IS INTERSERVICE COORDINATION IMPERATIVE PRIOR TO EMPLOYING FIRES IN THE TACTICAL ZONE?

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fufillment of the requirement for the degree

MASTER OF MILITARY ART AND SCIENCE

by

PAUL T. JOHNSON, MAJ, USAF
B.S., Murray State University, Murray, Kentucky, 1980

Fort Leavenworth, KS
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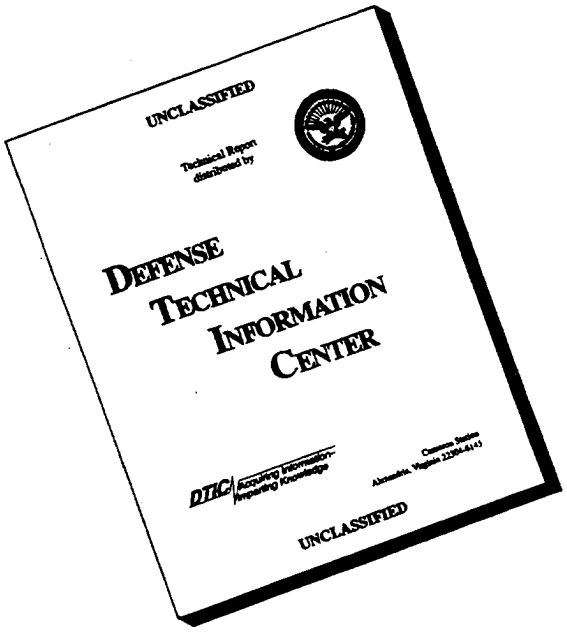

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ABSTRACT

IS INTERSERVICE COORDINATION IMPERATIVE PRIOR TO EMPLOYING FIRES IN THE TACTICAL ZONE? By MAJ Paul T. Johnson, USAF, 83 pages.

This thesis investigates the subject of coordination as it applies to interservice fires. Reports from Desert Storm indicate a level of dissatisfaction regarding the requirement and/or the need to coordinate with the other service prior to employing fires in a certain region of the battlefield. With the fielding of deep strike weapons systems, the U.S. Army can now apply fires to a region of the battlefield previously reached only by fixed wing aircraft. Prior to this, the Air Force had experienced a degree of independence and autonomy in conducting interdiction operations. To place the issue in a historical context this study examines the growth of coordination between U.S. air and ground forces in specific time periods from World War II to Desert Storm. This study identifies successful elements of coordination from the periods examined in an attempt to determine current coordination requirements. Current joint doctrine states that coordination is highly desirable but is not always required. This study concludes the risks of not coordinating are too great and the benefits of coordination are significant. Further, it concludes coordination prior to application of fires to that portion of the battlefield within range of both Air Force and Army systems is essential.

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CHAPTER 1.

INTRODUCTION

Coordination is not a recent battlefield concept. Before the seventeenth century, at the senior command level, infantry, cavalry, and artillery needed to coordinate on the battlefield. Senior commanders coordinated the effects and timing of the different arms on the battlefield. This was because senior commanders could often observe the entire battlefield and could coordinate with one another through personal contact or visual signals. A fairly static period followed during the eighteenth and much of the nineteenth century. During this period massed infantry armed with smoothbore muskets equipped with the socket bayonet was the backbone force. This infantry was supported by direct-fire, smoothbore artillery and saber-equipped cavalry. In this environment, coordination among the three arms was fairly simple. The infantry and artillery commanders usually had face-to-face contact or communicated directly by hand signals.[1]

However, during the nineteenth century, technological changes occurred that would ultimately affect how coordination occurred on the battlefield and would, if units failed to coordinate, result in catastrophe. While some of these changes were incorporated into late nineteenth century warfare, the full impact of these changes would not be seen until World War I.

The development of the breech-loading rifle during the middle part of the century dramatically changed how infantry was to be deployed in the field and employed during battle. The new rifles increased the tactical effective range of the primary infantry weapon and allowed soldiers to reload their weapons while remaining under cover. The development of repeating rifles and machine guns reinforced the observation that changes were now required in employing infantry on the battlefield.[2]

Artillery also underwent major technological developments during the latter part of the nineteenth century. The advent of recoil mechanisms improved accuracy while breech-loading improved rates of fire. Fuzes were also improved resulting in better weapons effects.[3]

The net result of these and other developments was an increase in the volume, range, and accuracy of fire on the battlefield. The size of the battlefield itself was growing which would preclude the senior commander seeing the battle develop. Coordination between artillery and infantry became more important; at the same time it was becoming more difficult. A lack of effective communication between advancing infantry and supporting artillery could lead to disjointed, poorly timed attacks or fratricide when artillery lifted or shifted their barrage from in front of advancing infantry. Various methods of coordination were tried with mixed results. Colored cloth was sewn to the backs of uniforms so observers could determine rates and limits of advance. Colored flares and signal lamps were also used to communicate. Types of artillery ordnance were sometimes used as a form of coordination. Shrapnel rounds instead of high explosive was sometimes used to allow infantry to

advance closer behind the rolling artillery barrage because the effect of the shrapnel was focused forward of the point of impact.[4]

Technological changes in this transitional period within the cavalry are not as clear. In fact, due to the increased firepower of the other two arms, some began to question the historic missions of cavalry on the battlefield. Employment concepts, such as dragoons or mounted infantry, were advocated and practiced.[5] During World War I traditional cavalry missions, such as shock and pursuit, were performed with limited success, by the tank. Yet a clear doctrinal vision for the tank's use and how to incorporate it onto the battlefield was lacking. Was it a modern form of cavalry ready to exploit penetrations achieved by infantry? If so, it was far too slow for the task. Or was it an early form of self-propelled, short-range artillery moving in support of infantry? Since few commanders had a clear vision regarding the tank's role on the battlefield, it was difficult to develop effective ways of coordinating this new system with infantry and artillery. When tanks were placed into battle with infantry without any prior training or coordination, the infantry found the tank more a hindrance than a help. On those occasions infantry had trained with tanks beforehand and developed coordinated plans, the result was the infantry placed a greater value on the tank.[6]

Thus, World War I saw a larger, more lethal battlefield than ever before requiring more coordination than previously required. Yet the tools used for coordination, such as radio-telephones, telegraphs, signal flares, signal panels, homing pigeons, etc., were inadequate for dependable and effective coordination. As a result, attacks often

failed when infantry did not move quickly to follow an artillery barrage. Sometimes, when infantry tried to move closely behind the barrages, it would either advance into its own artillery fire or the rolling barrage would advance faster than could the infantry.

Over this larger, more lethal, more confusing battlefield the airplane emerged as a new weapon system. With the introduction of this new system a new variable was added to the coordination equation. The airplane did not often play a major role in attacking ground targets. Yet, when it was employed against targets on the battlefield, various types of coordination occurred. Coordination between ground and air forces has continued up to the present with mixed success. The task has grown more difficult, in part, due to the greatly expanded depth of the battlefield. The ground commander, in the past, had no need to coordinate with the air commander regarding fires many miles beyond the close battle area since he had no assets capable of reaching those depths. Today, however, the ground commander has assets, such as attack helicopters and the Army Tactical Missile System (ATACMS), which can reach distances previously attacked only by air force aircraft.

Today a doctrinal dispute between the Army and Air Force over this coordination issue has emerged. Where does coordination take place? The crux of the conflict lies in the responsibility of the services to coordinate with one another before placing fires on the battlefield. There are areas on the battlefield where the Air Force must coordinate with the Army prior to employing fires.[7] In other areas, while it is highly desirable for the Army to coordinate with the Air Force prior to employing fires, it is not an absolute requirement.[8]

Air Force doctrine currently is at odds with Army and Joint doctrine over the requirement to coordinate fires on the battlefield.

The Research Question

This research will focus on the following primary question. Is it imperative for ground and air forces to engage in coordination prior to employing fires in the tactical zone?

Two subordinate questions will be addressed and should, as a result, help answer the primary question.

1. What have been the historical reasons for coordinating between army and air forces? The most obvious answer to this question is the avoidance of fratricide. However, this may or may not be the only reason and may, in fact, not be the primary reason.

2. What methods of coordination have been used and what has been their effectiveness?

Background and Development of the Problem

During World War I, the use of fixed wing aircraft in attacking enemy targets close to friendly positions prompted concerns over the potential for fratricide. The first coordination measure was known as the "bomb line" and was established to solve this particular problem. This line evolved over time into the Fire Support Coordination Line (FSCL) and other Fire Support Coordination Measures (FSCMs) for the purpose of effecting coordination between ground and air forces. Over the years an entire architecture has developed, both haphazardly and deliberately, to facilitate the coordination between Air Force and Army

on and over the battlefield. Service, multiservice, and joint publications have been written addressing this planning and coordination. The Air Force has liaison officers stationed with the Army to facilitate such coordination. In both Army command posts and Air Force operations centers there are cells and detachments consisting of sister service personnel. Such people work in these locations for the sole purpose of effecting coordination between services on multiple issues. The system has worked with a degree of success. As long as the FSCL was placed in the vicinity of the limit of canon fire the system appeared to work. However, today, with the development of truly deep fire weapons, such as ATACMS and attack helicopters, either placement of, or coordination around, the FSCL becomes cumbersome, frustrating, and confusing for all parties involved. On today's battlefield the Army corps commander spends a significant amount of time and energy focusing on the deep fight. The corps commander wants to use air force assets, when available, to shape the deep fight., Yet, at the same time the Air Force prefers a more independent role in which to conduct interdiction operations beyond the FSCL in an attempt to directly achieve Joint Force Commander (JFC) objectives. When the corps commander feels Army specified targets are not being adequately attacked by the Air Force and the corps possesses assets to work deep himself, the commander will decide to conduct operations long of the FSCL. The question arises as to how to coordinate the fires of Air Force and Army systems in the deep battle. One possible solution is to simply move the FSCL further out to the range of the corps commander's deepest assets. The Air Force would then be required to coordinate with the Army prior to placing any fires

inside the FSCL. This has a significant number of drawbacks since the corps now may have tens of thousands of square miles on the short side of the FSCL with friendly forces occupying little of it. In addition, there are likely to be targets within this new area that may be of limited concern to the corps commander and at the same time be critical targets to the Air Force or possibly the Joint Force Commandere (JFC). If the FSCL is not moved out to the limit of indirect fire range, the Corps commander will want to employ his deep fire assets beyond the FSCL. This creates problems of its own. The Air Force would then become concerned about Army weapons systems entering the airspace beyond the FSCL and either interfering with Air Force operations or possibly inflicting fratricide on Air Force assets. In addition, if Army attack aviation is conducting an operation beyond the FSCL, there are now additional friendly aircraft beyond the FSCL creating an "identification, friend or foe" (IFF) problem and another possibility for fratricide. This is a critical part of this research. Current Air Force doctrine conflicts with Army and Joint doctrine regarding coordination requirements beyond the FSCL. Joint and Army doctrine encourages coordination with the Joint Force Air Component Commander (JFACC) prior to placing fires long of the FSCL. However, the inability to accomplish the coordination should not preclude the use of the deep fires.[9] The official Air Force position has been that, if synchronization of all fires inside the FSCL is critical to the Land Component Commander, the same synchronization should be critical to the JFACC beyond the FSCL.[10] In Desert Storm the Army was in fact required to coordinate with the JFACC on all fires long of the FSCL.[11]

Definitions and Concepts

Before terms, such as FSCL, are used further they should be clearly understood. Some concepts need to be discussed, terms defined, and a new term introduced.

What, exactly, is coordination? There are many terms defined in service and joint publications that include the word "coordination". Several of them are worth examining.

The Air Force defines coordination as,

> The process of securing unity of effort in the development of a policy or course of action. It is the interaction between two or more functional areas to ensure that the interest of each area is considered in the development of a proposed course of action. It involves study, discussion, and resolution of differences, and may be provided through participation in air staff boards and committees or through normal staff actions and the communication between individuals at any organization level.[12]

For the purposes of this research, the two functional areas of concern are the Army and the Air Force. This definition points out that functional areas may have varying interests which may need to be resolved in an organized and recognized manner. The following three definitions address coordination of fires and relate to the research.

> Fire Support Coordination--The planning and executing of fire so that targets are adequately covered by a suitable weapon or group of weapons.[13]

> Fire Support Coordinating Measure--A measure employed by land or amphibious commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces.[14]

> Fire Support Coordination Line--A line established by the appropriate ground commander to ensure coordination of fire not under the commander's control but which may affect current tactical operations. The fire support coordination line is used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets. The fire support coordination line should follow well-defined terrain features. The establishment

> of the fire support coordination line must be coordinated with the appropriate tactical air commander and other supporting elements. Supporting elements may attack targets forward of the fire support coordination line without prior coordination with the ground force commander provided the attack will not produce adverse surface effects on or to the rear of the line. Attacks against surface targets behind this line must be coordinated with the appropriate ground force commander. Also called FSCL.[15]

An examination of the preceding definitions finds Fire Support Coordination is the job or task itself. Fire Support Coordinating Measures (FSCMs) are a group of tools available to those people coordinating fire support and the Fire Support Coordination Line (FSCL) is a specific FSCM.

At this point a new term will be introduced for the purpose of this research. It is important to determine where, on the battlefield, coordination may occur between air and ground forces. Since current FSCM's can generate controversy, they will be removed from this research as much as possible. This research will use a term called the "tactical zone" to denote that region of the battlefield where both air and ground forces are capable of applying fires. The Air Force may apply fires from the forward line of own troops (FLOT) to hundreds of miles into enemy territory. The Army historically has been limited to the range of its artillery or indirect fire systems. Since attack helicopters and ATACMS are able to range to significant depths on the battlefield, for the sake of this research the "tactical zone" is defined as that area of the battlefield extending from the FLOT to the maximum effective range of the Army's longest range artillery system or attack helicopter system. Obviously, this zone is not fixed in size. The expansion of

this zone by long-range Army systems that has resulted, in part, in controversy.

There are several reasons for using this new term. First, coordination of fires long of the zone should not be an issue since the Army does not possess assets to reach that far. Additionaly, there should be no coordination of fires short of the zone since that would place fires on friendly troops. In addition, use of the new term avoids use of current and controversial terms that often do not have an agreed upon definition.

Limits and Delimits

While addressing the growth, evolution and utility of coordination as a whole, this research will not attempt to address utility of specific coordination tools and measures such as the FSCL and whether it remains a viable FSCM. Some of those questions have been addressed in graduate theses and monographs. This research assumes them to be valid questions and merit further study and effort by doctrine writers in both services. The assumption is the FSCL and other FSCM's will continue to be critical in the immediate and possibly the foreseeable future.

In addition, this research will not address coordination with naval or allied forces. Such coodination is important but lies beyond the scope of this research.

Summary

Coordination of fires on the battlefield is an old necessity and with the increased range and lethality of ground weapons and the

advent of the airplane coordination takes on new importance. Yet, due to different visions, capabilities, and perspectives, coordination between air and ground forces has not always been successful and has rarely been easy. Armed with definitions and an understanding of coordination and an area in which it occurs between air and ground forces, the research will seek to determine if such coordination is imperative.

Endnotes

[1]House, Jonathan M., Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization. Research Survey No. 2, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1.

[2]Ibid., 7-8.

[3]Ibid.

[4]Ibid., 20-21.

[5]Ibid., 12.

[6]Ibid., 29.

[7]Joint Chiefs of Staff, Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms (Washington D.C.: Office of the Joint Chiefs of Staff, 1994), 146.

[8]Ibid.

[9]Joint Chiefs of Staff, A Joint Doctrinal Statement of Joint Operational Concepts (Washington D.C.: Office of the Joint Chiefs of Staff, 1992), 17-18.

[10]US Air Force, JFACC Primer (Washington D.C.: Department of the Air Force, 1994), 33-34.

[11]David H. Zook, "The Fire Support Coordination Line: Is It Time to Reconsider Our Doctrine?" (MMAS Thesis, U.S. Army Command and General Staff College, 1991), 6-7.

[12]US Air Force, AFM 11-1, Air Force Glossary of Standardized Terms (Washington D.C.: Department of the Air Force, 1989), 22-23.

[13]DOD Dictionary, 146.

[14]Ibid.

[15]Ibid.

CHAPTER 2.

LITERATURE REVIEW

While an examination of the coordination issue from World War I to today would be worthwhile, the volume of material requires the researcher to narrow the scope. Thus the research is not an examination of the evolution of coordination during the twentieth century but is, instead, a closer look at coordination during two critical periods separated by approximately fifty years of doctrine and technology. An examination of air and ground operations during World War I reveals airpower and its use against ground targets to be in its doctrinal and technical infancy. In contrast a vast amount of material is available on operations in World War II. The Mediterranean Theater of Operations (MTO) was selected for several reasons. First, many of the doctrinal questions regarding the role, use, and command of airpower were raised, debated, and in some way resolved. Commanders at all levels of warfare were involved in the debates. President Roosevelt and Prime Minister Churchill and the service Chiefs spoke from the strategic level and ultimately issued some answers to the questions with a reorganization of command relationships and publication of Field Manual (FM) 100-20, Command and employment of Airpower, in 1943. Operational level commanders in the theater were concerned with how to employ the more mature airpower technology but were constrained by, in some cases,

severely limited resources. Once some of the battlespace and resource management issues were, to some extent, resolved, commanders, troops, and pilots at the tactical level became concerned with the mechanics of coordination in order to minimize the chances of fratricide while still applying fires to targets. These developments began in the early days of the theater and progressed until the war's end. Thus the Mediterranean Theater of Operations provides a single theater within one conflict in which to examine the growth of doctrine, techniques, and procedures involved in coordinating fires between air and ground forces. Development of coordination was accelerated by the pressures of combat. Also, the existence of the theater from 1942 until the war's end provided ample time for different systems and techniques to be adopted, adapted, and when required, discarded. The European Theater of Operations (ETO) will be examined because many of the techniques and procedures used in coordination were transferred from the Mediterranean Theater of Operations (MTO). The Pacific Theater also had numerous examples of intense air-ground operations, but since the size of the tactical zone was often defined by the size of an island or atoll, it did not lend itself as well to the analysis.

While the MTO and ETO provide a useable period for the study of the early days of air-ground coordination, operation Desert Storm provides a modern case. Indeed, the differences, debate, and decisions occurring during Desert Storm have generated subsequent doctrinal discussions regarding the coordination.

With two historical periods selected a more thorough literature review is possible. The examination of literature reveals different

levels of emphasis and reasons for coordination depending on the level of warfare being discussed. Senior commanders involved at the operational level tend to focus on issues involving the appropriate use of Air Force and Army assets. Ground and air forces have two different perspectives for viewing combat and commanders from each perspective have firm ideas as to how best to use their forces in combat. But depending on which level of warfare is being examined, different reasons for coordination can be found. Though there may be some concerns at the strategic level, these may be more concerned with priority of effort between theaters and are beyond the scope of this research. Of much greater concern and interest are those uses of coordination at the operational and tactical levels.

Discussion and debate between senior commanders often center on how to use available assets to achieve certain goals on the battlefield. In the MTO in World War II air forces wanted to interdict deep while ground forces wanted a focus on working closer in to achieve more immediate effects. During Desert Storm Air Force leaders were intent on waging intense operations throughout the depth of Iraq and Kuwait at all three levels of war. Corps commanders, however, were not convinced their needs were being met against targets immediately in front of them prior to the ground offensive. Also, during the ground offensive the commanders were frustrated by the requirement to coordinate with the Joint Force Air Component Commander (JFACC) prior to employing fires beyond the FSCL. In today's terminology these concerns could be issues over battlespace management.

Another reason for coordination found in the literature is the issue of resource allocation. Rarely do commanders possess all the forces, firepower, and ammunition they desire. In some cases resource constraints severely impede operations. These constraints apply at all levels of war, and thus commanders at all three levels debate and discuss how best to employ limited air and ground assets in the tactical zone.

At the lowest tactical levels commanders are certainly concerned with target destruction, but too many historical examples of fratricide have resulted in intense concerns and efforts by both ground and air commanders to avoid fratricide.

At the operational level there is an abundance of material readily available. The issue of strategic versus tactical bombing was an example of coordination at the strategic level and impacted the other two levels based on availability of resources. At the operational level issues, such as interdiction versus close support, independence of action, weight of effort, etc., are much discussed in biographies, autobiographies, memoirs, and to some extend in official histories. Biographies and memoirs of World War II leaders in the Mediterranean Theater, such as Spaatz, Truscott, Eaker, and others, discuss at length the issues of coordination between Air Force and Army forces at strategic and operational levels.

At the tactical level information is less readily available but certainly exists. Much of the material is scattered among professional libraries, the Library of Congress, and the National Archives. This material, as opposed to biographies, is largely original source.

Since methods of and reasons for coordination vary somewhat depending on the level of war and thus, to some degree, the echelon of command, the review of literature will be oriented at the operational and tactical levels of war and within four categories. The categories sometimes overlap but offer a convenient method of separating the material.

Authoritative Sources

This classification will include official publications from the Joint Staff, US Army (USA), US Air Force (USAF), or US Army Air Forces (USAAF), including policy statements by service leaders, as well as commanders' directives in the field. For the purposes of this research the statements and positions of USAAF leaders will be considered similar to statements of a separate service.

An examination of recent and current doctrine reveals an abundance of material within joint and service publications, ranging from doctrinal documents to pamphlets and manuals. These should help in understanding the individual service and joint perspectives on fire support coordination. In addition, an examination of prior versions of such documents is useful in understanding the change and growth of a concept or doctrine. Publications suitable for such an examination would include Army Field Manuals 31-35, Aviation in Support of Ground Forces; 100-20, Command and Employment of Air Power; 6-20, Fire Support in the Airland Battle; and Air Force Manual 1-1, Basic Aerospace Doctrine of the United States Air Force and its predecessors. Specific methods and types of coordination within the MTO or under the Central

Command (CENTCOM) unified command in operation Desert Storm will be considered authoritative but at the same time was also non-doctrinal. The use of the FSCL in CENTCOM during Desert Storm did not fit the doctrinal definition; nevertheless, it was authoritative within that unified command.

Professional Journals and Periodicals:

Articles in service journals and periodicals, such as Military Review, Airpower Journal, and Field Artillery Journal, are valuable sources for assessing thought process and doctrine development within a service. They are of great value, but they cannot be considered as authoritative for a given service unless written by service leaders. These writings can best be considered professional dialogue and dispute within a service. They are useful in assessing how a separate service sees itself and its place on the battlefield.

There is a limited amount of material of this type available for the MTO that was written during or immediately following World War II. The pace of operations during the war did not allow for a great deal of introspective thought and doctrinal analysis.

The post-Desert Storm period has witnessed a large number of writings related to fires coordination and similar subjects. "JFACC Problems associated With Battlefield Preparation in Desert Storm," in the Spring 1994 Airpower Journal is an example of the dialogue occurring in service journals and discusses the problem of corps nominated interdiction targets that are not serviced to the corps commander's satisfaction. The article highlights the Air Force perspective that

corps target requests were not always viable targets and were not always in agreement with CENTCOM targeting priorities.

Research Efforts (Theses and Monographs)

Since Desert Storm a significant amount of research has been conducted on the subject of fire support coordination and related topics. Theses and monographs from the School of Advanced Military Studies, the Command and General Staff School, the School of Advanced Airpower Studies, and other institutions have specifically addressed the utility of the Fire Support Coordination Line as well as larger issues of command and control of deep fire assets. A significant thesis by Major David H. Zook III "The Fire Support Coordination Line: Is it Time to Reconsider Our Doctrine?" specifically asks whether the FSCL remains a viable Fire Support Coordination Measure. He performs a review of Fire Support Coordination Measures in general and the FSCL in particular, tracing their origins, development, and in some cases elimination. He concludes that the FSCL's current doctrinal definition is no longer valid. He goes on to state his belief that coordination long of the FSCL must occur between the ground and air components. While this research may or may not achieve a similar outcome, the researcher does not believe the current research will duplicate Zook's or others. This research will be oriented around determining the historical reasons for and methods of coordinating in the tactical zone and whether those reasons and methods remain valid.

Historical Sources (Original Source)

Unit diaries and histories, battle staff directives, air tasking orders (ATOs), after action reports (AARs), etc., allow an examination of specific points in history to identify areas of concern between commanders regarding coordination. In addition, when conflicts arise between services during combat operations over priority of air effort, such material can help in understanding service perspectives. The Air Force Historical Research Agency (AFHRA) at Maxwell Air Force Base, Alabama, maintains some original source material suitable for this research. Some of this material from World War II includes reports and memos from Headquarters First Us Army Group, Headquarters Mediterranean Army Air Forces (MAAF), Headquarters Mediterranean Theater of Operations, and the Army Air Forces (AAF) Evaluation Board. This material focuses on the mechanics of coordination at the tactical level and includes tactics, techniques, and procedures used the air and ground forces actually applying the fires. In addition, after action reports attempt to identy strengths and weaknesses in coordination systems. Similar materials are available for Desert Storm and include corps duty logs, Tactical Air Control Center (TACC) logs, and after action reports. The most complete collection of material is in the Gulf War Air Power Survey (GWAPS), a compilation of original source material comprised of five volumes. The GWAPS could also be considered an official history.

An example of original material fitting into more than one category would be the series of articles in the Military Review following Desert Storm. Each article was written by a senior leader in the theater addressing various issues during Desert Shield and Desert

Storm. These sources are authoritative, original, and appear in a journal.

Historical Sources (Secondary Source)

An excellent source within this category is Benjamin Cooling's Case Studies in the Development of Close Air Support. While this research addresses coordination in general as opposed to Close Air Support (CAS) specifically, the studies edited by Cooling conveniently break the issue into historical periods and theaters and discusses coordination at the operational and tactical levels of war. In the MTO study, specifically in Italy, the mechanics of coordination at the tactical level are discussed and original sources are noted at length.

Official Histories (Army/Army Air Forces)

The US Army official history series of books on World War II includes a four volume set entitled, The Mediterranean Theater of Operations. This is paralleled by an USAF official history The Army Air Forces in World War II. Material covering the MTO and ETO is found in volumes II and III. Both official histories address coordination primarily at the operational level and provide valuable information. The Condensed Analysis of the Ninth Air Force in the European Theater of Operations provides detailed descriptions of command relationships, coordination procedures, and execution mechanics.

Biographies, Autobiographies, and Memoirs

The primary value of this category of writings is the illumination of the attitudes of senior leaders making decisions

regarding coordination. This material can often provide reasons for coordination methods. Most of the actual methods and mechanics of coordination must be addressed by other types of literature. People in this category include Eisenhower, Spaatz, Truscott, and Tedder. Air Marshall Tedder's material is worth including due to his involvement in North Africa and his significant and direct impact on doctrine for the AAF in the MTO.

Conclusion

At the operational level of war, material addressing air-ground coordination is ample and readily available, mainly in secondary sources. At the tactical level of war, material where ample is not quite so readily available. This is because much of the material remains in original sources and is located in separate archive collections.

As for the research topic, there has been much written on the subject of air-ground coordination, especially since Desert Storm. Most studies have focused within two broad areas. The first is generally categorized at command and control issues. These writings and research efforts focus on battlespace management and unity of command issues. The second area focuses more narrowly on specific fire support coordination measures, their use, and their utility. This research attempts to work a different area by addressing the issue of air-ground coordination as a whole in two specific periods. There seems to be no significant existing efforts in this area and ample source material exists to support the research.

CHAPTER 3.

RESEARCH METHOD

The research method will involve examining the progress of coordination in World War II in the MTO and ETO and Operation Desert Storm. World War II operations will concentrate on the Mediterranean Theater of Operations (MTO) with a more focused examination of the European Theater of Operations (ETO). Key periods of time, events, or specific operations will be selected for comparing and contrasting with operations in Desert Storm.

As stated in the Introduction, two subordinate questions will be asked: (1) What have been the historical reasons for coordinating between army and air forces? and (2) What methods of coordination have been used and what has been their effectiveness?

The research intends, by tracing the development of coordination, to identify the primary reason or reasons for coordination. In addition, the research will determine if the reasons present in World War II were the same reasons for coordination in Desert Storm. Finally, the research will seek to determine if those reasons are still valid.

Operations in the MTO and ETO during World War II are well suited for an examination to answer subordinate question number two. Due, in part, to its duration, the MTO saw some significant modification

in coordination methods. The ETO, on the other hand, tended to refine the methods developed in the MTO instead of inventing completely new ones. Desert Storm on the other hand was too short to see methods evolve but can be examined to see how those methods compare to WW II and to doctrinally accepted practices in place immediately prior to Desert Storm. The use of a matrix can assist in answering the subordinate question of coordination methods. Coordination methodology will broken into three parts. The first to be considered will be command relationships. This involves the command relationship between the theater commander and his subordinate ground and air commanders and between the ground and air commanders. The second part is the coordination architecture. This is the control, communication, and liaison framework established to request, plan, and task air missions in the tactical zone. The third part of coordination methodology is execution mechanics. These include the devices and systems used to get the aircraft to identify and attack the desired target and avoid attacking friendly troops. These three parts compose the vertical portion of the matrix. The horizontal portion is composed of four periods or phases to be examined. Operations in North Africa will be examined first, followed by the Italian campaign. An examination of operations in the ETO will be limited to the combined efforts of the U.S. 12th Army Group and the U.S. 9th Air Force. The final operation to be examined will be Desert Storm. The research will attempt to determine if the three parts of coordination methodology were successful or unsuccessful in each of the periods examined. Criteria for successful or unsuccessful methods have been established. The first

requirement for successful coordination is for the method or methods to be clearly understood and recognized by the participants. In addition, successful coordination requires efficiency in terms of time, personnel, and assets required to accomplish the coordination. Finally, the participants should have a high confidence that the methods being used will result in timely application of fires and a low risk of fratricide. The success or lack of success will be determined largely by the participants as revealed in after-action reviews, interviews, personal histories, and questionnaires.

It is critical to the validity of the research to establish and emphasize the similarities and differences between operations in World War II and Desert Storm. In comparing and contrasting the periods, some of the similarities and differences will be discussed. During examination those similarities and differences will be categorized as technological, environmental, and organizational. Those similarities and differences impacting the research will be addressed after the analysis.

In the area of technology obviously great changes have occurred since 1945. Both Army and Air Force weapons systems possess, in most cases, greater speed, range, firepower, and lethality. However, one may find them employed in a similar manner. At the same time threat systems have changed as well.

Environmental differences and similarities are a function of where the war was fought as opposed to when in history it was fought. Conditions in Southwest Asia during winter months bear some resemblance

to North Africa but do not duplicate them, while the terrain in Italy is certainly radically different than that in Kuwait and Southeastern Iraq.

Organizational similarities and differences includes primarily command and control architectures. For example, how does the Army Air Ground System (AAGS) of today compare to its counterpart in the MTO?

At the conclusion of the analysis, successfully answering the two subordinate questions should lead to a logical conclusion regarding the primary research question.

CHAPTER 4.

ANALYSIS

Operations in North Africa

As allied forces prepared to enter the African continent in 1942 the U.S. forces had neither a coherent concept, nor a true capability, for engaging in air-to-ground coordination. One reason for the inability to coordinate effectively rested with doctrine. The current Army doctrine of the day, FM 31-35, spoke in broad terms regarding the use of air power on the battlefield.[1] In fact the FM's (field manual's) title, "Aviation in Support of Ground Forces," clearly indicated the attitudes flowing from the Army's Command and General Staff College and the Army War College. However, the Army Air Corps (AAC), with the Air Corps Tactical School at its intellectual center, was strongly supporting the concept of strategic bombardment and had done so for several years.[2] Complicating the problem was the lack of tactical aircraft available for training with Army units due, in part, to rapid expansion and formation of new units.[3] The total of available first-line combat aircraft at the end of 1942 was 10,885. In today's terms it seems a large number. Yet when measured in the context of eight numbered air forces operating or preparing to operate around the globe, coupled with the vast requirement to train pilots and crews,

11,000 aircraft did not go very far. Not until July 1944 would the AAC possess its greatest number of combat aircraft with 39,157.[4]

Reasons for Coordination

Although the reasons for coordination were not clearly stated, they can be derived from doctrinal publications current at that time. In any anticipated conflict the use of air power in support of ground forces was considered essential.[5] In addition, the basis of effective air support was teamwork. Several factors were believed to affect the employment of this air-ground team. While all the factors are logical and understandable, three are particularly relevant to this research and can be considered excellent reasons for coordinating. One factor discussed was "economy of force," yet when described, actually referred to application of air support on the right target at the right time. In today's military language an equivalent term might be "synchronization." Another factor discussed was "time and space" which addressed the importance ensuring all forces were properly positioned in time and space to support the overall objective. The final factor particularly relevant was "weight of attack." It was important to coordinate in order to ensure everyone understood where weight and by what means the attack would occur.[6] As stated above, these reasons for coodination in the early days of World War II must be deduced from doctrinal publications since they are not clearly delineated.

Methods of Coordination

Command Relationships

Doctrine had a direct impact on command arrangements in a given theater. Thus lack of doctrine, coupled with inadequate training, set the stage for dissatisfaction and possibly disaster in the area of air-to-ground coordination. The chain of command as Allied forces entered North Africa had General Eisenhower as the overall commander with Naval forces, three ground task forces, and Twelfth Air Force immediately subordinate. Each of the three task forces had air forces under their command. Twelfth Air Force (12AF), as the parent Allied Air Force (AAF) organization in theater, had indirect or advisory authority over those forces supporting the task forces (see figure 2).[7]

Changes in the North African command setup received their impetus in large part from Allied failures in the fall of 1942. These failures were based on several factors. One significant factor that affected many others was the inability of Allied air power to gain superiority over the Luftwaffe which was having a significant impact upon friendly troops.[8] The failure to gain air superiority was itself due to several factors. No doubt logistics played a large role. There was an insufficient number of hard-surfaced airfields close enough to the battle area to place large numbers of aircraft forward. Those airfields that were suitable were supported by a weak transportation system and thus poorly supplied. Poor weather added to a difficult situation and often precluded meaningful air operations.[9]

Patience was required to allow the weather to improve. Hard work and patience were also required to improve the logistical picture.

Yet, commanders were becoming increasingly impatient with the command arrangements. Air commanders continued to argue the inefficiency of using air power only against front-line troops and as air defense in an umbrella over those front lines. This, coupled with the lack of a real air-ground coordination team, due in part to widely separated ground and air headquarters, led to attitudes that the situation demanded change.[10]

While this research focuses on U.S. coordination, it is important to note the influence of British thinking on the issue. Prior to Allied landings in North Africa, British forces in the Middle East were using a system of air-ground cooperation they considered effective. With dissatisfaction prevalent, Eisenhower turned to Air Chief Marshall Tedder, the Air Officer Commanding (AOC) Middle East. Tedder had been involved in the Middle East fighting for over two years. The Royal Air Force (RAF) had a clearly thought out system which centered around four requirements. (1) There needed to be a separate air organization designated for support of the ground, but under RAF control. This force was to protect the ground force from enemy attack. This was not to be done solely by keeping fighter cover above, but also by attacking enemy airfields and aircraft on the ground as well as the supply lines supporting the airfields. This separate organization was also to mass firepower on the battlefield itself. (2) There needed to be a system of liaison personnel to explain methods and limitations of air power to soldiers and to communicate the army plan and situation to pilots flying the mission. (3) There needed to be a joint operations center or command post. And (4) There needed to be a communications network capable of connecting the joint control center both to brigade or

similar fighting formations and to the airfields from which missions would be launched.[11] The first requirement related to command relationships while the other three fell under the coordination architecture.

After conferring with air commanders and advisors, Eisenhower proposed in December of 1942 a change in command organization to a single air commander.[12] This change and many subsequent ones occurred over approximately a two-month period that witnessed both the Casablanca Conference and the German attack at Kasserine Pass.

At the conclusion of this period of transition and crisis, there existed a new command structure. Once again Eisenhower commanded all Allied troops in theater. On the ground side each corps answered to either First Army under General Anderson or Eighth Army under General Montgomery. Both Army commanders answered to the 18th Army Group (18AG) under General Alexander, who in turn reported directly to Eisenhower. On the air side, Eisenhower's immediate subordinate was Air Marshall Tedder in charge of Mediterranean Air Command. He in turn was over General Spaatz's North African Air Force (NAAF). NAAF had five subordinate commands addressing training, service, coastal defense, strategic efforts, and tactical efforts. Of interest to this research is the North African Tactical Air Force (NATAF) under Air Vice-Marshal Coningham. NATAF and 18th Army Group were to work directly with one another in prosecuting the fight. A key difference in the new structure was a new found independence of the air forces. While NATAF would work with 18th Army Group, they would work for NAAF.[13] Once the crisis of Kasserine had passed, all air umbrella missions were ordered stopped and

offensive missions were flown. Primary targets were not tanks on the front lines, but motor transport, troops, and logistics in the rear. In addition NATAF headquarters was established alongside that of 18AG.[14]

Additionally, NATAF had subordinate units, one of which was XII Air Support Command (XII ASC). This unit had a direct relationship with the U.S. Army II Corps and was tasked to provide air support to the Corps (see figure 3).

Coordination Architecture

Prior to, and immediately following the invasion, the doctrine, as indicated by FM 31-35, resulted in specific organizations and functions designed to execute air-to-ground coordination. FM 31-35 called for ground support to be provided by an Air Support Command (ASC), one of several in an Air Force. An ASC was to be habitually associated with or was to support an Army in the field.[15] The command post of this ASC was to be located immediately adjacent to the command post of the supported ground unit.[16] Subordinate to the ASC was an Air Support Control, located at corps or possibly division level. The Air Support Control had authority to task aircraft at various airfields to launch missions in response to Army requests. At the lowest level were Air Support Parties (ASPs) which operated at division level with the infantry or at regiment or combat command level with armored divisions.[17] As U.S. forces prepared to enter North Africa, the established system called for the unit commander to initiate a request through ground command channels. This request would travel until it reached a command post with an air support party. The air support

officer, a member of the AAC, would advise the ground commander of the suitability and practicability of using air power against the target. It is important to note the ground commander approved or denied the request. This was a direct result of command arrangements in effect. If approved, the request, now an order, was transmitted to the air support control which tasked specific aviation units to execute the mission.[18] In an important departure from doctrine, in Africa the ASC was not adjacent to the Army command post (see Figure D).

On the subject of target selection, doctrine stated that in most cases air power would not be directed at targets within the range of ground forces. If the situation was critical, air power would be called upon. Regarding the issue of prioritizing and selecting targets, doctrine stated that the ground commander would make the final decision. These procedures included requesting an air mission, deciding on the request, and ordering the mission to be flown.

It is important to remember this initial framework for the command and control of air in support of ground forces as it will be modified and expanded as the progress of coordination is traced.

The final subject of interest in FM 31-35 was that of the alert status of the air units. A key concept at that time was that of holding a significant portion of air power in an alert status, ready to respond quickly to assigned missions. At times, as much as 25 percent of aviation could be expected to be on alert.[19]

The changes in command relationships generated at the Casablanca Conference would eventually lead to changes in the control, communications, and coordination network. One of the first was the

placing of 18th Army Group and NATAF headquarters in the same location. The Commander of 18th Army Group would use the same operations center as the NATAF Commander with each having final authority over his own forces.[20] This facilitated the preplanning required for the phased operation to conquer Tunisia. An additional change was in the employment of the ASPs. In this new arrangement, liaison personnel in Air Support Parties, located with subordinate ground units, worked with the army staff to develop requests for missions. These requests were forwarded to XII ASC who then decided, in consultation with II Corps staff, which requests would be met. It is important to note that while ASPs were on the army staff they did not command or control any aircraft. That was reserved for XII ASC.[21]

Other changes in the network would be addressed over time. Yet, since changes in command relationships had not been fully reflected in the network structure, not everyone was pleased with the results. The immediate changes were seen in the planning of operations. The near-term process of requesting and executing immediate air missions would be changed later.

Execution Methods

Identification of targets would prove to be a large and troublesome issue and was addressed in FM 31-35. At that time target identification was to be accomplished using maps, aerial photos, coordinates related to terrain features, use of observation aircraft to assist, ground panels and vehicles arranged in patterns, tracer or smoke ammunition, signal lights, and pyrotechnics.[22] These methods, singly

and combined, would be used, modified, discarded, and supplemented until war's end in an attempt to insure aircraft hit the proper target while avoiding friendly forces.

No single technique for target identification proved effective in all cases. The problem of fratricide, whether air-to-ground or ground-to-air, was not solved merely by changing the command structure or the coordination network. Both before and after the Casablanca Conference, instances of fratricide occurred repeatedly.[23] The use of yellow smoke by friendly troops to mark their position was not universally understood by pilots.[24] This seems to indicates some techniques and methods for coordinating over the battlefield were not being adequately disseminated. Tools for target identification mentioned in FM 31-35, Aviation in Support of Ground Forces, continued to be used. The bomb safety line was in use in this theater and would remain throughout the war.[25]

Assessment of North Africa

Command relationships ended in North Africa on a successful note after poor beginnings. Initially, neither air nor ground commanders were pleased with air power results. In addition air commanders were not satisfied with command arrangements. Following reorganization, the air commanders had the command arrangements they sought. Reactions by ground commanders were mixed. Eisenhower endorsed the arrangement and the 18th Army Group commander publicly stated, "I shall never issue any orders on air matters. The Airman must be the final authority on air matters."[26] Likewise the British Eighth Army

commander Montgomery had been a strong advocate of the independent air commander during reorganization discussions.[27] On the other hand, some commanders expressed dissatisfaction with air power's capability when attacked by enemy aircraft.[28]

Although not universally hailed, the command relationships existing at the end of North Africa were deemed successful largely because they were clear and widely understood. The change in command relationships in North Africa were the most dramatic of the war and would remain largely in effect till the war's end. In fact the change in command relationships were the most important issue, relative to this research, dealt with in this theater.

Control, communication, and coordination network issues are not as easy to assess. The structure in place initially was designed to support the initial command relationships. When the new arrangements were established, new networks and structures were warranted. Few occurred in North Africa except for the collocation of air and ground headquarters. Overall, the control, communication, and coordination network is deemed neither a success nor a failure, but rather a work in progress to be modified and refined.

Regarding the mechanics of execution, the assessment is North African operations were unsuccessful. Fratricide issues continued to plague both air and ground forces. Few new techniques were attempted, and the possibility of strafing and bombing attacks by friendly aircraft remained quite real.

Operations in Italy

Reasons for Coordination

Planning for the invasion of Italy was done by some of the same organizations conducting operations in North Africa. To them the invasion of Italy was a continuation of a larger campaign, rather than a separate one. The pressures and constraints of combat operations did not provoke a great deal of introspective thought and dialogue regarding the coordination issue. Thus, as the invasion of Italy was a continuation of operations, so too was the issue of coordination in Italy an extension of coordination in North Africa.

Methods of Coordination

Command Relationships

Although command arrangements would change somewhat over time in the Italian Campaign, the overarching structure coming out of North Africa remained intact. Eisenhower and his successor were the Mediterranean Theater Commanders with three coequal components immediately subordinate. The Commander of 18th Army Group again directed all ground forces. The Commander-in-Chief Mediterranean directed naval operations, and air forces were led by the commander of Mediterranean Air Command (MAC). MAC would be designated Mediterranean Allied Air Forces (MAAF) and was referred as such.[29] The MAAF possessed three air arms--strategic, tactical, and coastal--each of which had its own forces. Of key interest is the tactical force, Mediterranean Tactical Air Force (MATAF). There was an early attempt to shift fighters from tactical to strategic units in order to protect the

bombers. This did not occur and the tactical forces remained intact. MATAF was itself composed of three main parts. The tactical bomber force was made up of light and medium bombers with no heavy bombers being a part of MATAF. The Desert Air Force (DAF) and XII Air Support Command (XII ASC) were the heart of the tactical effort. The DAF typically worked with the British Eighth Army and the DAF advance headquarters was usually located with Eighth Army headquarters. On the American side, XII ASC worked closely with Fifth Army, and again XII ASC advance headquarters was collocated with Eighth Army headquarters.[30]

Thus, there existed a command arrangement very similar to that of North Africa after Kasserine Pass. While air units had a direct relationship with a particular army unit, it was not a command relationship. These arrangements remained largely intact throughut the Italian campaign. When existing units moved out of Italy or new ones were formed, the principles of command arrangements remained intact.

Coordination Architecture

While this research focused on operations in Sicily, it is worth noting some comments and attitudes concerning air-ground coordination. One element that was expanded in Sicily was the Air Support Party (ASP). These ASPs were equipped with radios and radar in order to better control close air support activities. Due to terrain, poor experience, and limited communications, these ASPs proved largely ineffective.[31]

Nevertheless, Allied forces entered Southern Italy with the beginnings of a control, communications, and coordination network.

Collocation of Army and Tactical Air headquarters had been established and would continue. The use of ASPs would evolve and expand.

A detailed snapshot of the air-ground coordination network explains the system of requesting and providing air to the ground forces. The network existing between XII ASC and Fifth Army, and almost identically between DAF and Eighth Army, was anchored by the collocated headquarters. This typically meant the headquarters of XII ASC would be within a few hundred yards of Fifth Army headquarters.[32]

In addition to the collocation of headquarters, new staff positions were established, and liaison personnel were placed at various command levels to make the network function effectively. In both World War II and today, an Army headquarters staff had an individual known as the operations officer who was the focal point for current operations within that army unit. This operations officer in corps, army, and army group headquarters was designated the G-3. In Italy a new position of operations officer for air matters, or G-3 Air, was added. Liaison personnel were assigned at various levels within the respective staffs. Immediately subordinate to Fifth Army were the corps, each of which had two Army Air Corps officers assigned as Air Support Officers. Below corps were the divisions, each of which had one Air Support Officer. As of the end of 1943 these were nonflying officers. On the air force side of the network, each flying wing and subordinate flying group had a ground officer assigned as liaison. Everyone in the network was connected by radio or telephone.[33]

With the network established, a methodology for requesting and assigning missions was required. Prearranged missions were developed by

divisions, corps, and army level. Missions developed by divisions were typically not flown as most of their requests were for targets within range of their artillery. Division requests were forwarded to corps who then determined which requests should be granted. Often corps determined it had the ability to fulfill the division's request with corps artillery assets. The revised division requests were added to the corps' requests and forwarded to the Air Support Command. The Army operations officer (G-3) and operations officer for air matters (G-3 Air) would confer and determine which targets they wished to be attacked. This list was presented at the nightly Air Conference. This nightly, joint conference was a far cry from the days in North Africa when the ground commander ordered air missions in response to requests from his subordinate army commanders. In the Air Conference army and air staff officers conferred and arrived at a decision. There were occasions when the Army would limit its requests in order that air forces could concentrate on gaining air superiority.[34]

It is important to note that with liaison personnel at army levels down to division many target requests may have been eliminated or altered before being requested. One purpose of this liaison was to advise the ground commander regarding the appropriate use of air power.

Call missions, as opposed to prearranged missions, were missions requested to be flown as soon as possible. Typically a division could expect aircraft overhead within one and one-half hours of making the request.

Execution Methods

Mechanics for executing support missions continued to evolve during this time period. Again, one of the largest concerns was the requirement to properly identify and hit the correct target while avoiding friendly troops. Operations in Italy witnessed one of the most significant developments of the war along this line.

Though known by different names, the concept called for a pilot to be positioned on the ground in a position to observe enemy targets and equipped with radios to communicate directly with attacking aircraft. This arrangement was most widely known as "Rover Joe."[35] This arrangement did not replace the ASP located usually at division headquarters. The ASP was still central to the prearranged mission process. However, Rover Joe was designed to expedite call or alert missions. In this arrangement, flights of aircraft would arrive overhead at 15-to-20 minute intervals and await instructions from the Rover Joe. If no requests were passed by the end of their period, the aircraft would proceed to a prebriefed alternate target. If, however, the Rover Joe did have a request, it was possible to have ordnance on the target in as little time as 10 minutes.[36]

The effects on the battlefield were often greatly improved by this concept. Since the Rover Joe typically could see the target, possessed annotated maps and photos of the area, and was himself an experienced pilot, he was able to quickly and accurately direct the attacking aircraft on the proper target.[37] Smoke on friendly positions was still considered important to help prevent fratricide. Although not

without difficulties, usually associated with inadequate training, the Rover Joe concept would remain in use for the rest of the war.

With the Rover Joe, a new element was added that was involved in both coordination architecture and execution mechanics. The Rover Joe received and decided upon mission requests. He then called directly to the waiting aircraft and controlled the attack. Combining two elements of coordination methodology--architecture and execution mechanics--could certainly be efficient, but, if the Rover Joe was not proficient, results could be poor.

With acceptance of the Rover Joe concept, new ideas were continually attempted. One was a response to a Rover Joe weakness. The Rover Joe system was wellsuited to a static situation. For fluid, advancing conditions a system called Horsefly was sometimes used. This was a light observation aircraft manned by both an AAF pilot and an Army observer. This aircraft would observe the movement of friendly and enemy forces and would control attacks rather than the Rover Joe. This system worked only when air superiority was assured.[38]

Another development centered around attacking targets spotted by reconnaissance aircraft. In this system, called "Pineapple", the reconnaissance pilot would contact the Air Support Control and pass target information. The ASC could immediately launch aircraft on alert to hit the target. In some cases attacks took place within 15 minutes of the order. In a variation, the reconnaissance pilot would remain in the area and guide the attacking aircraft into the area to locate hard to find targets.[39]

These systems, as well as use of smoke, signaling panels, and other similar devices, continued to be used throughout this period to help place fires on the proper target in a timely fashion without endangering friendlies.

Assessment of Italy

A comparison of coordination in Italy to that in North Africa reveals a greater sophistication and responsiveness. Perhaps the best endorsement of the revised command arrangements is the fact that those same arrangements were carried into Italy and remained largely intact until the end of the war. The relationships appeared clear and all participants recognized and understood them. Thus, comand relationships in Italy are assessed as successful.

The coordination architecture was not nearly as austere as the one in Africa. It was in Italy that the architecture had time to develop and mature into one that would ultimately be exported to the European Theater of Operations (ETO). Innovations were adopted that remain to this day in one form or another. In preparation for the invasion of France, First U.S. Army Group sent a group of staff officers to Italy to examine the coordination architecture and recommend modifications. It was a true compliment that very few modifications were made.

This should not imply that all was well. The effectiveness of coordination experienced growing pains and was considered, by at least one ground commander, an abject failure until ground and air

headquarters were placed together and forward ground controllers were assigned to ground combat units.[40]

Methods of execution developed and matured in Italy. The use of the Rover Joe and Horsefly to accurately and safely work air attacks proved so successful they exist in some form today. At the same time, these developments highlighted the importance of adequate training and manning to make these systems work properly.

Operations with the 9th Air Force and 12th Army Group in the European Theater of Operations

Reasons for Coordination

No new or revolutionary reasons for coordination were revealed in the ETO. Commanders were still concerned with fratricide, timely destruction of targets, and proper use of available assets. The issue of the subjugation of the strategic bombing campaign to support the cross-channel invasion was an issue of how to use available assets. While it is an issue that falls under the category of command relationships it will not be addressed in this research. This research will be limited to the habitual relationship between 9th Air Force (9AF) and 12th Army Group (12AG). This team constituted a team of three field armies and the largest tactical air force ever assembled. The team was assembled prior to D-Day and remained intact until V-E Day.

Methods of Coordination

Command Relationships

The overall commander for the cross-channel invasion in 1944 was Eisenhower, designated Supreme Commander Allied Expeditionary Force.

His headquarters came to be known as SHAEF. Prior to the invasion he commanded four subordinate units, one naval, one air, and two ground. The primary U.S. ground force was 12AG. However, the 12AG did not esist for the cross-channel attack and would not be formed until after forces were established ashore in France.[41] The air organization, known as Allied Expeditionary Air Force (AEAF), had two subordinate units in the form of Second Tactical Air Force (2 TAF), a British unit, and Ninth Air Force (9AF), a U.S. Force.

While 9AF answered to AEAF regarding operational matters, the U.S. Strategic Air Force (USSTAF), commanded by Lieutenant General Spaatz, had administrative control.[42] While this arrangement was not completely satisfactory and efforts were made to change it, it remained relatively intact until the end of the war.[43]

Immediately after D-Day, the First Army was the only U.S. army operating in Normandy. A 9AF subordinate organization, IX Tactical Air Command (IX TAC) cooperated directly with First Army. Once U.S. forces were established in France and 12AG was activated, the composition of 9AF began to expand. When the Third Army was activated, XIX TAC was established to form a partnership. When the final unit of 12AG, Ninth Army, was formed, 9AF established XXIX TAC to work with the new army (see figure 5).[44]

This established a command organization similar to the one in the Italian Campaign and at the end of North African operations. Ground headquarters, normally an army, had an air force organization working directly with it to accomplish air-ground coordination. At the same time, the air forces maintained the autonomy established in North Africa

and continued in Italy. This overall control by 9AF enabled forces from one TAC to support a different army than the one it normally supported. In addition, this system also allowed 12AG to request 9AF to mass the bulk of its strength in a given army's area. Finally, this arrangement helped maximize availability of support. If a TAC was unable to support an army request due to commitment of its forces, the TAC could forward the request to 9AF who might be able to fill it with forces from another TAC.[45]

Coordination Architecture

Collocation of headquarters remained central to the coordination architecture. This included the use of advance or forward headquarters which became important in fast-moving offensive operations. If the First, Third, or Ninth Army commander needed to move elements of his headquarters forward to maintain contact with forward elements, the TAC commander was expected to move forward as well. Depending on the TAC and the speed of advance of its associated army, some elements of the TAC headquarters, such as administration, would remain in a given location for longer periods while other elements, such as operations and planning, would continue to move forward with the army's forward headquarters.[46]

At subordinate army levels, primarily corps and division, Tactical Air Parties (TAPs) were located. These were equivalent to the ASPs of North Africa and Italy. Likewise, Ground Liaison Officers (GLOs) from the Army were placed at Air Force Group and occasionally squadron level. As opposed to Italy where non flyers often served as

ASP Officers, 9AF used only qualified pilots, usually at the end of the combat tour as TAP Officer's, typically for 90-day periods. In North Africa the ASP Officer functioned as liaison and advisor. The same applied in Italy, except in those cases where he acted as a controller when the Rover Joe concept was employed. In 9AF, the TAP Officer was acknowledged as and expected to be all three--liaison, advisor, and controller. As the campaign unfolded and offensive operations moved faster, additional controllers were added to provide control from a rapidly moving spearhead.[47]

For preplanned missions the process resembled that used in Italy. The TAP Officer and G-3 Air at division level developed requests to be forwarded to corps the TAP Officer and G-3 Air filtered the requests. Corps forwarded its own requests, as well as those from division, to the Army-TAC level where decisions were made at a nightly conference attended by ground and air officers (see figure 6).[48]

For immediate request missions the TAP at the level requiring support radioed the request directly to the TAC. All intervening levels monitored the radio link. If a corps felt a division's request was not appropriate or that the corps could meet the request with Army assets, it would break into the radio link and deny the request. If no one objected to the request, the TAC-Army would process and decide on whether to order an attack (see figure 7).[49]

Execution Methods

While there were no revolutionary new techniques developed which eliminated the risk of hitting either the wrong target or friendly troops, new techniques and systems were developed.

One system, already mentioned, was the placement of an air force controller in a radio-equipped tank within an armored column. This was in addition to TAP officers already in place at division. The system functioned similar to that of the Rover Joe. Flights of aircraft would be dispatched at regular intervals to orbit overhead the column. The controllers riding in the columns could contact the aircraft overhead and have them attack known targets or provide armed reconnaissance immediately in front of the column.[50] While the Rover Joe functioned well in static situations, armored column cover was designed to support a rapidly advancing ground force. Identification of friendly location was a particularly difficult problem during offensive operations. While, traditional signaling devices such as colored smoke and recognition panels worked when troops were stationary and were used extensively in the ETO. they proved inadequate when friendly troops were advancing quickly. An Air Force controller, often in the column's lead tank and in contact with overhead aircraft, was in a better position to talk the pilots' eyes onto friendlies in a fluid situation.

An additional system for managing aircraft involved in air-ground cooperation incorporated a system of radar sets to provide a complete picture of the air effort to a TAC. A Tactical Control Center (TCC) was established adjacent to a TAC's Combat Operations Section. The TACC monitored and communicated with aircraft in flight and was

informed of the operational status of fighter groups. Also used to monitor aircraft was the SCR-584 Close Control Radar. This system was used to track aircraft with great accuracy and either place them over the target for a visual attack or direct a blind bomb attack if friendly forces were not in the area.[51]

The rapid advance of 12AG forces during parts of the European campaign, coupled with the large numbers of aircraft used in support of ground forces, prompted new methods of executing cooperative attacks. Radar and the TCC were used to efficiently and rapidly get aircraft to their target areas while close control radars facilitated rendezvous or blind attacks. Rapidly advancing columns used combat experienced pilots riding in radio equipped tanks at the head of the column to call down orbiting aircraft on new found targets. The image is one of a vast, well-oiled machine capable of displaying mass and flexibility.

Assessment of the ETO

Not only were the command arrangements clear and well defined, but the inidividuals occupying command positions appeared to have excellent personal working relationships and trusted one another's professional judgment. One of the best examples of reliance on another's skill was the ability of XIX TAC to cover the exposed flank of the Third Army.[52] It is difficult to determine whether the acceptance and endorsement of the command relationships were due to their existence since early 1943 or to the level of professional trust the commanders placed in one another. Regardless of the reason, the command arrangements for the 9AF-12AG team were a success.

Operations in the ETO had a significant advantage over both North Africa and Italy in regard to coordination architecture. Participants in the ETO had the benefit of experience and lessons learned from previous operations. In reading ground commanders' assessments, one receives the impression that each TAC and field Army functioned as a well-oiled machine in the execution of air-ground coordination. That does not imply there were no difficulties. When asked to assess the effectiveness of the architecture from various criteria, the answers from army group, army, and corps were almost unanimous in endorsing the system. However, answers from division were mixed. Some felt the system was not responsive enough in meeting immediate requests.[53] Nevertheless, based on assessments from every level from division to army group and from various echelons from 9AF, the coordination architecture for the 12AG-9AF team was a success.

Execution methods continued to be a source of frustration to all concernced. New ideas were incorporated in the ETO as in previous examples. The most notable was in the use of armored column cover. As the war progressed, methods for identifying targets or friendlies were rarely discarded. Colored panels, smoke, and other visual devices were used at the end of the war just as at the beginning. Even when new devices and methods were adopted, they did not displace old ones, but were added to the collection of options available to help avoid fratricide while hitting the proper target. The high state of training and competency must be credited as well as advanced methods. The idea of a well-oiled machine applied to mechanics of execution as well as coordination architecture. Nevertheless, fratricide occurred, often due

to uncertainty over friendly location during high-speed offensive operations. It is important to note that one response to the problem was to willingly forego air support missions when things were moving too fast. Commanders came to conclude that if ground forces were driving at such a fast pace perhaps air support was not that critical to success. On the other hand, fratricide could immediately stall any forward momentum. Ultimately, though the 9AF-12AG team enjoyed greater success in the area of execution mechanics than the other examples, the problem of fratricide had not been truly solved. At best it can be called a marginal success.

Operations in Desert Storm

Reasons for Coordination

The dangers of failing to coordinate between air and ground forces in the tactical zone continued to face air and ground forces. With the increased lethality of combat systems, poor or inadequate coordination could result in catastrophic results. With the U.S. Army acquiring systems capable of reaching further than ever before, into areas previously the domain of air forces, the need to coordinate in these areas became apparent. In reality, the need to coordinate between air and ground forces had not changed. What was different was the size of the tactical zone where both services applied fires to the battlefield. In this expanded tactical zone, the Air Force flew primarily interdiction missions. The Army now possessed the capability and the desire to participate in the interdiction effort. In fact, on the eve of Desert Storm, a proposed "Joint Interdiction Operations"

doctrine manual was published.[54] While there was not time to apply this new doctrine to operations in the Gulf, many of the concepts within the doctrine had existed for some time prior. Thus there was not only a need to coordinate air in support of ground, but also the need to coordinate intediction in support of the Joint Force Commander (JFC).

Methods of Coordination

Coordination will be addressed in two ways. First, the research will examine coordination as it was designed by doctrine immediately prior to Desert Storm. Second, the research will examine how coordination in Desert Storm varied from that established by doctrine.

Command Relationships

The Defense Reorganization Act of 1987 (also known as Goldwater-Nichols) established several Unified commands around the world. One of these was Central Command (CENTCOM), which was responsible for a geographic area which included Saudi Arabia, Kuwait, and Iraq. In the event of hostilities, the commander of CENTCOM would be responsible for and in command of U.S. forces operating in theater. Doctrine called for the commander to designate subordinate component commanders to command their forces. These components included the land component, air component, naval component, and marine component. Each of these component commanders was to be responsible for their forces.[55] This command arrangement was observed in Desert Storm with the exception of the Land Component Commander (LCC). The CENTCOM commander, General Schwarzkopf, retained command of the land component for himself.

The new joint doctrine for interdiction, while not in effect for Desert Storm, pointed out the need to authorize someone to plan, coordinate, deconflict, and execute the interdiction effort. Doctrine allowed for that authority to rest with the JFC's staff or with one of the components. As one of the components, the JFACC could be considered a logical choice since he often would possess the preponderence of interdiction assets.[56] The methods of planning, coordinating, deconflicting, and executing interdiction during Desert Storm would prove quite controversial.

Coordination Architecture

The system designed for use in the 1980s and 1990s strongly resembled that of the ETO in World War II. The most noticeable difference was in sophistication. The doctrinal system of the late 1980s was large, elaborate, far reaching, and redundant.

The senior element of the Air Force system was the Tactical Air Control Center (TACC). This facility controlled all air operations in an area of operations.[57] This was a noticeable departure from what was seen in WW II. In each of the previous examples, a separate air force organization was designated to provide air support to ground forces. In the ETO, an Air Force was to support an Army Group and subordinate Tactical Air Commands were to support subordinate Armies. Another difference from earlier examples was separation of headquarters or command posts. There was no doctrinal effort to place the TACC in close proximity to the land component Tactical Operations Center (TOC). There were, however, designed communications links between the TACC and the

land component TOC.[58] Under earlier systems, with heaquarters collocated, regular contact between Army and Air Force staff members was a normal occurrence. But with the TACC and the land component TOC separated, there was the potential for each service to operate in isolation from the other at the component level. This was prevented by the use of the Battlefield Coordination Element (BCE) within the TACC. The BCE was a group of Army staff members provided by the LCC to the TACC to facilitate the exchange of information through face-to-face contact. Divisions within the BCE included operations, plans, intelligence, airlift, and others.[59] Thus, while no Air Force flying organization was tasked to support specific Army units, the TACC, through control of all Air Force assets in theater, was designed to meet Army requirements for support. Also, while headquarters were no longer expected to be collocated, the inclusion of the BCE within the TACC ensured direct Air Force and Army interface.

Subordinate to the TACC at various levels were Tactical Air Control Parties (TACPs). These were direct descendents of the ASPs of WW II. At all levels the TACPs would request and coordinate air support for the Army; while at levels below brigade, the TACPs would also control air missions. Perhaps the largest difference between the ASPs and TACPs was level of deployment. During WW II ASPs were deployed to division level within infantry divisions and to the two combat commands within an armored division. The system leading to Desert Storm called for TACPs down to battalion level in all divisions. At corps level a TACP was placed within an organization called an Air Support Operations Center (ASOC). The TACPs were to be under operational control of the

ASOC.[60] An ASOC was always associated with a corps and was an integral part of the corps command post.[61] Within the TACPs were Forward Air Controllers (FACs). The role of the FAC was to control close air support aircraft and integrate the attack of those aircraft into the ground force effort. As a member of a TACP, the FAC would be on the ground with the supported army unit. In other situations a FAC could operate from an airborne platform.[62] This Forward Air Controller was a descendent of the Rover Joe ground controllers and Horsefly air controllers first conceived in Italy in WW II.

By the late 1980's other elements which had been added since WW II added capability and redundency to the system. Airborne elements of the Tactical Air Control System had been added by the Air Force to enhance communications and provide backup command and control capabilities. The Airborne Warning and Control System (AWACS) was designed to provide excellent radar coverage in support of air operations. The Airborne Battlefied Command and Control Center (ABCCC) was designed as an extension of the TACC and could function as an ASOC or a degraded TACC if required.[63] It was equipped with radios rather than radar and sensors to facilitate communications with air and ground elements.[64] The ABCCC would be staffed with representatives from concerned services, such as Army, Air Force, Marines, etc., and was capable of responding to requests from subordinate levels without needing to forward requests up channel to the TACC.

The design of the system called for the lowest elements to be capable of directly contacting the ASOC with requests for immediate air support. Intermediate levels monitored the radio network, and requests

by a battalion could be overidden or denied by brigade or division level. If no objections were voiced, the ASOC could deny the request or forward the request to the next level. If no ABCCC were available, the request would be transmitted directly to the TACC for resolution. If an ABCCC was airborne and granted the authority, the request would be relayed from ASOC to ABCCC who would then task alert aircraft or divert airborne aircraft to meet the request (see Figure H).

In many ways the architecture in Desert Storm followed that established in doctrinal publications. A TACC was established in Riyadh, Saudi Arabia, and AWACS and ABCCC both flew from the city. An ASOC was also deployed to support the XVIII Airborne Corps in theater.[65] TACPs were manned down to battalion level as expected.

Additional elements of the architecture were also developed and used. Roughly rectangular geographical areas within Kuwait and Iraq were termed "kill zones" and were labelled for easier reference. Interdiction sorties tasked by the Air Tasking Order but without a specified target would be assigned a kill zone by ABCCC.

One of the most difficult and controversial aspects of the coordination architecture centered on the targeting process. In the mature systems of WW II, staff officers from ground and air forces worked out target selection during nightly conferences at the TAC-Army level. Desert Storm was more complicated. Corps would request targets be struck by the Air Force. These requests would flow through ARCENT to the BCE. The BCE developed target nominations lists for the planners in the TACC.[66] However, the JFACC was not only responsible for support of ground troops, but for support of the JFC and strategic objectives as

well. ARCENT and corps commanders were not pleased with the result. They felt they had insufficient input into the target selection process.[67]

Additional complications were found in the form of the JFC acting as LCC and actively determining targets. In nightly briefs the JFACC would present proposed targets to the JFC, and on occasion the JFC would direct the JFACC to shift his interdiction weight of effort onto different enemy forces.[68] Thus targets not requested by the Army and not even facing U.S. Army forces would be struck while targets nominated by the Army were not struck. Information as to why the targets were not hit was not relayed to the corps commanders.[69] They understandably assumed the Air Force was ignoring their requests when in fact the JFC had directed Air Force assets elsewhere.

The use of the Fire Support Coordination Line as a fire support coordination measure proved quite controversial. The FSCL was a coordination measure used to ensure coordination between air and ground forces short of the line and to expedite fires beyond the line. The FSCL was not used in this manner in Desert Storm. Due, in part, to the JFACC's influence, the FSCL resembled a boundary. The JFACC wanted all fires beyond the FSCL, whether fixed-wing air, attack helicopters, or Army Tactical Missile Systems, to appear on the Air Tasking Order (ATO). The JFACC's reasoning centered around his concern over fratricide. He feared rapid moving ground forces would move near and possibly beyond the FSCL without the knowledge of higher headquarters, thus setting the stage for fratricide to occur.[70] Such a requirement made it extremely difficult for the Army to respond quickly to targets of opportunity.

Understandably, Army commanders were extremely dissatisfied with this arrangement. With systems capable of applying fires well beyond the FSCL, the Army did not know how to coordinate these fires if they had no control over how the air effort was being applied to enemy directly in front of them.[71]

Execution Methods

Although the systems used had changed greatly in the years since WW II, the methods for accurately identifying the proper target, hitting that target, and avoiding friendly troops while doing so remained largely the same. A typical situation would use redundant methods of getting the aircraft to the appointed target at the correct time. The aircraft would depart a known reference point, known as the Initial Point (IP), on a specified heading, for a specified distance. Theoretically this would place the aircraft over the target. This was supplemented by providing geographic coordinates to the pilots who could then enter the coordinates into on-board navigation sytems and (or) plot the coordinates on a map in the aircraft. This was supplemented further still by providing a description of the target itself in order for the pilots to paint a mental picture of the target's appearance. Finally, marking the target with smoke or a laser designator was to be used whenever possible.[72] Whenever appropriate, the location of, or distance to, friendly troops was included in the information.

Methods of execution in Desert Storm were very similar to published methods. Marker panels were once again used on the battlefield in a manner similar to that of WW II. Signal mirrors were

also used to mark or identify the FAC's position. The relatively new Global Positioning System (GPS) was highly prized by the TACPs as it helped them accurately plot their own locations in a featureless dessert. Understandably, the biggest fear was fratricide. Accurately identifying vehicles at night from an aircraft was an enormous problem and was solved only by using night CAS sorties well forward of any friendly troops.

Assessment of Desert Storm

A strong emphasis on after-action reviews and determination of lessons learned, coupled with the large number of professional journals and related periodicals has resulted in a great deal of material related to Desert Storm. To sort through the material available the research will again focus its assessment on command relationships, coordination architecture, and execution mechanics.

With the exception of the position of Land Component Commander (LCC), the command structure in Desert Storm reflected current Joint doctrine. Internal to the Army, there was some confusion regarding the Battlefield Coordination Element (BCE). Doctrinally, the BCE worked for the LCC. In Desert Storm the BCE worked for Army Forces Central Command (ARCENT) while the CINC retained the position of LCC. Thus, while the BCE could represent ARCENT, their role in representing the rest of the land component was not clear.[73]

Desert Storm was the first use of the Joint Forces Air Component Commander (JFACC) concept. Fortunately the CINC appointed the JFACC early during Desert Shield and several months elapsed before combat. This allowed everyone time to recognize the command

relationships and become acquainted with them. There was a difference in perspective between the Air Force on one hand and the Navy and Marines on the other regarding the exact role of the JFACC.[74] While these different perspectives are worth examining, they are beyond the scope of this research.

Although other areas of coordination generated controversy, the subject of command arrangements is not one of contention, despite disagreements. Participants did not question the validity of the command arrangements. This part is assessed a success.

The doctrinal architecture for planning, requesting, and ordering air support missions was duplicated for Desert Storm with some exception. The confusion over the BCE has already been noted as a problem internal to the Army. However, the results affected both Army and Air Force since the BCE was the face-to-face contact between Air Force and Army planners. In addition, the active role played by the CINC in shifting the weight of air effort around the battlefield prior to the ground war precluded the Army corps commanders from shaping the battlefield as they saw fit. The fact that the corps commanders did not understand why some of their targets were not being hit by Air Force aircraft indicates a problem with the architecture.

Once the ground war started the Army was frustrated when attempting to employ ATACMS beyond the FSCL on short notice. The Army felt the requirement to coordinate with the Air Force was too time consuming. The Air Force, on the other hand, felt the coordination was absolutely essential.

Much of the frustration in Desert Storm was not with the classic Close Air Support (CAS) mission but with the deep fight--that region beyond close proximity to friendly troops but within range of both Air Force and Army systems. The Army, with long-range systems, wanted to be a full participant in the deep battle. The Air Force, with air supremacy, was able to put significant efforts into attacking battlefield targets and was accustomed to a degree of independence in doing so. In addition, VII Corps, a late arrival to the theater in December and January, came from a theater with a different coordination architecture and was not pleased with or knowledgable about the one in place for Desert Storm.

The net effect was poor communication and frustration for everyone involved. The coordination architecture for Desert Storm is assessed a failure.

In the area of execution mechanics, the value of Forward Air Controllers (FACs), both air and ground, in controlling CAS missions was again proven while, at the same time, the importance of fratricide avoidance was highlighted. When in visual contact with all participants: friendly ground forces, CAS aircraft, and the enemy target, the FAC was a valuable member of the team. However, when the target was unobserved or the CAS aircraft unseen, the potential for mistakes rose. Although the instances of fratricide may not have been terribly high in Desert Storm, the results were usually catastrophic. The growing use of precision guided munitions (PGMs) translates to greater lethality. When a PGM strikes a friendly vehicle all occupants are often killed instead of wounded. Fratricide has always been costly

in terms of casualties, morale, trust, and stalled advances. However, now the casualties are often fatalities instead of wounded.

Desert Storm showed the problems of execution mechanics have not been completely solved. Until fratricide is eliminated execution mechanics cannot be deemed a success.

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CHAPTER 5.

CONCLUSIONS AND RECOMMENDATIONS

Elements of Successful Coordination

Having examined examples of coordination in selected instances, elements of successful coordination may be identified. First clear and recognized command arrangements between the Air Force and Army has ensured participants understand the tasks and responsibilities of each commander and his associated staff. Second, the ability of staff officers from different services to work face-to-face has greatly enhanced everyone's ability to resolve differences and has facilitated clear communication. Third, a successful theme in the examples studied was adaptability. The willingness and ability to alter components of the architecture and to experiment with the mechanics of execution allowed participants to determine the elements of success for their situation. certainly the duration of operations in World War II allowed for a great refinement of coordination. The success of the 12th Army Group-9th Air Force team was due in no small part to its ability to examine and learn the hard lessons from previous operations. Finally, during rapid offensive operations in Europe in 1944-45, Army forces were sometimes willing to forego close support because execution mechanics were never adequate to preclude fratricide. This is an important lesson. Rapid offensive operations presented additional problems in

locating and identifying friendly troops. Commanders concluded the risks sometimes outweighed the potential rewards. In short, they chose to not coordinate and withheld fires to avoid fratricide. Thus, part of the success of the 9th AF-12th AG effort was a recognition that withholding fires in certain circumstances was the only acceptable form of coordination.

Coordination Risks and Costs

If coordination is not to be required prior to employing fires under certain conditions the participants should be prepared to expect one or more effects. It is possible and even quite likely to discover duplication of effort. Without coordination systems from one service may attack a target that is about to be attacked by the other service. In addition, without coordination the participants should be prepared to accept some degree of desynchronization. In other words, the timing of attacks may not be optimum. Thirdly, application of fires by one service into an area where targets are being attacked by another service could result in confusion and distraction. Finally, the risk of fratricide increases any time one service is not certain as to the location of forces from another service.

If, on the other hand, it is decided that coordination is indeed required prior to employment of fires in the tactical zone, both services should be prepared to accomplish three things. First, clear procedures must be established in each service and at all echelons. Those procedures must be established in peacetime in order to exercise the system and build familiarity and competence. Second, the procedures

should be responsive and rapid. In today's battlefield environment important enemy deep targets may be located by intelligence systems for only brief periods. If those targets are not engaged quickly friendly forces may lose contact with them, thus losing a target. Any coordination system should allow for rapid engagement of newfound targets before they disappear. Such a system must respond within minutes. Finally, in addition to being clear and rapid, established coordination procedures must be disseminated to all potential participants. Different theaters make use of different coordination architectures and command structures. Those forces permanently based in those theaters are able to exercise and understand the systems in place. Forces based in the U.S. but slated for deployment to a specific theater can also learn the system and prepare to use and be part of the system. A problem arises when a force deploys to a theater for which they have not trained or exercised. In Desert Storm VII Corps deployed from the NATO structure to the structure employed in CENTCOM. VII Corps had long trained to make use of Battlefield Air Interdiction (BAI) as a part of the interdiction effort. Upon arrival in the Gulf region it was discovered that BAI was not used in theater. Thus, any system developed to coordinate the fires in the tactical zone within a theater must be disseminated to forces that have any potential to be deployed to that theater. This imposes additional training burdens but deploying forces should arrive in a theater prepared to execute rather than learn a new coordination architecture.

The Research Question Answered

The use of fixed-wing aircraft to support ground troops in contact with enemy forces has long been a combined Army-Air Force effort resulting in a sophisticated coordination architecture. Attack of targets close to friendlies could not be conducted independently by Air Force assets. In fact, as coordination improved, so too did the results. With the fielding of long-range systems by the Army, interdiction has become a combined Army-Air Force effort as opposed to a strictly Air Force mission. The results of not coordinating in this region are at least wasteful and at worst tragic. If history is a valid example, clear, rapid, and responsive coordination should improve the total results in the tactical zone regardless of whether it is Close Air Support or Interdiction. Thus, Air Force and Army forces should always coordinate prior to employing fires in the tactical zone.

Coordination Questions

For coordination to be successful it should be able to answer several questions quickly and accurately prior to placing fires on a target area. Staff officers should first ask whether the target area is clear of any friendly forces and whether it will remain clear for the duration of the attack. Next, it should be determined whether the enroute airspace is clear and whether it will be clear for the duration of the attack. If the airspace is not or will not be clear, it must be determined whether it can be cleared expeditiously. Next, staff officers should determine whether the target is already scheduled for attack by other means. Finally, it should be asked if the attack will

have any negative impact. For example, destroying a bridge by air attack may successfully impede movement of enemy ground forces, yet that same bridge may be needed by advancing friendly forces in the near future. Attacks should be coordinated to preclude negative effects on the other service.

By answering such questions rapidly and accurately Air Force and Army systems can be employed quickly and efficiently. If systems from both services place fires on the same target it will not be due to poor communication and coordination but because it has been determined that the massed fires of both services are appropriate for the target. If assets from one service are quickly and unexpectedly cleared from a region of airspace to avoid conflict with assets from the other service as they transit the airspace, it will not be due to poor coordination but due to superior coordination that determined the new target was of sufficient importance to prompt shifting or stopping other attacks.

	North Africa	Italy	9th AF-12th AG (ETO)	Desert Storm
Command Relationships				
Coordination Architecture				
Execution Methods				

FIGURE 1. Assessment Matrix for Methods of Coordination

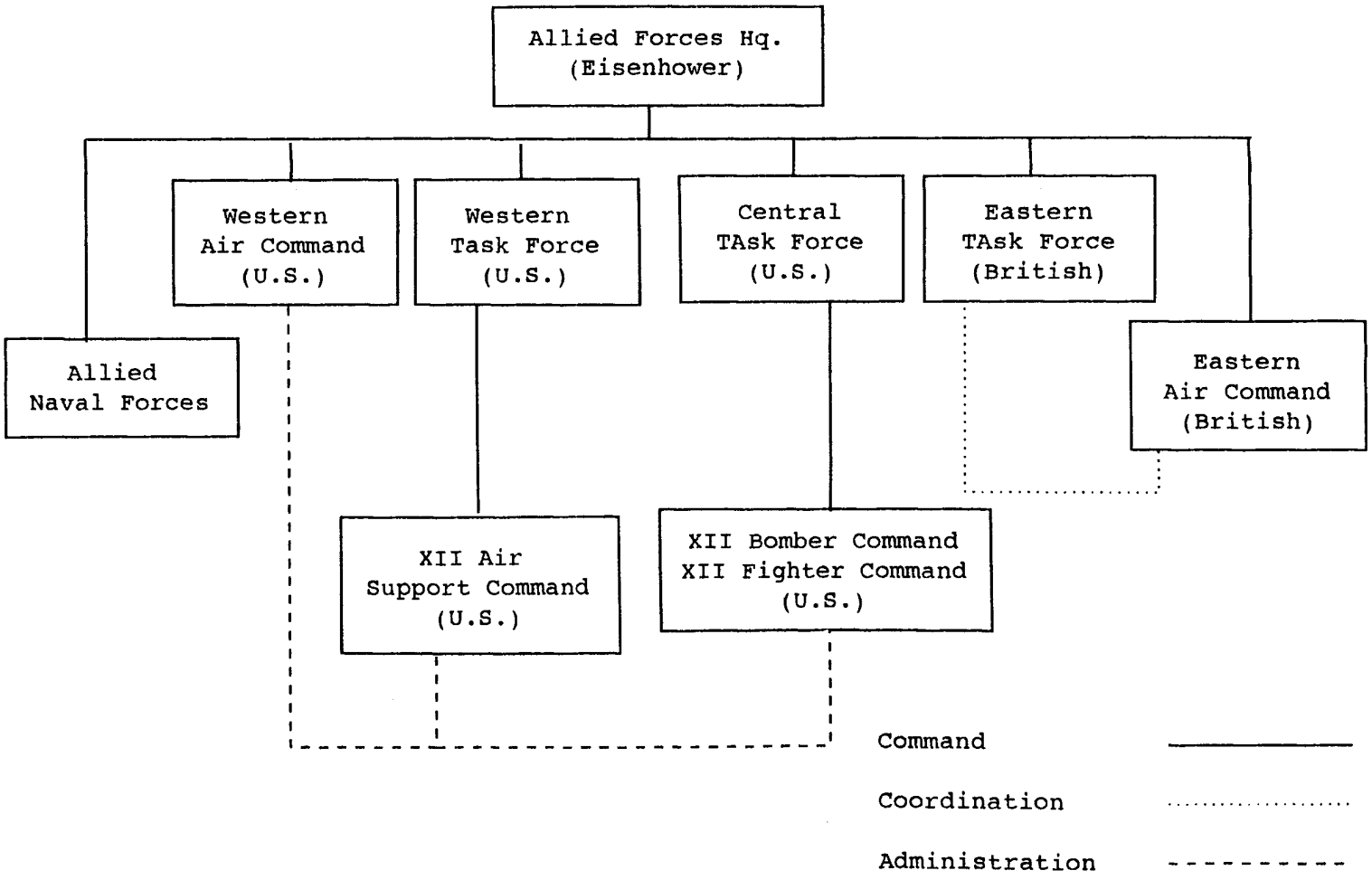

FIGURE 2. North Africa Command Arrangements
1 November 1942

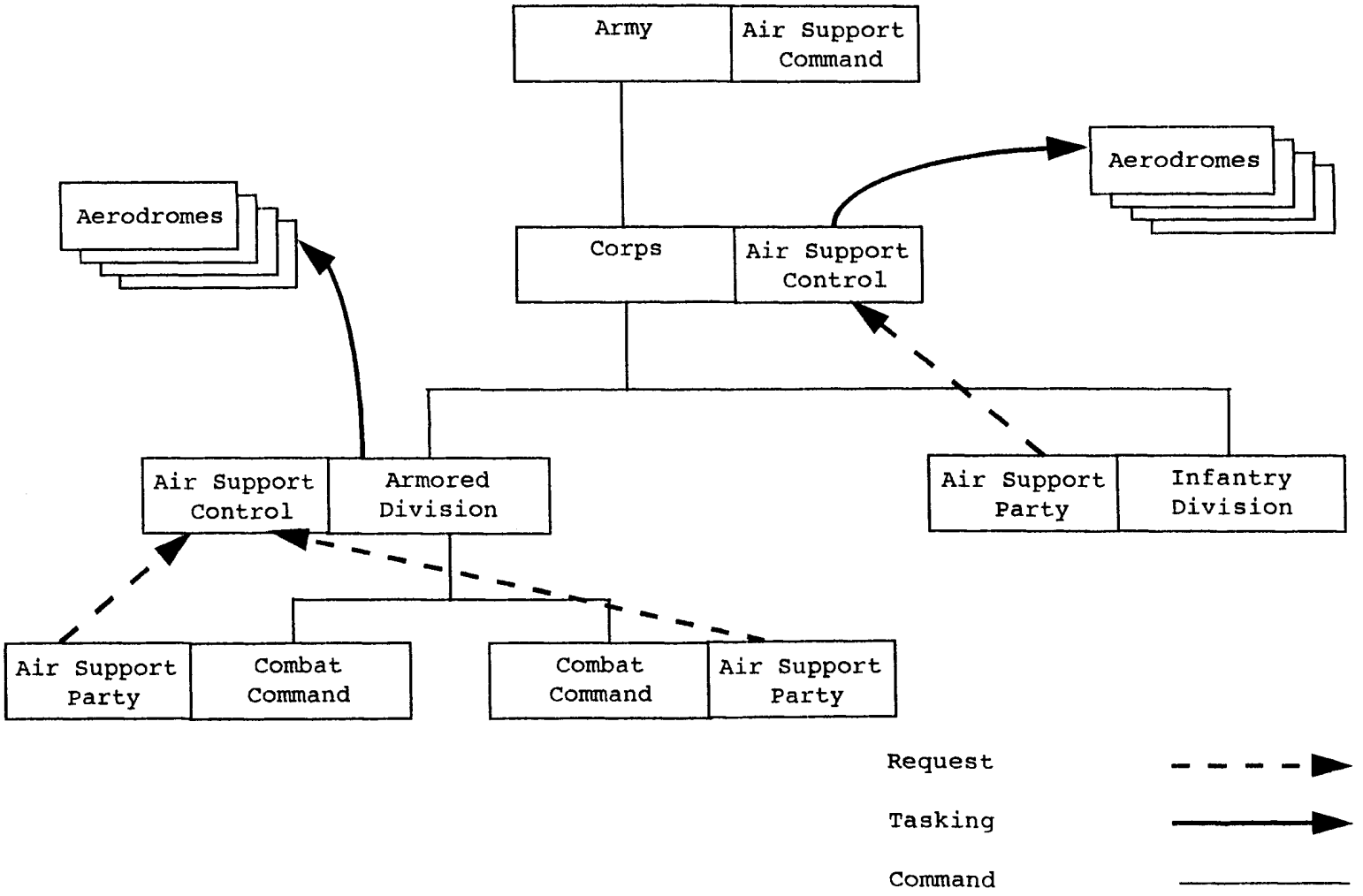

FIGURE 3. Coordination Architecture
Fall 1942

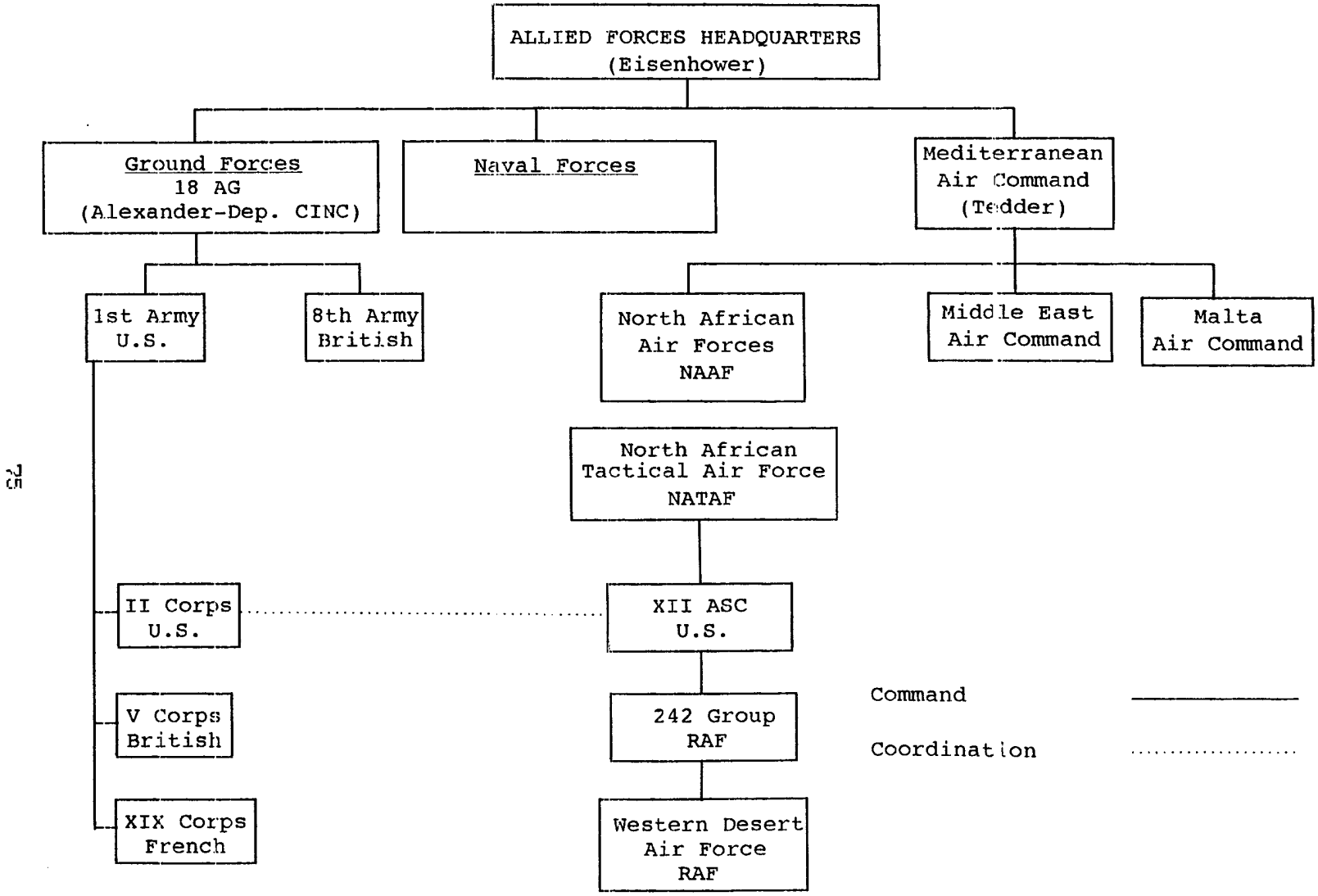

FIGURE 4. Revised Command Arrangements
Feb. 1943

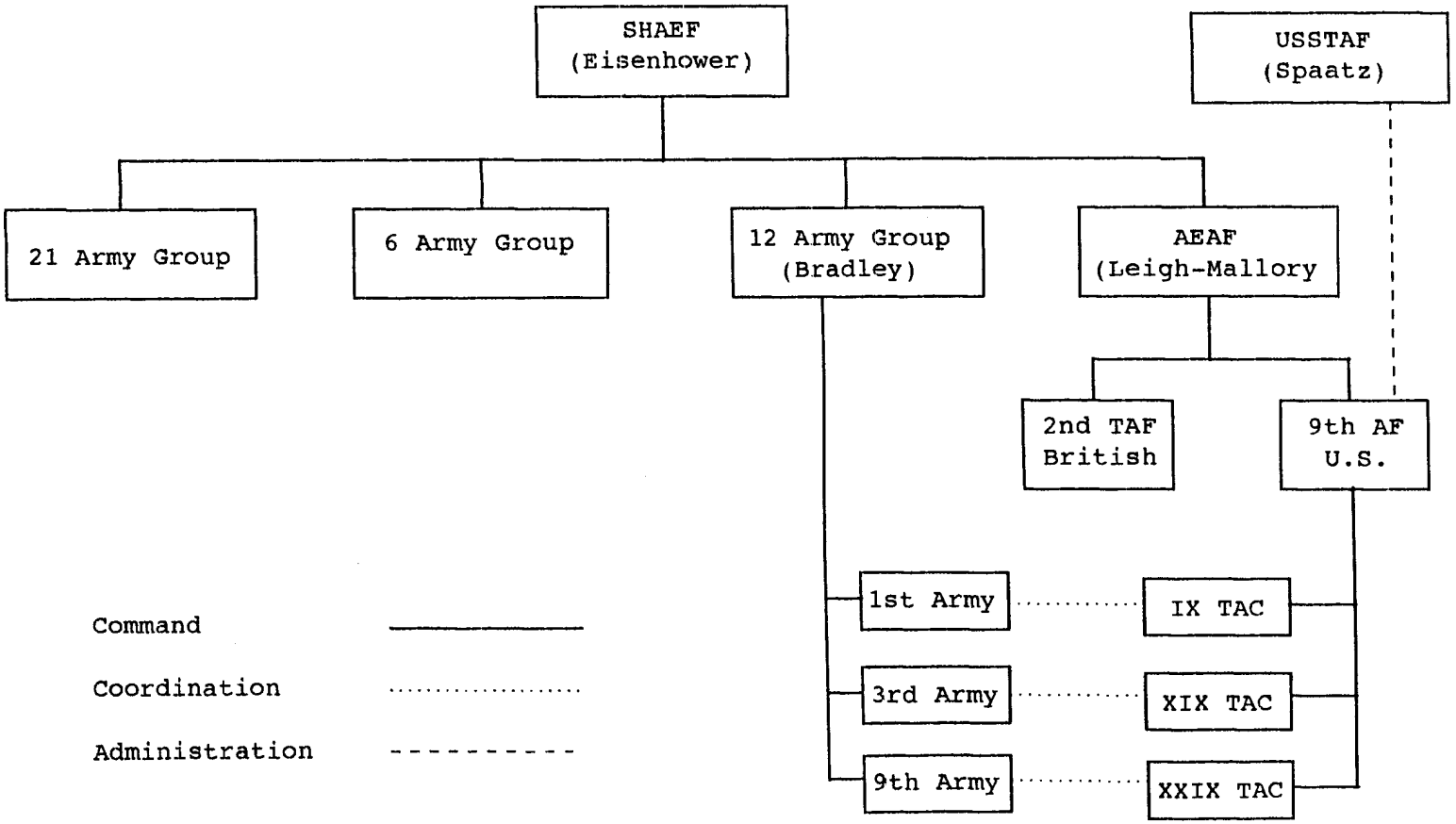

FIGURE 5. ETO Command Relationships

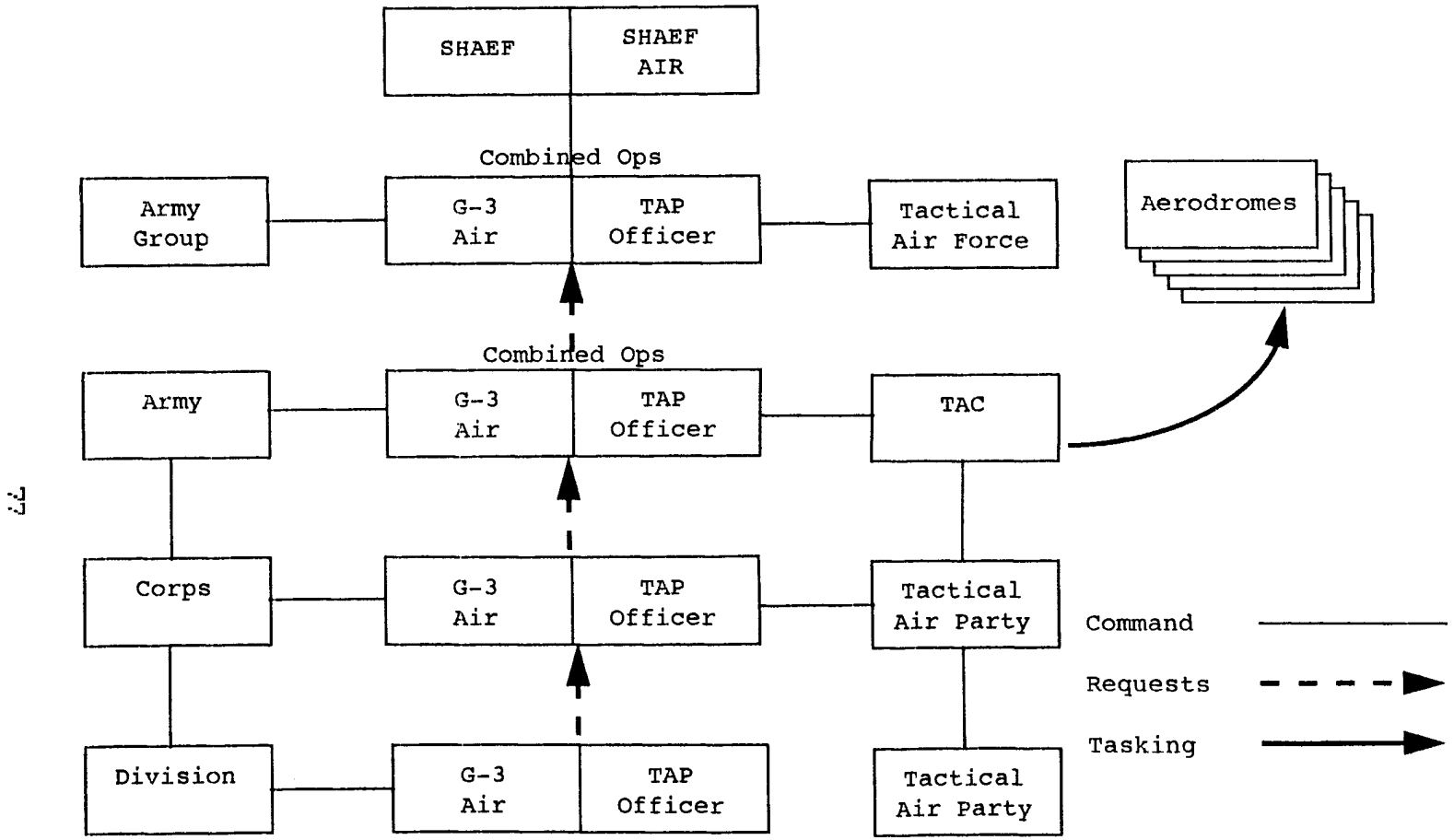

FIGURE 6. ETO Coordination Architecture
Requests for Planned Missions

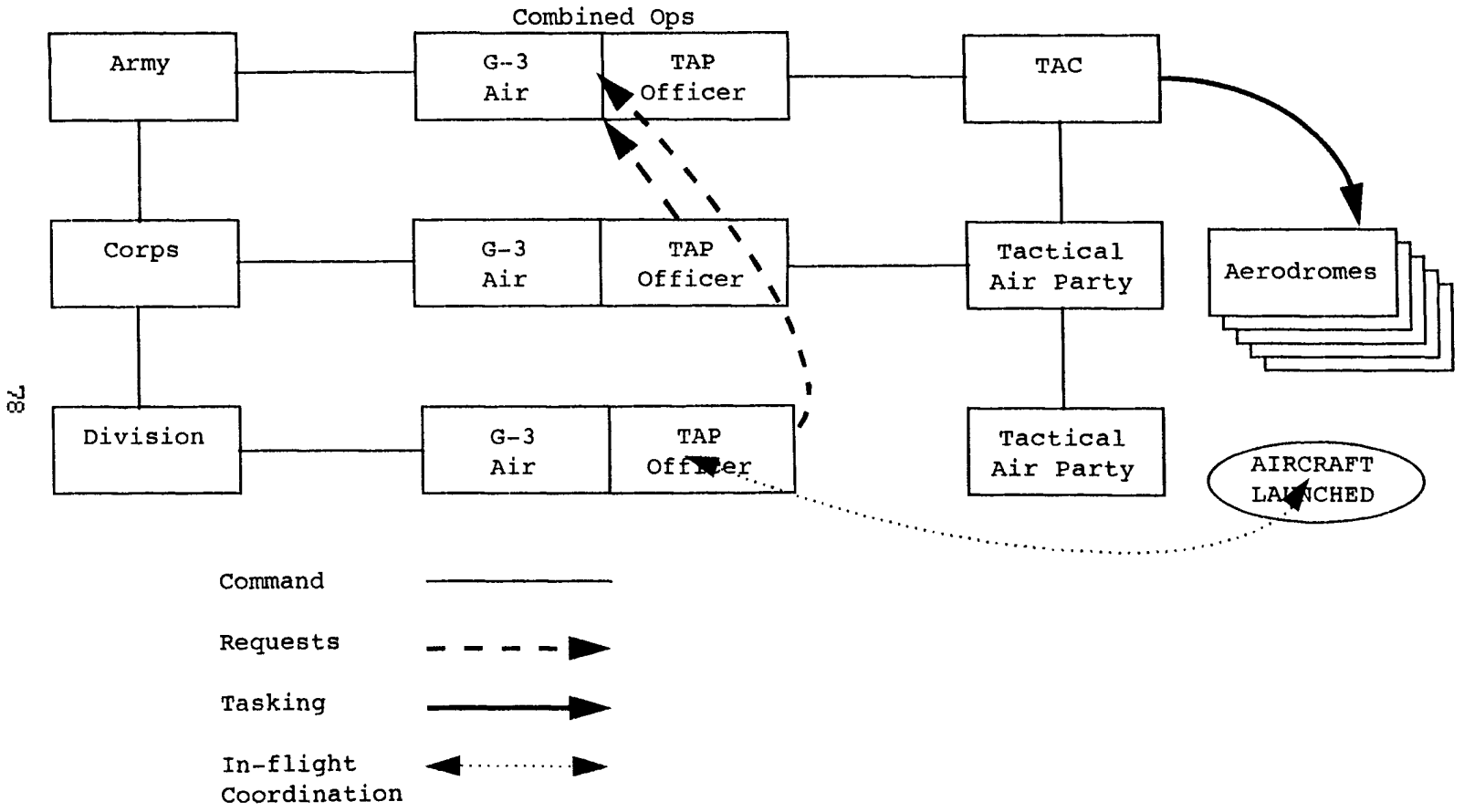

FIGURE 7. ETO Coordination Architecture
Requests for Immediate Support Missions

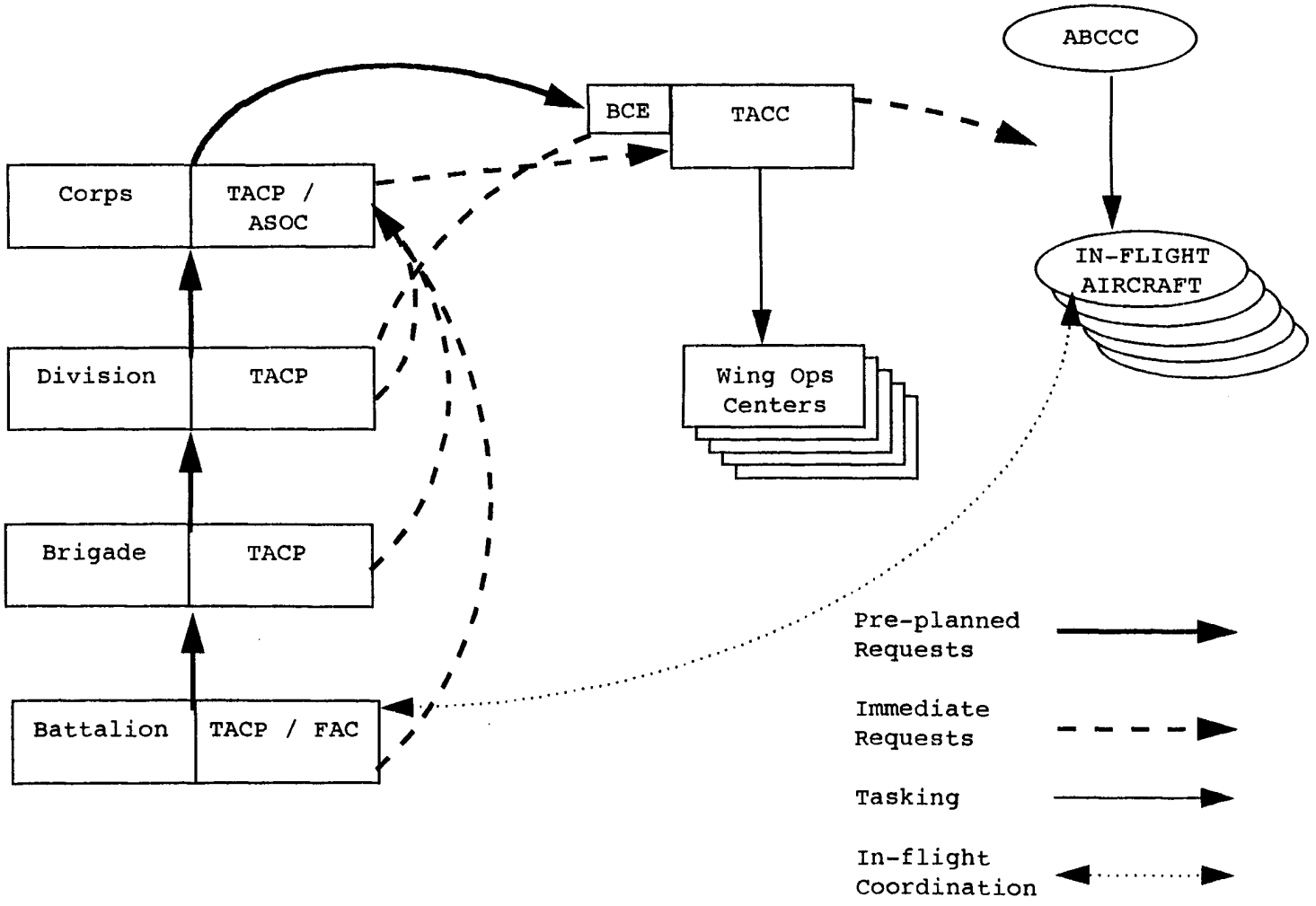

FIGURE 8. Tactical Air Control System 1980S

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