AIR MOBILITY FUTURE:

EVOLVING COMMAND AND CONTROL RELATIONSHIPS IN THE INFORMATION AGE

GRADUATE RESEARCH PAPER

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Abstract

This research paper analyzes information flow through theater Air Mobility Command and Control (C2) organizations. The purpose is to uncover guidelines going forward to adapt organizational structure and processes to increase the speed and reach of information. These guidelines could assist with improving organizational agility and decision making while adapting to future trends in the broader C2 enterprise. To collect data, the researcher conducted interviews with seventeen C2 experts with experience at various levels of C2, from worldwide to theater Air Mobility C2 organizations, from Air Mobility C2 leadership, to experts in non-mobility C2 divisions. Interview subjects shared their perceptions and insights over a 30-45 minute interview.

As a result of the research and the inputs of the interview subjects, this paper consolidates views and puts forth multiple recommendations for the future organizational structure of theater Air Mobility C2 organizations.

To my beautiful girls, thank you for your unceasing support through countless hours of writing, editing, and loud early morning phone interviews.

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Table of Contents

Page

Acknowledgments vi

Table of Contents vii

List of Figures ix

I. Introduction 1

Background 1
On the Future 3
Research Problem Statement 4
Research Questions 4
Assumptions/Limitations 5
Implications 6

II. Literature Review 7

Regulatory Guidance 7
History of C2 9
Where Are We Headed? 16
Organizational Information Process Theory 18

III. Methodology 30

Discussion and Selection of Research Methods 30
Sample 33
C2 Organization Members outside the AMD *33*
Organization Members *33*
Leadership *34*
Interview Procedures 34
Description of Interview 35

IV. Analysis and Results 36

Chapter Overview 36
Analyzing the Data 36
Subjects related specifically to OIPT and Position Location *37*
Consistent Themes from Research Subjects 40
Review of the Research Data 42
AMD Perspective 43
Perspective from Other Divisions 48
Leadership Perspective 50

Research Results with Respect to OIPT Models....56
Importance of the Data and Results to the Field of Air Mobility Command and Control....61

V. Conclusions....64

Overarching Research Question....64
Summary of Research Conclusions....64
Recommendations for Air Mobility Command and Control....68
Future Research Considerations....72
Conclusion....73
Glossary....77

Appendix A....78

Appendix B....79

Appendix C....83

Appendix D....84

Bibliography....85

CURRICULUM VITA....87

List of Figures

Page

Figure 1 - Hypothesized Framework of Equivocality and Uncertainty on Information Requirements 22

Figure 2 - Information Role of Structural Characteristics for Reducing Equivocality or Uncertainty 23

Figure 3 - Relationship of Interdepartmental Characteristics with Structure and Information Required for Coordination 24

Figure 4 - Subjects related to OIPT and Position Location 37

Figure 5 - Consistent Themes from Research Subjects 40

Figure 6 - AMD Steady State Position in Regards to Equivocality vs. Uncertainty 56

Figure 7 - Range of AMD Information Requirements and Coordinating Linkages 57

Figure 8 - Position of AMD Interdependence and Differentiation with AOC 58

Figure 9 - Position of AMD Interdependence and Differentiation with 618 AOC 59

AIR MOBILITY FUTURE:
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I. Introduction

Background

The history of the Air Operations Center is only a few decades old, but it is based on Air Force doctrine, and rooted in a history of practices that have shown continual success in the crucible of combat. The earliest Air Operations Centers (AOCs), utilized in the nineties, were a result of lessons learned through the eras of Korea, Vietnam, Grenada, and Desert Storm. An organization that was able to take commander's guidance and intelligence and fuse it into a daily executable plan was needed to effectively utilize air power in support of theater objectives. In those early days, instead of clicking a button to electronically publish the daily plan, it was saved to a disk and physically delivered to locations where coalition aircraft were based. During the same period of time that these AOCs were under development, mobility forces were consolidated in the new Air Mobility Command (AMC). AMC's worldwide asset, mobility aircraft, were controlled through their own command and control entity, an organization capable of planning and controlling tanker, airlift, and aeromedical evacuation missions across the globe, unless the aircraft were transferred to a theater commander with an AOC able to take over that role locally. In that case they were controlled through that AOC's Air Mobility Division, one of five specialized divisions spelled out in Air Force doctrine and under the command of the Joint or Combined Forces Air Component Commander (JFACC or CFACC) in theater.

Just a few years later, society experienced the Internet boom, the end of the industrial age and the dawn of the information age. Due to the availability and velocity of

information, decision timelines were condensed (David Alberts, 2003), and much to John Boyd's delight, the OODA (Observe, Orient, Decide, Act) loop finally got the credit it deserved. The appetite for information grew insatiable, and unmanned vehicles added the capability for twenty-four hour surveillance coverage. The swift collection and dissemination of information has changed the way organizations, government and private alike, do business. Information has allowed corporations to manage global supply chains and react seemingly on a dime to changing market conditions anywhere in the world.

Air Mobility is especially interesting in the command and control realm. Because aircraft are divided into airlift, tanker and aeromedical operations, and also those categories are subdivided into intertheater and intratheater operations, there have long been discussions on how these assets should be managed. When the global environment is relatively peaceful, air mobility assets can be split between a central controlling entity at the 618th AOC, a functional AOC, and many theater AOCs with relatively little interaction between the two. Aircraft change operational control from United States Transportation Command (USTRANSCOM) to the geographic combatant commanders, and essentially return when the combatant commander no longer has a need for them. More and more often, on the other hand, the Air Mobility community finds that meeting the demand for support requires more creative solutions and rapid and precise communication of information between the 618th AOC and the geographic AOCs in order to provide support to the many combatant commanders across the globe.

Jay Galbraith's research sought ways to deal with the coming informational age as far back as the 1970s, when he foresaw that the management of information would make or break the organization. His basic proposition was that the amount of information

processed between decision makers is proportional to the amount of uncertainty in a task (Galbraith, 1974). Uncertainty limits the ability of an organization to preplan or make decisions about activities in advance of their execution (Galbraith 1974). Organizational Information Process Theory (OIPT) can inform the structure of both business and the command and control of military aircraft. The way the command and control (C2) enterprise organizes around the flow of information could play a key role in the ability of Rapid Global Mobility to meet the nation's needs.

In addition, David Alberts, in his research of the future of command and control, argued that the term command and control itself is an impediment to progress in the field (Alberts, Agility, Focus, and Convergence: The Future of Command and Control, 2007). Industrial age structures, based on span of control and traditional hierarchies, are grossly outdated and have resulted in large organizations with oversized middle management entities (David Alberts, 2003). Through Network Centric Operations, information-age organizations can leverage not only emerging technology but new organizational structures tailored for rapid information processing and utilization (David Alberts, 2003).

On the Future

It seems the end of the AOC as we know it is within sight. Lt Gen (Ret) David Deptula, one of the chief planners of the air campaign that brought down Iraqi forces in Desert Storm, recently stated "our ability to C2 air and space forces will be affected by three major interrelated trends: emerging threats, new technologies, and the velocity of information." (Deptula 2014) The Air Force went further and actually spelled out what the environment would look like in their "Call to the Future" and the "Air Force Future

Operating Concept" describing the Multi Domain Operations Center (MDOC) of 2035, complete with new divisions, impressive resiliency, robust reach back capabilities, and a smaller footprint. (AFFOC 2015) In these documents, the outgoing Air Force Chief of Staff has attempted to shine a light on the command and control environment of the future, but it's up to current and future leaders to get there, and as former Army Chief of Staff Gordon Sullivan famously wrote, "hope is not a method".

Research Problem Statement

The success of Information and Communications Technology has made distance between entities a smaller concern, and organizational information process theories look to change the way we utilize our personnel interfacing with each other and that technology. Furthermore, mobility assets will always be a low-density asset in high demand, possibly more so as our legacy aircraft begin to show their age and retire. That being said, one of the AMC Commander's roles and responsibilities is to establish in coordination with the other Mobility Air Forces (MAF) commands, the C2 process for airlift, air refueling, aeromedical evacuation, and air mobility support forces to include the interfaces with USTRANSCOM and geographic AOCs (Headquarters, AMC/A8X, 2014). How can the Air Mobility C2 enterprise adapt its processes and organizational structures to meet emerging requirements, providing timely support to all stakeholders?

Research Questions

The ultimate goal of this research is to offer some guiding ideas with particular respect to organizational structure as the Air Mobility enterprise adapts itself to C2 operations in the 21st century. Utilizing Galbraith's Organizational Information Process

Theory (OIPT) and also Network Centric Warfare research, this paper seeks to answer one primary question by addressing two sub questions:

1. *In a geographically separated organization such as the C2 of Air Mobility aircraft, how can the enterprise utilize OIPT and Network Centric Warfare principles to adapt organizational structure and processes to increase the speed and reach of information to improve organizational agility and decision-making?*

1a. What specific criteria determine the functions that can or should be performed at a central hub and which functions need to be present in a regional control center in order to increase speed and reach of information while decreasing equivocality?

1b. *How might the structure of the Air Mobility personnel present in the regional control center be leveraged more effectively in a future information-driven, integrated planning and execution cycle to both increase the organization's ability to respond to uncertainty and guard against the increased vulnerabilities of a central mobility hub.*

Assumptions/Limitations

The researcher assumes that all subjects will give their honest opinions during the interview process. There will most likely be a bias introduced by some informants that heavily favors a particular course of action. On this note, it is readily apparent from previous research (Oelrich, 2013) that JFACCs are not yet ready for their Air Mobility Divisions (AMDs) to consolidate fully with the 618th AOC. This is due to the suspicion that USTRANSCOM taking operational control of all mobility assets would be a logical

next step, and something JFACCs are at this time firmly against. This paper will not be an argument for a change in command relationships of mobility forces, as these relationships are based on many years of experiences.

The researcher is limited by time and the inability to travel to geographic AOC locations. Time will limit the amount of research subjects, and the inability to travel will limit the perspective from individual AOCs. The researcher understands that not all AOCs, or AMDs for that matter, are created equally. In fact, the popular saying in this community states "if you've been to one AOC, you've been to one AOC." Each combatant command is confronted with different strategic and operational realities, and these influence structures of their respective command and control entities. The research and conclusions presented here will pertain to command and control practices in general and could be tailored as needed in each theater according to its own realities.

Implications

While talk on this subject has picked up in recent years, the aim of this research is to provide more academic rigor and background on a subject on which some change is inevitable. Results from this study could act as a reference for decision makers in both the Air Mobility community and those in the geographic combatant commands when assessing the feasibility of changes in command and control of mobility forces.

II. Literature Review

Regulatory Guidance

A regulation that offers key guidance on the C2 of mobility forces is Joint Publication 3-17, Air Mobility Operations, which discusses extensively the abilities and the command relationships surrounding Air Mobility operations. The document specifically describes the Air Force core mission of Rapid Global Mobility, and recommends treating mission as a global enterprise: "Although it is not necessary for a single global organization to centrally control all air mobility forces, all commanders should envision air mobility as a global system capable of simultaneously performing intertheater and intratheater missions." (Joint Chiefs of Staff, 2013) Yet "Intertheater air mobility serves the continental United States (CONUS) to-theater and theater-to-theater air mobility needs of the geographic combatant commanders (GCCs). Air mobility assets assigned to USTRANSCOM execute the majority of intertheater airlift missions." (Joint Chiefs of Staff, 2013) This is a clear delineation of control regarding intra and intertheater airlift between USTRANSCOM's air C2 arm, the 618th AOC or Tanker Airlift Control Center (TACC) and the AMDs located at various theater AOCs.

While these two organizations differ in structure, there is considerable overlap in function: "The AMD functions are similar to those of the 618 AOC (TACC). The AMD's theater focus is critical in teaming with the Joint Deployment and Distribution Operations Center (JDDOC) or Joint Movement Center (JMC) to coordinate and prioritize the phasing of intertheater and intratheater airlift requirements. The AMD has vast theater expertise and familiarity and is best able to assess theater requirements,

allocate forces to meet those requirements, and when needed, seek USTRANSCOM augmentation." (Joint Chiefs of Staff, 2013)

Additionally, interoperability is considered critical between these two entities, "Effective support of the supported Combatant Commander's (CCDR's) mobility requirements demands theater and CONUS-based forces form a mutual partnership. This partnership must operate as an integrated force with interoperable planning, tasking, scheduling, and C2 systems." (Joint Chiefs of Staff, 2013) The key points here are that air mobility is truly global in nature, but that it can be managed at both a regional and functional level. Finally, in order for this balance to work, there must be clear, frequent communication and interoperability between the two entities. Yet, to get the full picture, the researcher must look at how the C2 enterprise has evolved over time.

Joint Command and Control practices for air operations are described in Joint Publication (JP) 3-30, which prescribes centralized control and decentralized execution. "Centralized control is giving one commander the responsibility and authority for planning, directing, and coordinating a military operation or group/category of operations. This maintains the ability to focus the impact of joint air forces as needed throughout the operational area" (Joint Chiefs of Staff, 2014). Decentralized execution delegates execution authority to subordinate commanders in order to keep up with the pace of operations and the uncertainty and fluidity of combat operations (Joint Chiefs of Staff, 2014). It also enables mission command, which is the conduct of operations through decentralized command based on mission-type orders, allowing for subordinates to take the initiative at the tactical level based on clear instructions and commander's intent. This kind of flexibility is critical for the C2 of air operations, which are unique in

their speed, range, and flexibility (Joint Chiefs of Staff, 2014). Missions with a higher degree of uncertainty are subject to a greater degree of decentralized execution, while highly sensitive air strikes would be subject to a greater proportion of centralized control. The keys to success are clear centralized guidance and resistance to over controlling, which hampers operator initiative and effectiveness (Joint Chiefs of Staff, 2014).

In reference to the AMD, JP 3-30 says it integrates intertheater and intratheater airlift, aerial refueling, and aeromedical evacuation into air tasking orders, and coordinate with the Joint Force Commander's movement center and the 618th AOC. Furthermore, the AMD has a responsibility to assist the Combat Plans division with integrating intertheater and intratheater missions into the Air Tasking Order (ATO), even though intertheater missions are normally operationally controlled (OPCON) to the USTRANSCOM commander due to their global mission (Joint Chiefs of Staff, 2014). Requirements for airlift missions usually originate at the component level and are validated by either the JDDOC, the theater JMC, or by the Geographic Combatant Commander's J-3 in coordination with the J-4, depending on the theater. The Director of Mobility Forces ensures appropriate prioritization of tasks while interfacing with the AMD and 618th AOC to ensure capacity. After this coordination has taken place, requirements arrive at the AMD through electronic means for planning, tasking, and execution (Joint Chiefs of Staff, 2014).

History of C2

C2 has evolved has seemingly evolved since the beginning of warfare. Paul Maykish expanded on this in an article in the Air and Space Power Journal, which stated

that the United States' greatest advantage in war fighting lies not in the quality of its people or weapons, but in the systematic integration of those elements via C2 (Maykish, 2014). The author traces the history of C2 back to the days of the famed strategist Carl Von Clausewitz, who concluded that while the weapons used in conflict would change, certain aspects would remain the same no matter the time period (Maykish 2014). C2 grew from the ability of a commander to control his forces on a single battlefield as in the case of Napoleon, to coordinating an entire force, which in turn established an entirely new level of warfare, wedged in between the tactical and the strategic. The operational level of warfare was born. Though C2 went through various iterations, British Air Chief Hugh Dowding perfected the defensive use of radar and fighters to deter enemy forces, a system still used today for the defense of American borders on the Atlantic and Pacific. (Maykish, 2014) However it was John Boyd who revolutionized C2, using the OODA Loop to maximize our capacity for independent action. Boyd's system involved adding system level "insight" to the defensive "expedients" found in the Dowding model (Maykish, 2014). Yet even the current model of C2 may have become outdated. The DOD commissioned a C2 research program as a means of understanding the effects of the information age upon C2. "They aggressively concluded that traditional approaches to Command and Control are not up to the challenge. Simply stated, they lack the agility required in the 21st century." (Maykish, 2014) What does the next generation of C2 look like, the author is not entirely sure, but most signs point to the speed of information and collective knowledge of the force. To help determine this, one needs to look at the entirety of the operation.

In “The Rest of the C2 Iceberg”, Lt. Col. Dave Lyle writes that when considering C2, most of those unfamiliar only consider the execution of the Air Tasking Order (ATO). Beyond the day-to-day planning efforts, there are also theater staffs that examine the strategic outlook of the entire area of operations, and liaison officers from joint and coalition partners, not to mention Joint Task Force Headquarters and their staffs. Any advances made in C2 must incorporate these many elements. At a minimum, any C2 system must do 4 things: Build situational awareness, translate commander’s intent, produce feasible plans, and conduct mission control. (Lyle, 2014) When observing the most recent operations in the Middle East and in Europe, he sees three threats to our C2 excellence: Complacency in design, threats from systemic factors, and faulty C2 assumptions caused by systems illiteracy. (Lyle, 2014) Some of the details in these threats include the fact that our C2 expertise is getting smaller by the day, and that resources are continually being driven in other directions, probably because C2, unlike flying airplanes, is not in our cultural DNA. Furthermore, our enemies have allowed us to conduct C2 in a mostly static, uncontested environment, and our practices, rather than get more robust, are becoming simplified versions of themselves, simply because they can. (Lyle, 2014) Lastly, we have faulty assumptions about the possibilities for the future of C2, and that distributed operations, along with reach back, are often accompanied with delays and insufficient products.

The author states that there are ways to uphold C2 excellence. Among them are: Recognizing that C2 has an effect on strategic outcomes, acknowledging that C2 is primarily a human endeavor and not a technical one, recognizing that tactical Air Force

proficiency is necessary for entry but not sufficient for C2 success, invest in more robust training, both initial and advanced, for C2 operators, continue to invest in C2 exercises, and finally explore three-dimensional operational graphics and animation to raise general awareness. (Lyle, 2014) He states in his conclusion that "however, it is crucial to remember that tactical power is useless without sufficient C2 to direct it well." (Lyle, 2014) The staff at Air Force Headquarters seems to agree.

The themes reviewed thus far consist of agility, increased human proficiency, and a need to change the way things are done in a primarily human endeavor. In September 2015, the office of the Chief of Staff published its Air Force Future Operating Concept (AFFOC) as a look into the future of warfare where multi-domain operations, as well as reach back and distributed capabilities were commonplace in C2 operations. "The permanent, infrastructure-heavy theater AOCs of 2015 have evolved into MDOCs that can quickly be repositioned, reconfigured, and augmented. Many of the mission specific functions of 2015's AOCs have merged or moved to geographically dispersed reach-back cells with globally networked capabilities." (USAF, 2015) Furthermore, this concept focused on a reduced forward presence, reducing physical vulnerabilities, and reorganized operations centers based on advances in C2 capabilities. "The AOC's divisions, benefitting from new technology and use of distributed operations, have reduced their forward-deployed footprints and reorganized into four functional teams: Strategic Design, Tasking, Operations Execution, and Rapid Assessment." (USAF, 2015) Lastly, there is clear recognition of benefits of a highly trained C2 force, much like a new Air Force Specialty Code (AFSC) but one that can

only be earned after experience at the tactical level of war. New technologies and methods have brought on a paradigm shift in the way the Air Force trains and assigns personnel for C2 operations. Traditional tactical specialists continue to contribute to operational C2; however, the force needs trained multi-domain C2 Airmen leading operational design and execution efforts (USAF, 2015). These professionals could be developed from the best of the Air Force's tactical warriors. Clearly, Headquarters Air Force presented a personification of the themes presented in current research, consisting of agility, increased proficiency, and change to keep pace with the realities of the information age. Yet this was also a general picture, and though Air Mobility was mentioned, the path forward for the command and control of airlift, tankers, and aeromedical evacuation is still generally unclear.

To complement the Air Force's vision, in 2015 General Darren McDew released a vision for the future of Air Mobility Command. In this vision, he talked about the "potential for enhanced warfighter support through improved command and control capabilities." (McDew, 2015) The key to developing this asymmetric advantage is a networked system with modern situational awareness tools to allow commanders to rapidly adapt to changing situations in what will most likely be an Anti Access/Area Denial (A2/AD) environment. (McDew, 2015) These thoughts, when viewed through the lens of the AFFOC, illuminate a path to the themes presented earlier, through a concept known as Network Centric Warfare (NCW) and what professionals are currently calling the "Combat Cloud".

Lt Gen David Deptula, one of the architects from Operation DESERT STORM's air campaign, recently weighed in on the future of the AOC. He contends that

our ability to C2 forces will be affected by three major interrelated trends: emerging threats, new technologies, and the velocity of information." (Deptula 2014) He goes on to say that the changes in these areas since the design of the current AOC have been dramatic, and that the time has come for us to either update what we have, or begin a fundamental redesign. (Deptula 2014) The reason that we have not yet done so is that we've been essentially on a break fighting inferior powers in Iraq and Afghanistan, on a holiday from large-scale C2 airpower activities where our capabilities have not been challenged (Deptula, 2014). But in that time, some near-peer adversaries have modernized their equipment and kept an eye on how we employ our forces. This has led to the strategy of A2/AD.

> "A2/AD threatens our ability to C2 air and space operations in three ways. Near-peer adversaries can employ kinetic and nonkinetic weapons to deny us communications and intelligence, surveillance, and reconnaissance (ISR) from our space-based assets, thereby isolating our forces and blinding our leadership. Cyber attacks—now evolving beyond mere hacking or denial of service—are becoming more sophisticated and may be used to intentionally disrupt operations at the combined air and space operations center (CAOC). Accurate, long-range cruise and ballistic missiles are growing in their potential to threaten large, fixed, and exposed CAOCs." (Deptula 2014)

This environment makes our traditional AOCs very lucrative targets. Deptula asks if

now is the time to break up the traditional AOC with its stovepiped division structure in favor of something new. (Deptula 2014) Our modern military force needs to be able to respond quickly with little or no time for traditional AOC decision processes. Furthermore, it would be extremely useful if the aircraft that were sensing the emerging targets were also capable of striking such targets just moments later.

This points at using a command and control operation that can keep up. "Advancing threats demand that we move beyond large, centralized, and static C2 facilities. Replacing them with a mobile, distributed C2 structure that can handle the same volume and diversity of information as today's regional CAOC will call for a reappraisal of how we deal with information flow." (Deptula 2014) The AOCs of today were built on the success of Desert Storm, and contain stove piped divisions that task and execute assets using different software. For example, mobility assets are planned using the Global Decision Support System (GDSS2) and the Consolidated Air Mobility Planning System (CAMPS), and one of the members of the AMD has to translate this into the ATO by putting the already-planned sorties into another system, the Theater Battle Management Core System (TBMCS). Intelligence, Surveillance, and Reconnaissance assets are tasked on yet another program. "It is time to end the segregation inherent in the current CAOC organizational and process design and move to a much more integrated planning and tasking function." (Deptula 2014). Also, Deptula states that although the principle of "centralized control, decentralized execution" has served us well in command and control of airpower since World War Two, we are, as a benefit of advances in technology, moving into the realm of centralized command, distributed control, and decentralized execution. (Deptula 2014) When sorties took off in

Desert Storm, or the beginning of Operation Enduring or Iraqi Freedom for that matter, they knew which targets they would hit. Today, most pilots taking off on sorties over these same areas only know the areas they will monitor, and the targets become known as the situation develops. This calls for much more agile command and control. But how does one accomplish this? Deptula suggests flipping the paradigm on its head, getting rid of the large theater AOCs altogether to "develop a system that issues specific direction to particular elements of combat power according to a paradigm of multiple nodes responding in parallel to guidance designed to produce desired theater-wide effects." (Deptula 2014) In a contrained fiscal environment, he contends we cannot do this by simply buying less of what we need, and we certainly can't do it through the systematic AOC upgrades as originally intended by AOC creators. We must leverage our creativity to make a dramatic change in how we accomplish command and control (Deptula 2014)

Where Are We Headed?

The articles cited thus far can be summarized by their call for a new method of C2 for success in the 21st century warfare environment. It seems a given that communications and information technology will continue to develop, but using the same organizational structure to translate and process the information gained from this new technology seem like a strategy ultimately doomed to fail. The AFFOC stressed that the C2 structures of the future will be distributed and feature reach back capabilities and smaller footprints in theater (AFFOC 2015). Furthermore, the current AOC divisions will cease to exist as the MDOC of the future utilizes a more integrated approach to planning and execution. Because the mission of Air Mobility can be both global and

regional, there will surely be Air Mobility expertise present both at the global-natured 618th AOC and the regional AOCs and eventually MDOCs, but the structure of those organizations, due to the changes in how war is waged, and the strides made in the development of information and communications technology, will most likely change to reflect these realities. This is exactly the point made in current works detailing NCW.

When many people consider NCW, they think of computers and communications technology linking a variety of sensors across the world to create an integrated information network. However, according to David Alberts, this is not NCW, but rather what enables NCW in the first place. NCW, Alberts states, is about human and organizational behavior. It is about developing a new way of thinking, and applying it to military operations. (Alberts, Garstka, & Stein, Network Centic Warfare: Developing and Leveraging Information Superiority, 1999). Due to the increased proliferation of information technology and sensors across the battlespace, more information confronts the C2 enterprise than ever before. The most important focus of C2 is the need to manage that information (Alberts, Garstka, & Stein, Network Centic Warfare: Developing and Leveraging Information Superiority, 1999). It is characterized by the ability of geographically dispersed forces to create a high level of shared battlespace awareness that can be exploited via self –synchronization and other network centric operations to achieve commander's intent. NCW is transparent to missions, force size, and geography. It is not about technology, but about an emerging military response to the information age. Moreover, NCW does not focus on network centric computing and communications, but rather focuses on information flows, the nature and characteristics of battlespace entities, and how they interact (Alberts, Garstka, & Stein, Network Centic

Warfare: Developing and Leveraging Information Superiority, 1999). So what does research say about how an organization structures itself to process mass amounts of information while maintaining agility and keeping in mind the vulnerabilities added to a permanent presence in a forward location?

Organizational Information Process Theory

In the mid-70s, Jay Galbraith published a theory on information flow in organizations called Organizational Information Process Theory (OIPT). The basic proposition follows that the degree of uncertainty correlates to the amount of information that needs to be processed between decision makers in order to obtain a given level of performance. (Galbraith, 1974) The author further states that if the task is well understood prior to execution, then much of the task can be pre-planned. In military operations, Operational Plans attempt to accomplish this, but as the popular saying goes, no plan survives first contact with the enemy. Therefore, due to the nature of war, a vast amount of knowledge will need to be processed between decision makers, especially in the early stages of an operation. The organizational structure is designed according to an overall strategy. In a hypothetical organization, a task is divided into subtasks that require specialists. The problem is to integrate the subtasks around the completion of the main task (Galbraith, 1974). In order to integrate subtasks, an organization has to create integrating mechanisms, which again depend on the overall strategy of the organization. Some of these mechanisms include a rules and programs for more predictable tasks, hierarchy for greater uncertainty, or targets and goals for an even higher degree of uncertainty. Each has its own advantages and disadvantages, but the ability of an

organization to successfully utilize any of these mechanisms depends on the frequency of exceptions that must be decided by the hierarchy, and the capacity of the hierarchy to handle them (Galbraith, 1974). As task uncertainty increases, an organization can either limit the information it processes, or increase its capacity to process information. There are two strategies for each, with the eventual goal being reduced requirement for hierarchy intervention (Galbraith, 1974). This assumes that the limiting factor in an organization is its ability to process unanticipated, consequential information (Galbraith, 1974).

If the goal is to reduce the information it processes, the two strategies are the inclusion of slack resources or the creation of self-contained tasks. In industry, some companies may push goal delivery dates to the right to ensure they can still meet their goals even with increased uncertainty (Galbraith, 1974). This certainly seems to be the opposite to operational agility in the employment of airpower. The second method, self-contained tasks, creates multiple sub-organizations, each with their own complement of specialties. It shifts the basis of the authority structure from one based on input, resources, skill, or occupational category, to one based on output or geographical categories (Galbraith, 1974). This seems to apply to the regional AOC structure across the combatant commands. The opposite would be to abolish each of the regional AOCs and leave all coordination to only functional AOCs, which would require a higher rate of information exchange and would most likely argue over priorities. The cost of this approach is the loss of specialization and utilization of economies of scale. This is also most likely why there is tension over control of Air Mobility assets between the respective geographic and functional AOCs.

If an organization is looking to increase its ability to process information, the two strategies are investment in vertical information systems and the creation of lateral relations. Vertical information systems, very simply, create a formal decision-making language that makes things easier on the decision-maker (Galbraith, 1974). This manifests itself in the Air Force through systems such as the Joint Operation Planning and Execution System (JOPES) and even the Task Management Tool (TMT). The critical note the author makes is that if the data is formalized and quantifiable, then this strategy is a winner. However if the data is more ambiguous, it may prove unable to clear up the confusion. The lateral relationship strategy brings the decision-making down to where the information exists, but does not re-organize around self-contained groups (Galbraith, 1974). As uncertainty increases, lateral relationships can develop from direct contact, to liaisons and task forces, and eventually toward establishing integrating roles, managerial linking roles, and finally the matrix organization, complete with two supervisors with equal authority for certain roles. The cost of this approach is an increased amount of personnel in integrating and managerial roles (Galbraith, 1974)

In conclusion, the author states that an organization must choose at least one strategy when confronted with increased uncertainty. If it does not choose, decreased performance standards will be virtually automatic (Galbraith, 1974). Increased uncertainty definitely seems to be on the rise due to our military's increased information-gathering ability combined with the pace of operations around the world thanks to the power of communications and information technology. The Air Mobility C2 community will need to choose a strategy.

Further research on Galbraith's OIPT shows that organizations process

information in order to eliminate uncertainty, which Galbraith defined as the lack of information (Richard L. Daft, 1986), and equivocality. Equivocality presumes that the field of information is unclear, and for any ambiguous tasks, managers preferred working with unequivocal data (Richard L. Daft, 1986). Furthermore, researchers found that face-to-face meetings were preferred between personnel dealing with equivocal data so non-verbal communication could be better interpreted. When the data was unequivocal, an e-mail or document presenting such data was sufficient. So while there appears to be two different goals for processing information, they are quite similar because both involve reducing the ambiguity in decision-making. The researchers created a framework for determining the amount of uncertainty and equivocality in a particular organization.

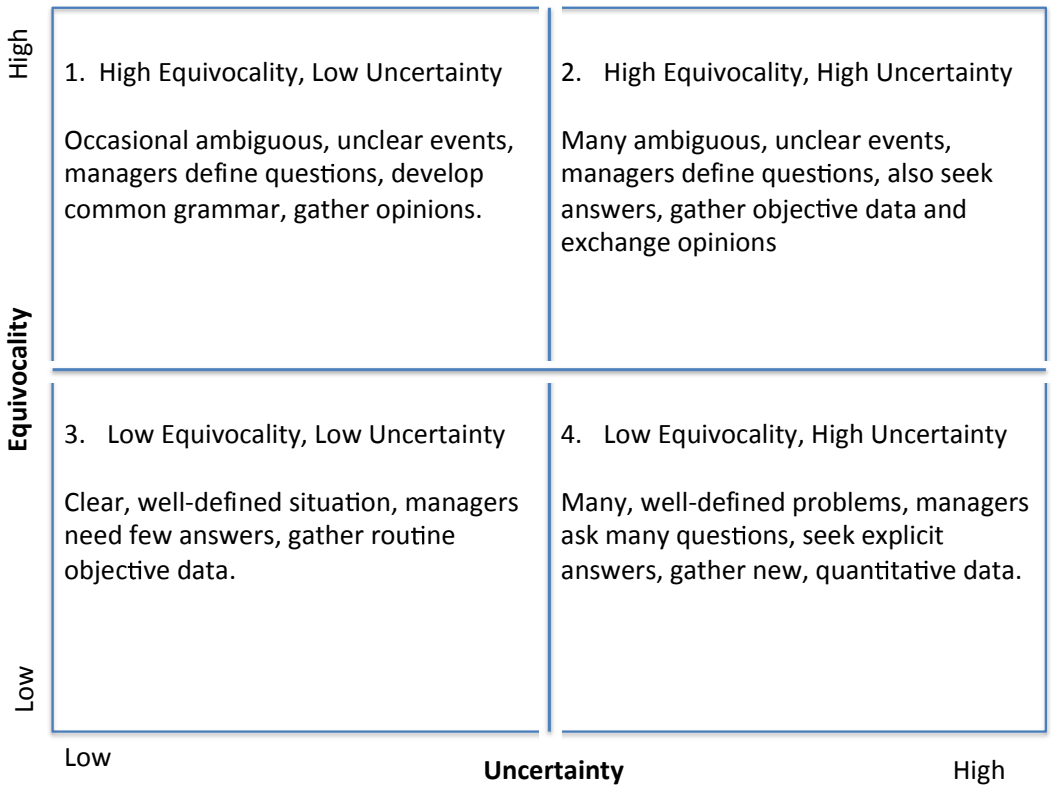

Figure 1 - Hypothesized Framework of Equivocality and Uncertainty on Information Requirements

Source: Based on R.L. Daft and R.H. Lengel (1984)

Based on this framework one can observe that determining the structure of an organization is more than simply processing information to reduce uncertainty. Building on Galbraith's research, which shows that organizations can be structured to provide the right amount of information, this research aims to show that organizations can be structured to provide information with suitable richness to reduce equivocality as well as uncertainty. Information richness is defined as information with the ability to change understanding within a certain time interval (Richard L. Daft, 1986). Daft and Lengel introduced their own chart to illustrate seven different organizational strategies to address uncertainty and equivocality, and the effect of each strategy on each problem, shown in

figure 2.

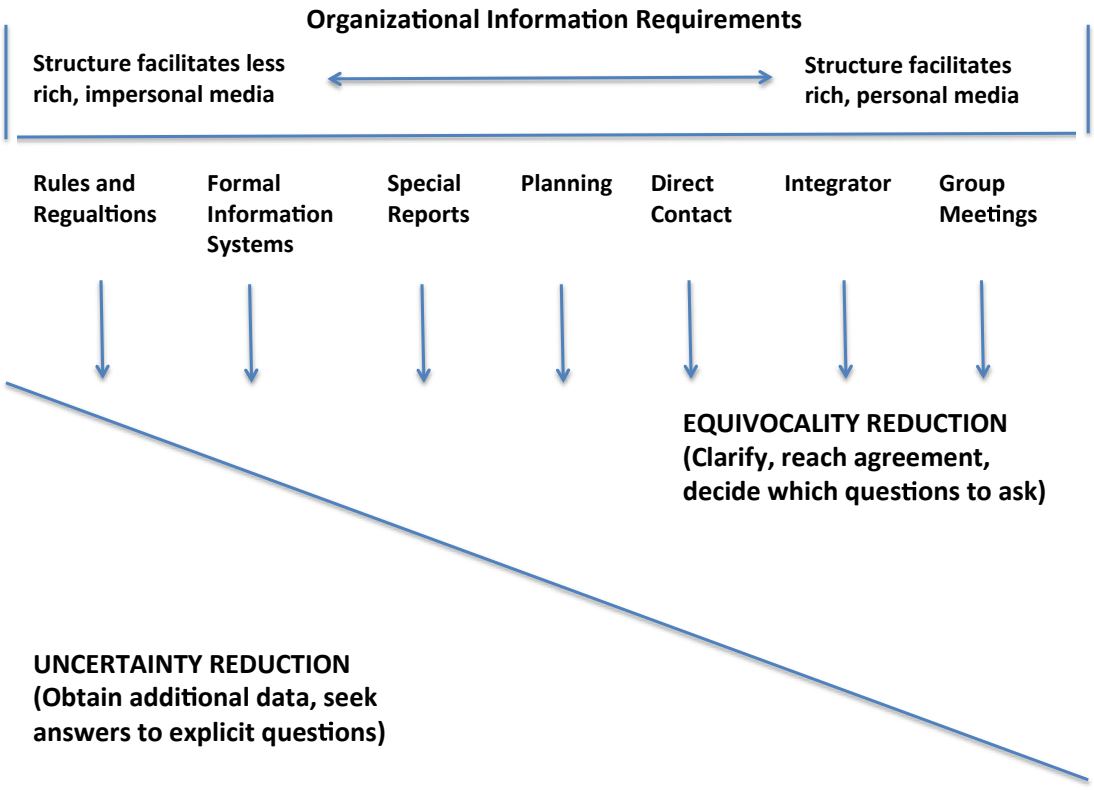

Figure 2 - Information Role of Structural Characteristics for Reducing Equivocality or Uncertainty

Source: Based on R.L. Daft and R.H. Lengel (1984)

According to this chart, group meetings would provide the highest return on equivocality reduction, while offering typically only a small amount of raw information exchange. On the opposite end, rules and regulations pass large amounts of information, but this medium does little to reduce equivocality. The best blends are located in the middle of the chart, such as special reports, planning, and direct contact, some of which are mentioned by Galbraith (Richard L. Daft, 1986).

The characteristic that influences equivocality is differentiation, meaning the different language, goals, and culture that evolves in different groups within an

organization. Equivocality is high when differentiation is great, and organizational structure should allow for discussion and resolution of conflicts between interdependent departments (Richard L. Daft, 1986). That said, the characteristic that most influences uncertainty is the strength of interdependence between departments, or how much two departments depend on each other (Richard L. Daft, 1986). When interdependence is low, departments experience more autonomy and stability. To observe how these relate, Daft and Lengel created the following illustration:

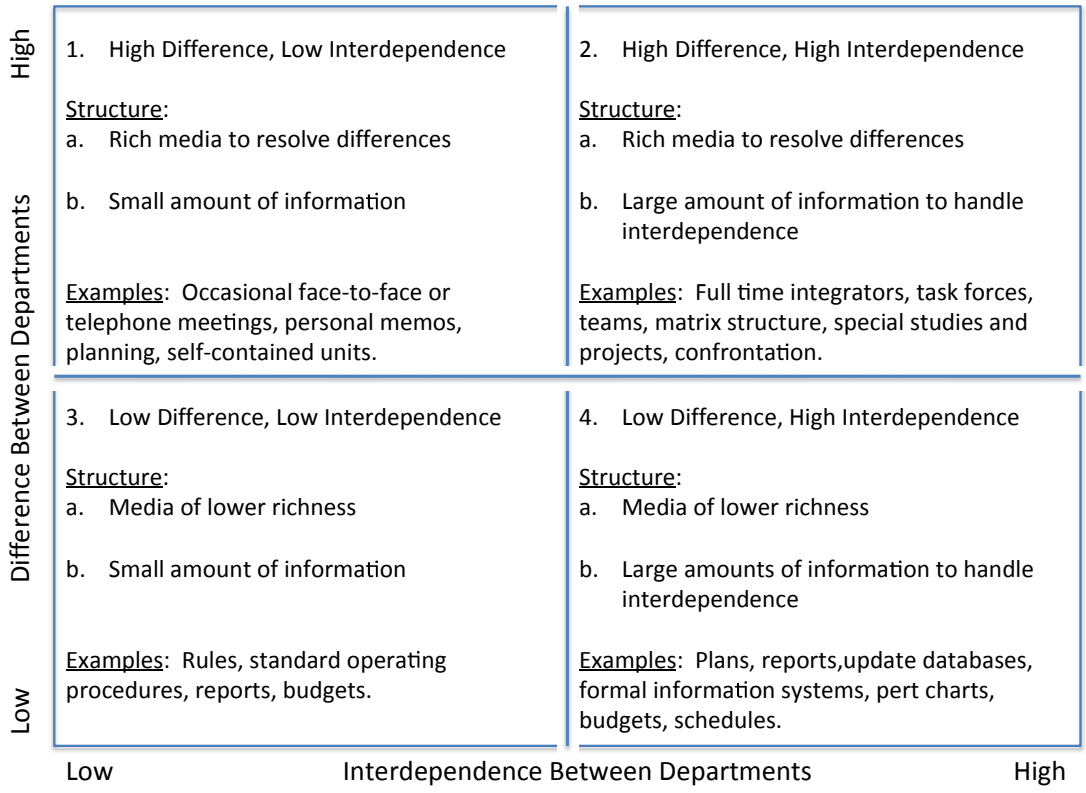

Figure 3 - Relationship of Interdepartmental Characteristics with Structure and Information Required for Coordination

Source: Based on R.L. Daft and R.H. Lengel (1984)

Both of these previous articles, from Daft and Galbraith, are highly influential in that they are often cited in more recent articles regarding organizational design. Yet these works were not the last words for either set of authors, as Galbraith continues to publish works and is the subject of interviews.

In a 2011 interview, he updated his original words after having published more works on organizational design, in particular, the STAR organization and matrix structure. In the interview, Galbraith tells a story about a series of business consultants who are brought in a company to optimize its structure. While one recommends splitting into divisions, the next recommends centralizing all decision-making, and the last one focuses on interpersonal relationships. He says none of these are necessarily wrong, but none of them capture the entire picture either (Kates, 2011). He also states that many international organizations are going to a matrix structure in order to contend with added complexity, and that complex organizational structures built to keep up with the demands of the world are starting to be seen as a strength (Kates, 2011). This could almost be interpreted as foreshadowing the world of 21st century military operations, where coalitions with complex rules of engagement are the norm and A2/AD environments become more common. Furthermore, Galbraith states that process, along structure, is the key to making complex organizations work. Organizing by process, is critical to designing structures that work, and the more complex the structure, the more critical the process becomes (Kates, 2011). Reflecting on the Air Force Future Operating Concept and the work published by General Deptula, it seems that the ATO Cycle will become much more adaptive to rapidly updated information. These comments by Galbraith would seem to state that a future C2 organization must have a structural design that

reflects a more adaptive and agile approach to warfighting and humanitarian operations. Also, one cannot discount the role technology plays in organizational design.

Enterprise Resource Planning (ERP) systems can be a key way to automate and integrate several business processes across data networks. These kinds of systems are already present in DOD operations and will no doubt become more sophisticated in the future. Nonetheless, OIPT suggests that these systems will fit into some organizations better than others. Specifically, units that are highly dependent on one another may benefit immensely from such integration, while units who suffer from high differentiation, may incur costs such as suboptimal business processes or a dependence on employee workarounds (Gattiker & Goodhue, 2005). This sounds very much like the environment in some AOCs currently.

The journal of Economics and Management published an article about a synchronous supply network in 2013. According to the author, supply chain management experts have for many years focused on lean and six sigma, but for the information age, a new approach is needed. She calls this "Supply Chain Networkability". (Kempny, 2013) In the past, supply chains were sequential or linear in nature, or composed of multiple phases. If one looks at the way information flows today in supply chains, it is distinctly non-linear. In fact, there is really no fixed pattern for information flow. Users simply put the information on a website for others to see, and the network responds. This method developed because of the way humans interact on the internet, and has helped form a sort of shared consciousness that makes the entire supply network more agile. (Kempny, 2013) Agility here is defined as the strategic and operational readiness of the supply chain to change and the ability to respond adequately to these changes (resource

mobilization).” (Kempny, 2013)

Because of this, she expects the flows in real goods in supply networks to begin flowing like the information. (Kempny, 2013) There is still much to be learned in the area of which IT and communications systems work best for synchronous networks, but she points out the advantages of Direct Delivery (Kempny, 2013), a strategy utilized by Air Mobility for quite a few years to deliver goods directly to a point of need. Also, contrary to traditional established hub and spoke method, Kempny states that hubs should be changeable based on momentary advantages, which means smaller footprints at those hubs. (Kempny, 2013) At the center of this is a modern, integrated information network with software capable of real network visualization and design simulation. (Kempny, 2013) This network should be usable by government agencies and industry partners alike. In time she believes this will lead to not only better collaboration, but increased opportunities for direct deliveries at lower cost. (Kempny, 2013) Kempny’s article seems to articulate a need for shared consciousness and decreased differentiation across an interdependent enterprise in order to contend with this increased information flow and requirements from an ever-wider array of sources. So why wouldn’t it make sense to consolidate all AMDs under the 618th AOC?

In 2013, a research project examined the possibility of a consolidation of worldwide AMDs into the TACC through a Delphi study. The conclusions were key in the formulation of this research topic and a factor in the assumptions. The chief measure in effectiveness in this previous project was customer satisfaction. An important aspect of good service is understanding what the customer wants. In this case “more” may not necessarily be as important as “now.” Just because someone can provide you more of a

product or service does not necessarily mean the customer is thereby more satisfied (Oelrich, 2013). “In many ways, the definition of effective and efficient resides with the customer, the JFACC. Yet again, if the JFACC, as the customer, does not receive their mobility assets because it was re-tasked to another Combatant Command (COCOM), that JFACC is going to want answers.” (Oelrich, 2013) Because consolidation also comes with a prospective change in command relationships, the research also had to endorse supporting command relationships over a change in operational control. As many have seen with intratheater airlift in support of the Army, if needs are not met, priority levels will inevitably be raised in order to guarantee the perceived requirement for support. The consequence here is that eventually everything becomes a priority, so that it is extremely difficult to distinguish between which should be priority 1A and which should be priority 1B. This creates the potential for a bottleneck at USTRANSCOM, who becomes the arbiter for such decisions.

“The key is who knows the customer best, often times it is the individual that spends the most time with their clients. Unfortunately, the 618th AOC is geographically separated from the COCOMs and often falls victim to the adage, virtual presence is actual absence.” (Oelrich, 2013) “Conversely, individual AMDs can also have a myopic view of the world strictly from their Area of Responsibility (AOR) perspective. In turn, AMDs may incorrectly prioritize missions when in fact another COCOM may have more urgent requirements.” (Oelrich, 2013)

Ultimately it was obvious that there were many senior leaders who did not think that AMD consolidation was a good idea. In fact, there was clear disagreement and polar extremes on whether or not the AMD consolidation would even be beneficial.

While the intent of a Delphi study is to reach consensus, this lack of consensus is also just as powerful of an indicator." (Oelrich, 2013) However, there were positives that came out of this study, such as the requirements for a regional mobility C2 body. "The panel strongly concluded that in any MAF C2 organization, present or future, that in order to succeed MAF C2 must do the following three tasks: clearly understand the commander's priorities and intent, second provide responsive, flexible and synchronized MAF resources and solutions against diverse and varied COCOM requirements, and finally execute time sensitive, adaptable and integrated mobility C2 oversight inside and outside the AOR to ensure those commander's intent are met." (Oelrich, 2013) In addition, the subject of a hybrid C2 organization, or an AMD with a strong reachback capability to the 618th AOC, would be an appropriate subject for further study: "Lastly while full consolidation is currently suspect, the development of a hybrid MAF C2 organization that is able to optimize the positive attributes of both organizations should be further explored." (Oelrich, 2013)

III. Methodology

Discussion and Selection of Research Methods

One has to examine both the constraints and opportunities of the subject matter at hand in order to choose a method that would yield the most informative end product. The National Science Foundation published a document on data collection methods for qualitative research which include observations, interviews, focus groups, and others such as document studies, public records, and personal documents (National Science Foundation, 1997). Furthermore, the Delphi Method of conducting surveys was also highly utilized in previous research related to this topic.

Research data needed to be collected from various C2 experts with current or recent employment in a variety of roles and geographic locations in order to gain a broad perspective on current practices and processes. Also, the opportunity for the researcher to travel to multiple locations was not available. Additionally, the researcher was aware, as stated earlier, that the Delphi method of using multi-round surveys to gain information from experts in the field had been utilized previously and recently, leaving little appetite for continuing to use this method.

After examining these constraints, observations and focus groups as methods of data collection were ruled out almost immediately due to travel limitations. Document studies, while helpful in constructing a background on the subject, would discount the expertise in the field available to discuss the intricacies of each their respective experiences. The choice, therefore, appeared to be between using a Delphi Method and that of interviews.

When examining interviews, the research illustrated the following advantages (National Science Foundation, 1997):

1. Usually yield richest data, details, new insights
2. Permit face-to-face contact with respondents
3. Provide opportunity to explore topics in depth
4. Afford ability to experience the affective as well as cognitive aspects of responses
5. Allow interviewer to explain or help clarify questions, increasing the likelihood of useful responses
6. Allow interviewer to be flexible in administering interview to particular individuals or circumstances

Furthermore, interviews offered the following disadvantages (National Science Foundation, 1997):

1. Expensive and time-consuming
2. Need well-qualified, highly trained interviewers
3. Interviewee may distort information through recall error, selective perceptions, desire to please interviewer
4. Flexibility can result in inconsistencies across interviews
5. Volume of information too large; may be difficult to transcribe and reduce data

Finally, the following are circumstances for which interviews were found to be particularly well suited (National Science Foundation, 1997):

1. Complex Subject Matter
2. Detailed Information Sought
3. Busy, High-Status respondents
4. Highly Sensitive Subject Matter

In regards to the Delphi, it has similar advantages and disadvantages as the interview method, with the exception of the following (Linstone & Turoff, 2002):

1. Does not permit face-to-face contact with respondents
2. Data is submitted electronically or in written form versus in the form of dialogue
3. Does not allow interviewer to clarify responses
4. Is inflexible in that each respondent receives the same survey

5. Inexpensive
6. More consistent responses due to inflexibility of surveys

Additionally, the Delphi method is particularly suited for certain purposes and is advantageous to use in distinct environments. For example, the Delphi is useful in the corporate environment due to the anonymous nature of the data. Delphi studies are frequently used to look at a future state, and are also used to combine and refine the opinions of a heterogeneous group (Linstone & Turoff, 2002)

While each method could offer advantages for this particular set of research, one has to return to the research goal to determine which is a better fit. The stated goal is to utilize OIPT to determine criteria for which Air Mobility C2 tasks should be performed at a geographic AOC and which should be performed at a functional AOC like the 618th AOC. Furthermore, the research aims to determine if an alternate structure for Air Mobility C2 within a geographic AOC might be utilized to better facilitate the flow of information, with the eventual goal to increase agility and improve decision-making throughout the Mobility C2 enterprise. In order to utilize OIPT, one must have as much information about the current processes and procedures as possible, which will require more detailed information than could be obtained through a Delphi Study, which would not allow a researcher to delve deeper into a topic or clarify the responses of research subjects. Finally, due to the increased focus on C2 by the Air Force in recent years, many research subjects have already been tasked with various surveys. Interviews would most likely yield a higher participation rate in addition to revealing more detailed information; therefore interviews were chosen as the data collection method.

Sample

A purposive sample frame was used to capture representative data from those directly related to the Air Mobility C2 enterprise. In this case there are three group types: interdependent organization members, organization members and leadership. The following paragraphs address each group of interviewees and the reason for their inclusion.

C2 Organization Members outside the AMD

Interdependent organization members are those personnel who do not work in the AMD, but interact with AMD members and products through their roles in another AOC division. These personnel offer a unique perspective as outsiders who depend in some way on the flow of information through the AMD. Furthermore, because they work outside the organization, they experience the differentiation between their organization and the AMD, and how their organizations depend on AMD products to perform their specific tasks.

Organization Members

AMD members are those personnel who work in either a planning, execution, or coordination role in one of the traditional AMD teams. Though not in a larger leadership role, AMD members may lead a smaller amount of personnel while accomplishing a specific task associated with their assigned team. AMD members understand the demands of specific tasks, and how much uncertainty and equivocality are involved in those tasks on a daily basis. They also understand how other organizations may differ in processes and culture, as well as dependence on AMD products.

Leadership

Leadership consists of Air Mobility C2 leaders. These members have significant experience in the C2 community and have fulfilled a leadership role as either an AMD Chief or Director of Mobility Forces. They have a keen understanding of the demand on leaders in such positions to sort through information and make decisions. Furthermore, leaders in these positions offer a perspective informed by years of experience and relationships with members across the C2 community as a whole.

Interview Procedures

The interview procedure consisted of a three-step process. The first step was to construct the interview itself (see Appendix B). The interview was divided into three distinct sections. The first consists of the interviewer's script that discusses the purpose and confidentiality of the interview of the interview, obtains permission to record, and briefly introduces the format. The next section consists of questions that were asked of all subjects. The final sections consist of questions specific to the individual groups.

The second step was to determine specific members to interview, obtain approval, and then notify the member of the interview. Notification was accomplished in the form of a pre-notification letter (see Appendix A, Pre-Notification Letter). The pre-notification letter describes the intent and basic format of the interview.

The final step was to conduct the interview. The goal was to complete all of the questions and interviewing within a 45-minute time limit. Some interviews were shortened due to time constraints of senior leaders. Many interviews were unobtainable in person and were conducted via electronic means. One interview had to be completed

over e-mail due to connectivity issues.

Description of Interview

The goal of the interviews was to learn as much as possible from the participants about their perceptions regarding the Air Mobility C2 enterprise. To do this; the interviews included two sections of questions. The first section consisted of more general questions that pertained to each group of interviewees (i.e. interdependent organization members, organization members and leadership). This set includes questions about how information flowed between organizations. Furthermore, there are questions regarding general ideas about the future of C2, such as agility, education, and increasing the speed of information. The second section is divided into group-specific questions. Each group received questions regarding the relationship between the AMD and other organizations, examining interdependability and differentiation from both inside and outside the AMD organization. For AMD members and leadership, there are targeted questions that attempt to find the amount of uncertainty and equivocality dealt with routinely.

IV. Analysis and Results

Chapter Overview

In this section, several areas of the research are reviewed. These areas include an analysis method and translation to statistics, and a review of the data collected via interviews to include salient insights from various sources. The data and results presented here are representative of the views of experts and leaders in C2 from the Air Mobility community as well as members of the ISR, Strategy, and Combat Plans divisions.

Analyzing the Data

In total there were 17 interviews involving C2 experts lasting between 30 minutes and 1 hour in length. These interviews included 9 subjects with experience as either an AMD Chief or a Director of Mobility Forces. Also included were 5 subjects with C2 experience outside the AMD, and 3 subjects with AMD experience. Subjects had experience at the 609th, 603d, 613th, 612th, 607th, and 618th AOCs. The interviews were recorded, transcribed, and input into MAXQDA, a data-coding program. The transcribed interviews were then analyzed for the answers to questions pertaining to OIPT and also those pertaining specifically to the question of position location of C2 tasks in accordance with previously stated research questions. Not all subjects were asked the same questions since certain AMD questions would not pertain to those from positions outside the AMD, as well as questions about outside interaction with AMD members and Air Mobility practices would not pertain to AMD members or leadership.

Furthermore, interviews were semi-structured to allow for follow up questions and exploration of other topics when appropriate.

Subjects related specifically to OIPT and Position Location

Following an analysis of the data, the answers given by subjects were coded into 12 subjects, which are listed below. The statistics for each subject are discussed following this table, with many of the specific reasons for responses discussed in the review of the research data in the following section of this chapter. Furthermore, statistics calculations are shown in Appendix C.

	Subjects related specifically to OIPT and Position Location
1	Success using reachback with all AMD positions
2	Success using reachback with some AMD positions
3	Success integrating entire AMD into AOC divisions
4	Success keeping some AMD entity within AOC
5	Leaders overloaded with Information/decision requirements
6	Leaders not overloaded with Information/decision
7	AMD differentiation
8	AMD Interdependence
9	AMD deals with more equivocality than lack of information
10	Lateral relationships highly important for success
11	Face-to-face interaction needed to resolve equivocality
12	Face-to-face interaction not needed to resolve equivocality

Figure 4 - Subjects related to OIPT and Position Location

2. **Success using reachback with some AMD positions**: This subject applied to only AMD leadership and AMD members. 92% of subjects responded that this practice would be successful in various forms.

3. **Success integrating entire AMD into AOC divisions:** This subject applied to only AMD leadership and AMD members. No subject responded that this practice would be successful.

4. **Success keeping some AMD entity within the AOC**: This subject applied to only AMD leadership and AMD members. 100% of subjects responded that this practice would be successful in various forms.

5. **Leaders overloaded with information/decision requirements**: This subject applied to only AMD leadership. No subject responded that leaders did not have an appropriate balance of information/decision requirements.

6. **Leaders not overloaded with information/decision requirements**: This subject applied to only AMD leadership. 100% of subjects responded that leaders had an appropriate balance of information/decision requirements, some with the caveat that when operations moved from Phase 0/1 into Phase 2, there was high potential for overload due to the manning of their particular AMD being designed for Phase 0/1 operations.

7. **AMD Differentiation**: This subject applied to only AMD leadership and AMD members. 78% of AMD Leaders, 66% of AMD members, and 75% of all subjects responded that more differentiation existed between the AMD and the 618th AOC. Also, one subject maintained the difference in differentiation was unquantifiable. Moreover, participants expanded on this subject in the next section.

8. **AMD Interdependence**: This subject applied to only AMD leadership and AMD members. 44% of AMD Leaders, 33% of AMD members, and 41% of all subjects responded that more interdependence existed between the AMD and the 618th AOC than between the AMD and its corresponding AOC. An equal amount of AMD leadership responded that there was more interdependence between the AMD and its corresponding AOC, with one abstention based on the opinion that this distinction was non-quantifiable. Additionally, members expanded on this subject in the next section.

9. **AMD deals with more equivocality than lack of information**: This subject applied to only AMD leadership and AMD members. 78% of AMD Leaders, 67% of AMD members, and 75% of all participants responded that AMD members regularly dealt with more equivocality or the lack of clarity of information than with uncertainty or the lack of information. The chief locations of noted equivocality came requirements and tasks from geographically separated organizations.

10. **Lateral relationships highly important for success**: This subject applied to all participants. 78% of AMD Leaders, 40% of other division members, 67% of AMD members, and 65% of all subjects responded that lateral relationships were observed as highly critical to ensure mission success. Examples of such relationships included group meetings, liaisons, and matrix structures to ensure shared consciousness across the organization.

11. **Face-to-face interaction needed to resolve equivocality**: This subject applied to all participants. 67% of AMD Leaders, 100% of AMD members, and 60% of

all subjects responded that face-to-face interaction offered media richness much higher than other forms (VTC, telephone, e-mail) when resolving equivocality.

12. **Face-to-face interaction not needed to resolve equivocality**: This subject applied to all participants. 0% of AMD Leaders, 0% of AMD members, 40% of other division members, and 12% of all subjects responded that face-to-face interactions offered only slight or even no benefit when resolving equivocality when compared to other forms (VTC, telephone, e-mail).

Consistent Themes from Research Subjects

In addition, various themes emerged during the interviews that pertained to the overall research goals. These themes were tracked as well and are listed below:

	Consistent Themes from Research Subjects
1	Proximity of position highly significant in success
2	Personnel C2 experience highly significant in success
3	Members do not understand inner workings of 618th AOC
4	Perceived C2 Resiliency not adequate
5	618th AOC not responsive enough to theater needs
6	Air Mobility mission/practices not understood by non-AMD

Figure 5 - Consistent Themes from Research Subjects

1. **Proximity of position highly significant in success**: This theme applied to all participants. 78% of AMD Leaders, 67% of AMD members, 80% of members outside the AMD, and 76% of all subjects responded that due to time constraints and work requirements, they were more likely to talk face-to-face with personnel who worked close to their position, or within a short walk not to exceed approximately 30 seconds, than to

those who may work in the same geographic location, but are not within the same distance.

2. **Personnel C2 experience highly significant in success**: This theme applied to all participants. 55% of AMD Leaders, 100% of AMD members, and 80% of members outside the AMD, and 70% of all subjects pointed out that while C2 training was certainly important, experience was much more significant in increasing the flow of information through the C2 organization while decreasing equivocality. Also, experience was noted as especially important in regards to information timeliness in the correct format.

3. **Members do not understand inner workings of 618th AOC**: This theme applied to only AMD Leaders and AMD members. 22% of AMD Leaders, 33% of AMD members, and 25% of all subjects responded that most members did not fully understand how the 618th AOC was structured. When acquiring information, members often did not know where to start and usually called a friend in the organization or a contact they had used previously. The lack of a similar organizational structure made it difficult to interpret how information flowed, which limited the ability to acquire information or eliminate equivocality in a timely manner.

4. **Perceived C2 Resiliency not adequate**: This theme applied to only AMD leaders and AMD members. 44% of AMD Leaders, 33% of AMD members, and 41% of all subjects perceived that there was not adequate resiliency for the 618th AOC to take on C2 for a significant amount of air mobility assets operating within geographic theaters.

Subjects perceived that such a change would result in mission failure due loss of connectivity and unfamiliarity with the backup plan.

5. **618th AOC not responsive enough to theater needs**: This theme applied to only AMD leaders and AMD members. 88% of AMD Leaders, 67% of AMD members, and 83% of all subjects identified that 618th AOC is not able to respond to geographic AOC requests for information in a timely manner. This was the chief concern with reachback operations and will be discussed in detail in the next section.

6. **Air Mobility mission/practices not understood by non-AMD members**: This theme applied to all participants. 67% of AMD Leaders, 100% of AMD members, 60% of other division members, and 70% of all subjects identified that Air Mobility practices are generally unknown to members outside of the AMD. AMD members stated that requests for information are frequently repeated, and that AMD members are often asked to attend meetings where they either find that operational planning has taken place with no regard to air mobility capabilities or capacity, or they are entirely unneeded but were asked due to an unfamiliarity with what they could offer.

Finally, salient insights were highlighted for possible inclusion into the review of the research data.

Review of the Research Data

The following section includes a review of the data presented above to include some of the salient insights from the research interviews. This section is divided into the perspectives of the three groups of research subjects consulted for this project.

AMD Perspective

This section discusses the perspective of Air Mobility C2 personnel. Most interviews were conducted over the phone due to distance, while others were conducted in person. AMD personnel felt that most information flowed in a face-to-face format due to the close working quarters of most AMDs. That being said, e-mail was also preferred as a method of record keeping, but could become overwhelming when used incorrectly. One member spoke of receiving up to 100 e-mails upon walking in one morning, and most of them had little or nothing to do with his position. They were simply sent by other personnel who wanted to ensure they weren't missing something in their planning regarding Air Mobility, due to unfamiliarity. Also, division update briefings were rarely used for presenting information for leadership decisions. Again, due to the close proximity of leadership, AMD personnel would simply gather the right personnel and walk over to the division chief's desk. This did not appear to overload leadership with decision requirements, reflected in leadership results.

The AMD capacity for information flow was perceived as high, usually with excess capacity. The exception would be for those AMDs with a smaller manning compliment, such as 607th AMD and 612th AMD, which would require augmentation incredibly quickly keep up with information requirements. It was rare for AMD personnel to interact face to face with members from other divisions outside of a formal planning meeting. This resulted in some unfamiliarity with the other missions being carried out in theater, but did not detract from AMD accomplishing their required tasks. One noted issue consisted of Air Mobility personnel being asked to formal meetings

where they were not needed. Interviewees felt that they were most likely asked to ensure planners from other divisions hadn't overlooked something related to Air Mobility. Furthermore, when meetings were needed and AMD personnel were required, face-to-face was preferred due to the tendency of some members of a virtual meeting to simply let it play while working on other tasks. Requirements usually appeared via computer software, but the requirements listed did not usually paint a comprehensive picture. While this was sufficient for some everyday missions, AMD members found themselves calling units to fill in some of the missing information on more complex missions. It was noted that the units, DDOC, and AMD were seldom collocated, creating the opportunity for much of the equivocality AMD professionals encounter. When AMD personnel needed something quickly from outside the division, they preferred to call or e-mail unless the walk was within about 30 seconds. Yet when attempting to solve something incredibly urgent, face-to-face or phone was preferred over e-mail due to the fact that the other member had to give their undivided attention. Members favored using collaborative information sharing websites, but felt that finding the desired information, in most instances, took entirely too much time and were often not worth the investment. Also, signing up for and keeping up the numerous accounts was overly tedious. Finally, when acquiring information outside their division, AMD personnel preferred talking face-to-face to LNOs in the AOC rather than calling to a geographically separated organization.

AMD members preferred to clear up equivocality via face-to-face interactions because it allowed them to read non-verbal cues. That being said, most agreed having a

record of the interaction via e-mail was preferable as well. While there were times when AMD personnel lacked information, they were few and far between. The difficulty became contacting the correct person. Forming relationships quickly inside and outside the AOC was deemed of the utmost importance from all interview subjects. While relatively simple within the AOC, AMD members calling the 618th AOC were often confused and handed off from person to person as many as 10-15 times before they were able to find the person with the information they required. AMD members felt like they dealt with equivocality more often than a lack of information due to this confusion with the 618th and the earlier mentioned requirements, although they also noted that much of the time, AMD-specific information did not make it far outside of the AMD, and they repeatedly found themselves answering the exact same questions, sometimes asked by the exact same people. One interviewee said he had copied and pasted the exact same e-mail multiple times a week as a response.

Regarding physical positions in the AMD, members stated that there was a benefit to having the members of the division co-located, with the exception of the Air Refueling Control Team (ARCT), which was oftentimes located with the Combat Plans Division. The perception as to the reason for the AOCs specific geographic location had to do with being in a similar time zone, as AMD members rarely interacted face-to-face with personnel outside of the AOC. Moreover, the time it takes for requirements to move through service validators and combatant command can sometimes leave little time for AMD personnel to plan the mission, making it beneficial to be on the same time zone as the tasked unit and the combatant command, especially since some AMDs do not operate

24 hours on a regular basis. The fact that members are at work during the same time as the units they task leads to quicker coordination. Specifically, Requirements team members and Operations/execution members would need to be able to contact the planning team. Aeromedical evacuation (AE) team members needed to be near other AMD personnel due to the typical urgency of their operations. It was noted that having someone with Air Mobility expertise close to the ATO integrator was also preferred. Also, it was brought up that having the Requirements team in synchronization with the Strategy Division would be helpful during contingency operations, although this didn't necessarily mean that they would be in close physical proximity.

Airlift tasks were largely similar every day, while AE and ARCT tasks encountered very little mission similarity from day to day, although their daily routine was largely the same. Additionally, most members found that the questions they encountered from outside the division were almost identical from day to day.

Regarding reach back or distributed operations, members encountered slower support or products that were not in line with what they had requested. This was mostly a result of the two entities not working on the same schedule. For example, one member going off shift at a non-24 hour facility would request something from a geographically separated entity while including a specific range of options for the product to be completed. When arriving the next morning, the member would find the product that was delivered did not fall within the specified range, but because that member was not available to provide continuing guidance through the night, the geographically separated member made assumptions to complete the product as he or she saw fit with the

information available. Another perceived reason for this was the lack of accountability for geographically separated organizations, in that the members of a planning entity located in the US are not accountable to the AOC leadership in the Middle East or Europe. They are rather only accountable to those in the AMD who requested the products, and because of the familiarity with AMD members and the pull of local requirements on their time, many geographically separated employees will choose to satisfy local requirements first. Nonetheless, while reach back was a concern, AMD members saw no need for a traditional full AMD staff in theater to accomplish all tasks. Because many AMD tasks are similar day to day, personnel felt that some kind of dedicated reach back entity in the US might be more efficient and could serve multiple theaters if needed. They did feel that it was important, given the feedback above, that this reach back entity be dedicated to the AMD it served so as ensure rapid support. Moreover, overlapping but not identical business hours for non-24 hour AMDs would provide a force multiplier for a smaller AMD entity in a theater AOC.

Regarding differentiation, there was more cited between members of the AMD and the 618th AOC (TACC) than the rest of the AOC. The culture and language were very different between the AMD and other divisions, but members agreed that with experience the barriers were easier to surmount while working towards similar goals under one CFACC. One of the critical pieces of information to know before crafting a message became the length of time the message receiver had worked in the AOC. Lastly, AMD members often reported there can sometimes be a perception that airlift is "automatic", such that planners from other divisions will often plan without consulting

Air Mobility experts, risking presenting an infeasible plan. Although much of the language between the AMD and the 618th AOC was the same, the goals and timelines were vastly different between the two which contributed to the greater differentiation.

In terms of interdependence, there was slightly more between the AMD and the rest of the AOC then between the AMD and the 618th AOC (TACC). AMD personnel were however especially dependent on the 618th AOC when performing hub and spoke airlift operations because intertheater aircraft would deliver to the hub, setting the timing for the operation. This could prove especially difficult due to the competing priorities of other theater requirements and the somewhat inflexible nature of the worldwide mobility requirements.

Perspective from Other Divisions

This section discusses the perspective of personnel who worked in AOC divisions outside of the AMD. These consisted of members with expertise in Strategy, Combat Plans, and ISR divisions, which will consequently be referred to as non-AMD personnel. Most interviews were conducted over the phone due to distance, while some were conducted in person. Non-AMD personnel felt that most information flowed in a face-to-face format within their division and this was highly dependent on the distance of travel required for those positions in divisions outside of their own. Also one member added that if there was any disagreement, it was easier to resolve in person due again to non-verbal cues. Additionally, members were more inclined to use a Video Tele-Conference (VTC) capability that was readily available and easy to use without prior coordination. Without these conditions, even with some VTC capability, phone calls

were preferred because they were simple and provided roughly the same amount cues such as vocal tonality and pauses. However, e-mail was again preferred as a method of record keeping since no other collaboration system was available to do so. Telecommunications software was cited as useful but not nearly as helpful as face-to-face, noting that in group settings, members are more likely to think of their next response rather than listen intently to current speaker.

Non-AMD personnel differed on the topics of equivocality versus lack of information. Some members thought they dealt with more equivocality, while others felt they more often were seeking out information. The one salient point was that when searching for particular information outside the organization, it usually consumed a disproportionate amount of time in relation to what they were searching for, due to filtering through large quantities of extraneous information. Interactions with AMD personnel were usually rare unless contingency operations were underway. In any case, most of the time these interactions were fairly one-sided with non-AMD personnel seeking information from AMD personnel. Furthermore, AMD personnel weren't perceived as actively seeking out non-AMD members in attempts to understand their priorities. The segregated nature of the AMD sometimes made them appear to work at a different pace than other divisions, especially those AMDs that operated 24 hours while other divisions' members work each day for an undetermined amount of time. While most interactions with AMD were only during formal planning meetings, non-AMD members still felt that AMD members were generally in sync with other divisions. Nonetheless, most non-AMD members felt having some sort of Air Mobility expertise in

their division would be well utilized, especially if a considerable distance separates the two divisions. One member stated that if a CFACC did decide to use the Rapid Raptor concept in an A2/AD environment, it would be crucial to have an Air Mobility expert embedded with that planning/execution entity. This embedding of personnel is something that happens occasionally with members of other communities. For instance, one member from the ISR community who sat in Combat Plans as a liaison was essentially matrixed back to the ISR Division, but spent time in both divisions and also the Combat Operations division. He saw this as essential to smoothing the seams between two divisions that in the past didn't have incentive to communicate frequently.

Leadership Perspective

This section discusses the perspective of Air Mobility leadership who held positions of either AMD Division Chief or Director of Mobility Forces. Most interviews were conducted over the phone due to distance, while some were conducted in person. These interviews made up the bulk of the contributing data for this project.

First, many leaders were frustrated with the lack of fidelity in the In-Transit Visibility (ITV) of cargo, and also the lack of real-time data on missions in execution. This type of data would assist them in not only further planning efforts and execution, but would help them establish trust and stronger relationships with partners throughout the theater.

While all leaders felt that some type of reach back capability for Air Mobility C2 was possible and would allow for certain efficiencies, all were firmly against eliminating

the AMD entity altogether anytime in the near future. Leaders varied over which positions or tasks, and which theaters, would be suited for moving back to a central location. The smallest change proposed was to move a dispatch function and diplomatic clearances back to a central location, while the largest was to move back dispatch, diplomatic clearances, aeromedical evacuation, airlift requirements, and airlift plans back to a central location. Not a single leader proposed that any aspect of the Air Refueling Control Team be moved, nor airlift execution. Many were concerned about inadequate resiliency at the 618th AOC under the threat of a cyber-attack. This, combined with observed slower reaction speed, which is discussed later, were the chief, but not the only reasons why leaders and AMD members alike were skeptical of AMD reach back.

What's more, all leaders were quick to point out that AMDs are manned for the steady state operations of that theater. Although they clearly did not feel that leadership was overloaded with information or decision requirements at the present time, that reality could change, and quickly. Should operations move from Phase 0 or Phase 1 into Phase 2 operations, information requirements, uncertainty, and equivocality increase rapidly, requiring augmentation. While reach back operations may suffice for steady state operations, augmentation to the theater of operations would still be required in the case of an increase in operations tempo. This fits with the result that AMDs contend more with equivocality than uncertainty. According to OIPT lateral relationships are better solutions to equivocality than vertical information systems, and face-to-face interactions are incredibly effective at eliminating the lack of clarification of information. In most cases, however, requests for augmentation can take up to a week to fulfill due to

approval, funding, and sourcing processes. Regardless of tempo, whatever the form of the Air Mobility C2 structure, that entity will have to contend with increased information requirements and equivocality for up to a week, not to mention the time it takes for augmentation to get acclimated to theater, even if it is minimal. This is a crucial time in any conflict where the ability to respond through timely consideration of information and coordinated action are critical.

This brought interview subjects to a brief discussion on the augmentation capability, namely, the Air Mobility Operations Squadrons (AMOS). Leaders felt that these squadrons were a crucial part of their ability to meet increasing requirements. AMOS members are intimately familiar with theater processes through numerous annual exercises. Yet most leaders were concerned with the amount of time from request until augmentation arrival. The AMOSs are mostly composed of Guard and Reserve members, which are traditionally aligned with specific AOCs to ensure familiarity with those theaters. These members already have the required accounts and know specific procedures immediately upon arrival. Nonetheless, due to the reserve nature of their positions, their allowed reaction time from request is up to three times longer than that of their active duty brethren. However, due to what leaders described as different approval processes, the guard and reserve components are sometimes able to respond more quickly than Active Duty AMOS members, even though Active Duty members can respond in 12 hours from official approval. Though it seems the reason for the existence of an Active Duty AMOS is to respond more quickly than the Guard and Reserves, this is sometimes

not the case, for reasons that these units are unable to fix. This knowledge was frustrating to leaders.

To ensure the speed of information, most leaders felt that keeping some form of the AMD in geographic AOCs was best. While leaders acknowledge the value of lateral relationships, the synergies gained from having at least some air mobility experts working alongside each other outweigh the potential gains of integrating the entire AMD into the other four divisions of the AOC. This is not to say that steps to build lateral relationships should not be made. This is evident in a few AOCs, where Air Mobility leaders made the choice to embed personnel in divisions such as Strategy, Combat Plans, and even Combat Ops. Embedding a Mobility expert in Strategy seemed especially valuable, as they were able to positively influence planning efforts earlier in the process in way that utilized Mobility capabilities and personnel more effectively and in many cases efficiently. In addition, those members were an influence on the culture of the division. Interviews with leaders showed that lateral relationships become more crucial during heightened operations tempos, as face-to-face interactions quickly eliminate equivocality and ensure the rapid flow of information across the divisions. Defining those relationships proved difficult, as some AOCs have adopted tanker planners as a part of the Combat Plans Division, reporting to that Division head instead of the Chief of the AMD. Others have seen success from a matrix structure, much like FedEx in their divisional structure, where members sit with another division and report to both that division head and the AMD Chief along the rules of a defined agreement.

Leaders overwhelmingly felt that the AMDs were more closely aligned with their respective AOCs than with the 618th AOC in terms of culture, language, and goals, although there were mixed feelings about who shared more interdependence. This often depended on the type of operations taking place. Also, the interdependent relationship between the AOC and its AMD seemed more one-sided, with the AOC divisions depending on the AMD for information.

Leaders were encouraged by information sharing across different AMDs. Until recently most of this was done via AMOS members as they traveled to different AOCs for exercises, but the latest development has been an actual AMD conference and increased training for those already on the job, as written about in the AFFOC. Still, leaders feel this could go even further, by conducting some sort of weekly update or at the very least using some sort of shared information exchange space.

Additionally, the theme of 618th AOC responsiveness was also evident among AMD leaders. Leaders were especially praising of 618th AOC's ability to C2 intertheater assets, but were concerned with the timeliness of response from 618th AOC when AMDs requested information. Leaders were all especially hopeful when speaking of the 618th's current initiative to change its own organizational structure to somewhat mirror the geographic AOCs along functional lines rather than the former structure, which was mostly organized along funding streams. Most feel this change will increase responsiveness and information flow between the functional AOC and the AMDs. Moreover, this might help adapt the 618th AOC to the emerging roles that cyber and space will play in future Air Mobility operations as prescribed by the AFFOC. Yet some

leaders felt there was a cultural piece that is more nebulous, as the nature of a global command and control enterprise, like that of FedEx or any major logistics enterprise, is concerned with efficiency more than theater AOCs, which are primarily concerned with effectiveness, sometimes in order to meet mission requirements, with seemingly total disregard for efficiency. These two mindsets, completely sensible in each respective setting, have historically put the 618th AOC and the AMDs at odds, and are seen a key component of the larger differentiation between the global AMDs and the 618th AOC.

Finally, there were two key inputs related to the future implications of organizational structure within the AOC. The first acknowledged the need for improved information flow capacity and rapid decision making in a future environment, but for Air Mobility, not at the same anticipated level as their kinetic-oriented brethren, who could see a change in target sets mid-mission due to the actions of a near peer-level enemy. Airlift aircraft, on the other hand, take off with cargo bound for a specific destination for a specific reason. Such aircraft, if the destination were compromised, would most likely turn around rather than proceed to another location. Therefore while increased capacity for planning or re-planning might be needed in such an environment, the execution piece could remain surprisingly similar, although not uncomplicated. The second input involves command relationships. While discussing reach back operations, two leaders were careful to point out the implications on unity of command if a significant reach back capability developed at a central location such as the 618th AOC. They were quick to point out that AMDs need to be responsive to the JFACC's scheme of maneuver in that theater, and should answer first to that respective theater chain of command.

Research Results with Respect to OIPT Models

Chapter 2 of this paper depicted 3 models to describe information flow in an organization in regards to uncertainty vs. equivocality, and also in regards to interdependence vs. differentiation. The following models interpret the results of this research with reference to the previously depicted OIPT models.

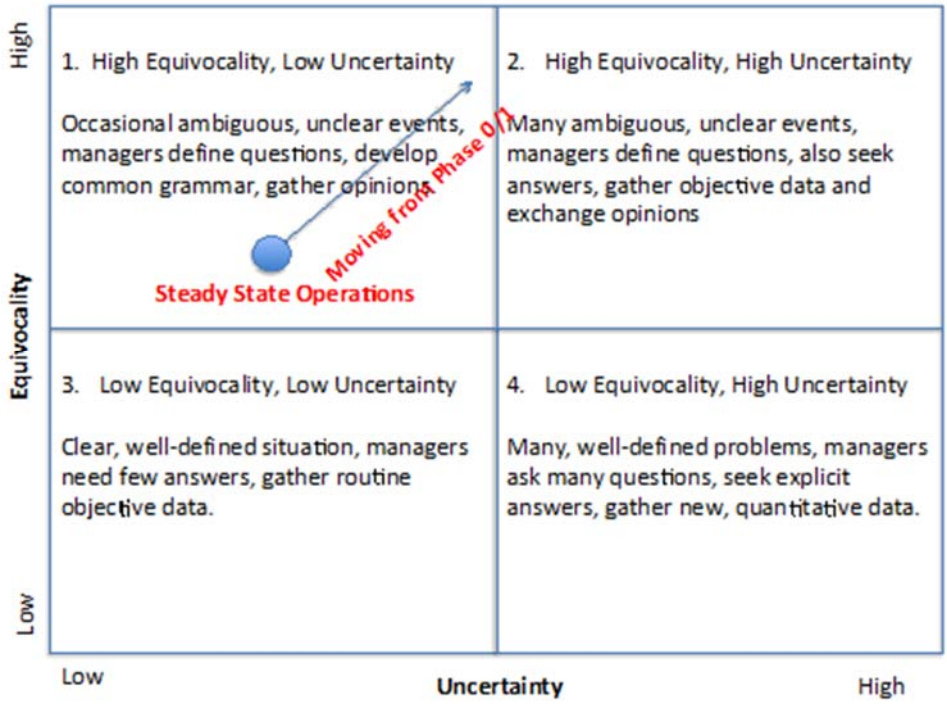

Figure 6 - AMD Steady State Position in Regards to Equivocality vs. Uncertainty

Source: Based on R.L. Daft and R.H. Lengel (1984)

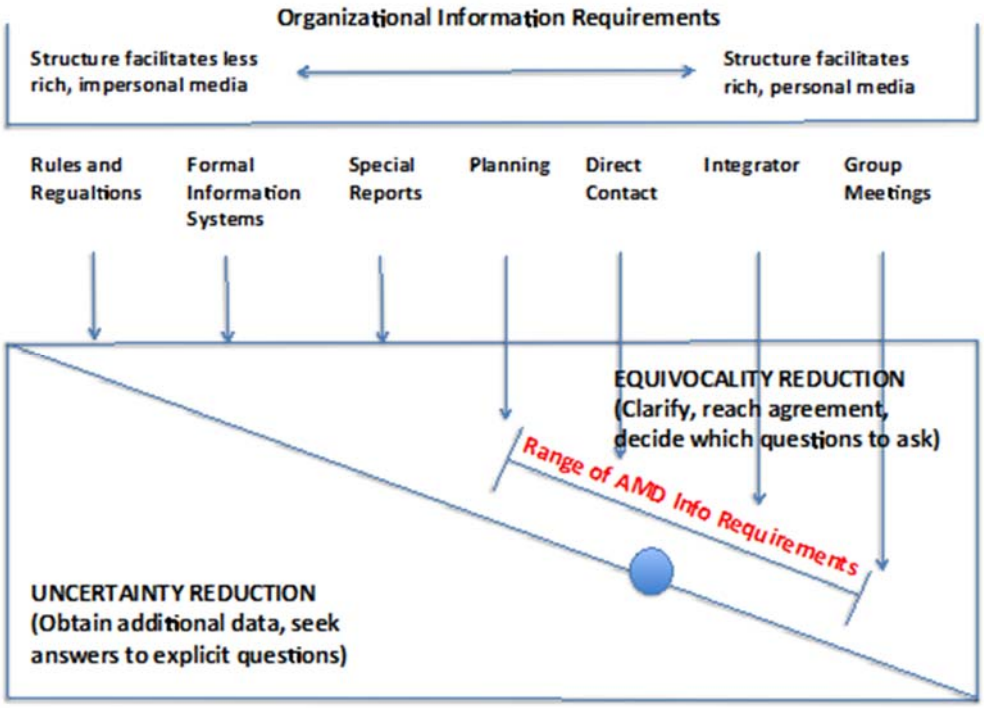

Figure 7 - Range of AMD Information Requirements and Coordinating Linkages

Source: Based on R.L. Daft and R.H. Lengel (1984)

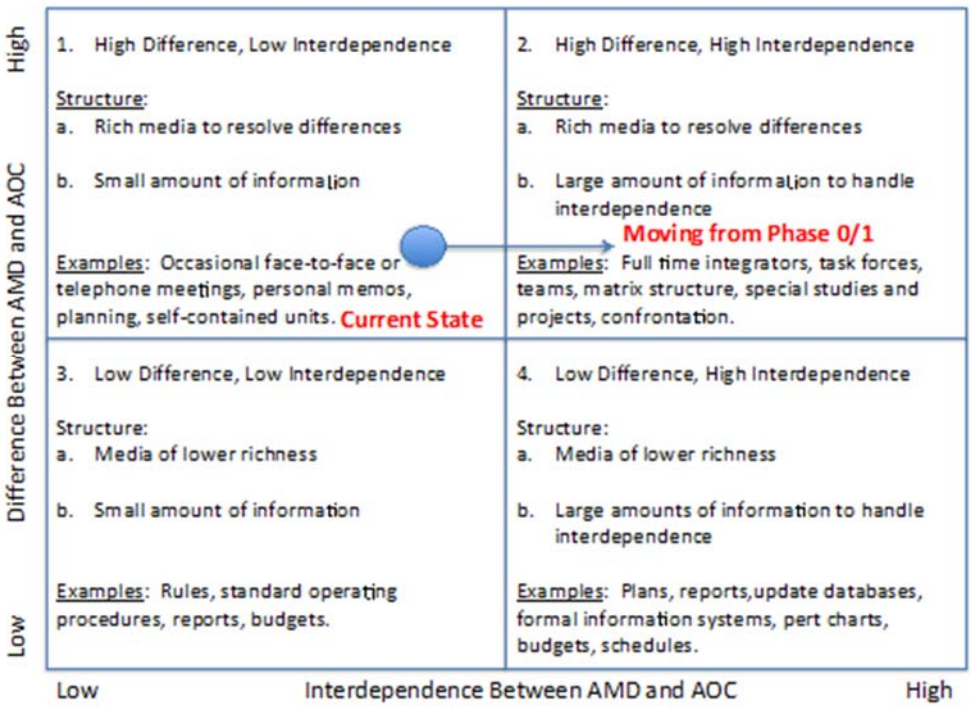

Figure 8 - Position of AMD Interdependence and Differentiation with AOC

Source: Based on R.L. Daft and R.H. Lengel (1984)

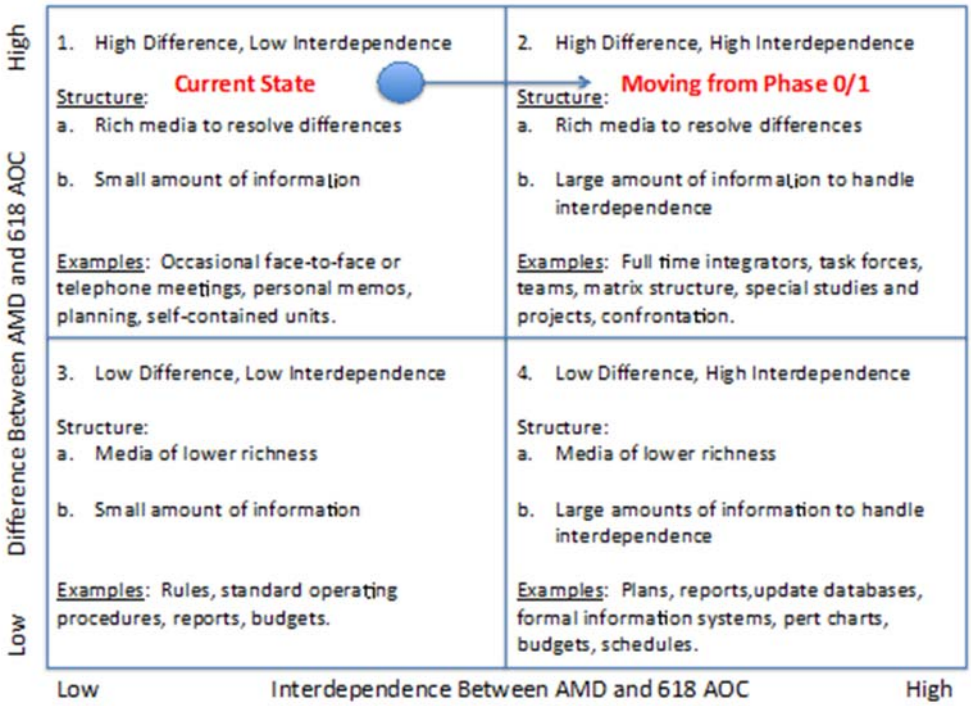

Figure 9 - Position of AMD Interdependence and Differentiation with 618 AOC

Source: Based on R.L. Daft and R.H. Lengel (1984)

Based on the research results, the models show that AMD leaders and members deal with relatively high equivocality and lower uncertainty. In Figure 6, to ensure success, members must develop common grammar and gather opinions. As operations move out of Phase 0 and 1 into non-steady state operations, members would encounter increased equivocality with increased uncertainty, which would most likely move them from quadrant 1 into quadrant 2, where they would need to now gather objective data and exchange opinions.

In Figure 7, based on research results, AMD leaders and members contend with higher equivocality than uncertainty, although not completely without uncertainty.

The range of coordinating linkages that correspond to the approximate AMD information requirements includes planning, direct contact, an integrator, and group meetings.

Finally, according to Figures 8 and 9, the AMD resides in the quadrant 1 in relation to both the geographic AOC and the 618th AOC. However, it is slightly higher in quadrant 1 with the 618th AOC due to the finding that the AMD shared an equally interdependent relationship with both the geographic AOC and the 618th AOC. It was noted that these relationships become more interdependent when moving from Phase 0/1 into Phase 2. Also, the AMD was found to be more closely aligned with the geographic AOC. When observing quadrant 1, the model shows that rich media can resolve differences and only a small amount of information is needed when in steady state, and this can be accomplished through occasional face to face meetings, personal memos, planning, and self-contained units. Nonetheless, given constant differentiation, as interdependence increases when moving to Phase 2 operations in either a wartime contingency or humanitarian relief effort, information increases require full time integrators, task forces, matrix structure, and special studies and projects.

Observing the particular differences between primarily steady state peacetime operations in the 603d AOC versus the consistent combat operations observed through the lens of the 609th AOC, the validity of this model, as well as a suspected cause of some of the insights regarding the 618th AOC becomes apparent. The structure of the 609th AOC features Combat Plans and Combat Operations Divisions that include lateral relationships with members doctrinally tied to the AMD. The 603d does not, but during exercises involving combat operations, these lateral relationships become standard.

According to the model, the need for such lateral relationships is amplified at the 618th AOC due to the increased differentiation between the 618th and geographic AMDs. The observed theme that the 618th is generally not responsive enough to theater needs might be due to a deficiency in the amount of lateral relationships and rich media exchange between the AMDs and the 618th AOC. From the data depicted on the models above, one might infer that though reach back operations to a central C2 entity might eventually yield a manpower savings, the chief motivation for such a change should be an increase in lateral relationships, such as those present, or at least at the ready, at the geographic AOCs between the AMDs and their partner divisions. Such relationships could be the key to confronting increased information flow while reducing equivocality.

Importance of the Data and Results to the Field of Air Mobility Command and Control

The collection of data from the sources listed above contain the following areas of importance:

1. Interview subjects revealed that a reach back capability for Air Mobility operations would be an efficient use of resources without compromising mission effectiveness as long as certain elements were left in geographic AOCs to ensure Air Mobility responsiveness and expertise to the Combatant Commanders. Capacity in theater becomes especially important when moving from steady-state operations into contingency operations.

2. AMD leadership clearly revealed that theater AMD leaders are not overloaded with information or decision requirements. This illustrates that there is most likely an

excess of information processing capacity, however small, in geographic AOCs. It appears there is an opportunity to gain efficiencies through a change in organizational structure or manning while maintaining leadership's ability to look forward and examine the suitability of processes.

3. AMD leaders and members were clear that the AMD as an organization shares more goals, culture, and language with the AOC they inhabit. While historically this was not always the case, in recent years as the AMD has become doctrinally part of the AOC, the experience gained by both AMD and non AMD members alike has aligned the two more closely than the AMD aligns with the 618th AOC. There is still a seam here to be sure, as the theme that outsiders are generally not familiar with Air Mobility practices also emerged from this research. But experience and the use of proximity and lateral relationships have helped to bridge this gap in many cases, and could be helpful when established before the onset of contingency operations, when these relationships become especially crucial due to increased uncertainty coupled with more equivocality. Another theme was the lack of AMD familiarity with the 618th AOC due to the different organizational structure, which was usually solved through calling a friend or making a series of calls until finding the right person, both inefficient uses of time.

4. The AMD shares roughly an equal amount of interdependence with the geographic AOC as it does with the 618th AOC. The answer to this question often depends on the scenario, but it is clear that geographic AMDs are a lynchpin for air mobility operations.

5. AMD leaders and members experience a much greater amount of equivocality in general than the lack of information. This is in part due to the lack of clarity of the vertical information systems used to channel requirements to the AMD. These vertical information systems were used to link the processes between entities that shared a greater amount of differentiation, partially due to their geographically separated locations and also due to varied organizational goals.

V. Conclusions

Overarching Research Question

The overall research goal for this project was to use OIPT and NCW principles to determine enduring ideas and possible advantageous changes to Air Mobility C2 organizational structure and processes in order to increase the speed of information to improve organizational agility and decision-making. The research questions centered on physical location for certain C2 tasks, as well as how the structure of Air Mobility Divisions might be positioned to respond to uncertainty. The conclusions described below were ascertained through numerous interviews with C2 professionals to include Air Mobility C2 experts, leaders, and experts from other divisions, all from numerous AOCs around the world.

Summary of Research Conclusions

In regards to the first research question, the results indicate that deciding which tasks should be performed in a theater AOC and which tasks could be performed via reach back or distributed operations depends mostly on the definition of those tasks. Tasks that are easily defined and need little clarification are ideal for accomplishment via reach back. Furthermore, those tasks often require clarification, rapid changes, or joint and coalition interaction are more suited for personnel located in the theater AOC. Unfortunately, the interviews revealed that the AMD contends with more equivocality than uncertainty, and one of the key locations of equivocality exists between two entities that are usually geographically separated, the DDOC and the AMD. The chief reason for this is the means by which tasks are delivered, which is essentially a vertical information

system meant to increase the flow of information using standard language. Requirements are validated by DDOC personnel and sent to the AMD via a textual message because the two are usually not co-located. Although most requirements are easily understood and defined, there are times when they are unclear. AMD members usually clarify these requirements by either calling the units or interacting with a liaison inside the AOC. By moving functions such as requirements and planning, which deal with unclear information from time to time, to a reach back entity, their ability to clarify those requirements is virtually unchanged since they were previously separated from the DDOC. Usually a request for airlift must go through several entities before it is approved as a valid requirement by the DDOC and sent as a requirement for lift to the AMD. By this point much of the detail can be lost if the requirement is complex. There is not enough manning to place a liaison in each airlift unit. But a simple phone call often clears up this source of equivocality. This can be done through a reach back entity just as easily as it could be done from the theater. Other sources of equivocality are from a lack of familiarity with the 618th AOC, and from unclear information from multiple organizations within the theater. Because of these two sources, the increased efficiency of a reach back cell could help eliminate some of this equivocality. A theater-focused reach back cell at the 618th AOC could help eliminate equivocality between the theater AMD personnel and those at the 618th AOC, while allowing for additional manpower in the theaters for another purpose.

In regards to the second research question, interviews with members from outside the AMD frequently focused on lateral relationships between divisions, usually

between the Strategy Division, the ISR Division, and the Combat Plans Division. These three divisions frequently experience a close working relationship due to the nature of their tasks and the personnel in each. There were some cases where Air Mobility personnel formed lateral relationships with other divisions, in particular, tanker planners in the Combat Plans Division and tanker executors in the Combat Operations Division. Members from outside Air Mobility expertise expressed that these liaison or matrix-type relationships were incredibly beneficial and had created Air Mobility advocates of the leadership of those divisions. More importantly, these Air Mobility professionals eliminated much of the lack of clarity of information between the AMD and other organizations. It was clear that placing Air Mobility personnel in a position to interact with members of other divisions on a more regular and informal basis assists in smoothing the seams between divisions and aiding in the operational planning process. That being said, Air Mobility personnel, like other personnel, are available in limited quantity and must be used where utility is greatest, which many times is within an AMD. However the utility of lateral relationships in this environment cannot be discounted.

OIPT states that organizations that frequently face equivocality can clarify information more rapidly by establishing lateral relationships in the form of liaisons, group meetings, and perhaps a matrix structure. Moreover, these lateral relationships need not be confined to the AOC. One could argue that since there is more differentiation between the AMD and the 618th AOC than there is between the AMD and the other AOC divisions, there may be a need for the establishment of a strengthened lateral relationship between the AMDs and the 618th AOC. Though these two entities

often share elements of a common language and culture, their immediate goals are often very different, and the chief cause of their differentiation. A reach back cell located at the 618th AOC with a regional, theater focus could gain efficiencies in manpower and translate those savings to increase lateral relationships in theater, but also establish a lateral relationship between the theaters and the globally-minded 618th AOC. The theme that the 618th AOC is not responsive to theater needs is perhaps an issue of organizational culture. Leaders often find that changing a deep seeded culture is a patience-draining, gargantuan task that outlives their tenure. Embedding a theater-minded division inside a global organization might quickly reduce differentiation between two entities that require a more coordinated OODA loop going forward.

The danger here is possible splitting of control between two airmen (Col Hamilton, 2016). The risk to the mission will depend on the fidelity of the process developed in place of the current AMD process, and the fidelity and resiliency of the communications between the two entities (Col Hamilton, 2016). These arrangements would need to be worked out between Combatant Commands and AMC to ensure a single air commander in theater over Mobility forces OPCON to that command. The most critical piece is that any reach back support would have to be indistinguishable in product quality from the current organizational construct (Col Hamilton, 2016).

The most significant discussion in any changes to organizational structure revolves around the question of “why?”. More specifically, what can be gained from these changes and how does it benefit the C2 enterprise as a whole. This research concludes that the chief roadblock to increasing the speed of information through the Air Mobility C2 enterprise is the presence of equivocality between organizations, even two

Air Mobility organizations. According to OIPT, the way to eliminate this lack of clarification of information is through rich media sources, direct contact, liaisons, and the building of lateral relationships. A reach back cell at 618th AOC establishes a key lateral relationship while providing for the additional manpower needed for more direct contact and the cultivation of lateral relationships in theater C2 organizations.

Recommendations for Air Mobility Command and Control

The Air Force Future Operating Concept spends considerable time expounding on both Rapid Global Mobility and C2. Both sections include the assumption that our information-handling capacity will need to increase if the Air Force as a whole is to keep up with future requirements. It also does not prescribe even the existence of an AMD in the MDOC of 2035. Moreover, it explains that MDOC airmen will need to be able to integrate global assets with those already in theater (AFFOC 2015). This project, while seeking to optimize information flow and organizational structure, is ultimately about a path to the predicted realities of 2035. There are essentially two paths, one of which is to focus on the technology needed to enable the common operating pictures, enterprise resource planning, and communications technology of the future that allow for smaller theater footprints and increased velocity of rich, useful information. The alternate path is to begin to change the organizational structure to reflect the envisioned future reality, and adapt the technology to address the needs of more optimal structure. This alternate path is obviously more difficult initially in that there is the potential for more equivocality and less responsiveness at the outset. But the potential rewards of shared consciousness across the entire global mobility force, decreased equivocality across not the mobility

enterprise, but the Air Force C2 enterprise, and more rapid and agile response may be too great to pass up because our technological capabilities do not allow for them today.

Essential points to keep in mind are that effectiveness is a CFACC's number one concern, but that mobility assets are dwindling while in higher-than-ever demand. Also, while OIPT informs us that equivocality is best solved through lateral relationships rather than through vertical information systems, there are noted synergies to keeping a group of Air Mobility experts together. Outsiders are often unfamiliar with Air Mobility tactics, techniques, and procedures, but respect Air Mobility expert's contributions the theater mission and are even anxious to see more integration of personnel outside the AMD. AMDs are more closely aligned with their AOCs, yet depending on the scenario roughly equal in their interdependence with those AOCs and the 618th AOC. AMDs are capable of meeting current information requirements, but could quickly be oversaturated with a change in the pace of operations. 618th AOC, although improving in this regard, has generally shown an inability to respond in a timely manner to AMD requests for information and assistance. Moreover, the Air Force and the Air Mobility community is seeing the beginnings of a manning shortage that will last at least for the next 5 years if not considerably longer, especially in the pilot community. There will not be a pool of units with excess manning from which to draw to advance this cause.

A proposed first step in developing an optimal organizational structure could be to develop a theater-focused reach back cell at Scott Air Force Base in support of theater mobility operations. This cell could be manned on a 24-hour basis with AMOS-type airmen who already have relationships with geographic AOCs. These airmen,

during Phase 0/1 operations could perform a theater airlift requirements and planning function along with aeromedical evacuation functions. Tanker personnel would remain in theater due to close ties with Combat Plans and Combat Operations functions. This reach back division of geographic AMDs, which would essentially perform the easily defined tasks with little to no equivocality and almost no face-to-face interaction with coalition or joint members, would be led by a Colonel as other divisions in an AOC to ensure the separation this intratheater mission from the intertheater mission of other divisions at the 618th AOC. It would be highly critical that the same funding for and expectation of exercise participation at the geographic AOCs continue unaffected by this change. These exercises are the key to establishing strong relationships and making the 618th AOC a stronger and more responsive partner.

This, however, would not be planned as a manpower savings change, but any savings in manpower with this efficiency-gaining move would be used to increase the degree of lateral relationships across the global C2 enterprise and/or man the reach back cell effectively for its other mission, rapid projection of Air Mobility expertise in the event of a change in operational tempo in a theater. AMD Chiefs would remain in theater along with their smaller but more integrated AMD. The Mobility airmen essential to each theater would remain in place, working on harder-to define tasks and ensuring the success of the execution of Air Mobility assets in theater. The amount of personnel present in theater would need to be capable of requirements, plans, and AE functions for a short time in the case of an attack on the 618th AOC, but at a Phase 0/1 operations tempo.

Lateral relationships in theater could be established as deemed necessary by the AMD Chief, but interviews demonstrated that tanker presence in Combat Plans and Combat Operations have increased information flow between necessary parties, and an Air Mobility expert in the Strategy Division has proven effective during planning efforts. The command relationships are difficult, as these members have sometimes been re-aligned under the division where they sit, and other times part of a matrix organization. Both have shown to be successful, but to ensure the flow of information, OIPT prescribes a matrix structure with the critical piece being a memorandum of agreement that defines the boundaries in the relationship. In a more complex operating environment, more complex organizational structures are often needed and such personnel operating on the seams of an organization must continue to establish these relationships and processes across organizational lines in times of peace, relatively slow-paced operations, and C2 exercises, in order to build the muscle memory that will be needed in a contingency.

This proposed reach back division could not be expected to take over the previously described functions for all geographic AOCs simultaneously. The initial phase would be a proof of concept with a smaller AMD such as the 612th. If the reach back cell could demonstrate no breaks in service or loss of quality, along with an increase in responsiveness on the part of the 618th AOC as a whole, this capability could be expanded to include other, more active theaters on a trial basis before any reduction in manning could take place.

A critical piece of this proposal would be the ability to rapidly deploy elements of the reach back cell in the case of a contingency. Such a reach back cell would be

effective and efficient in Phase 0 or even Phase 1, but once beyond that, the effectiveness of such an entity would be questionable due to rapidly changing conditions in the AOR. As stated previously, a theater AMD needs to be responsive to the CFACC's scheme of maneuver, and this becomes increasingly difficult to do from a reach back location in a contingency. With the lateral relationships built at the steady-state reach back location, members could deploy forward to maximize information flow, eliminating the increased uncertainty and equivocality by shifting the balance of lateral relationships to the theater. Their reach back roles could be filled with Air Force Reserve or Guard members if needed.

Future Research Considerations

When preparing for this research project, it was important to examine all sides of C2 advancement. Doubtless, information technology was a seductive target as it offers many solutions to complex problems. However, research behind enterprise resource planning and common operating pictures makes the case that organizational structure and processes are vastly more important than the information technology used to supplement them. Personnel are often resistant to change a process based on the demands of a new IT system, but if the process is optimized first, adoption of the enterprise resource planning program is historically more successful. Even though information technology is a tool rather than a solution to a problem, it is an essential part of the solution and should be examined in detail to determine the capabilities required to ensure a seamless transition into the world of the AFFOC in 2035. There is also an inherent, seductive danger in having an information capability that allows leaders to look into the cockpits of

aircraft under their control. A future research project could look at the information technology systems required for movement into the future of C2 described in this paper and the AFFOC, while also promoting the survival of mission command, an essential part of success in an A2AD environment.

The AFFOC also speaks of specially trained multi-domain C2 airmen (AFFOC 2015). These airmen would be selected based on their cognitive abilities, adaptability, and networking abilities to form a talent-based balanced capabilities mix and maturing into trusted operational and strategic leaders (AFFOC 2015). Yet today in the Air Mobility community, duty in an operational C2 position is not perceived as highly desired, even as the Air Force Personnel Center recently received instructions to place manning AOCs near the very top of their priority list. In order to ensure the success of this critical C2 capability, how does the Air Force change the culture that propagates this perception? The answer to this question could be significant in developing the agile C2 enterprise and Air Force of the future.

Conclusion

To close this look at the evolution of Air Mobility command and control in the information age, it is vital to remember the salient points from literature and the experts alike. First, doctrine reminds us that Air Mobility is a global system capable of simultaneously performing intertheater and intratheater missions, and although that system does not necessarily need to be controlled from one location, it is important to have global awareness. This awareness becomes more critical as the US military begins to encounter operations in contested and A2/AD environments, where task uncertainty

and sophisticated enemy counter actions become more rapid and commonplace. According to Maykish and proponents of Network Centric Warfare, the future of command and control will involve not only the speed of information but collective knowledge of the force and its employment in the battlespace. This knowledge will most likely reside in a distributed C2 network in order to reduce forward footprint and in-theater vulnerability while encouraging self-synchronization. While information technology will be an important part of this network, C2 is and will always be a human endeavor, and the speed of information flow and battlespace awareness depends on the humans employed in the network, and perhaps more importantly how they are employed. The Multi-Domain Operations Center will only include four divisions: Strategic Design, Tasking, Operations Execution, and Rapid Assessment. C2 professionals will need to be more knowledgeable due to the complex nature of the environment and the variability of threats, from conventional to the increasingly more prevalent cyber-attack. While Air Mobility may not be a division in this envisioned future operations center, expertise in its employment plays a crucial role. There must be, as there has always been a need, a balanced approach to employment of a limited asset that is always in high demand. This requires both the theater expertise and familiarity of the AMD professional and the worldwide approach of the 618th AOC, and it requires that the two be ever-more in sync with each other.

The speed and reach of information across organizations is the key to meeting these future needs. The C2 structure must be such that hierarchy are not overloaded with information and decision requirements when exceptions arise. Tasks that can be pre-planned should be as much as possible, but as experts predict, tasks are increasingly

uncertain, which thus requires increased information processing capability. Equivocality is highest when differentiation is high, but these issues can be best solved through proper organizational structure according to the literature and also increased face-to-face interaction according to the research subjects. Complex organizational structures are more able to deal with complex information requirements, and the more complex the structure, the more critical the organizational processes become.

According to the majority of research subjects, at best, most AMD tasks can be performed from a central location, and at worst, at least a few can. The big question is should they? And if so, how many and which ones? Interviews have shown that easily-defined tasks are the best candidates, and could be attempted in the near future to gain efficiencies. But there is a larger, underlying issue that should be considered in adapting the Air Mobility C2 enterprise in the future.

The problem AMC has been trying to solve is how to support multiple combatant commands with limited resources. Originally there was an idea that all assets could be effectively and more efficiently controlled at 618th AOC, but this idea was vastly unpopular with Combatant Commanders and JFACCs alike because of another problem they observed from their perspective. This problem, confirmed through research interviews was that the 618th AOC was not as responsive as needed by the theater in many cases, and in most cases unfamiliar to theater AMD members. This stems from the belief, confirmed by research, that generally the theater AMDs share an interdependent relationship with the 618th AOC that is every bit as vital as their interdependent relationship with their respective AOC. Yet research subjects overwhelmingly agree that there is much more differentiation between the theater AMD and the 618th AOC, which

seems off balance. Furthermore, AMDs consistently see more equivocality with regards to requirements than uncertainty due to the lack of information. OIPT shows that equivocality, usually seen with differentiation, is solved through rich, personal media and methods such as direct contact, integrators, or even a matrix structure, where interdependent sides can talk face-to-face, a preferred method confirmed by research subjects. The 618th AOC has sought to alieve this problem by placing a liaison inside theater AOCs in order to smooth the seams between the two, but the problems appears to persist. The ongoing restructure of the 618th AOC into something that resembles a traditional geographic AOC may also assist in this effort. Having a theater planning element or even a staff of theater liaisons in the 618th AOC, while it may not reduce the overall manning requirement for Air Mobility C2, would perform some easily defined tasks to reduce information requirements downrange and act as an information conduit that reduces the equivocality and differentiation between the 618th AOC and the theater AOCs. This element would assist in building a more agile Air Mobility enterprise, helping the “now” regain its footing in the battle with “more” in the support of geographic combatant commands, and help the enterprise take another step into the future of Air Power C2.

Glossary

A2/AD	Anti-Access/Area Denial
AE	Aeromedical Evacuation
AFFOC	Air Force Future Operating Concept
AFSC	Air Force Specialty Code
AMOS	Air Mobility Operations Squadron
AOC	Air Operations Center
AOR	Area of Responsibility
ARCT	Air Refueling Control Team
ATO	Air Tasking Order
C2	Command and Control
CAMPS	Consolidated Air Mobility Planning System
CAOC	Combined Air Operations Center
CCDR	Combatant Commander
CFACC	Combined Forces Air Component Commander
COCOM	Combatant Command
ERP	Enterprise Resource Planning
GCC	Geographic Combatant Command
GDSS2	Global Decision Support System
ISR	Intelligence, Surveillance, and Reconnaissance
ITV	In-Transit Visibility
JDDOC	Joint Deployment and Distribution Operations Center
JFACC	Joint Forces Air Component Commander
JMC	Joint Movement Center
JOPES	Joint Operation Planning and Execution System
JP	Joint Publication
MAF	Mobility Air Forces
MDOC	Multi Domain Operations Center
NCW	Network Centric Warfare
OIPT	Organizational Information Process Theory
OODA	Observe Orient Decide Act
OPCON	Operational Control
TACC	Tanker/Airlift Control Center
TBMCS	Theater Battle Management Core System
TMT	Task Management Tool
USTRANSCOM	United States Transportation Command
VTC	Video Tele-Conference

Appendix A

CONSENT TO PARTICIPATE IN INTERVIEW

EVOLVONG AIR MOBILITY COMMAND AND CONTROL RELATIONSHIPS IN THE INFORMATION AGE

You have been asked to participate in a research study conducted by a researcher from the Air Force Expeditionary Center, Advanced Study in Air Mobility program. The main objective of the project is to identify ways that the Air Mobility C2 enterprise can utilize Organizational Information Process Theory and Network Centric Warfare principles to adapt organizational structure and processes to increase the speed and reach of information to improve organizational agility and decision-making. The results of this study will be included in a briefing to the leadership of the Air Force Expeditionary Center and the Air Force Institute of Technology, as well as possible research publications. You were selected as a possible participant in this study because of your command and control knowledge. You should read the information below and ask questions about anything you do not understand before deciding whether or not to participate.

- This interview is voluntary. You have the right not to answer any question, and to stop the interview at any time or for any reason. I expect that the interview will take 30-45 minutes.

- You will not be compensated for this interview.

- The information you provide will be kept confidential. All data will be presented at an aggregate level.

- I would like to record this interview so that I can transcribe it and use it for analysis as part of this study. I will not record this interview without your permission. If you grant permission for this conversation to be recorded, you have the right to revoke permission and/or end the interview at any time.

- This project will be completed by June 2016. All interview documents will be stored in a secure work space until 1 year after that date. The documents will then be destroyed.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

(Please initial)

[ ] I give permission for this interview to be recorded and transcribed.

Name of Subject:

Signature of Subject _____Date _____

Signature of Investigator _____Date _____

Appendix B

Interview Script & Questionaire

Icebreaker/Introduction

Name:
Organization/Position:
Years of experience (In Air Force & C2):

In this research, I am examining information flow in Air Mobility C2 organizations. Before we get started, I want to give you a brief background. Current C2 thought pieces focus on increasing operational agility and the speed of information flow in C2 organizations, as well as shrinking vulnerability of forward-based C2 structures through reduced footprint, reachback, and distributed operations. These ideas are based on the belief that future military operations will encounter Anti-Access/Area Denial environments and utilize information from many sensors widely distributed throughout the battlespace. Using Organizational Information Process Theory (OIPT) and Network Centric Operations principles, I will examine current practices surrounding the flow of information in the C2 enterprise, with a particular focus on Air Mobility. My research questions center on defining criteria for determining position location in a C2 enterprise and how the Air Mobility C2 enterprise might position itself to increase the flow of information through geographic AOCs. The following interview questions will assist me in capturing the current information flow practices as well as insight on the reasoning for such practices.

General Questions (For all research subjects)

1. Tell me about how information flows in your organization? (What medium, formal/informal, how often is it exchanged, etc)
(a) How do you acquire information to make decisions?
(b) Do you feel your organization could handle a higher amount of information flow, or do you feel you are operating generally at a capacity where more information would amount to diminishing returns on decision-making?

2. When communicating information with someone, how do you decide if that information is better e-mailed/called in/over VTC/or in person?
(a) Are there certain types of information that you would rather receive through certain mediums?

3. What do you feel is the best setting or way to eliminate uncertainty (lack of information). Is it through a group meeting, direct contact, using a liaison, a planning effort, or looking it up yourself in some sort of information database?

4. What do you feel is the best way to eliminate equivocality (to clarify task or reach agreement)? Is it through looking it up in an information database, using a liaison, a planning effort, a group meeting, or direct contact?

5. In your organization, do you feel like you deal more with uncertainty (lack of information) or equivocality (lack of clarification)?

Questions for Interdependent Organization Members

1. Are there positions in the AMD that require a good amount of interface with your organization?
(a) How is information generally passed from your division and the AMD?
(b) Is this different from your interaction with other divisions?

2. How often do you (as a C2 member) need to acquire information from outside your division in order to perform your job?
(a) How do you go about acquiring this information?

3. When passing information to another division, how much time do you spend translating some of that information so others can understand?
(a) How much information do you think is lost in translation?

4. How dependent are you on the AMD for information about Air Mobility operations?
(a) Do you operate "highly in sync" or do you operate virtually independent of one another?

5. How different would you say that your organization is from the AMD in terms of language, goals, and culture?

6. Do you feel that your organization has the correct structure to best leverage advances in telecommunications?
(a) What changes would you make in order to improve the flow of information?

7. If you could get additional training, what would you want it to focus on?

Questions for Organization Members

1. Which positions in the AMD require a good amount of face-to-face contact with other members within the organization?
(a) What about with other divisions in the AOC? Why?

2. Would any current positions in the AMD benefit from more face–to-face contact with those they exchange information with? Why?

3. Approximately what percentage of daily tasks go as planned?
(a) How much ambiguity is there in day-to-day tasks?

4. What is your experience getting routine expected products from a geographically separated organization on time/correct?
(a) What about non-routine products?
(b) What were some of the reasons why products were late/incorrect?

5. How much differentiation is there between AMD vs TACC in terms of culture, goals, and language?
(a) How much between AMD and the rest of the AOC?
(b) Which would you say has more?

6. How much interdependence is there between AMD vs TACC?
(a) How much between AMD and the rest of the AOC?
(b) Which would you say has more?

7. Do you feel like you spend a lot of time explaining things specific to Air Mobility to those outside the community?
(a) Do you feel that sometimes the point of a discussion is lost on those who are unfamiliar with Air Mobility TTPs?

8. Do you feel that your organization has the correct structure to best leverage advances in telecommunications?
(a) What changes would you make in order to improve the flow of information?

9. Do you feel the level of C2 expertise in your current state is adequate to take on a large-size HADR or conflict with a near peer adversary?
(a) If you could get additional training, what would you want it to focus on?

10. Do you feel you have enough capacity to handle your current day-to-day taskings?
(a) Are there any positions that you feel don't need to be co-located with you?
(b) Are there any tasks accomplished centrally that you feel would be better if accomplished locally?

Questions for Leadership

1. How much time does leadership spend sorting through information to make decisions vs leading, creating vision/mission parameters etc?
(a) Do you think you have found the right balance?

2. Do you feel like there's not enough time to plan and reflect?

3. Do you feel that your organization has the correct structure to best leverage advances in telecommunications?
(a) What changes would you make in order to improve the flow of information?

4. What are your general concerns with reachback or distributed operations?
(a) Do you get the products you need at the right time?
(b) Are the products correct?
(c) How much extra time is spent fixing items that were lost in translation?

5. How much differentiation is there between AMD vs TACC in terms of culture, goals, and language?
(a) How much between AMD and the rest of the AOC?
(b) Which would you say has more?

6. How much interdependence is there between AMD vs TACC?
(a) How much between AMD and the rest of the AOC?
(b) Which would you say has more?

7. Do you feel the level of C2 expertise in your current state is adequate to take on a large-size HADR or conflict with a near peer adversary?
(a) If you could get additional training for your team, what would you want it to focus on?

8. Do you feel you have enough capacity to handle your current day-to-day taskings?
(a) Are there any positions that you feel don't need to be co-located with you?
(b) Are there any tasks accomplished centrally that you feel would be better if accomplished locally?

Appendix C

Interview Results and Statistics

Appendix D

Quad Chart

Evolving C2 Relationships in the Information Age

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Introduction

This research paper analyzes information flow through theater Air Mobility Command and Control (C2) organizations. The purpose is to uncover guidelines going forward to adapt organizational structure and processes to increase the speed and reach of information. These guidelines could assist with improving organizational agility and decision making while adapting to future trends in the broader C2 enterprise. As a result of the research and the inputs of the interview subjects, this paper consolidates views and puts forth multiple recommendations for the future organizational structure of theater Air Mobility C2 organizations.

Explanation of Charts

The charts (center page) depict the perceived AMD information environment based on subject input against Organizational Information Process Theory derived from work by Richard Daft. AMDs encounter more equivocality due to differentiation, and require rich media sources and lateral relationships for improved performance

Research Goals

Primary Research Question: *In a geographically separated organization such as the C2 of Air Mobility aircraft, how can the enterprise utilize OIPT and Network Centric Warfare principles to adapt organizational structure and processes to increase the speed and reach of information to improve organizational agility and decision-making?*

Secondary Research Question 1: *What specific criteria determine the functions that can or should be performed at a central hub and which functions need to be present in a regional control center in order to increase speed and reach of information while decreasing equivocality?*

Secondary Research Question 2: *How might the structure of the Air Mobility personnel present in the regional control center be leveraged more effectively in a future information-driven, integrated planning and execution cycle to both increase the organization's ability to respond to uncertainty and guard against the increased vulnerabilities of a central mobility hub.*

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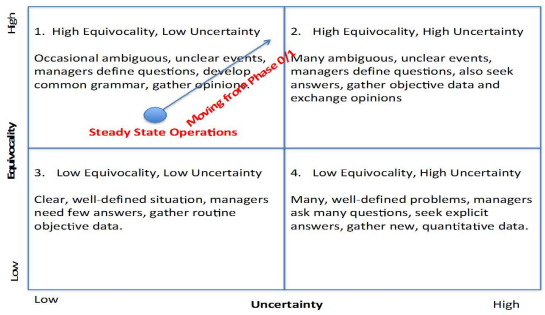

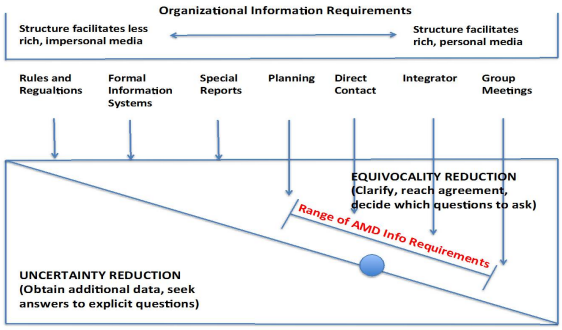

Methodology

This research used semi-structured interviews to collect and analyze the expert opinions of C2 subject matter experts. To capture the varied nature of C2 operations, this research included opinions from former and current C2 personnel from AMD Leadership and other varied AMD positions, as well as personnel from other AOC divisions.

Questions focused on information flow in C2 organizations as related to Organizational Information Process Theory. Questions sought open-ended discussion and insight on information quantity, equivocality, organizational differentiation and interdependence in order to capture expert opinions as they relate to the primary research question. The researcher then consolidated the findings to find consistent themes and answers to research questions.

Implications

While talk on this subject has picked up in recent years, the aim of this research is to provide more academic rigor and background on a subject on which some change is inevitable. Results from this study could act as a reference for decision makers in both the Air Mobility community and those in the geographic combatant commands when assessing the feasibility of changes in command and control of mobility forces

Conclusions & Recommendations

1. Research subjects revealed that a reachback capability would be an efficient use of resources provided that certain elements were left at geographic AOCs to provide the proper level of expertise and responsiveness to Combatant Commanders.
2. AMD leaders revealed that they did not feel overloaded at present operations pace with information or decision requirements.
3. AMD leaders and members shared that geographic AMDs shared more in common with their AOCs in terms of goals, culture, and language.
4. AMD leaders and members concluded that geographic AMDs share an equal amount of interdependence with their AOCs as they do with the 618th AOC.
5. AMD leaders and members shared that they encounter much more equivocality than a lack of information. This is partly due to a lack of clarity from vertical information systems.

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AWARDS

Meritorious Service Medal
Air Medal (7 OLC)
Aerial Achievement Medal
Air Force Commendation Medal (1 OLC)
Air Force Achievement Medal
Afghanistan Campaign Medal (1 Campaign Star)
Iraq Campaign Medal (1 Campaign Star)
92 OG Pilot of the Year 2007
92 OG Aircraft Commander of the Year 2008

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14. ABSTRACT

This research paper analyzes information flow through theater Air Mobility Command and Control (C2) organizations. The purpose is to uncover principles, using Organizational Information Process Theory, to adapt organizational structure and processes to increase the speed and reach of information to improve organizational agility and decision making while adapting to future trends in the broader C2 enterprise. To collect data, the researcher conducted interviews with seventeen C2 experts with experience at various levels of C2, from worldwide to theater Air Mobility C2 organizations, from Air Mobility C2 leadership, to experts in non-mobility C2 divisions. Interview subjects shared their perceptions and insights over a 30-45 minute interview. As a result of the research and the inputs of the interview subjects, this paper puts forth multiple recommendations for the future organizational structure of theater Air Mobility C2 organizations.

15. SUBJECT TERMS
Air Mobility Division, Organizational Information Process Theory, Interview, Reach back

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