Chapter One

INTRODUCTION

COMBAT SUPPORT COMMAND AND CONTROL AS A COMPONENT OF AGILE COMBAT SUPPORT

During the past decade, the United States military has supported continuous deployments of forces around the world, often on very short notice and for prolonged duration, to meet the needs of a wide range of peacekeeping and humanitarian missions or major contingency operations. These deployments have come from a smaller force based closer to home. The pattern of varied and fast-breaking regional crises appears to be the model for the foreseeable future and has prompted the United States to reassess how it prepares, maintains, and employs its military forces.[1] In response to this operating environment, the Air Force has reorganized into an Aerospace Expeditionary Force (AEF).[2] In the AEF concept, the Air Force presents forces in multiple, self-contained packages that are equipped to provide integrated, sustained force anywhere in the world on very short notice. A major premise of the AEF concept is that forces that are primarily stationed in the Continental United States (CONUS) can be tailored rapidly, deployed quickly, employed immediately, and sustained indefinitely as a viable alternative to a permanent forward presence. This premise, however, reduces the margin for error and places an increased emphasis on combat support. Although the form and structure of the AEF continues to evolve, it is clear this concept will play a central role in the future U.S. Air Force.

These AEF global force projection goals present significant challenges to the current combat support (CS) system,[3] and the importance of command and control (C2) has been identified as a key component of the AEF Agile Combat Support (ACS) system

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[1]Donald Rumsfeld, *Defense Strategy Review*, June 21, 2001; and Donald Rumsfeld, *Guidance and Terms of Reference for the 2001 Quadrennial Defense Review,* June 22, 2001.

[2]M. Ryan, "Air Expeditionary Forces," DoD press briefing, 1998. When first introduced, the term EAF was used to describe the concept of employing Air Force forces rapidly, anywhere in the world, in predefined force packages called AEFs. The terms have since evolved and the Air Force now uses the term AEF to describe both the concept and force packages. Whereas previous RAND reports in the Supporting Expeditionary Aerospace Forces series refer to EAFs, we now use the term AEF to maintain consistency with Air Force usage.

[3]Throughout this report, we use the word system in the general sense to mean a combination of facts, principles, methods, processes, and the like. We use the expression information system to refer specifically to a product designed to manage data.

that needs attention.[4] This report presents concepts for guiding the development of a CS execution planning and control operational architecture for the Aerospace Expeditionary Force. Within the Department of Defense (DoD), an operational architecture is a description of tasks, operational elements, and information flows required to accomplish or support a DoD function or military operation. It describes the operational elements, assigned tasks and activities, and information flows required to support the warfighter. It defines the types of information exchanged, the frequency of exchange, which tasks and activities are supported by the information exchanges, and the nature of information exchanges in sufficient detail to ascertain specific interoperability requirements.[5] For our study, we used these definitions, applied to Air Force CS activities, to identify and describe the processes involved in execution planning and control, at each echelon and across each phase of operations.[6]

OBJECTIVES OF CS EXECUTION PLANNING AND CONTROL

Joint and Air Force doctrine defines command and control as the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission.[7] It includes the battlespace management process of planning, directing, coordinating, and controlling forces and operations. Command and control involves the integration of the systems, procedures, organizational structures, personnel, equipment, facilities, information, and communications that enable a commander to exercise C2 across the range of military operations.[8] We expand on this definition of C2, typically applied to battlespace management, and address the functions of planning, directing, coordinating, and controlling CS resources to meet operational objectives. In a narrow sense, this definition, because it deals with battlespace management, includes C2 functions with respect to the operational and tactical levels of warfare.[9]

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[4]Research at RAND has focused on defining the vision and evaluating options for an ACS system that can meet AEF operational goals. See Galway et al., *Supporting Expeditionary Aerospace Forces: New Agile Combat Support Postures*, RAND, MR-1075-AF, 2000. Additional research has identified the importance of CSC2 within the AEF ACS system. See Tripp et al., *Supporting Expeditionary Aerospace Forces: An Integrated Strategic Agile Combat Support Planning Framework*, RAND, MR-1056-AF, 1999.

[5]Department of Defense, *C4ISR Framework Document Version 2.0*, December 18, 1997. The command, control, communications, and computing intelligence, surveillance, and reconnaissance (C4ISR) framework is intended to ensure that the architectures developed by geographic and functional unified commands, military services, and defense agencies interrelate between and among the organizations' operational, systems, and technical architecture views, and are comparable and integrated across joint-service and multinational organizational boundaries.

[6]Rather than view the results of this study as a combat support command and control (CSC2) operational architecture, which would promote the concept of a stovepiped, non-integrated architecture, we address CS execution planning and control processes in the context of the larger Air Force C2 architecture.

[7]Joint Pub 1-02, *DoD Dictionary of Military and Associated Terms,* April 12, 2001.

[8]U.S. Air Force, *Air Force Basic Doctrine*, Air Force Doctrine Document 1 (AFDD-1), September 1, 1997.

[9]Although our work in this report deals primarily with the operational and tactical levels of warfare, we take a wider view and believe that the CS execution planning and control definition includes the strategic level as well, e.g., over the Program Objective Memorandum (POM) process where CS plans need to be assessed, monitored, and controlled. Some may argue that planning is not part of the functions of CS, but we define it to include this function, which is consistent with AFDD-1.

AEF operational needs provide further insights for CSC2 requirements, as shown in Table 1.1. Rapidly tailoring force packages requires that the system begin to generate support requirements based on desired operational effects alone. Combat support planners must coordinate closely with operators to estimate suitable force packages before such decisions are finalized. Early generation of CS requirements will contribute substantially to Course of Action (COA) assessment, focusing efforts on feasible COAs early in the planning process.

Rapid deployment requires that the C2 for combat support system provide force beddown plans and assessments quickly. Again, assessments must begin before plans are finalized, and therefore the capabilities and status of all potentially relevant airfields must be available. In addition, the status of in-theater resources must be continuously updated and effectively communicated to facilitate rapid Time Phased Force and Deployment Data (TPFDD) development.

Quick employment and subsequent sustainment require that theater and global distribution, maintenance, and supply operations be rapidly configured and expanded, and that global prioritization and allocation of combat support resources be rapidly shifted to the area of interest. Effectively allocating scarce resources requires that the system monitor resources in all theaters and prioritize and allocate resources in accordance with global readiness.

Finally, the system needs to be self-monitoring during execution and able to adjust to changes in either CS performance or operational objectives.

Table 1.1

CSC2 Functionality Required to Meet AEF Operational Goals

AEF Operational Need	CSC2 Requirement
Rapidly tailor force packages to achieve desired operational effects	Estimate CS requirements for suitable force package options; assess feasibility of alternative operational and support plans
	Identify and preplan potential operating locations
Deploy rapidly	Determine FOL[a] beddown capabilities for force packages and facilitate rapid TPFDD development
Employ quickly	Configure distribution network rapidly to meet employment timelines and resupply needs
Shift to sustainment smoothly	Execute resupply plans and monitor performance
Allocate scarce resources to where they are needed most	Determine impacts of allocating scarce resources to various combatant commanders and prioritize allocations to users
Adapt to changes quickly	Indicate when CS performance deviates from desired state and facilitate development and implementation of get-well plans

[a]FOL = Forward Operating Location.

PROBLEMS REVEALED

The need for this level of CSC2 functionality, as well as further insights into the needs of the CSC2 system, was revealed in Air Force operations [Operation Noble Anvil (ONA)] in the Air War Over Serbia (AWOS). The lessons from and shortcomings in the present system in ONA provide useful insights for AEF CSC2 needs. The major lessons and corresponding CSC2 requirements are summarized in Table 1.2. Initial analysis of Operation Enduring Freedom (OEF) and Operation Noble Eagle (ONE) revealed many of the same shortcomings.

The transition to wartime CS operations in ONA was difficult, partly because of a departure from doctrine that shifted command from the Numbered Air Force (NAF) to the Major Command (MAJCOM) during operations. Although there were several reasons for this action,[10] shifting organizational responsibilities during conflict created problems, including attempting to use organizational relationships that did not exist day to day, delays in developing communications paths, and using people who may not have been trained for wartime jobs. These problems may have arisen even if the NAF had supported ONA because of the staff augmentation necessary to make the current doctrinal organization effective.[11] There is a need for standing (permanent) CS organizations to provide operational continuity and seamless transition through the spectrum of operations from peacetime to major theater warfare. The transition

Table 1.2

CSC2 Requirements Revealed by Lessons from Operation Noble Anvil

ONA Lesson	CSC2 Requirement
Slow and difficult transition from peacetime to wartime operations	Identify permanent organizations that will perform critical CS tasks continuously during peace and war
	Expand Air Force involvement in theater distribution system planning and execution
Poor interface between operations and CSC2	Include CS input in initial planning
	Translate CS information into operations capability
Inability to react quickly to changes in the operational plans	Provide real-time visibility of theater and global resources
	Rapidly reconfigure CS infrastructure
Insufficient and inadequate CSC2 policy/procedures, systems, training, and education	Develop and formalize doctrine/policy, systems, and training programs

[10]Feinberg et al., *Supporting Expeditionary Aerospace Forces: Lessons From the Air War Over Serbia,* RAND, MR-1263-AF, 2002.

[11]Hanser et al., *The Warfighting Capacity of Air Combat Command's Numbered Air Forces,* RAND, DB-297-AF, 2000.

was also hindered by confusion over responsibility for theater distribution management, leading to an ineffective theater distribution system.[12] Rapid configuration of both theater and global distribution systems is essential to meet AEF operational deployment and employment goals, further highlighting the need for these responsibilities to be clearly delineated between the services or for the Air Force to maintain the skills to develop and configure such a system.

In AWOS, the limited ability and opportunity for interaction between the CS and operations planners led to plans being developed with minimal CS input, resulting in excessive revamping and slow progress.[13] Limited communications links between operations planners and CS planners hindered interaction. The single CS person responsible for interaction in the operational planning group did not have a full depth of CS experience, information system links, or decision support tools to help facilitate interaction. This lack highlights the importance of formalized procedures for including CS factors in operational planning and execution and relating CS capabilities in operational terms.

The CS system was slow to react to changes in the air campaign.[14] It was slow to reconfigure the CS support infrastructure (to redirect materiel, adjust maintenance priorities, and alter distribution routes and modes) partly because personnel were inexperienced in these wartime functions. According to doctrine, the NAF was to exercise these responsibilities. MAJCOM personnel taking on these functions were not trained in many of them. Also, the Air Force took on some functions, such as planning the theater distribution system, that it may not have trained personnel for, assuming that the Joint Command would have the wartime responsibility.

Finally, ONA demonstrated that existing policies, procedures, and information systems are inadequate and that education and training are insufficient.[15] While good people compensated for these shortfalls, the deficiencies did result in additional time to determine what should be done. We emphasize the importance of defining the role of CS execution planning and control and of incorporating those activities into training and education.

In summary, the CS execution planning and control system must be able to continuously monitor CS resource levels and translate them into operational metrics; evaluate the resources needed to achieve operational goals, assess the feasibility of support options, and help to develop alternative plans; rapidly reconfigure the CS infrastructure to meet specific contingency scenario needs; employ commodity and process control metrics and process monitoring to regulate support processes; and adjust support activities during execution to optimize warfighter support.

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[12] Feinberg et al., 2002.

[13] Feinberg et al., 2002.

[14] Feinberg et al., 2002.

[15] Feinberg et al., 2002.

DEVELOPING AN OPERATIONAL ARCHITECTURE FOR CS EXECUTION PLANNING AND CONTROL

Our objectives were to define and analyze the current (*AS-IS*) architecture, identify changes needed, and present concepts for a future (*TO-BE*) architecture for the Air Force to use as a point of departure. A CS execution planning and control operational architecture should concentrate on the decisions by Air Force CS organizations and the information flows supporting these decisions over the phases of operations. In this analysis, we focus on sortie production, base support, and decisions made by each organization during all phases[16] of operations.

Based on our analysis of the *AS-IS* and *TO-BE* architectures, we identify the shortfalls in the *AS-IS* system and the changes required to achieve the functionality of the *TO-BE* system. We highlight the roadblocks in meeting AEF operational goals. We then present concepts for guiding the development of the *TO-BE* CS process, including an example of how the CS execution planning and control system would operate in a small-scale conflict. After discussing the existing shortfalls and modifications proposed in doctrine and policy, organizations, training and education, and tools and systems to move to the *TO-BE*, we summarize our findings, recommendations, and steps needed to implement the architecture.

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[16] Air Force and joint-service publications refer to phases of operations differently. For our analysis, we have used readiness, deployment, employment, sustainment, redeployment, and reconstitution to describe the phases.