the Southeast Air Defense Sector (SEADS) Tyndall Air Force Base, Florida. Major Baker came off active duty in December 1990 and accepted a position in the USAF Reserve IMA program at the United States Atlantic Command (USACOM) Norfolk, VA. In this capacity he works Joint Operations with active duty personnel assigned to the J33 Directorate, Current Operations Major Baker has a Masters in Business (MBA), attended Air/Ground Operations School

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Dave Goldfein: Major Goldfein received his commission in the US Air Force through the US Air Force Academy in 1983. He graduated from pilot training in 1984, and was assigned as a T-38 instructor pilot in the Euro-NATO Joint Jet Pilot Training (ENJJPT) program at Sheppard AFB TX. He completed his Masters in Business Administration in 1987. He transitioned to the F16C Fighting Falcon and served as a flight/mission commander at Shaw AFB. During his tour, he deployed to Al Dhafra AB ,UAE where he led 40 combat missions in support of Operation Desert Shield/Storm. Maj Goldfein was selected to attend F16 Fighter Weapons School and was subsequently assigned as initial cadre in the Air Force Air Intervention Composite Wing at Mt Home AFB ID. He served most recently as the Chief of Wing Weapons and Tactics and deputy chief of combat plans in the wing air operations center (AOC). Major Goldfein is currently a student at Air Command and Staff College.

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Jimmy Gonzalez: Major Gonzalez received his commission in the United States Air Force through the Officer Training School as a distinguished graduate. From April 1983 to May 1986, he served as a command and control software system analyst and quality control chief at Offutt AFB, Nebraska. After completing missile combat crew training at Vandenberg AFB, California, he was assigned to Minot AFB, North Dakota, where he served as a crew commander and led two branches in the standardization/ evaluation division. In March 1991, he was transferred to Peterson AFB, Colorado, and served as a software engineer, squadron section commander, and executive officer. Major Gonzalez is currently a student at Air Command and Staff College.

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Sheron Leonard: Major Leonard received her commission in the United States Air Force through the Reserve Officer Training Corps in 1981 as a Distinguished Graduate. She received a Bachelor of Science degree in Computer Science from

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Douglas G. MacCrea: Commander MacCrea, United States Navy, is a Surface Warfare Officer and member of the Air University Naval Advisory Group. CDR MacCrea was commissioned via the NROTC Program at Iowa State university in 1977. He has served aboard USS *Semmes* (DDG 18), USS *Robert G Bradley* (FFG 49), USS *Hawes* (FFG 53), USS *Halyburton* (FFG 40) and the staffs of Destroyer Squadron FOUR and Cruiser-Destroyer Group THREE. Prior to joining the Naval Advisory Group and ACSC faculty he served as Assistant Chief of Staff for Material/Logistics on the staff of Commander, Cruiser-Destroyer Group Three/*Carl Vinson* Battle Group. Commander MacCrea is currently attached to the faculty at the Air Command and Staff College.

Bruce F. MacNeill: Major MacNeill, United States Army, received his commission from Jacksonville State University, as an ROTC Distinguished Military Graduate, 1980. He is an AH-64 Apache pilot and has commanded an AH-1 attack

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Rex Marshall: Major Marshall received his commission in the United States Air Force through the Officer Training School in 1980. He received a Bachelor of Science Degree in Education from the University of Alabama in 1974 and a Master of Human Relations Degree from the University of Oklahoma in 1988. Major Marshall completed the US Air Force's Undergraduate Weapons Controller Training Course in 1980, and spent three years as an instructor at the USAF Weapons Controller Training School and eleven years as an Airborne Warning and Control Systems (AWACS) weapons director, senior director, and mission crew commander. He has served on staff at several wing-level positions, and most recently served as assistant operations officer and operations officer in two separate training squadrons. Major Marshall is currently a student at Air Command and Staff College.

Susan Pardo: Major Pardo received her commission through the Officer Training School in 1980. She received a Bachelor of Arts Degree in Mathematics from Texas A & M University in 1973 and a Master of Business Administration in Systems Science from University of West Florida in 1986. Major Pardo is a distinguished graduate of the Advanced Communications-Computer Officer Training School and spent nine years in various tactical air control assignments, including a tour on the TAC Inspector General

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David Wessner: Major Wessner completed Marine Corps Officer Candidate School in 1981. After completion of The Basic School and Air Defense Control Officer training he was the Tactical Air Operations Center Officer-In-Charge, qualified as Senior Air Director and served in that capacity with squadrons in both South Carolina and Okinawa Japan. He then went to H&HS-18, Marine Air Control Group-18, Okinawa as Senior Air Coordinator at the Marine Tactical Air Command Center for the 1st Marine Aircraft Wing. Later he was assigned as Plans Officer for the Air Control Group. From his four year tour in Japan. Wessner then served as exchange officer with the Royal Air

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