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## ADEQUACY OF ARMY AIRSPACE COMMAND AND CONTROL ON THE AIRLAND BATTLEFIELD

BY

LIEUTENANT COLONEL DENNIS D. CROSS, AV  
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### ADEQUACY OF ARMY AIRSPACE COMMAND AND CONTROL ON THE AIRLAND BATTLEFIELD

#### A GROUP STUDY PROJECT

by

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## ABSTRACT

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This study seeks to examine the evolving system of Army Airspace Command and Control. Five general areas or pillars that form the basis of the system are: personnel, training, doctrine, equipment, and leadership. Strengths and weaknesses will be examined in each area. The study seeks to determine where change is needed to comply with the principles set forth in joint doctrine. Problem areas are highlighted and recommendations to improve the program are provided.

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# ADEQUACY OF ARMY AIRSPACE COMMAND AND CONTROL ON THE AIRLAND BATTLEFIELD?

## CHAPTER I

### INTRODUCTION

The increasing depth and lethality of future battlefields ultimately means that we have to synchronize more weapons systems. With each new addition to the plethora of highly technical weapons, the need to coordinate the employment of all weapons systems in conjunction with maneuver and supporting forces has made the command and control effort increasingly difficult. Our continuing development of systems to exploit the third dimension of the battlefield further compounds the problem. Doctrinal and weapons system development assumed a hectic pace throughout the 1980's making the concept of Airland Battle a complex and harrowing reality. The question this study will attempt to address is that of command and control of the third dimension.

The focus of the study is the Army Airspace Command and Control (A2C2) system. The processes and players have to function together as a system to be effective. Therefore, the study will address interface with the sister services, joint doctrine and combined operations to provide an overall view.



## BACKGROUND

Has our ability to command and control the airspace matched our doctrinal pace? The impact spans the entire spectrum of Army organizations and the Air Force as well. It involves operations with our Allies, the Navy, and the Marine Corps. We have doctrine, equipment, training, and organizations in place throughout the world with our forward deployed forces.

The system will be viewed through five areas to assess adequacy: personnel, training, doctrine, equipment, and leadership. Operation of the system differs at varying organizational levels due to personnel and equipment authorizations. Our discussion of the levels of the system is divided at echelons above corps and corps and below.

Why address adequacy at this point? Our last major conflict revealed only minor difficulties in airspace command and control. However, the advent of Airland Battle Doctrine, with its emphasis on the deep battle while the close-in battle is in full swing, presents a new challenge. The difference is one of scope. Low intensity warfare provides a completely different environment than that of mid- or high-intensity. The threat is also a major factor as the operational altitude has been lowered to the treetops in order to survive. The ability to communicate and, therefore, command and control the great majority of Army aviation assets has dwindled with the altitude.

However challenging the command and control aspect may be, the growing lethality and range of weapons systems provide another challenge--fratricide. Fratricide is not a new problem. It occurred with the first use of Army aviation. During the Civil War, a Federal observation balloon was fired on by Federal troops as it drifted back over friendly lines after confirming Confederate troop concentrations.<sup>1</sup> Study of every conflict since then reveals similar problems. The difference is one of ever increasing lethality.

During World War II, Operation Husky in Sicily witnessed a disaster in command and control. During a night drop of the 504th Airborne Regiment, 82nd Airborne Division, one "friendly" machine gunner started firing at the second wave of aircraft flying low level over the beach. Within minutes, every Allied gunner on ship and shore opened up.<sup>2</sup> The result was 12 missing, 132 injured, 81 dead, 37 aircraft badly damaged, and 23 aircraft destroyed. German air operations that bombed and strafed the ships and shore parties had ceased only 30 minutes before. The operation had been coordinated, but darkness and recent enemy attacks set the stage. Conditions of air parity or less invite disaster. So does a rapidly changing ground tactical situation.

In a context comparable to a highly mobile armored war in Europe, Arab gunners shot down 139 planes in the 1973 Arab/Israeli war. Much to their dismay, 59 of those turned out to be their own.<sup>3</sup> Iranians shot down 80 aircraft during one phase of the Iran/Iraq war. Much to the dismay of the Iranian Air Force, only

28 of them were Iraqi; the other 52 were their own.<sup>4</sup> Both sides apparently had problems in these recent conflicts. Massive Iraqi flags were painted on the sides of their MI-24 HIND helicopters to keep their own troops from firing at them. Israeli tankers began firing at all helicopters, friendly included, as soon as the Syrians began using Gazelles in an anti-armor role.<sup>5</sup>

Recent experience leads us to question whether or not our A2C2 system is adequate. How well we answer the question will determine our success in the next war.

### METHODOLOGY

The overall methodology for conduct of the study consisted of a multifaceted approach. A literature search was made of the existing doctrinal manuals-including drafts where available-to gain an appreciation for current doctrine. Personal interviews were used to glean information from subject matter experts on future systems and on current system operation. Three surveys were developed to ascertain perceptions and conditions in the field. Information gathered from the literature search, interviews, and the survey was coupled with the authors' personal experience to provide a basis for this research report.

The survey audiences were selected to provide a broad range of information and perspective. Twenty three commanders of aviation brigades from active division and corps were selected to provide an operational overview of the system from a tactical command perspective. Their operations span both the tactical ground and

air maneuver aspect at division and corps. Surveys were addressed to each commander by name in a personalized cover letter. Response rate was excellent in that 21 of 23 surveys were returned. The compiled results are provided in Appendix I on page 61. Specific comments from these commanders are in the first portion of Appendix IV.

Four Air Traffic Service (ATS) battalion commanders and one ATS company commander were surveyed on specific ATS operations and interface within the A2C2 environment. Given the changing mission and equipment for ATS units, the input of these respondents was considered highly valuable, even though the sample was quite small. Three of the five surveys were returned and compiled results are listed in Appendix II; comments are provided in the second portion of Appendix IV.

The 23 active division and corps G3 Air staff officers and 10 each brigade and battalion level S3's were surveyed to provide detailed input on training, manning, equipment, and functioning of the system at the user level. Two officers at echelons above corps were also surveyed. The goal was to obtain opinions at the staff level as well as a broad perspective offered by various level units. 35 of 43 surveys were returned. The results of the survey were compiled and are provided in Appendix III. Staff comments are provided in Appendix IV.

The Statistical Program for the Social Sciences (SPSS/PC) was used to generate descriptive statistics; frequencies and percentages. The percentage of responses for each answer in each

survey is provided in the appropriate appendix. Specific areas of the surveys that required additional analysis to be useful are described in each appendix. Inferences, comparisons, and analyses are incorporated as discussion in the five functional areas at the appropriate organizational level.

#### ENDNOTES

1. Wayne J. Childress, CPT, "The Origins of Army Aviation," U.S. Army Aviation Digest, June 1988, pp. 34-35.
2. Air Ground Operations School, Joint Combat Airspace Control Lesson Plan, October 1989, p. 6.
3. Ibid., p. 7.
4. Ibid.
5. Charles B. Cook, LTC, Fred W. Dickens, LTC, and Crofton B. Wilson, MAJ(P), "Integrating Army Aviation and Forward Area Air Defense in the Counterair Mission," U.S. Army Aviation Digest, October 1987, p. 3.

## CHAPTER II

### AIRSPACE CONTROL SYSTEM OVERVIEW

At the strategic level of war, senior leaders are concerned about integrating and applying political, economic, socio-psychological and military elements of national power. They strive to execute these elements in a manner that will most likely achieve strategic objectives. However, at the operational level of war, the critical issue is simply the application of the military element of power. Consequently, the commander organizes his forces for the conduct of campaigns that are designed to achieve strategic objectives. Since campaigns are joint and often combined operations, they place major responsibilities on the operational level commander for the planning, coordination, and execution of operational maneuver and fires as well as sustainment. The command is likely to have a diverse composition, usually consisting of ground, air, naval, special operations, and combat service support units.<sup>1</sup> This chapter will focus on the commander's responsibilities for command and control of his tactical airspace assets; it will analyze the current system for meeting those responsibilities at the operational level of war and below. This detailed, sequential presentation will provide the basis for determining the effectiveness or adequacy of the current system in subsequent chapters.

## DOCTRINE FOR JOINT AIRSPACE CONTROL

The draft JCS PUB 3-52, dated October 1989, is the most recent publication defining the doctrine for joint airspace control in a combat zone. Conceptually, this joint publication addresses combat airspace control at the operational level of command. It provides commanders with the basic framework upon which to build a combat airspace control system using current United States national military objectives.

What is airspace control? The formal definition reveals that:

Airspace control is defined as a service in the combat zone to increase operational effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to permit greater flexibility of operations, while authority to approve, disapprove, or deny combat operations is vested only in the operational commander.<sup>2</sup>

In addressing the scope and methods of application, JCS PUB 3-52 specifically states:

The prescribed doctrine is broadly stated to fit a wide range of operational situations. International agreements, enemy and friendly force structures and deployments, commanders' concepts of operations, level of conflict and operating environments such as foreign continents, the high seas, and amphibious objective areas, will necessitate different specific arrangements for combat airspace control among various theaters of operation. However, the basic doctrine, ideas, and concepts relating to joint combat airspace control are intended to be universal.<sup>3</sup>

The primary objective of combat airspace control is to maximize the effectiveness of combat operations without adding

undue restrictions on the capabilities of the users.<sup>4</sup> The system must quickly discriminate between friendly and enemy air operations; also, it must provide for close coordination between surface force operations, supporting fires, air operations and airspace control activities within the established combat airspace system.

The airspace of a theater is the crucial third dimension of the battlefield. It is used by all components of the joint force and allies to conduct their assigned missions. A high concentration of friendly surface and air-based weapons systems must effectively share this airspace without unnecessarily hindering the application of combat power in accordance with the Joint Force Commander's (JFC) campaign plan. The primary goal of combat airspace control is to enhance air, naval/maritime and ground force effectiveness, at the decisive time and place, to accomplish the JFC's operational level objectives.<sup>5</sup>

Airspace control involves four basic functional activities; command and control, fire support coordination, air defense and air traffic control. Therefore, a coordinated and integrated combat airspace control system is essential to any successful operation. JCS PUB 3-52 outlines some basic principles of airspace control:<sup>6</sup>

1. The airspace control system which supports combat air operations must be unified in an effort to provide centralized management.

2. Close coordination between airspace users and air defense elements is an absolute must to prevent fratricide.



Compatible friend and foe identification (IFF) procedures and equipment will be required.

3. Combat airspace control users must utilize compatible and mutually supporting equipment, command and control procedures, and standardized terminology.

4. Effective use of liaison personnel among all airspace users is essential to promote timely and accurate information flow. The success of a campaign plan may be directly related to the effectiveness of liaison personnel at all levels of command.

5. Combat airspace control procedures must be common for all airspace users. These procedures must allow maximum flexibility throughout the theater by utilizing an effective mix of positive and procedural control measures. The control structure must permit close coordination between ground, maritime, and air operations to allow for rapid concentrations of combat operations in a specific portion of airspace in minimum time.

6. The combat airspace control system procedures are a compromise between a wide variety of conflicting demands for airspace use. The flexibility and simplicity of the system must be emphasized to maximize the effectiveness of forces operating within the system.

7. One additional principle is gleaned from United States Air Force Manual 2-12; a reliable and secure communication network is needed for all airspace users. Coordinated and detailed planning is required to ensure that communications systems and procedures are compatible among all users of the airspace system.<sup>7</sup>

In summary, the combat airspace control system procedures must prevent mutual interference, ease air defense identification requirements, and accommodate and expedite the flow of all air traffic in the combat theater. To accomplish this, the basic principles of war and the Joint Force Commander's (JFC) campaign plan must remain the cornerstone of future operations.<sup>8</sup>

### COMMAND AND CONTROL

Field Manual (FM) 100-5, Operations, explains the importance of the air dimension and the commander's role in its application.

The airspace of a theater is as important a dimension of ground operations as the terrain itself. This airspace is used for various purposes including maneuver, delivery of fires, reconnaissance and surveillance, transportation, and command and control. The control and use of the air will always affect operations and, in fact, can decide the outcome of campaigns and battles. Commanders must consider the airspace to include the apportionment of air power in planning and supporting their operations. They must protect their own forces from observation, attack, and interdiction by the enemy and expect the enemy to contest the use of the airspace.<sup>9</sup>

The Joint Force Commander (JFC) exercises operational control over all assigned and attached forces within the theater of operations. Key to his responsibilities is the development of strategy, objectives, and priorities for the joint force. This coordinated effort produces a campaign plan that provides the basis for all supporting plans, to include the airspace control plan.

The JFC normally assigns overall responsibility and authority for airspace control to the Joint Force Air Component Commander

(JFACC). The JFACC is the component commander with the preponderance of air power in the theater and the command and control capability to control it. As the JFACC, he is designated as the Airspace Control Authority (ACA) and the Area Air Defense Commander (AADC). Overall, he is responsible for the establishment and operation of the integrated joint airspace control system.

#### Component Commanders

The other component commanders within the joint force are responsible for complying with the specific tasks, procedures and policies outlined in the JFC's campaign plan. Each must have the maximum allowable freedom to operate their organic aerial vehicles and weapon systems within their assigned airspace. Each commander must ensure that his command is adequately represented during all phases of the campaign with knowledgeable liaison personnel. Extensive coordination must occur with all participants to insure that the final plan is acceptable and supportable. An integrated air defense, fire support and airspace control plan could make the difference between a successful and unsuccessful operation.

The Land Component Commander (LCC) further assigns missions to his subordinate commanders and determines priority for airspace use in his area of operations. The Army airspace command and control system (A2C2) allows the commander to fully synchronize his aviation assets and air maneuver to contribute decisively to the outcome of the battle. A2C2 is intended to coordinate the efficient employment of airspace users to accomplish the ground commander's

mission by means of deliberate planning and execution of tasks. Keys to this objective are standardization, minimal restrictions, and close and continuous coordination of all airspace users. It is therefore important that all commanders and their staffs understand the nature of airspace and airspace control facilities.10

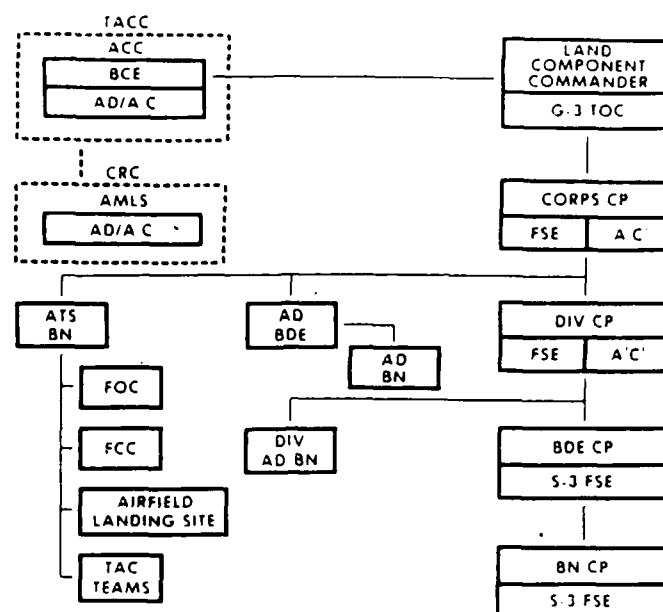
#### ARMY AIRSPACE COMMAND AND CONTROL SYSTEM

Field Manual (FM) 100-103, Army Airspace Command and Control in a Combat Zone embodies the Army's doctrinal tenets for airspace control. As shown in figure 1, FM 100-103 establishes an airspace control system from the theater Army through the maneuver battalion level of command. The manual focuses on the Army's requirements, procedures, and command and control tasks involved in the planning, coordination, and execution of airspace control functions. It includes air defense artillery, command and control elements, fire support coordination elements, Army air traffic service facilities, and airspace control liaison personnel who are located at airspace control facilities.11

The wording "Army airspace" does not mean that any airspace is solely owned or controlled by the Army. Rather, it signifies the Army's implementation of joint airspace control doctrine.

FIGURE 1

## ELEMENTS OF THE A2C2 SYSTEM



The objective of A2C2 is to ensure the most effective employment of combat power by those airspace users whose unrestricted use of airspace might result in the loss of friendly air assets. Additionally, A2C2 must facilitate integration of air assets into the ground battle without adversely impacting on the application of ground-based combat power.

The purpose of A2C2 is to deconflict the use of airspace by such activities as tactical air support, Army aviation, unmanned aerial vehicles, air defense artillery, field artillery, and electronic warfare assets.

All A2C2 elements--at the corps, division, maneuver brigade, and battalion levels--form a vertical and horizontal channel through which airspace control requirements, plans, orders, and

information are coordinated, disseminated, and synchronized with the tactical plan. Personnel from these sections and elements assigned A2C2 staff responsibility accomplish two separate tasks. First, they assist the echelon commander in the proper application of the parent unit's assets. Second, they assist in the A2C2 process by synchronizing the airspace requirements of parent units with the airspace users of the combined arms team and supporting services.

Primary tasks of A2C2 elements:

1. Identify and resolve airspace user conflicts.
2. Coordinate and integrate airspace user requirements within the area of operations, and with other services and adjacent units.
3. Maintain A2C2 information displays and maps.
4. Develop and coordinate airspace control SOP's, plans, and annexes to unit level OPORD/OPLAN's, and disseminate airspace control orders, messages, and overlays.
5. Approve, staff, and forward to the next higher headquarters requests for special use airspace.

The same A2C2 functions that began at the joint force level must be carried down to brigade, battalion and even company level.<sup>12</sup> Commanders must ensure that top notch officers and NCO's are selected to serve as their representatives in the A2C2 elements at each echelon.

### Corps and division

At the corps and division levels, the A2C2 elements coordinate with and consolidate requirements for present and future use of the airspace within their area of operations. Corps and division commanders must exercise control over their forces in a subdivision of the theater airspace. Designated as the Army airspace control subarea, this area normally extends forward from the corps rear boundary to the forward line of own troops (FLOT), and from the coordinating altitude down to ground level. A2C2 elements must facilitate the accomplishment of the commander's concept of operations in the conduct of the close, deep, and rear battle by providing the airspace control procedures, plans, and directives necessary to accomplish the mission. Corps and division methodology stresses the use of procedural control, relying on standard operating procedures, selected use of theater airspace control measures, and compliance with the theater airspace control plan and SOP's. A2C2 elements are collocated with the fire support cell at the corps and division main command posts.13

### Aviation brigades

The primary A2C2 in the main battle area is performed at the brigade level because most airspace users are under brigade control. Airspace command and control is accomplished by procedural communication and visual control means. It involves detailed coordination and integration of tactical air, indirect fire, organic air defense, and tactical fire and maneuver

operations. Air operations are conducted on a "see and be seen" basis to prevent aircraft collisions.14

In summary, the Army aviation command and control system (A2C2) integrates the Army airspace users into the overall airspace management arena, reduces conflicts, and provides maximum flexibility to our airspace users and commanders. The A2C2 system is in place, but it is only as good as the leadership that enforces its use. Commanders at all levels must ensure that the established system is properly staffed and trained to perform its required tasks in combat.

#### THE INTEGRATED AIRSPACE CONTROL SYSTEM

The integrated airspace control system within a joint force provides an arrangement of those organizations, personnel, facilities, policies, and procedures required to perform airspace control functions. The airspace control authority (ACA) fulfills his responsibilities through the established system. This system is structured around the Air Force tactical air control system (TACS) and includes the Army airspace command and control system (A2C2). If the joint force includes the U.S. Marine Corps or U.S. Navy, their air command and control systems are integrated into the airspace control system.15

The airspace control authority (ACA), under the management of the JFACC, is the focal point for coordination and integrating the use of theater airspace. The ACA establishes the policies and procedures for the employment of airspace operation and



coordination requirements for all airspace users by preparing an airspace control plan (ACP), which explains the specific procedures to be followed in the theater of operations. To facilitate this effort, the ACA establishes airspace management liaison sections (AMLS), with representation from each service component and allied nation. The AMLS coordinate the operational commanders' requests for airspace utilization; also they coordinate and integrate flight operations from their own component commander.16

The tactical air control center (TACC) serves as the Air Force's joint force air operations command and control center. The JFACC is staffed, within the TACC, to execute his functions as tactical Air Force commander, area air defense commander, and airspace control authority. The subordinate elements of the TACC contribute to and influence the A2C2 process:

1. The airspace control center (ACC) is the element of the TACC that coordinates and integrates airspace, secures approval for all control measures requiring inter-service coordination and publishes the airspace control order (ACO).

2. The battlefield coordination element (BCE) is the land component commander's senior liaison representative at the TACC. The BCE is responsible for face-to-face coordination between the Army and Air Force. Also, the A2C2 element representing the LCC is located in the BCE.

3. The airspace management liaison section (AMLS), in conjunction with the BCE, ADA brigade and corps liaison officers, provide the ACC with current unit input and coordination.17

The control and reporting center (CRC) is the focal point of air traffic management and air defense within the theater. It is directly subordinate to the TACC and is the primary TACS radar element concerned with decentralized execution of air defense and airspace control functions. Using downlink data from the airborne warning and control system (AWACS) and uplink data from radar sources, the CRC collects, displays, evaluates, and disseminates real-time information on air activities throughout the system. Within the CRC is an AMLS that is linked to the TACC for sharing information on ADA and aviation operations. An Army air traffic control (ATC) representative in the CRC gathers real-time data at the CRC for use by the flight operations center (FOC).

The Army has air traffic service (ATS) assets located at echelons above corps through division level. These ATS assets consist of tactical towers, GCA's, beacons and flight operations communications shelters. The main purpose of these ATS assets is to synchronize and integrate all Army, joint and combined aircraft into the battlefield. Army ATS provides input into and develops A2C2 plans and procedures, provides enroute, terminal and navigation services as well as interfaces with other ATS assets belonging to other service components or host nations.<sup>18</sup>

The mission of the flight operations center (FOC) is to manage the Army enroute ATC system. The FOC is collocated with or electronically connected to the Air Force control and reporting center (CRC). As such it maintains a current status on all airspace user actions and supervises the operations of subordinate

flight coordination centers. It has no radar or secure communication capability.

The mission of the flight coordination center (FCC) is to extend the capabilities and communication of the FOC within the Army enroute ATC system and specifically within the division area of operations. The FCC is the interface between the FOC, Air Force, corps and Army terminal ATS facilities. It also lacks radar or secure communication capability.

#### Airspace control procedures

In future battles, enemy forces will attempt to degrade airspace control capabilities by direct attack or electronic interference directed against control nodes or other specific targets. Therefore, any system of airspace control must be survivable through hardening and/or redundancy, and it must permit an effective combination of positive and procedural control measures. The command and control system (C2), A2C2 system, and Air Force tactical air control system (TACS) provide the necessary organization and facilities to exercise positive control. Joint and Army-specific airspace control measures, plus standard Army operational procedures, afford the necessary methods for the procedural control of airspace. The Army's airspace control methodology emphasizes the procedural control of airspace in the main battle area (MBA). The airspace control procedures must include identification methods that are compatible with those required for air defense. This will ensure timely engagement of

enemy aircraft, conservation of air defense resources, and reduction of risk to friendly forces.<sup>19</sup>

All air defense artillery systems must be integrated, to include air-to-air fighters and allied systems, to preclude fratricide and to ensure timely engagement of hostile aircraft. The JFACC, in his role as the AADC, exercises centralized control and decentralized execution over all air defense forces within the theater, except for the organic divisional short range air defense (SHORAD) units. Basically, he writes the rules and air defense forces execute them from a level that can effectively counter the threat. Such Army air defense assets as the Hawk and Patriot missile systems operate under a positive radar control environment and receive their fire direction from the CRC via data links. On the other hand SHORAD assets, like the Stinger, Vulcan, and Chaparral, are controlled by procedural control methods, such as weapons control status, rules of engagement, and air defense warnings. The division A2C2 elements play a very important role in keeping the SHORAD units updated on the current status in the area of operations.

Indirect fire support units must maintain close coordination with the appropriate airspace control facilities, particularly regarding fires not within established restricted areas. The intensity, duration and location of friendly fires are tied to the tactical situation and therefore are not generally predictable. Current command and control systems do not possess the capability to collect, categorize and disseminate timely artillery information

throughout the area of operations. However, the highest probability of conflict between aircraft and indirect fire weapons will most likely occur at relatively low altitudes in the immediate vicinity of firing unit locations and target impact areas.20

#### Airspace control measures

Maneuver commanders at all levels must exercise A2C2 within their assigned area. They are faced with integrating positive and procedural measures to control organic and supporting forces.

To exercise positive command and control of his assigned airspace, the commander must have the ability to identify and locate the airspace user. He must also have the means to communicate directly with the aircraft user.

If positive command and control (C2) measures cannot be used or are inappropriate, then procedural C2 measures must be utilized. Common procedural means include the use of orders, overlays, SOP's, and A2C2 control measures and restrictions.

A variety of current jointly approved, Army specific, and theater specific procedural control measures are available for the commander's use in managing airspace. Additionally, each major grouping of airspace users (field artillery, ADA, Army aviation) has internal procedural measures suitable for A2C2 purposes.

All currently approved A2C2 measures accomplish one or more of the following functions:

1. Reserve airspace for specific airspace users.
2. Restrict the actions of airspace users.

3. Control the actions of specific airspace users.

4. Require airspace users to accomplish specific actions.21

Ground forces, as well as airspace users, require as much freedom of action as possible. Excessive control prevents the commander from making the best use of all of his resources, overburdens the C2 system, and degrades the effectiveness of the airspace users. Unless required to support the concept of the operation, positive measures should be avoided.

There are five jointly recognized procedural airspace control measures:22

1. Coordinating altitude is a procedural method designed to separate fixed-wing aircraft and rotary-wing aircraft. It normally extends from the corps rear boundary forward to the FLOT. The coordinating altitude is normally specified by the theater airspace control authority.

2. A high density airspace control zone (HIDACZ) is a defined area of airspace that is requested by the maneuver force commander, normally division and above. The purpose is to reserve airspace and to control which users have access to the zone. Establishing a HIDACZ requires approval by the ACA. It is a defined volume of airspace characterized by a large number of airspace users such as close air support, field artillery, Army aviation, and air defense operations. No aircraft can transition the HIDACZ without approval from the controlling facility.

3. Restricted operations areas (ROA) and restricted operations zones (ROZ), are synonymous. A ROA is a volume of

airspace of defined dimensions with horizontal and vertical limits; it is used for a specific operational mission and time period. It is normally activated for drop zones, search and rescue, SEMA orbits, and ADA weapon free zones. It requires approval at the ACA level.

4. Minimum risk routes (MRR), provides a low altitude transiting route designed to get friendly high performance aircraft across the battlefield. They are recommended by the corps commander, through the land component commander, to the air component commander for approval. MRRs normally begin at the corps rear boundary and end at the fire support coordination line (FSCL). They usually extend below the coordinating altitude and avoid areas of high airspace use. They are generally used to support the battlefield air interdiction (BAI) and air interdiction (AI) missions.

5. Low-level transit routes (LLTR)(NATO Peculiar) set aside airspace of defined dimensions used by high performance aircraft to pass through areas of organic air defense surface forces. LLTRs are developed by the ACC and coordinated with the BCE and A2C2 representatives in the TACC. They provide a temporary bi-directional corridor through the areas of organic low-level air defenses of surface forces, similar to a HIDACZ or ROZ.

6. Standard use Army aircraft flight routes (SAAFR) are routes established below the coordinating altitude to facilitate the movement of Army aviation assets. SAAFRs are developed by the A2C2 elements to safely route Army aircraft conducting combat

support (CS) and combat service support (CSS) missions in the terrain flight environment. Normally located in the corps through brigade rear area of operations, these routes are jointly recognized routes that do not require joint approval.

In conclusion, the integrated airspace control system provides the four basic functional activities of airspace control: command and control, air defense, some aspects of fire support coordination, and air traffic control. The system is designed to expedite tactical mission accomplishment, to ensure that air defense and ground-based fire support systems have maximum freedom to engage the enemy, and to provide air traffic regulation and identification within the area of operations. A relatively easy concept to talk about, they are extremely difficult to exercise, particularly when one considers the total use of airspace.

#### ENDNOTES

1. Edward D. Chandler, LTC, Aviation Liaison Officers: A Means To Enhanced Combat Power, p. 18.
2. Joint Chiefs of Staff, JCS PUB 3-52 (Draft), p. v glossary (hereafter referred to as "JCS PUB 3-52").
3. Ibid., p. I-1.
4. Ibid., p. I-4.
5. Ibid., p. I-6.
6. Ibid., pp. I-6/I-8
7. United States Air Force, Air Force Manual 2-12, p. 2 (hereafter referred to as "AFM 2-12").
8. JCS PUB 3-52, p. I-8.



9. U.S. Department of the Army, Army Regulation 100-5, p. 4.
10. U.S. Department of the Army, Field Manual (FM) 100-103, p. 4-27 (hereafter referred to as "FM 100-103").
11. Ibid., p. 1-1.
12. Ibid., p. 4-7.
13. U.S. Department of the Army, Field Manual (FM) 100-15., p. 4-27; Field Manual (FM) 71-100., p. 3-17.
14. U.S. Department of the Army, Field Manual (FM) 1-111., p. H-12 (hereafter referred to as "FM 1-111").
15. FM 100-103., p. 1-10.
16. AFM 2-12., p. 4.
17. Ibid., p. 6-7.
18. Memorandum For: Commander, U.S. Army Aviation Center and Ft. Rucker, Subject: Draft Interim Operational Concept for Air Traffic Services (ATS)., p. 1-11.
19. FM 1-111., p. H-16.
20. AFM 2-12., p. 13.
21. FM 100-103., p. 2-7.
22. Ibid., p. 2-8/2-15.

### CHAPTER III

#### ECHELONS ABOVE CORPS

The echelons above corps provide the direction for the top layer of the system. Only doctrine of the joint and combined arena will be discussed at this level. The impact of the guidance from these sources determines what the user has to work with in the heat of battle. In examining the system as a whole, it quickly becomes apparent that a major problem lies in differences with sister service systems. The problem is rapidly exacerbated when allied operations are considered. We must work fast and hard to standardize procedures and terminology at the joint and allied levels of operation. We are violating our principles in this area.

A review of each of the systems reveals that all of them are workable. They have been tailored to the needs of the individual service and improved through the years. The closest marriage of doctrine occurs with pairs of services. The Army/Air Force doctrine has been closely integrated. The same is true of Navy/Marine Corps doctrine. Yet each service organizes and mans its airspace control organizations differently and each has different names for each functional area. However, the actual functions performed differ little, if any.

The net result of this service specialization has several impacts. It makes the overall system difficult to learn as it becomes unnecessarily complicated. To the many users, operations

in a arena becoming more joint or exclusively joint, the system is viewed as too complex. The strongest responses on the survey of users and coordinators centered on standardization. 96% (54 of 56) of all respondents indicated agreement that the system must be standardized within our joint doctrine. Another strong response, 91% of those responding, urged us to further standardize with our allies.

One quick glance at the various doctrinal organization charts for airspace command and control tell the story. Figure 2 depicts U.S. Navy organizations while Figure 3 depicts the U.S. Marine Corps organizations and agencies. Figure 4 overlays the U.S. Army organizations with that of the U.S. Air Force. Figure 5 lists the varied terminology of the control measures of different services and nations. The term for a "route" or "corridor" is signified by eight different words or phrases, as presented in FM 100-103. Significant work within our own house is in order.

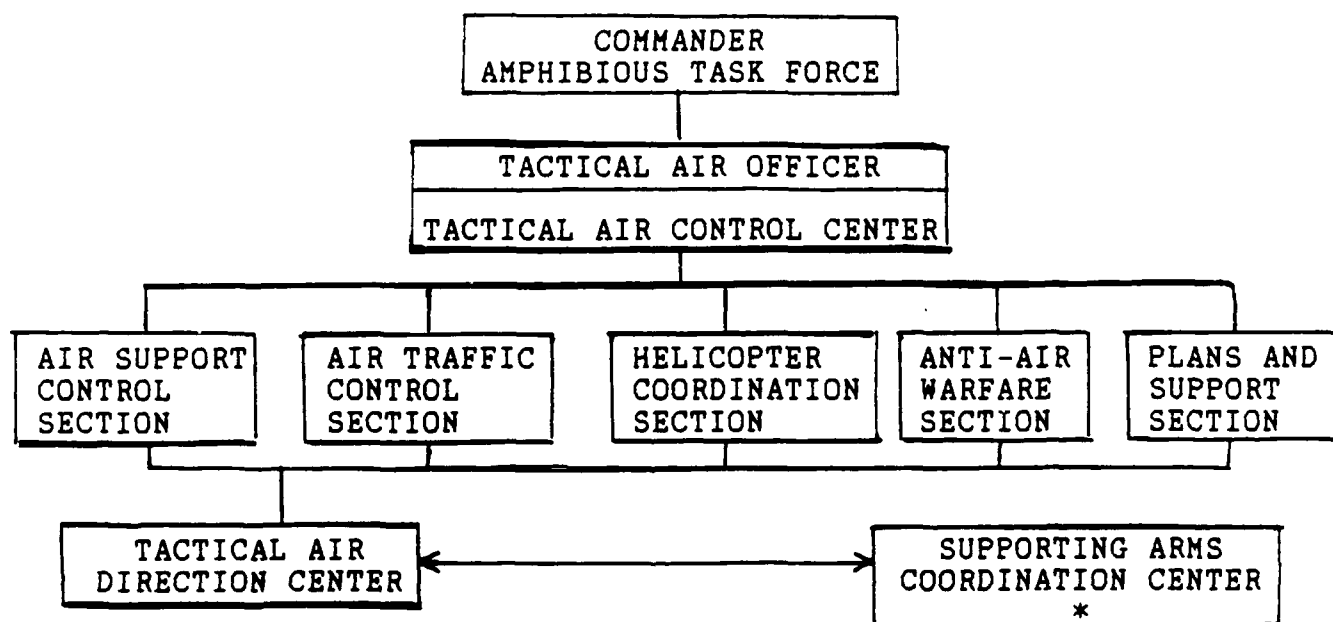
The problem at echelons above corps lies in the proliferation of control organizations and the terminology associated with airspace control measures. Joint doctrine in JCS PUB 3-52 lists standardization among U.S. services as one of its principles. When this is accomplished, we must negotiate with our allies to achieve the same end. Without this standardization, joint and combined operations remain a strictly preplanned operation with unwieldy coordination measures. There can be no hasty attacks by joint forces or timely application of tactical air. Streamlined procedures and organizational flow will set the stage for safe and

timely performance of the airspace command and control system.

While beyond the purpose of this paper, there appear to be possibilities for equipment standardization of future airspace control systems across the joint arena.

Change will not come easy. Considerable friction exists in the form of organizational and national bureaucracy.<sup>1</sup> Substantial command emphasis will have to be brought to bear to accomplish significant gains in this area.

FIGURE 2 NAVY TACTICAL AIRSPACE CONTROL SYSTEM

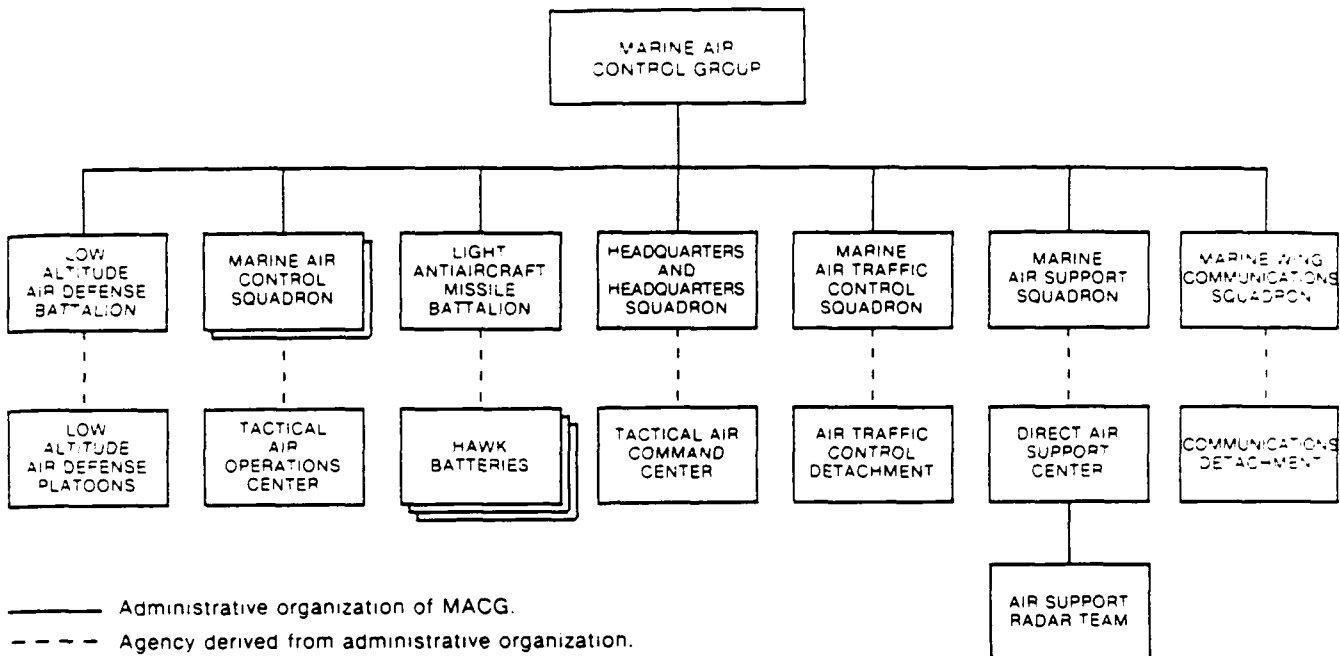


2

\*The SACC is not a member of NTACS, but like the FSE, works very closely in coordinating airspace with the Tactical Air Direction Center.

# MARINE AIR COMMAND AND CONTROL SYSTEM

## MARINE AIR COMMAND AND CONTROL ORGANIZATIONS



## MARINE AIR COMMAND AND CONTROL AGENCIES

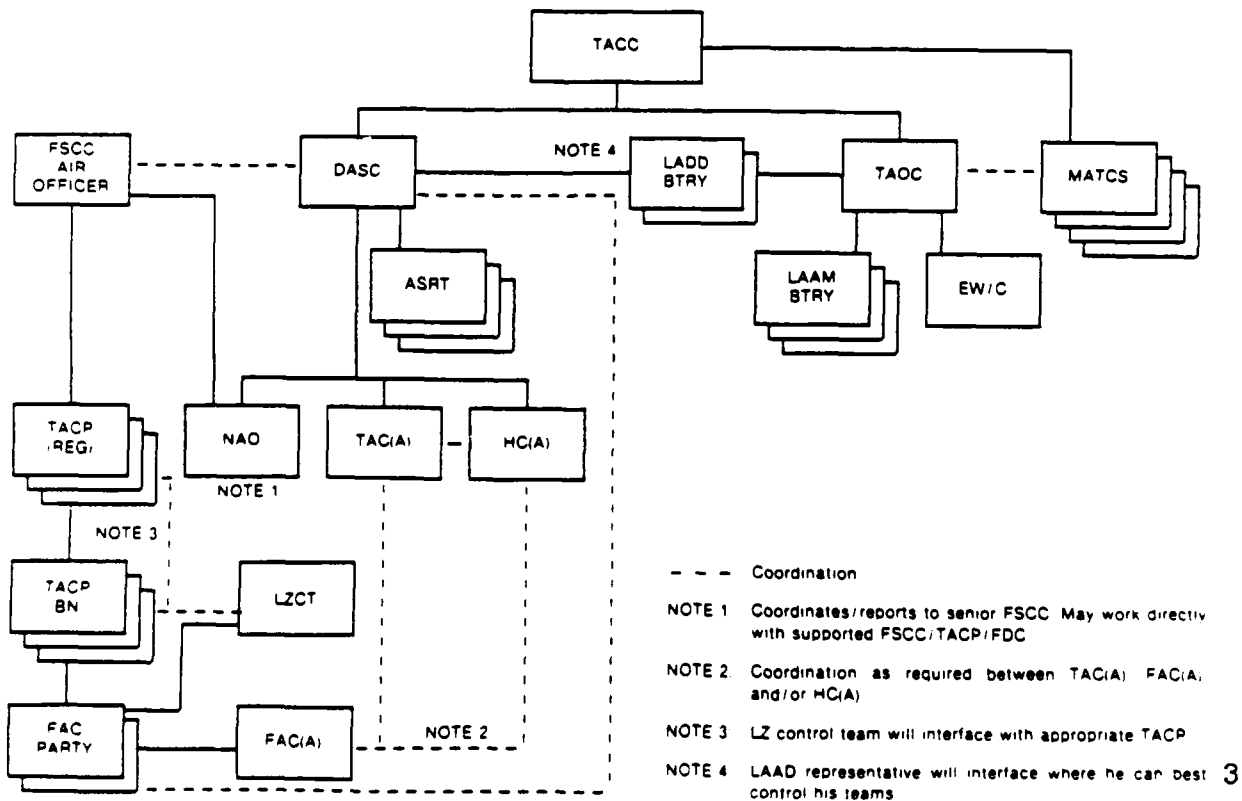


FIGURE 4.

ARMY AND AIR FORCE AIR CONTROL SYSTEMS

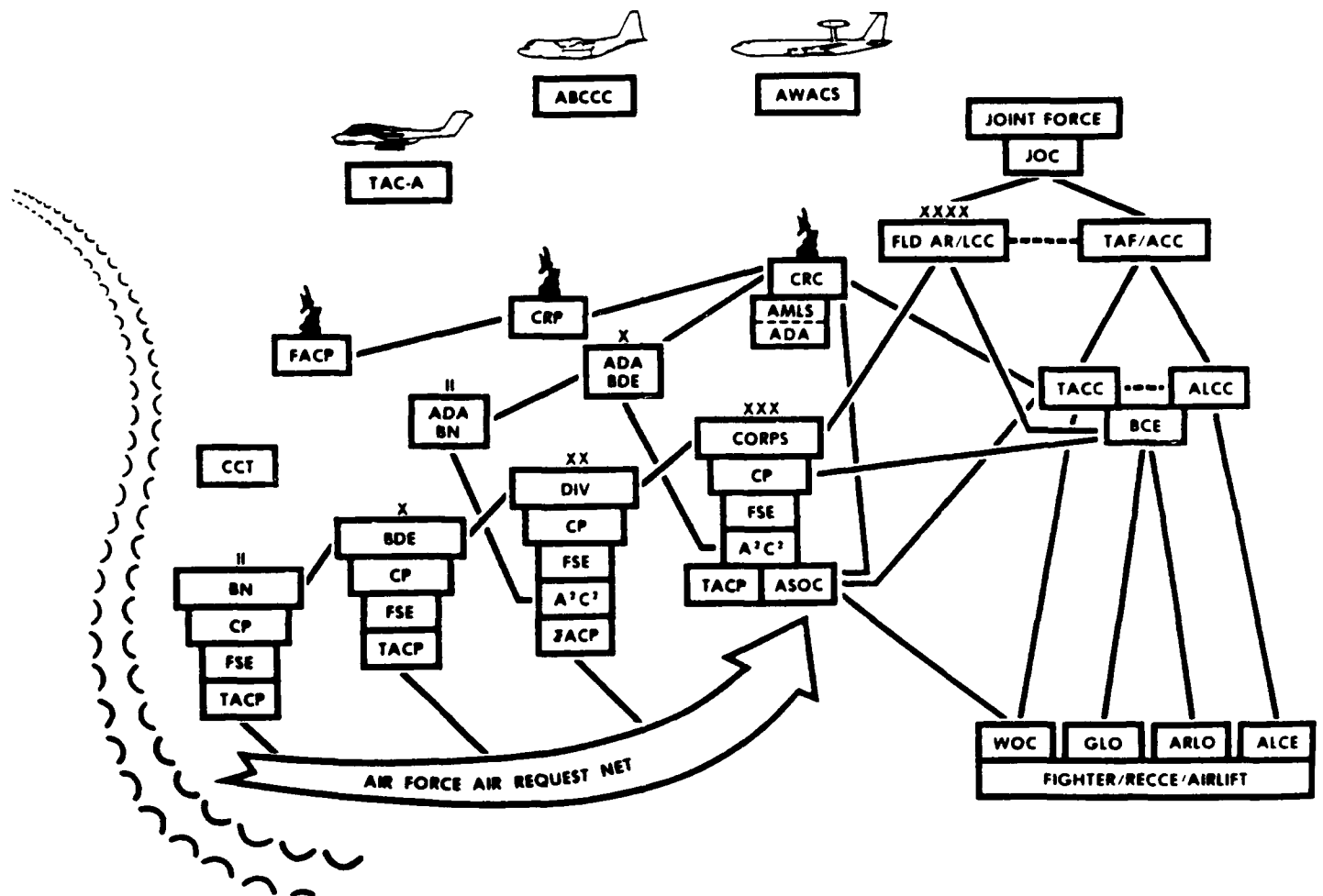


FIGURE 5.

## PROCEDURAL AIRSPACE CONTROL MEASURES

MEASURE	USAGE
CORRIDORS AND ROUTES	
Air Route-----	NATO/ASCC*
Low level transit route-----	NATO/ASCC
Minimum risk route-----	US
Standard use Army aviation route-----	US
Air corridor-----	U.S. Army
Air axis-----	U.S. Army
Special Corridor-----	NATO
Transit Corridor-----	NATO
ZONES	
Base defense zone-----	NATO
High-density airspace control zone-----	US/NATO/ASCC
Restricted operation zone-----	US/NATO/ASCC
Weapons free zone-----	NATO
FLIGHT LEVELS	
Coordinating altitude-----	US/NATO
Traverse level-----	US/NATO
OTHER AIRSPACE SUBDIVISIONS OR CONTROL MEASURES:	
Airspace coordination area-----	US/NATO
Amphibious objective area-----	US/NATO
Terminal control area (zone)-----	US/NATO
Weapon engagement zone-----	US/NATO
Control point-----	US/NATO
Way-point-----	US/NATO
Time slot-----	NATO/ASCC
*ASCC=Air Standardization Coordinating Committee_____	5

### ENDNOTES

1. Interview with Calvin R. Graef, LTC, Doctrine Division, Center for Army Tactics, U.S. Army Command and General Staff College, Ft Leavenworth, 21 December 1989.
2. Air Ground Operations School, Joint Combat Airspace Command and Control Course Workbook, pp. 32A1-32A10.
3. U.S. Marine Corps, Operational Handbook 5-8, pp. 1-3 & 9-1.
4. Air Ground Operations School, Joint Combat Airspace Control Lesson Plan, p. 32A-21.
5. FM 100-103, pp. 2-6 & 2-17.

## CHAPTER IV

### CORPS AND BELOW

Operations at the corps level provide the initial view of the tactical application of the Army Airspace Command and Control System (A2C2). While the land component commander is represented in the headquarters of the air component commander through the battlefield coordination element, the first appearance of tactical level A2C2 is at the corps level. The coordinated plan for overall airspace management is embodied in the Airspace Control Plan (ACP). This document is forwarded to the corps for further expansion and dissemination as necessary for operational considerations.

Routine updates in the form of an Airspace Control Order (ACO), normally at eight hour intervals, flow through the echelons from corps down to battalion or lower. Coordination with higher, lower and adjacent units is continuous as operations are planned and executed simultaneously.

Both the division and corps are resourced with personnel to accomplish the A2C2 mission. Below division, maneuver units accomplish A2C2 functions with assigned staff and liaison personnel. The A2C2 element operates under the staff supervision of the G3/S3 at the main command post.

A system overview was presented in Chapter II. This chapter will concentrate on the problem areas at corps and below. It is worthwhile to note that the majority (59 %) of the G3/S3 Air



officers sampled felt that the system can perform its mission in combat. Aviation commanders and ATS commanders were not as optimistic. The reservations are addressed in the following categories.

### Personnel

Surveys of the division and corps G3 Air officers provided a significant problem area. While it is true that the elements are resourced at both levels, the sufficiency of the numbers authorized is questionable. An assistant G3 Air and an additional aviation officer to provide for 24 hour operations was frequently cited as a need. While the organization varies depending on the division and corps, the universal observation of the brigade commanders, who provide the aviation cell to the A2C2 element, was the lack of aviation personnel to man the cell adequately. The personnel authorization must be increased to enable the system to work as designed. The primary concern is the ability to operate around-the-clock.

A second area of concern is the general lack of liaison officers to serve with supported units. The problem stems from the limited numbers of liaison positions in the "Army of Excellence" organizations. For whatever reason, 10 of the 13 divisions and 2 of the 5 corps reporting had no ATS LNO assigned. Three of eight brigades reporting had no aviation LNO assigned whereas only one division had no aviation LNO assigned. There were no instances of FSO or ADA LNO positions not filled. One division and one corps

had no G3 Air assigned. There were two instances of ALO shortages; one at battalion and one at a corps headquarters. Across the board, aviation had the poorest showing for provision of liaison officers. Given the complexity of emerging weapon systems along with the increasing task loads for combat unit staffs, the lack of liaison officers must be addressed to resolve difficulties in coordination. The need for liaison officers is well established in the 1989 study by LTC Chandler, Aviation Liaison Officers: A Means to Enhance Combat Power.

Turbulence in the individual positions of the A2C2 cell was cited as a problem. The complexity of the system coupled with rapid turnover of personnel is a major concern. Analysis of the surveys revealed turbulence to be greatest at the battalion level; most served in the A2C2 positions less than 9 months.

Officers assigned with known short tenures suffer in training. One survey respondent reported that after being assigned to work in A2C2, he was told "you're not going to be in the position long enough to justify schooling." For the tactical units, funding is a major impact if each player must go TDY for A2C2 training. Most are not allowed this luxury.

Positions should be for a specified minimum length and schooling should be a prerequisite, otherwise the officer spends months trying to learn the terms and procedures. The problem of short term assignments exists in some commands, but the one time snapshot provided by the survey indicates a larger problem. There were several instances of massive turnover of the cell members.

The impact of short term assignments compounds the functional aspect of the cell. One consideration should be adequate time to learn the system by the individual players. The main emphasis, however, must be on the ability of the cell to function as a team. Personnel stability is essential for training a functional cell.

At the brigade and battalion level some respondents indicated that the LNO's were different for every exercise. Further, they relied heavily on the ALO, FSO, and ADA LNO or section leader to accomplish their A2C2 functions. Aviation LNO's were key in this process, especially if Army air was to be employed, but were not routinely available to the unit.

A general lack of liaison officers available to promote timely and accurate information flow violates the fourth principle set forth in JCS PUB 3-52.

### Training

Two training areas require consideration-individual and collective. Qualification of individual officers in functional skills takes place in the basic and advanced courses. These skills are expanded in branch related assignments in the field at company and battalion level. Given this type of education and experience, the officers are aware of how their units operate and of major considerations of their employment. This describes generally what is termed Branch Qualified. Does this mean that such an officer can step in and perform duties at the division or corps A2C2 cell?

The survey of S3 and G3 Air officers at division and corps level indicates that most officers cannot perform A2C2 duties immediately upon reporting for duty (question #31). 82% of the respondents indicated that less than 40% of the officers were immediately effective for assumption of duties in A2C2. While formalized "on the job" training received fair marks, more than half indicated a better option. This shortfall has been recognized and steps have been taken to provide for joint level training specifically in A2C2.

The USAF Air-Ground Operations School offers several courses needed to individually qualify an officer in the skills necessary to operate in the A2C2 elements at various levels.<sup>1</sup> Some TRADOC schools now offer instruction in A2C2. The survey further questioned who should attend this specialized schooling. The overwhelming response was that all members of the cell should get specialized training. The prioritized list of "need to attend" specialized training is as follows (from highest to lowest priorities): G3 Air, Air Defense Officer, Aviation Officer, Fire Support Officer, and Air Traffic Services liaison officer. School quotas and funding, mentioned earlier, are detractors to the accomplishment of this training.

But individual training is only half the battle. The collective training to make the cell functional as a team requires more effort. It appears that formalized "on the job training" is a good way to accomplish this. However, the collective training mission must assume a two part approach.

On the lesser end of the spectrum is the collective training of the A2C2 cells themselves. It involves internal functioning and coordination within the cells. The larger problem is how to bring all of the elements together to train. It is one thing to bring staff officers from one headquarters together and accomplish training. It is quite another to bring the commanders and staff officers from all of the headquarters from corps to battalion to exercise the A2C2 system, not to mention all of the users such as Army and Air Force aircraft crews, air defense units, fire support and air traffic control teams it would take to realistically load the system.

Conducting realistic training that adequately reaches all of the players of the system requires new thinking. The survey respondents indicated that this is only accomplished during FTX's/CPX's. For different units, this has different meanings. Funding has in the past limited field training for units above battalion level. It is rare that corps size elements take to the field except for REFORGER or similar exercises. Thus it is very rare that units actually practice the full functional range of duties under realistic loads. The players at battalion and brigade rarely get the full impact of the environment envisioned in Airland Battle doctrine. The lack of the task-loading from division and corps initiated air missions to fight the deep battle and counter-air battle creates a false impression. The reverse is also true.

The higher headquarters do not get the benefit of the task-loading brought about by those that actually fight the close-in

battle. The battalions, brigades and divisions have to initiate procedural measures to enable fire support, air defense, aviation and air to accomplish their mission. So the new thinking must focus on how to provide realistic training that encompasses both the various levels and realistic task-loading for all levels.

The systemic processes are communication and coordination intensive. These processes have to embody the commander's intent on how the battle is to be fought. The Army system of airspace command and control must be able to react to the ebb and flow of battle quickly to carry out the commander's intent as the numerous tactical units bring their assets to bear on the enemy. Practicing this once every two or three years when all of the players in the system can be made available is not sufficient.

Part of the solution to training the system in totality can be addressed at the division and corps level. The commitment to realism in training has reached many of our exercises, training centers and ranges. Our installation airspace offers one piece of the system that can be exercised on a more routine basis. Consistent with the wartime plan to provide airspace positive and procedural controls, the corps or divisional level post should structure the local airspace system to mirror the wartime version. The wartime players should be brought into the role with emphasis on the A2C2 elements to provide inputs that exercise the system and enhance realism to the other players.

Some examples of conditions in the field are offered for clarification. About 40% of the aviation units questioned

indicated that they "rarely" trained using Mode 4 IFF. This also means that Air Defense gunners are able to train in IFF interrogation of helicopters even more rarely. This is an equipment issue for the aviation units, but it serves as an indicator of realism in training. For the A2C2 elements at the various levels, almost half indicated that they "rarely" practiced deconflicting fire support and a low level transit route. These very basic, yet critical functions deserve increased training emphasis if the system is expected to function in combat.

Training at all levels on a more routine basis would serve to educate all involved in what the doctrine is and how the command intends to implement their plan. From the surveys and personal interviews, it became apparent that knowledge was lacking at all levels on doctrine and on the details of the wartime plan. Overall, this impacts directly on the ability of the system to function. Failure to do so limits the fifth principle set forth in JCS PUB 3-52 which states in part.

Combat airspace control procedures must be common for all airspace users and allow maximum flexibility throughout the theater by utilizing an effective mix of positive and procedural control measures. The control structure must permit close coordination between ground, maritime, and air operations to allow for rapid concentrations of combat operations in a specified portion of airspace in minimum time.

This cannot be accomplished by untrained or poorly trained users of the system. This principle carries over into the next area for consideration; doctrine.

## Doctrine

The overview of the airspace control system in general and the Army Airspace Command and Control doctrine reveals a functional system at the corps and division levels. Some problems occur as a result of inadequate resourcing in equipment or personnel; these have been addressed separately. Training to accomplish the doctrine is a challenge. However, most of the respondents indicated that the doctrine for the corps/division level is about right. There are some notable exceptions.

The 71- series of field manuals currently lack the specifics required to operate. The most frequent comments came from units that are aircraft intensive (light infantry, airborne and air assault). All manuals need to be brought on line with an expanded FM 100-103. Presently, the great majority of manuals briefly cover the overall functioning of the system at higher echelons, where equipment and personnel are readily available to accomplish the mission. The lower the level, the greater the task load to perform; but here the "how to" is the skimpiest. The staff officers at the battalion and brigade level are the least equipped, staffed and trained to work through situations where the greatest doctrinal void exists. FM 71-2. The Tank and Mechanized Infantry Task Force, September 88, briefly mentions the S3 Air as a player in A2C2. It also mentions ACA's as means to separate fires from close air.<sup>2</sup> FM 71-3. Armored and Mechanized Infantry Brigades, May 88, mentions A2C2 in three places and says "timely dissemination of air defense information is important to limit fratricide."<sup>3</sup>



The surveys spanned A2C2 supervisors from corps to battalion. There was a very definite trend in both comments and responses that demonstrated that the knowledge in the system and responsibilities decreased with the level of unit. While this is to be expected as one encounters more junior officers, the knowledge level in some of the individual responses is worrisome. Consider this example: The respondent states, "When is the Army and Air Force going to develop procedures to keep A-10's or F-15's from flying into the firing sector of attack helicopters or vice versa." It's obvious that he did not realize what part he or his liaison officers played in deconflicting attacking elements in his sector of responsibility. Another S3 officer states, "I'm a 88 CGSC grad and I've had no exposure to FM 100-103. FSO, S3 Air & ALO perform the various A2C2 functions."

The essence of the doctrinal challenge is that it must be tailored to work in the environment where the close-in battle is being fought. While some units have developed good SOP's, the recent example of rapidly drawing battalions from various divisions for "Just Cause" make the use of SOP's questionable. The doctrine should provide simple, standardized procedures that will work everywhere.

This was graphically demonstrated one hot afternoon at the National Training Center (NTC) during the live fire phase. While the task force was rapidly preparing for a hasty attack to seize better terrain for a defensive battle the following day, planning and coordination was ongoing for both the offensive and defensive

battles. Liaison officers and supporting unit commanders were "hanging close" to get a grasp of the commanders concept in order to formulate their plans to support the upcoming battle.

The assets available were not complex. The standard package of fire support, air defense and engineers was supplemented by a limited amount of close air support. An attack helicopter battalion was OPCON to the brigade and had been given a reinforcing mission with the task force. As the plan grew in detail and coordination expanded, the command and control measures and associated limitations grew to the point where the task force commander and his staff were overcome. The numerous considerations and separate actions required to employ all of the elements of the combined arms team were too much. Not in and of themselves, but on top of his already tough mission to fight his task force. The commander said simply, "I can't use all this help."

This task-loading of the command structure was by design, something that the NTC does well. It is one of the few places where all of the elements come together; this environment can simulate a somewhat realistic combat environment. The NTC provides a stress level that taxes units, the command element and their preparation to the limits. Had this particular unit not trained together and worked out procedures for employment of all of the supporting arms, it would not have performed as well as it did.

The environment forces the necessary coordination and command and control for employment of units that operate in the airspace. Units leave with a sense that it can and will work, given time and

resources. A2C2 is not easy to do in the best circumstances. It is demanding and frustrating at the NTC, yet the system is not fully loaded there because of the paucity of air in the BAI or counter-air role. The most frustrating factor is a lack of standardized guidance for units to prepare beforehand. Most units have some type of plan to conduct A2C2, but the NTC has a procedure that must be followed that evolved from a diminutive statement on informal Airspace Coordination Areas. The first time a unit participates in the live fire exercise phase, it encounters a unique learning experience. Examination of the doctrine revealed that detailed procedures now exist in deconflicting close air support and artillery. The FM 6-20-XX series recently published now contain specific techniques that can be used.<sup>4</sup> This was brought about by concerned users of the system working closely with the Artillery School.<sup>5</sup> Work remains for aviation employment in this area as well as other maneuver forces.

The problem extends from the freedom that units within corps have in developing a standardized procedure. Almost every unit and commander has a different idea about how to do it. Within the unit, that is acceptable. But idiosyncratic procedures make it very confusing as units move from one unit to another in support roles. The attack helicopter battalion from corps that is temporarily chopped to various divisions finds a maze of different procedures to cope with. Subsequent coordination with the brigade whose sector one will pass through or reinforce yields another set of operating rules. The same is true of the air defense and

artillery units. For units whose operations span the battlefield, the result is frightening as well as frustrating. While many Army officers are grumbling about the difficulty of employing close air support, the Air Force has been forced to structure the environment or rules under which air can be used. All of this planning must respond to the forever varying environment of rules of various units that have different ideas on command and control.

The following statement reveals the frustration of a battalion S3, but his frustration is probably misdirected: "What we need is an intelligent ALO who has a habitual relationship with my battalion. Must be a make sense guy, not someone who hides behind a bunch of stupid Air Force Regs and doesn't get his mission accomplished." Two observations are necessary here. First, the air liaison officers were the ones who had the highest number of officers on station with units for over twelve months. Second, most "Regs" used in USAF employment simply specify what conditions have to be met for employment; most of these make good, clear sense. Other responses to the remainder of the survey lead one to believe that this young officer did not understand the A2C2 system and was more than a little frustrated with what he did understand. What is called for is a more detailed and coordinated effort in a "how to" manual for the divisions and below.

Doctrinal change should not dictate a major overhaul for the system. The doctrine for the corps and above should establish standardization across commands and with our allies. The appropriate techniques for use at brigade and below should be

developed and standardized. Simple and standardized terminology coupled with an ambitious training program that is exportable would do much to enhance our current system. Failure to do so violates the principles set forth in JCS PUB 3-52 that call for simplicity, flexibility, and common procedures among users.

### Equipment

The challenge of A2C2 in our fighting units is complicated because suitable equipment is not yet in the field. Development of automated systems is now underway to provide a suitable architecture for carrying out command and control of the third dimension. Whatever the final system consists of, the survey of the current system provided some insights into capabilities necessary for successful operation of the system. The comments provided in the surveys gave many ideas on what was needed to make the system work. The bottom line is the ability to communicate.

Communications form the lifeblood of the system. Constant coordination up, down and laterally calls for a system that can serve a variety of technical demands. The system must provide long range compatibility with sister services and a capability to interface with our allies. The varied needs of the users at the tactical level merit careful consideration. The ability to communicate with aircraft at terrain flight altitudes over distances consistent with the missions envisioned in corps deep battle is critical. The need for this capability, though readily acknowledged, has been far too long in coming. A systemic tie-in

to air traffic service units, FOC/FCC facilities, air defense and fire support units must exist in aircraft cockpits. Without the capability to transfer command and control and intelligence information rapidly, the ability to conduct hasty attacks with highly lethal aviation assets will be wasted. This is not a new idea. General Riscassi listed virtually the same requirements as a challenge for the aviation community in 1986.6

The aviation Tactical Operations Center (TOC) must be brought out of the age of tents and grease pencils. The automated TOC offers great potential to serve aviation needs. We direly need a system that can interface with other maneuver units, fire support, intelligence, air defense, Air Force, A2C2 agencies and with Army aircraft.

The immediate future offers the potential to solve many of our systemic problems in aviation command and control. The automated TOC must be able to draw upon numerous sources and rapidly transmit the updates to aircraft. Using standardized data transfer cartridges that can be rapidly programmed by operations personnel and entered in the aircraft automatically, the ability to conduct hasty operations will become a reality. Systemic capability to enter directly into on-board systems such items as frequencies, maneuver and air graphics, control measures, and fire support plans can be integrated into aircraft modernization efforts.

The future is now, as functional area designs are being tailored under the umbrella of the Army Tactical Command and Control System (ATCCS). Full integration and interoperability are

critically important. The efforts in this area are under the supervision of a TRADOC Program Integration Officer (TPIO). Branch or functional area needs must be addressed as well as the need to cross the spectrum of ATCCS for A2C2 purposes. As the development continues in this area, this long term system deserves our best efforts. The Maneuver Control System (MCS) is in the initial fielding stage. Users of MCS did not give high marks in the ability of MCS to enhance A2C2 (see questions 20-23, S3/G3 Air survey) in the present configuration. Subsequent iterations of software and the automated command post must improve functioning in this area. Mobile Subscriber Equipment was better received as a tool to aid in the coordination of A2C2 requirements.

In summary, we presently violate the principle in JCS PUB 3-52 that calls for secure and reliable communications.

### Leadership

This look at various elements that make up A2C2 up and down the various levels offers a broad view of opinions and knowledge of the system. Almost everyone has an opinion on A2C2, usually a strong one. It became obvious that there is a training challenge, not only for the staff officers, but for the leadership at virtually all levels.

The survey revealed that leaders had less confidence in the A2C2 system than did their staff counterparts. Perhaps this reflects the inadequate manning levels and communications equipment, or possibly, leaders have greater insights into the

phenomenon Clausewitz called "friction."<sup>7</sup> The situation he very clearly describes as potential for friction could have been written about A2C2.

The military machine-the army and everything related to it-is basically very simple and therefore seems easy to manage. But we should bear in mind that none of its components is of one piece: each part is composed of individuals, every one of whom retains his potential of friction.<sup>8</sup>

One of the obstacles that must be overcome for the A2C2 system to work is support from the command structure. The system suffers from being only a part of one of the "glass balls." Except for Air Force, aviation and air defense units, the maneuver command structure rarely considers A2C2 until field exercises are imminent where air will be used. The Battle Command Training Program (BCTP) has not yet begun to fully exercise this critical system. The level of awareness must be raised across the full spectrum through education and emphasis. All prospective commanders should have an overview on the current system and implications of failure of the A2C2 system.

We, the Army, have too much of an individualistic view of the function of A2C2. The system suffers from neglect at the tactical level. Perhaps, if we chose to see a system that is highly critical to combined arms efficiency through an "integrator" role rather than a coordination role, more emphasis could be mustered. The old adage that "a unit does well what the commander checks" is still true. This area deserves more frequent and in-depth checks.



#### ENDNOTES

1. Vernon M. Huggins, "Joint Combat Airspace Command and Control Course," U.S. Army Aviation Digest, May 1988, p. 16.
2. U.S. Department of the Army, Field Manual (FM) 71-2, pp. 2-5, 6-20/6-21.
3. U.S. Department of the Army, Field Manual (FM) 71-3, pp. 2-5, 2-7, 2-8, 5-10.
4. U.S. Department of the Army, Field Manual (FM) 6-20-50, pp. C-13/C-18.
5. Robert Reynolds, COL, "Artillery/Aircraft Airspace Coordination," Air Land Bulletin, 31 December 1989. pp. 3-7.
6. Robert W. Riscassi, LTG, "Army Aviation in the 1980's," U.S. Army Aviation Digest, January 1986, p. 8.
7. Carl Von Clausewitz, On War, p. 119.
8. Ibid.

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

The adequacy of Army Airspace Command and Control has been addressed in broad terms and contrasted in chapters III and IV with the principles listed in JCS PUB 3-52. Conclusions will be presented in the format used throughout the paper: regarding personnel, training, doctrine, equipment and leadership. Recommendations will follow conclusions where appropriate.

#### Personnel

Two areas impact on the adequacy of A2C2 in the personnel area. A third area will be briefly discussed that is beyond the scope of this study, yet it impacts indirectly on the overall effectiveness of the Army.

#### Conclusions

1. The resourcing of the corps and division aviation element for A2C2 is inadequate. The size of the cell authorized must be increased to provide for 24-hour a day operation. This would also provide for a surge capability when operations and plans call for aviation representation in the main and tactical command posts.

2. Insufficient numbers of liaison officers are authorized in aviation units to provide timely and well-informed coordination with supported units. The supported units rely heavily on the liaison officers to assist in the A2C2 arena. While this area was

not the main focus of the study, it emerged very clearly from the literature search and comments from the field. The initiative of having aviation officers as S3 Air staff officers in line units should greatly assist the A2C2 effort.<sup>1</sup> However, the need for a liaison officer still exists to serve the needs of the unit commanders at all levels.

3. The depth of the staff of maneuver battalion and brigade units is inadequate for the task of 24-hour a day operations. Perhaps some of the planning load can be shifted from the battalion to brigade level or other operational alternatives considered, but the fact remains that our doctrine and our equipment capabilities do not match our manning levels. We need to change one or the other. Action is required at the highest levels to change policy on manning of tactical units if appropriate action is to be taken.

#### Recommendations

1. Increase the A2C2 cell authorized in the aviation brigade, Table of Organization and Equipment(TOE), for both the division and corps to a minimum of four people with appropriate ranks for the organizational level.

2. Increase the number of liaison teams and associated equipment from two to three in the aviation brigade headquarters in the divisional aviation brigade. Manning for the ATS liaison teams must be resolved or the corps aviation brigade liaison capability increased.

3. Further study should be conducted on the manning of maneuver battalion and brigade staff levels with regard to around-the-clock operations. A major policy shift is necessary here.

## Training

### Conclusions

1. The ability to train collectively is inadequate due to the lack of high level exercises that can load the system. The problem is further complicated by the numerous levels involved and the number of players at each level. The technological differences of each of the player units at each level also presents a problem in that realism is difficult to generate without actual employment of those units.

2. Staff officers and leaders lack specific knowledge of the A2C2 system and the various procedural controls. This is not to imply that no one understands the specifics, but most do not understand everything about the system. The indication that some officers have not even seen FM 100-103 provides evidence that our education system is lacking in a critical joint and combined arena. At the lower unit staff levels, the lack of understanding of "how to" in a constantly changing environment is detrimental to overall functional adequacy.

3. Individual training offered by the Air-Ground Operations School received high marks for those assuming duties. The need for this type of formal training for individual officers was well established in the survey. Availability of course quotas is not

adequate to meet the demand for training, yet seats go unfilled due to funding constraints or scheduling conflicts. Formalized on-the-job training is also recognized as critical to functional efficiency of the A2C2 cell as well as individual training. A multi-faceted approach to the training challenge is called for.

4. There is a general shortfall in our conduct of day-to-day training to incorporate the A2C2 system and build operator proficiency. Aviators should routinely practice IFF Mode 4 operations in aircraft; air defense gunners should routinely interrogate the aircraft keyed with Mode 4; installations should institute A2C2 procedures that mirror the corps/division "go to war" procedures. There are many such areas that lend themselves to improved training and awareness for local A2C2 procedural training. These training opportunities must be seized.

#### Recommendations

1. An exportable training package that can be provided to units of various levels must be developed. A key to the success of both individual and collective training, the package must find a way through simulation to provide a training environment to load the system so that the A2C2 cells can conduct CPX type-training simultaneously. The simultaneous training of cells coupled with task loading of a type that replicates combat usage by all the various players is a necessity.

2. Individual training of officers whose duties place them in A2C2 cells should be prescribed. Specifics should be made

available to ascertain what is required to be fully trained as an individual in this critical functional area. The joint training offered by AGOS should continue to be used to the maximum extent possible.

3. Training must be included within our TRADOC schools to ensure that our officers and NCO's have a working knowledge of the system in general. The role as an integrator of combat power should be emphasized in contrast to that of safety for those who fly.

4. Installation A2C2 procedures must be modified to mirror the command's procedural and positive controls to enhance peacetime training for the wartime mission. Standardization of this area across installations should become a part of the Aviation Resource Management Survey.

## Doctrine

### Conclusions

1. The conceptual basis of the A2C2 doctrine is sound. The lack of personnel and equipment to enable the system to function around the clock is detrimental to current functioning. Until the advanced equipment is fielded, personnel numbers must be increased to enable the system to function. A second detractor to the A2C2 system is caused by the unnecessary proliferation of synonymous terms and organizations within our joint and allied forces.

2. The doctrine below division level is inadequate because it lacks sufficient description of how to perform A2C2 at those

levels. The lack of standardized and streamlined procedures at those levels detract from functional effectiveness. This is offered not in an attempt to limit flexibility, but rather to provide a simple bag of usable tools that captains can understand and lieutenants can learn.

3. The lack of Army wide standardization will impact on future joint operations. Hasty employment of tailored forces to meet a variety of contingencies require interoperability now.

#### Recommendations

1. The Airspace command and control organizations and procedures must be standardized and streamlined to permit efficient functioning and training. This must be enforced at the joint level and executed at the service level. This is a prerequisite to the following recommendation.

2. Doctrine that spells out how to conduct A2C2 at the fighting unit level must be developed and published in an appropriate forum. The document must standardize the normal operational procedures to facilitate training and employment. consistent with other units. It must be useable and applicable throughout the services.

#### Equipment

##### Conclusions

1. The present equipment is marginal for conduct of the command and control of airspace. The long range plan to automate equipment for command and control under ATCCS is much needed. The

challenge to provide for interoperability through the five functional areas is an overriding concern. The challenge to aviation is to ensure not only interoperability with the five functional areas, but also to ensure the capability is built in to carry this through to the aircraft. Without this capability, the air systems are relegated to the grease pencil and copying overlays.

The automated command and control system must be able to address the communication shortfall. Aggravated by operations at terrain flight altitudes, the problem of communication with aircraft and other headquarters was the most frequently cited equipment problem. The comments listed under equipment in Appendix 4 vary in the suggested solutions, but the message is quite clear. Our ability to communicate is not adequate.

2. Radios of sufficient range and in sufficient numbers must be provided if operational command and control of our aviation assets is to be maintained. The operational range and altitude of the modernized fleet of aircraft in accomplishing Airland Battle doctrinal missions requires a major upgrade in capability.

3. No suitable device is fielded to Army aviation units that enables the aircraft to test for functional operation of Mode 4 IFF. This tester is critical for maintaining operational readiness for combat. Training is inhibited, since there is no way to test the Mode 4 capability short of requesting gunners from the air defense units to come out for every flight to test for proper functioning.



### Recommendations

1. The senior leadership of aviation should appoint a special liaison or some oversight mechanism to work with the TPIO-ATCCS at Ft Leavenworth. Additional emphasis is needed to ensure interoperability of aircraft systems with the Maneuver Control System. The special liaison effort should extend to the material acquisition commands within Army Material Command. Future aircraft systems, such as communications suites and fire control computers, must interoperate/interface with MCS or other functional areas within ATCCS. Special handling is required for success in both of these critical areas. We must initiate appropriate action to field a communications system with the capability to command and control both the aviation mission as well as A2C2.

2. We must acquire sufficient quantities to provide units the capability to test aircraft for proper functioning of Mode 4 IFF.

### Leadership

#### Conclusions

1. The functional area of A2C2 does not enjoy widespread support of commanders in training priority. Due in part to confusion as to what all it entails, the A2C2 system merits more support by commanders at all levels to enhance training. What one officer described as the "1000 yard stare" when briefing his commander on details of airspace control measures must be replaced with informed interest. We can enhance our operational effectiveness through knowledgeable leadership and training.

### Recommendations

1. The education of the Army leadership must include an overview of the A2C2 system. The key is what the costs are for failure in this critical area of command and control. Integrate into the pre-command courses, CGSC and the advanced courses.

2. The BCTP offers an excellent opportunity to emphasize the A2C2 system in conjunction with other key issues concerning command and control.

### ENDNOTES

1. FM 1-100, p. 3-9.

APPENDIX I

The Survey Instrument (Questionnaire)

Leadership Questionnaire

Military Study Project

U.S. Army War College

Carlisle Barracks

1990

## OVERVIEW OF AVIATION COMMANDER SURVEY RESULTS

The following surveys were sent to commanders of 18 divisional aviation brigades, 5 corps aviation brigades, and 2 former brigade commanders. As of the cutoff date of 15 March 1990, the numbers of responses received were as follows; 18-division, 3-corps. Total respondents numbered 21 for a response rate of 84%.

Numerous comments were received that provided a well rounded response to a request for information. The specific comments are provided in Appendix 4.

The lack of liaison officers, inadequate communications equipment, and lack of guidance for the battalions and brigades were the areas of greatest concern. The brigade commanders had more negative appraisals of the ability of the A2C2 system to function in combat than any other group. 19 of 21 respondents indicated that the system probably or definitely would not provide for coordination in combat.

The commanders strongly supported simplification and standardization with joint and allied doctrine. 76% of the brigade commanders reported that the local airspace procedures did not resemble their go-to-war A2C2 procedures or only marginally so. The opinions expressed significant concern on the present ability of the system to operate effectively.

APPROVAL AUTHORITY: U.S.ARMY SOLDIER SUPPORT CENTER  
SURVEY CONTROL NUMBER: ATNC-A0-90-30A  
RCS: MILPC-3

SURVEY OF ARMY AIRSPACE COMMAND AND CONTROL (A2C2)  
BRIGADE COMMAND VERSION

S: 1 March 1990

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INSTRUCTIONS

Please answer the following questions using your current status. Feel free to include any additional comments you have. A self addressed, return envelope is provided for ease in returning the answer sheet. Circle the one best answer for each question.

---

1. What type Aviation Brigade do you command?

- (86%) A. Divisional.  
(14%) B. Corps.

2. The A2C2 doctrine contained in current manuals (FM 100-103 & FM 1-111) describing aviation requirements to operate in the A2C2 system:

- (67%) A. Provides insufficient guidance.  
(29%) B. Is about right.  
( 5%) C. Provides excessive guidance.

3. The number of personnel authorized in my brigade to perform the doctrinal A2C2 functions at my DIV/CORPS headquarters:

- (86%) A. Is less than adequate.  
(14%) B. Is about right.  
( 0%) C. Is more than adequate.

If changes are needed, please specify\_\_\_\_\_.

4. No additional personnel are authorized by TOE at other maneuver BDE or BN level units to perform A2C2 functions. As one of the primary users of the A2C2 system in those sectors, select the phrase you feel best describes conditions in combat.

- (33%) A. Conditions definitely will not permit A2C2 coordination.  
(57%) B. Conditions probably will not permit A2C2 coordination.  
(10%) C. Conditions probably will permit A2C2 coordination.  
( 0%) D. Conditions definitely will permit A2C2 coordination.

5. The present doctrinal system provides for timely coordination in a combined or joint environment:

- ( 0%) A. Almost always.
- (24%) B. Usually.
- (43%) C. Seldom.
- (24%) D. Almost never.

6. Is the DIV/CORPS you support equipped with the Maneuver Control System (MCS)?

- (43%) A. Not at all.
- (33%) B. Partially.
- (24%) C. Completely.

7. Have you had the opportunity to observe A2C2 operations with units equipped with MCS?

- (24%) A. Yes.
- (76%) B. No-----If no, go to QUESTION 11.

-----  
In your opinion, does MCS enhance A2C2 interface with...

	Responses shown in % below			
	Not at all	A little	Somewhat	A lot
8. other aviation units?	20%	20%	20%	40%
9. other A2C2 elements?	20%	20%	40%	20%
10. users of aviation?	20%	40%	20%	20%

-----  
11. Is the DIV/CORPS you support equipped with Mobile Subscriber Equipment (MSE)?

- (67%) A. Not at all.
- (19%) B. Partially.
- (14%) C. Completely

12. Have you had the opportunity to observe A2C2 operations with units equipped with MSE?

- (14%) A. Yes.
- (86%) B. No-----If no, go to QUESTION 16.

-----  
In your opinion, does MSE enhance A2C2 interface with:

	Responses shown in % below			
	Not at all	A little	Somewhat	A lot
13. other aviation units?	0%	0%	67%	33%
14. other A2C2 elements?	0%	0%	67%	33%
15. the users of aviation?	0%	0%	67%	33%

16. The equipment authorized in my organization to permit integration into the A2C2 system:

- (76%) A. Is less than adequate.  
(24%) B. Is about right.  
( 0%) C. Is more than adequate.

If you need additional equipment to interface with the A2C2 system, please indicate what capability you need. \_\_\_\_\_

17. How is collective training for ALL players in the A2C2 system conducted?

- ( 9%) A. During normal operational mission conduct.  
(62%) B. During FTX's and CPX's only.  
(29%) C. Rarely.

-----  
How well does the present A2C2 system in your DIV/CORPS provide for rapid changes in the tactical situation and subsequent hasty employment of each of the following?

		Responses shown in % below			
		Not well at all	A little	Somewhat	Very well
18.	Air Defense	48%	19%	24%	9%
19.	Aviation-General Support	19%	14%	48%	19%
20.	SEMA	25%	35%	40%	0%
21.	Deep Attack	20%	20%	45%	15%
22.	Fire Support	33%	33%	19%	14%
23.	Tactical Air	33%	19%	38%	9%

Note any of these areas that have presented a particularly challenging problem in A2C2: \_\_\_\_\_

-----  
Below is a list of procedural controls that might be employed in combat. Please review the list and indicate if the A2C2 procedural control is planned for use in your operational area.

	Yes	No	Unknown
24. Coordinating Altitude	90%	5%	5%
25. IFF Mode 4 operations	86%	9%	5%
26. Standard use Army aircraft flight routes	70%	25%	5%
27. Restricted operations zones	76%	14%	10%
28. High-density airspace control zones	33%	38%	29%
29. Low-level transit routes	86%	5%	9%

-----

How often do your aviators encounter the following procedural controls during training? Circle the letter under the APPROPRIATE column.

	Each Mission	FTX/ CPX's	Rarely
30. Coordinating Altitude	33%	57%	10%
31. IFF Mode 4 operations	33%	29%	38%
32. Standard use Army aircraft flight routes	24%	48%	29%
33. Restricted operations zones	30%	40%	30%
34. High-density airspace control zones	0%	38%	62%
35. Low-level transit routes	10%	52%	38%

36. Do your installation day to day airspace procedures replicate your go to war A2C2 procedures?

(14%) A. As close as possible.

(10%) B. Somewhat.

(43%) C. Marginally.

(33%) D. Not at all.

Indicate how much you agree or disagree with the following statements on Airspace Command & Control using the scale below.

Strongly Disagree A	Disagree B	Neutral C	Agree D	Strongly Agree E			
Responses shown in % below							
A	B	C	D	E			
37.	A2C2 terminology must be simplified.		0%	0%	14%	43%	43%
38.	A2C2 terminology must be standardized with our <u>JOINT DOCTRINE</u> .		0%	0%	0%	19%	81%
39.	Too many A2C2 terms for routes or corridors mean essentially the same thing.		0%	5%	24%	52%	19%
40.	Standardized terminology will enhance training.		0%	0%	5%	52%	43%
41.	Standardization of terms should also be accomplished with our Allies to enhance Combined Operations.		0%	0%	5%	38%	57%



### COMMENTS

Are there any other things you think we should know or include in our report on A2C2? Use the space below to comment on any aspect of this survey.

### OPTIONAL

If you would like a copy of the results mailed to you, please write your name and address below.

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THANK YOU FOR YOUR COOPERATION!

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APPENDIX II

The ATS Survey Instrument (Questionnaire)

ATS Leadership Questionnaire

Military Study Project

U.S. Army War College

Carlisle Barracks

1990

## OVERVIEW OF ATS COMMANDER SURVEY RESULTS

The following survey was sent to four active ATS battalion commanders and one company commander. Three of the five surveys were returned for a return rate of 60%. Even if all had been returned, the low number of potential respondents would have made any analysis suspect. The survey on the following pages does provide some insight of the strength of concerns in the areas of personnel, equipment, training and doctrine.

Personnel authorizations and fill seem to be a problem throughout. Secure communication capability and ability to communicate with aircraft operating in the terrain flight mode are also problems. The ability to train collectively and doctrinal voids are current distractors.

The greatest benefit from the ATS surveys were the comments provided on the forms. The ATS comments are provided in Appendix IV.

APPROVAL AUTHORITY: U.S. ARMY SOLDIER SUPPORT CENTER  
SURVEY CONTROL NUMBER: ATNC-AO-90-30A  
RCS: MILPC-3

SURVEY OF ARMY AIRSPACE COMMAND AND CONTROL (A2C2)  
ATS COMMAND VERSION

S: 1 March 1990

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INSTRUCTIONS

Please answer the following questions using your current status. Feel free to include any additional comments you have. A self addressed, return envelope is provided for ease in returning the answer sheet. Circle the one best answer for each question.

---

1. The A2C2 doctrine contained in current manuals (primarily FM 100-103) describing ATS requirements to operate in the A2C2 system:

(67%) A. Lacks sufficient guidance for the ATS mission.  
(33%) B. Is about right.  
( 0%) C. Provides excessive guidance for the ATS mission.

2. The present doctrinal system provides for timely coordination in a combined or joint environment:

( 0%) A. Almost always.  
(33%) B. Usually.  
(67%) C. Seldom.  
( 0%) D. Almost never.

3. The number of personnel authorized to perform the doctrinal ATS functions required in combat:

(100%) A. Is less than adequate.  
( 0%) B. Is about right.  
( 0%) C. Is more than adequate.

Indicate general shortfalls or overages: \_\_\_\_\_

---

4. The number of personnel assigned to perform ATS functions to meet the doctrinal A2C2 requirements in combat:

(100%) A. Is less than adequate.  
( 0%) B. Is about right.  
( 0%) C. Is more than adequate.

5. The equipment authorized in my organization to permit integration into the A2C2 system:

- (100%) A. Is less than adequate.  
( 0%) B. Is about right.  
( 0%) C. Is more than adequate.

6. Is the DIV/CORPS you support equipped with the Maneuver Control System (MCS)?

- (33%) A. Not at all.  
(67%) B. Partially.  
( 0%) C. Completely.

7. Have you had the opportunity to observe A2C2 operations with units equipped with MCS?

- ( 0%) A. Yes.  
(100%) B. No-----If no, go to QUESTION 11.

-----  
In your opinion, does MCS enhance A2C2 interface with...

	Not at all	A little	Somewhat	A lot
8. other ATS units?	A	B	C	D
9. the A2C2 elements?	A	B	C	D
10. users of ATS services?	A	B	C	D

-----

11. Is the DIV/CORPS you support equipped with Mobile Subscriber Equipment (MSE)?

- (67%) A. Not at all.  
(33%) B. Partially.  
( 0%) C. Completely

12. Have you had the opportunity to observe A2C2 operations with units equipped with MSE?

- (66%) A. Yes.  
(33%) B. No-----If no, go to QUESTION 16.

-----  
In your opinion, does MSE enhance A2C2 interface with:

	Not at all	A little	Somewhat	A lot
13. other ATS units?		100%		
14. the A2C2 elements?	100%			
15. users of ATS services?	100%			

Below is a list of equipment based capabilities. Consider what you feel it takes to carry out your ATS functions required in A2C2 doctrine (including the interim ATS operational concept). Does your current authorization provide the capability?

(Circle the letter under the appropriate column)

	Not well at all	A little	Somewhat	Very well
	A	B	C	D
16. Survivability.	33%	67%	0%	0%
17. Flexibility.	33%	67%	0%	0%
18. Interface with user's.	0%	67%	33%	0%
19. Ability to communicate with deep operations assets.	33%	67%	0%	0%
20. Secure communications throughout the combat zone.	0%	100%	0%	0%
21. Rapidly transmit changes to aircraft at NOE altitudes.	100%	0%	0%	0%
22. Rapidly transmit changes to units using ATS information.	33%	33%	33%	0%

If you need additional equipment to interface with the A2C2 system, please indicate what capability you need. \_\_\_\_\_

23. How is collective training for ALL players in the A2C2 system conducted?

- ( 0%) A. During normal operational mission conduct.  
 (67%) B. During FTX's and CPX's only.  
 (33%) C. Rarely.

How well does the present A2C2 system in your DIV/CORPS provide for rapid changes in the tactical situation and subsequent hasty employment of each of the following?

	Not well at all	A little	Somewhat	Very well
	A	B	C	D
24. Air Defense	33%	33%	33%	0%
25. Aviation-General Support	0%	67%	33%	0%
26. SEMA	33%	67%	0%	0%
27. Deep Attack	0%	100%	0%	0%
28. Fire Support	0%	67%	33%	0%
29. Tactical Air	33%	33%	33%	0%

Note any of these areas that have presented a particularly challenging problem in A2C2: \_\_\_\_\_

Below is a list of positive and procedural controls that might be employed in combat. Please review the list and indicate if the A2C2 controls are planned for use in your operational area.

(Circle the appropriate answer for each question)

	YES	NO	UNKNOWN
30. Tactical IMC terminal operations	67%	0%	33%
31. Tactical Aircraft Advisory service	100%	0%	0%
32. FOC/FCC operation	100%	0%	0%
33. IFF/SIF procedures implemented	100%	0%	0%
34. Coordinating Altitude used	67%	0%	33%
35. Tactical Navaid operation	67%	0%	33%
36. Air control order dissemination	100%	0%	0%
37. Standard use Army aircraft flight routes	33%	0%	67%
38. Restricted operations zones	67%	0%	33%
39. High-density airspace control zones	67%	0%	33%
40. Low-level transit routes	67%	0%	33%

How often do your Air Traffic Personnel encounter the following controls during training?

(Circle the letter under the appropriate column)

	Each Mission A	FTX/ CPX's B	Rarely C
41. Tactical IMC terminal operations	0%	33%	67%
42. Tactical Aircraft Advisory service	33%	67%	0%
43. FOC/FCC operation	33%	33%	33%
44. IFF/SIF procedures implemented	0%	33%	67%
45. Coordinating Altitude used	0%	67%	33%
46. Tactical Navaid operation	0%	33%	67%
47. Air control order dissemination	0%	100%	0%
48. Standard use Army aircraft flight routes	0%	67%	33%
49. Restricted operations zones	0%	33%	67%
50. High-density airspace control zones	0%	33%	67%
51. Low-level transit routes	0%	33%	67%

52. Do your installation day to day airspace procedures replicate your go to war A2C2 procedures?

- (50%) A. As close as possible.  
 (50%) B. Somewhat.  
 C. Marginally.  
 (50%) D. Not at all.

Indicate how much you agree or disagree with the following statements on Airspace Command & Control using the scale below.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A	B	C	D	E

(Circle the appropriate letter below)

	A	B	C	D	E
53. A2C2 terminology must be simplified.	0%	0%	33%	67%	0%
54. A2C2 terminology must be standardized with our <u>JOINT DOCTRINE</u> .	0%	0%	0%	67%	33%
55. Too many A2C2 terms for routes or corridors mean essentially the same thing.	0%	0%	33%	33%	33%
56. Standardized terminology will enhance training.	0%	0%	33%	0%	67%
57. Standardization of terms should also be accomplished with our Allies to enhance Combined Operations.	0%	0%	0%	67%	33%

=====

### COMMENTS

Are there any other things you think we should know or include in our report on A2C2? Use the space below to comment on any aspect of this survey.



OPTIONAL

If you would like a copy of the results mailed to you,  
please write your name and address below.

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THANK YOU FOR YOUR COOPERATION!

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APPENDIX III

The S3/G3 Air Survey Instrument (Questionnaire)

S3/G3 Air Questionnaire

Military Study Project

U.S. Army War College

Carlisle Barracks

1990

## OVERVIEW OF S3/G3 AIR SURVEY RESULTS

The following survey was sent to all active division and corps G3 Air staff officers. Selected brigade and battalion S3 staff officers were also requested to provide input. Because the survey covers a wide range of respondents, there are certain questions that require manipulation of the data to provide meaningful answers. The purpose of this portion is to provide percentages for each answer and to address any discrepancy of data presented in the percentage of responses shown.

Surveys were sent to 10 battalions, 10 brigades, 18 divisions, 5 corps, and two officers in positions that equate to echelons above corps. As of the cutoff date of 15 March 1990, the numbers of responses received were as follows; 6-battalion, 8-brigade, 13-division, 5-corps and 1-EAC. Two respondents did not specify the level of assignment. Total respondents numbered 35 for a response rate of 78%.

Questions 5-16 require separate analysis to be meaningful in terms of time in the position and time remaining in the position. Results are presented in the body of the study in Chapter IV. Also, the questions relating to ATS and aviation liaison officers "not assigned" rates should be disregarded in that none are authorized for placement at battalion level. Additionally, no ATS liaison officers are authorized at the brigade level.

APPROVAL AUTHORITY: U.S. ARMY SOLDIER SUPPORT CENTER  
SURVEY CONTROL NUMBER: ATNC-AO-90-30B  
RCS: MILPC-3

SURVEY OF ARMY AIRSPACE COMMAND AND CONTROL (A2C2)  
S3/G3 AIR VERSION

S: 1 March 1990

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INSTRUCTIONS

Please answer the following questions using information that reflects your current position and unit status. Feel free to include any handwritten comments you have. A self addressed, return envelope is provided for ease in returning the answer sheet. For each question, please circle the one best answer.

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1. Indicate the unit level at which you perform A2C2 duties.

- (18%) A. BN
- (24%) B. BDE
- (39%) C. DIV
- (15%) D. CORPS
- ( 3%) E. EAC

2. The A2C2 doctrine contained in current manuals (such as FM 100-103) describing requirements to operate in the A2C2 system:

- (37%) A. Provides insufficient guidance.
- (60%) B. Is about right
- ( 3%) C. Provides excessive guidance.

3. The present doctrinal system provides for timely coordination in a combined or joint environment:

- ( 6%) A. Almost always.
- (53%) B. Usually.
- (38%) C. Seldom.
- ( 3%) D. Almost never.

4. The number of personnel authorized to perform the doctrinal A2C2 functions at my headquarters:

- (46%) A. Is less than adequate.
- (48%) B. Is about right.
- ( 6%) C. Is more than adequate.

If changes are needed, please specify \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Indicate how long each of the following has been a member of your A2C2 element. If there is no officer in the position, mark N/A.

	Less than 3 mo. A	3-6 mo. B	7-9 mo. C	10-12 mo. D	More than 12 mo. E	
Responses shown in the appropriate category below						
	A	B	C	D	E	N/A
5. G/S-3 Air	9%	25%	19%	19%	22%	6%
6. Air Traffic Services Liaison	6%	0%	0%	6%	3%	84%
7. Air Defense Officer	38%	16%	16%	19%	13%	0%
8. Fire Support Officer	19%	25%	22%	6%	25%	3%
9. Air Liaison Officer	19%	16%	22%	9%	28%	6%
10. Aviation Officer	25%	12%	9%	16%	6%	31%

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In your opinion, how much longer will each member of the A2C2 element remain in the unit? If there is no officer in the position, mark N/A.

	Less than 3 mo. A	3-6 mo. B	7-9 mo. C	10-12 mo. D	More than 12 mo. E	
Responses shown in the appropriate category below						
	A	B	C	D	E	N/A
11. G/S-3 Air	38%	41%	6%	3%	6%	6%
12. Air Traffic Services Liaison	6%	3%	0%	9%	3%	78%
13. Air Defense Officer	31%	31%	9%	19%	9%	0%
14. Fire Support Officer	22%	38%	12%	19%	6%	3%
15. Air Liaison Officer	16%	31%	25%	16%	6%	6%
16. Aviation Officer	19%	25%	9%	9%	6%	31%

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17. No additional personnel are authorized by TOE at maneuver BDE or BN level units to perform A2C2 functions. As the primary coordinator of the A2C2 system with or in these units, select the phrase that best describes conditions in combat.

- ( 9%) A. Definitely will NOT permit A2C2 coordination.
- (28%) B. Probably will NOT permit A2C2 coordination.
- (56%) C. Probably will permit A2C2 coordination.
- ( 6%) D. Definitely will permit A2C2 coordination.

18. Is your headquarters equipped with Maneuver Control System (MCS)?

- (58%) A. Not at all.
- (23%) B. Partially.
- (19%) C. Completely.

19. Have you had the opportunity to observe A2C2 operations with units equipped with MCS?

(23%) A. Yes.  
(77%) B. No-----If no, go to QUESTION 24.

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In your opinion, how much does MCS enhance A2C2 interface with...

	Not at all	A little	Somewhat	A lot
20. higher headquarters?	86%	0%	0%	14%
21. lower headquarters?	37%	25%	13%	25%
22. adjacent units?	62%	13%	0%	25%
23. adjacent Hqs-TAC, Rear, etc?	50%	13%	37%	0%

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24. Is your headquarters equipped with Mobile Subscriber Equipment (MSE)?

(58%) A. Not at all  
(13%) B. Partially  
(37%) C. Completely

25. Have you had the opportunity to observe A2C2 operations with units equipped with MSE?

(29%) A. Yes.  
(71%) B. No-----If no, go to QUESTION 30.

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In your opinion, how much does MSE enhance A2C2 interface with...

	Not at all	A little	Somewhat	A lot
26. higher headquarters?	22%	33%	0%	44%
27. lower headquarters?	11%	33%	0%	56%
28. adjacent units?	0%	11%	44%	44%
29. adjacent Hqs-TAC, Rear?	22%	11%	0%	67%

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30. The equipment authorized in my organization to permit integration into the A2C2 system is:

(40%) A. Less than adequate.  
(60%) B. About right.  
( 0%) C. More than adequate.

If you need additional equipment to interface with the A2C2 system, please indicate: \_\_\_\_\_

31. In your experience, what percentage of the arriving officers are able to immediately operate effectively in A2C2?

- ( 0%) A. 80 - 100%
- ( 6%) B. 60 - 79%
- (13%) C. 40 - 59%
- (41%) D. 20 - 39%
- (41%) E. 0 - 19%

32. How is collective training for all players in the A2C2 system conducted?

- ( 3%) A. During daily mission execution.
- ( 0%) B. During specified training sessions WEEKLY.
- ( 7%) C. During specified training sessions MONTHLY.
- (84%) D. During FTX's and CPX's only.
- ( 6%) E. Never been conducted.

33. How important is specialized A2C2 training for proper staff functioning?

- (31%) A. Very Important.
- (38%) B. Important.
- (19%) C. Somewhat Important.
- (12%) D. Not Important.

34. What is the best method to individually qualify an officer in A2C2?

- (30%) A. Formalized on-the-job training.
- ( 3%) B. Self-development/self-study
- ( 9%) C. At a TRADOC school.
- (33%) D. At AGOS Joint Firepower Control Course
- (24%) E. Other (specify) other AGOS courses, combinations: a&d  
Typical answers inserted above.

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Who should be required to go for specialized A2C2 training?  
(Circle "Yes" or "No" for each item)

	YES	NO
35. G/S-3 Air	91%	9%
36. Air Traffic Services Liaison	71%	29%
37. Air Defense Officer	87%	13%
38. Fire Support Officer	73%	27%
39. Air Liaison Officer	88%	12%
40. Aviation Officer	90%	10%

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How well does the present A2C2 system in your unit provide for rapid changes in the tactical situation and subsequent hasty employment of each of the following:

(Circle the letter under the appropriate column)

Responses shown in the appropriate category below

	Not well at all	A little	Somewhat	Very well
41. Air Defense	9%	16%	41%	34%
42. Aviation-General Support	12%	16%	38%	34%
43. Attack Helicopters	6%	6%	44%	44%
44. Fire Support	0%	12%	47%	41%
45. Tactical Air - CAS	6%	12%	50%	31%
46. Air Interdiction	29%	6%	52%	13%

If any one of these areas has presented a particularly challenging problem in A2C2, please comment. \_\_\_\_\_

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Below is a list of procedural controls or functions that might be employed in combat. Indicate if the A2C2 procedural control is planned for use in your operational area. Circle your answers.

	YES	NO	UNKNOWN
47. Coordinating altitude	82%	9%	9%
48. IFF on/off lines	75%	19%	6%
49. Standard use Army aircraft flight routes	94%	3%	3%
50. Restricted operations zones	85%	6%	9%
51. High-density airspace control zones	52%	24%	24%
52. Low-level transit routes (LLTR)	76%	9%	15%
53. Receive an Air Control Order	58%	18%	24%
54. Disseminate an Air Control Order	58%	18%	24%
55. Deconflict LLTR and fire support	79%	9%	12%

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How often does your A2C2 element actually practice with the following procedural controls.

(Circle the letter under the appropriate column)

	Daily	FTX/ CPX's	Rarely
56. Coordinating altitude	0%	78%	22%
57. IFF on/off lines	0%	66%	34%
58. Standard use Army aircraft flight routes	3%	82%	15%
59. Restricted operations zones	3%	70%	27%
60. High-density airspace control zones	0%	46%	54%
61. Low-level transit routes (LLTR)	0%	73%	27%
62. Receive an Air Control Order	0%	49%	51%
63. Disseminate an Air Control Order	0%	51%	49%
64. Deconflict LLTR and fire support	3%	58%	39%



65. To what extent do your peacetime CPX/FTX A2C2 procedures replicate your Go-to-War A2C2 procedures?

- (58%) A. As close as possible.  
 (30%) B. Somewhat.  
 (12%) C. Marginally.  
 ( 0%) D. Not at all.

=====

Indicate how much you agree or disagree with the following statements using the scale below.

(Circle the appropriate letter for each question)

Strongly Disagree A	Disagree B	Neutral C	Agree D	Strongly Agree E	
ANSWERS IN PERCENT					
A	B	C	D	E	
66.	A2C2 terminology must be simplified.			6	12 30 39 12
67.	A2C2 terminology must be standardized with our <u>JOINT DOCTRINE</u> .			6	0 3 39 51
68.	Too many A2C2 terms for routes or corridors mean essentially the same thing.			0	21 21 46 12
69.	Standardized terminology will enhance training.			6	0 18 46 30
70.	Standardization of terms should also be accomplished with our Allies to enhance Combined Operations.			3	0 12 36 48

### COMMENTS

Are there any other things you think we should know or include in our report on A2C2? Use the space below to comment on any aspect of this survey.

### OPTIONAL

If you would like a copy of the results mailed to you,  
please write your name and address below.

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THANK YOU FOR YOUR COOPERATION!

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APPENDIX IV  
The Survey Instrument Comments

Respondent Comments  
Military Study Project  
U.S. Army War College  
Carlisle Barracks

1990

## Respondent Comments

The following pages provide a summation of all comments from all surveys. The comments were included for insight into the depth of feeling on problem areas, recommended solutions and simply because they are informative.

The comments are given in the following order; Aviation Brigade Commanders, ATS Commanders, G3 Air, S3. Each category is further divided into personnel, training, doctrine, equipment and leadership as appropriate.

Some comments were very close or exactly the same. These comments are not repeated. Instead, the comment is followed by and X and a number to indicate how often the comment was provided.

## BRIGADE COMMANDER SURVEY COMMENTS

### Personnel

"I currently eat "out of hide" an LNO w/driver, radio, etc., in order to provide LNO's for the three maneuver brigades. Also have extra reps in the DTAC--all in an effort to pull A2C2 together."

"I need more people for the Corps Aviation Brigade to support A2C2. Only two people are authorized."

"We need two officers authorized in order to provide a 24 hour capability at the A2C2 cell at the Division Main. We also need an ATS NCO at the AVN Bde to assist in coordination of low-level transit routes, minimum risk routes, restricted operating areas, TAC beacon locations, etc."

"The authorization to perform A2C2 is inadequate. We need a 4 man cell to work at Div A2C2 and also at the three maneuver brigades."

"The manpower allocation must be increased to allow 24-hour operational capability." X 3

"Ground maneuver Bde A2C2 function now performed by Avn LNO provided out-of-hide from Avn Bde. At risk is the ability to fill cockpits."

"The numbers tell it all--no 24 hour a day capability--only two LNO's. The Avn Bde is incapable of command and control without augmentation and right now these folks come from subordinate BN's and Companies."

"AOE TOE's are short personnel in virtually every specialty--especially in the HQS."

"I don't have enough personnel to run my operations now, much less support A2C2 at Division."

"A2C2 team goes to division during CPX/FTX leaving NO Bde planners and no 24 hour capability at either division or brigade. Then the team works in task overload trying to accomplish the mission."

"A2C2 gets overcome by events."

"Corps Bde is not staffed for the A2C2 mission--Need a minimum of 4, preferably 6 people. All should be school trained-AGOS Battle Staff Officers Crs. We presently have to supplement with ATS Personnel to accomplish A2C2 functions."

"A2C2 Avn cell needs two officers and two NCO's, & no lower enlisted. Experience and knowledge base required @ div with ability to operate around the clock."

## Training

"The training of all players could be done daily if wartime A2C2 procedures were practiced in conjunction with installation airspace management."

"We don't train like we fight. Reason- the system is too complicated. Witness NTC/JRTC. But I'm like so many others in that I have no brilliant ideas that pose a quick (even slow) fix."

"We have no Army training program."

## Doctrine

"The doctrine does not provide adequate A2C2 guidance for the brigade or battalion S-3 Air regarding "how to" in developing A2C2 control measures, or graphics; suggest a FC be developed for the A2C2 cells."

"Our toughest coordination problem is the station block time and positioning of our EH-60 aircraft."

"The doctrine is confusing, disjointed and unrealistic."

"The system is broke!"

"In 1972 a Corps Commander said "We've got to get a handle on this airspace problem for helicopters/artillery/ADA, etc." Guess what...20 years have passed & we still don't have a handle. It's in the too hard to do box...Enormous \$ required to buy the technology...Otherwise it's still a stubby pencil world for A2C2."

"The people and equipment are not available to do the doctrine."

"A2C2 Doctrine for the set-piece, high intensity battlefield is fairly clear. There is little or no doctrine for A2C2 during contingency opns or low intensity conflict."

"A2C2 manuals do not adequately address procedures from Bde rear boundary forward. Although procedural control is exercised thru use of tactical control measures, some people clearly do not understand and expect to see some more stringent control exercised."

"Experience at JRTC with rigid enforcement of FM 100-103 and an excellent ATC platoon shows that it can work."

"The NTC proves over and over again that the system probably won't provide for timely coordination in joint operations."

"The doctrine is ok, but needs to be more specific in areas of responsibility--who does what and who controls."

"From Doctrine; School house; ATS Bn Cdr; ATC Plt Ldr; A2C2 officer--None of them can layout the concept or best use of ATS units to help the Divisional Aviation Brigade Cdr control or manage airspace--Where do they fit??"

"Both FM 100-103 and FM 1-111 need to be in greater detail for division level and below. Also, the 71-series need to be aligned with FM 100-103."

"ADA--difficult to get the word to each stinger team--word gets to Bn & Co--then confusion. Sometimes in excess of 6-8 hours to get to everyone. Too long!"

"The ground rules are not clear--we lack definition of who is responsible for actions, etc."

"Doctrine needs to be more specific for standard implementation."

"It is my very strong opinion that A2C2 as we now describe it in our doctrine will be of minimal use in future combat. Deconfliction will be done by coordinated procedures rather than using radio. Some risk will have to be accepted. Related to this issue we would benefit greatly by converting ATS spaces to Pathfinder Qualified personnel."

#### Equipment

"We need dedicated MSE for A2C2 interface from division to brigade; FAX machine to dispatch updated graphics of A2C2 control measures, TAC beacons, etc."

"More radios of any type are needed. Great help would be UHF/VHF and HF." "The Div Aslt CP needs UHF/VHF in addition to FM."

"Avn Bde's are short radios- Bde rear because of no FSB--is not tied to Div rear w/comms--MSE appears to have same problem because doctrine does not recognize as a HQ--We must stop being a stepchild."

"In the Corps Brigade, no equipment for A2C2 is authorized...None...Zero!"

"Long range, non LOS, secure comms capability suitable for hardcopy transmissions is needed to accomplish the mission."

"MCS--is too slow, cumbersome and is not user friendly. The Cav Sqdn should have it."

"MSE--is a good system, mostly reliable. Outstanding for Log and Intell--little use for the conduct of the battle."

"We need a long range commo system that functions at terrain masking altitudes."

"The aviation brigade needs a link into the TACP, TACFIRE, and ADA early warning."

"We need portable UHF/VHF radios."

"We need a system that can integrate w/Army Group & Corps MSC's to communicate graphics. Dissemination of information is a problem."

"Actual shortage of radios is immediate impact now. Overall we need a better commo capability; higher reliability/some redundancy."

"A2C2 section needs a vehicle with at least 2 secure FM's. The A2C2 section and the Bde Hqs require TACSAT to spt long range ops."

Bde/Bn TOC's need UHF/VHF radios. Bde TOC's need two 5 ton expando vans w/4 radios each to command and control aviation assets."

### Leadership

"In the past two years, airspace management has been nonexistent in planning at DIV and BDE level. Our A2C2 system is given "lip service" only."

"A2C2 requires commanders who understand and give support at the senior level."



## ATS COMMANDER COMMENTS

### Personnel

"ATS LNO personnel should be increased to ensure that an ATS LNO at all the following: CRC, Corps, Divisions, BCE."

"We lack the personnel to operate the Corps Airspace element...Also, the lack of trained A2C2 personnel at the brigades is a factor."

"S3 sections under AOE TOE are weak and do not provide for sufficient ATS LNO's to corps/divisions."

### Training

"A2C2 is generally given lip-service because A: Commander's don't understand it; B: there's no good mechanism to replicate the true magnitude of battlefield airspace clutter that will exist and therefore emphasize the need to deconflict all users. Until commanders at the Corps and Division level are given reason to be concerned about A2C2, it will not get emphasis."

"We get zero play from EAC for most operations. The lack of personnel for the airspace management elements really hurts training."

"Collective training for ALL players is key. Some organizations do not know what all is much less have a good concept what A2C2 is at the operational or planning level. G3 Airs at all levels are weak at planning or implementing A2C2."

## Doctrine

"ATS doctrine is currently being written. We should have draft doctrine by April 90."

"The problem is not only terminology, but also application of basic control principals as an integral part of operational planning at corps, division and brigade levels. In essence no one has the A2C2 picture or "bubble" because there are several bubbles or pictures depending on theater of opns, level of command, and joint force structure. What is a "common thread" however is the basic principals and the necessity for proper equipment and education to implement them at the operational level."

"The doctrinal mission is still focused on the high threat environment. Consequently, there are insufficient assets-personnel and equipment to perform the stated missions for an entire corps. However the fact is the doctrine calls for missions we will not execute on a large scale."

## Equipment

"We need the capability to interface with the Div A2C2 cell and Aviation Brigade. Also need the capability to communicate with aircraft at NOE altitudes."

"We need reliable radios that operate secure, in NOE, are man portable, with a directional capability. Must be consistent with the aircraft and units we serve."

"MSE and GPS are a must for effective ATS contribution to A2C2 effort. Real time capability for perishable info from CRC-FOC-FCC reference the ATO/ACO is an absolute necessity."

"Lack of aviation section in AOE TOE leaves no organic flightcheck capability of enroute facilities, Nav aids, or terminal facilities."

## G-3 AIR SURVEY COMMENTS

### Personnel

"Manning of the ADA and ALO sections are adequate. The G-3 Air and Aviation positions are not adequate for quality operations."

"The focus of A2C2 needs to be improved. Positions within the A2C2 element are historically short term fills. Positions should be for a specified length and schooling should be a prerequisite, otherwise the officer spends several months scrambling to understand A2C2 procedures and terms. Mentality of "you're not going to be in the position long enough to justify schooling" needs to be changed."

"The unique responsibilities of the airborne division requires an additional Asst G-3 Air and a senior NCO."

"An additional aviation officer is required for that cell to perform 24 hour operations." X2

"The expectation from the division command group is that there will be representation in both the D-Main and the D-Tac. This requires the Avn Bde to provide additional personnel."

"There should be a MOS for Airspace Management NCO."

"I'm a one man show; I've had no officers arrive in the A2C2 cell and I'm leaving with no replacement."

### Equipment

"We need more reliable equipment to interface with Corps and Bde."

"Timely, rapid communications is the most important element in A2C2 system. Questionable whether this system would work in a theater combat scenario (it is not responsive to hasty actions). Decentralize local airspace control measures to lowest possible levels."

"We need a way to automate procedures (ie routes, etc.) and ways to integrate helicopter routes."

"Standardized CP will help--G3 Air at corps is authorized nothing with which to operate in the field."

## Training

"To adequately practice A2C2 during CPX/FTX, assistance must be received from higher HQS--Airspace Control Orders, for instance. This only happens at very high visibility training events. For this to improve, the Army focus must change."

"Mechanism for training immediate deconfliction needs to be developed for ADA, Fire Support, CAS, and Army Aviation."

"Coordinating the Army assets is difficult when the A2C2 slots are not filled."

"A2C2 appears to be well understood in ADA, FA, AVN and USAF. Much less well understood in maneuver elements at Bde and below."

"FM 100-103 deals with deconflicting the airspace users--one of the choices is to "accept the risk." In combat, this decision will be made frequently. In training, we for obvious reasons can't accept the same degree of risk that we will have to in combat. So--we must acknowledge the differences in an effort for soldiers to clearly understand that when dealing w/airspace and its users--we don't train the way we will fight."

"No training event that I have seen replicates the airspace users that we will see in a high intensity conflict! Commanders are therefore unaware of the impact airspace will have on their opns. We tend to be much too restrictive in CPX's (ie, BCTP, REFORGER). We look at airspace as a way to reduce fratricide rather than a way to increase combat effectiveness."

"We have no good way to coordinate airspace to separate Fire Support from aircraft---no training---done by magic in CPX/FTX's."

"During REFORGER 90, the limitations of current A2C2 doctrine versus execution became evident. Our division trains to fight under \_\_\_\_ Corps, but was deployed to fight under \_\_\_\_ Corps and \_\_\_\_ ATAF. The differences in A2C2 execution just between Northag and Centag were difficult to assimilate and train for, not to mention Allied (FRG) units with no A2C2 element or joint doctrine. With little command emphasis on A2C2, it was not considered as important with correspondingly poor results. We were fortunate that this was not actual combat."

"Bosses don't know A2C2. Aviators in general don't know A2C2."

"Training of senior officers is a must. It is very difficult to educate Armor Colonels about A2C2 while they are fighting a battle. Train them before they reach senior grades."

## Doctrine

"There are many documents concerning A2C2, all of which provide little in terms of how to do it! We have developed a method in our division that works well, and is tailored to accommodate the ever changing tactical situation. A "how to" document that is standardized throughout the Army would benefit all. It is necessary to understand what A2C2 is. However, it is much more important to know how to create a system that is workable at all levels down to Battalion."

"Notification to USAF and higher HQS of Lance and MLRS firings prior to execution has been particularly challenging."

"Integration of single helicopters is a problem. Coordination for Attack Helicopters needs automation to keep up. Over the horizon commo is required. Current commo is insufficient."

"Corps and Div TOE's must spell out personnel and equipment. We are too lean or not existent."

"Fluid battlefield and lengthy planning time requirements for BAI tend to hinder operations."

"We need a manual that tells us "how to do it" not "what it is"."

"The TOE designation of G3 Air should be as "special staff" like Div Chem Officer, Asst Div Engr, etc. In other words, get the G3 Air out of the grasps of the G3 training shops."

"Totally impossible to prevent fratricide/hazards to flight when Atk Hel assets are diverted to stop a penetration (Hasty Attack)."

"A flight route is a flight route to the ground commander. I always get a "1000 yard stare" the moment I launch into a briefing filled with A2C2 terminology. The command group doesn't really care to hear a bunch of Aviation "mumbo jumbo" when all they really want to know is that they can fly somewhere safely."

"G3 Air's should have a manual which tells them how to deconflict airspace. I cracked the code on how to do it. Using air check points published in the CONPLAN Annex, the aviation brigade simply relays the ACP #'s in and out for their mission. I connect the dots and overlay the appropriate graphics for ADA, hazards, Fire support, ALO, Chem hazards, all of which are in my van. The route is approved or an alternate is recommended to the aviation bde. The info is then passed thru their LNO's. For a hasty mission, I call units affected and simply state the ACP's that will be used in their area and "turn off" hazards. Good Luck Army wide!"

## S-3 SURVEY COMMENTS

### Personnel

"The A2C2 coordination can occur only if the lift Bn provides a 4 man cell to operate in the Bde TOC."

"We need an intelligent ALO who has a habitual relationship with my battalion....not someone who hides behind Regs and doesn't get his mission accomplished."

"24 hour operation is difficult at best. Having said this, every position in the BDE TOC is a problem in this regard. Force structure is not sufficient to cover all jobs on a 24 hour basis."

"We need more aviation folks at Bde Hqs."

### Training

"Our problem is a training issue. Aviators & USAF do not consider it until real bullets fly. For LFX operations at \_\_\_\_\_ and at JRTC and EDRE with live artillery, aviation and air followed procedures exactly. During FTX's, they tend to slip and have to be reminded to follow the procedures."

"Mortars are sometimes left out of consideration with inexperienced Aviation and FSO planners."

"A2C2 is a low priority in our training focus."

"There is a problem of unequal education within the combined arms team."

"Officer turnover rates are too great to ensure proper training and use. Not enough training incorporates all players and systems simultaneously. JRTC preparation and conduct was the first and only time this battalion incorporated all systems."

## Doctrine

"Because we work so little with Naval Gunfire, this is an area of concern. The Navy and USMC do not understand our Army A2C2 system and always want to impose their system."

"Each Bde in an Air Assault Division operates with an Atk BN, a UH-60 lift Bn, a CH-47 Bn, and a UH-1H for command and control. We operate primarily by procedural communication and visual control means. Where we encounter great difficulty is when operating with Naval/USMC forces who want to use positive control and have the equipment they feel to make it work. However, they are not used to having 200+ sorties of Army Air in one Bde AO. This totally unhinges their system and they want to fall back on not allowing missions to fly based on tactical requirements."

"Doctrine does not address A2C2 below division level--we've had to develop our own system."

"Our doctrine may need to be refocused away from Europe."

"When will the Army and Air Force deconflict the possibility of an A-10 or F-15 from flying into the firing sector of a group of Attack Helicopters or vice versa?"

"Coordination w/assets not attached at the time that planning is taking place is the usual problem. Our Army Air LNO never has any authority. He is only a message passer."

"From a light division perspective, the main thing is to match A2C2 to the threat. Too many doctrinal pubs deal with WWII revisited with massive coordination. In Panama it was all done by USAF- we just monitored. In my 3 years experience in G-3/S-3 jobs, it has only been done at division level and not below. It is part of JAAT coordination at BDE/BN. There is some confusion on MGMT of a full up battlefield with LLTR's, etc...But I've never seen enough aircraft to really create any problems- even in Panama when we had AC-130's, A-37's, A-7's and AH-1's in the same target area. USAF has experts and they handle it."

"The problem with doctrine is that there is insufficient guidance that is helpful, and too much that is not helpful."

"I believe we underestimate the problem of controlling friendly Air Defense---ie; fratricide."

"We are doing a much better job than 10 years ago---still need to simplify."

"Unknown what the Bn level joint/combined doctrine is; have 0 exposure to FM 100-103 (88 CGSC grad)."

### Equipment

"We need a AN-VRC 113 for the BDE TOC to coordinate A2C2."

"In Panama, we were OK because we were using USAF radio suite. Anywhere else, we'd need more HF/UHF/VHF."

"We need systems to easily interface with aircraft in the absence of the ALO."

"Our MCS equipment does not work."

"We need an upgraded comms system. FM is not enough for combined operations. Ground force must be able to communicate more effectively with air assets."



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