AN
OPERATIONAL
ARCHITECTURE
FOR
COMBAT
SUPPORT
EXECUTION
PLANNING
AND CONTROL

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Prepared for the United States Air Force

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This report presents concepts for guiding development of an Air Force combat support (CS) execution planning and control operational architecture that meets the needs of the Expeditionary Aerospace Force (EAF). These concepts incorporate evolving practices; information from interviews with Air Force personnel; lessons from the Air War Over Serbia (AWOS), Operation Enduring Freedom (OEF), Operation Noble Eagle (ONE); and results of the authors' analysis of the current architecture for command and control of CS.

During the last few years, RAND has been defining the elements of a future Agile Combat Support (ACS) system that could help achieve AEF operational goals. The AEF operational goals are to

- Select and tailor force packages quickly to meet operational scenarios
- Deploy large and small force packages quickly
- Employ immediately with the capability to lay down firepower
- Shift smoothly to sustainment operations
- Deal quickly with changes to the campaign
- Allocate scarce resources to where they are needed most.

These goals place significant demands on the CS system, which must

- Estimate support requirements for alternative force packages, assess their feasibility, and propose alternative operational and support plans
- Estimate operational capabilities of beddown facilities and other combat support resources
- Configure the distribution network to meet employment and resupply needs
- Execute support plans and monitor support and operational performance
- Assess the effects of resource allocation options and prioritize allocations to users
- Signal when plans are out of control and support get-well analyses.
This study is one of a series of RAND publications that address ACS issues in implementing the EAF. Other reports in the series include the following:

- **Supporting Expeditionary Aerospace Forces: An Integrated Strategic Agile Combat Support Planning Framework**, Robert S. Tripp et al. (MR-1056-AF). This report describes an integrated ACS planning framework that can be used to evaluate support options on a continuing basis, particularly as technology, force structure, and threats change.

- **Supporting Expeditionary Aerospace Forces: New Agile Combat Support Postures**, Lionel Galway et al. (MR-1075-AF). This report describes how alternative resourcing of forward operating locations (FOLs) can support employment time lines for future AEF operations. It finds that rapid employment for combat requires some prepositioning of resources at FOLs.

- **Supporting Expeditionary Aerospace Forces: An Analysis of F-15 Avionics Options**, Eric Peltz et al. (MR-1174-AF). This report examines alternatives for meeting F-15 avionics maintenance requirements across a range of likely scenarios. The authors evaluate investments for new F-15 avionics intermediate-maintenance ship test equipment against several support options, including deploying maintenance capabilities with units, performing maintenance at forward support locations (FSLs), and performing all maintenance at the home station for deployment units.

- **Supporting Expeditionary Aerospace Forces: A Concept for Evolving the Agile Combat Support/Mobility System of the Future**, Robert S. Tripp et al. (MR-1179-AF). This report describes the vision for the ACS system of the future based on individual commodity study results.

- **Supporting Expeditionary Aerospace Forces: Expanded Analysis of LANTIRN Options**, Amatzia Feinberg et al. (MR-1225-AF). This report examines alternatives for meeting Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) support requirements for AEF operations. The authors evaluate investments for new LANTIRN test equipment against several support options, including deploying maintenance capabilities with units, performing maintenance at FSLs, and performing all maintenance at continental United States (CONUS) support hubs for deploying units.

- **Supporting Expeditionary Aerospace Forces: Lessons From the Air War Over Serbia**, Amatzia Feinberg et al. (MR-1263-AF). This report describes how the Air Force’s ad hoc implementation of many elements of an expeditionary ACS structure to support the air war over Serbia offered opportunities to assess how well these elements actually support combat operations and what the results imply for the configuration of the Air Force ACS structure. The findings support the efficacy of the emerging expeditionary ACS structural framework and the associated but still-evolving Air Force support strategies.

- **Supporting Expeditionary Aerospace Forces: Alternatives for Jet Engine Intermediate Maintenance**, Mahyar A. Amouzegar et al. (MR-1431-AF). This report documents work on alternative concepts for Jet Engine Intermediate
Maintenance (JEIM) to determine whether peacetime and wartime jet engine maintenance is better performed by JEIM shops located with the aircraft or by organizations operating in a centralized facility.

- Supporting Expeditionary Aerospace Forces: Forward Support Location Options, Tom LaTourrette et al. (MR-1497-AF). This report assesses location options for intermediate-level maintenance of fighter aircraft. It identifies feasible sites that meet operational requirements for potential expeditionary operations and derives estimates of the investment and operating requirements and costs needed to implement a forward support location system. Candidate locations must be able to supply forward operating locations, have low wartime vulnerability, and be accessible for future U.S. use. (Limited distribution; not for public release.)

The research in this report was conducted in the Resource Management Program of Project AIR FORCE and was sponsored by the Air Force Deputy Chief of Staff for Installations and Logistics (AF/IL).

PROJECT AIR FORCE

Project AIR FORCE, a division of RAND, is the Air Force federally funded research and development center (FFRDC) for studies and analysis. It provides the Air Force with independent analyses of policy alternatives affecting the development, employment, combat readiness, and support of current and future aerospace forces. Research is performed in four programs: Aerospace Force Development; Manpower, Personnel, and Training; Resource Management; and Strategy and Doctrine.
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INTRODUCTION AND MOTIVATION

To be able to execute the full spectrum of aerospace operations, the United States Air Force has transitioned to an Aerospace Expeditionary Force (AEF).\(^1\) Much of the discussion about the AEF concept has focused on changes in the way the Air Force is organized and provides forces to joint-service force commanders. The AEF construct concerns rapidly deploying, employing, and sustaining aerospace power around the globe, from a force structure that is predominantly located within the Continental United States (CONUS). These AEF global force projection goals present significant challenges to the current combat support (CS) structure. The AEF’s requirement to respond quickly means that force and support packages must be tailored quickly to meet the operational needs of the specific contingency. The deployment and sustainment of CS resources must be coordinated to arrive at forward operating locations (FOLs) so that initial and sustained operations can take place without interruption. Most of the resources needed to support operations (munitions, housekeeping, and so forth) are not part of the deploying units. Scarce resources must be allocated to units with the highest priorities, often from different regions of the world. Thus, initiating and sustaining AEF operations require planning and control of a global network of CS resources from organic and industrial sources.\(^2\)

AGILE COMBAT SUPPORT COMMAND AND CONTROL

This report presents concepts for guiding the development of a CS command and control operational architecture for the Aerospace Expeditionary Force. The concepts were developed from an analysis of AEF doctrinal changes, evolving

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\(^1\)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.

\(^2\)Previous RAND analyses offer recommendations for such an infrastructure, which would include forward operating locations from which missions would be flown and forward support locations/CONUS support locations for regional repair and storage facilities, a transportation system for distribution, and a combat support command and control system. See Tripp et al., *Supporting Expeditionary Aerospace Forces: A Concept for Evolving the Agile Combat Support/Mobility System of the Future*, RAND, MR-1179, 2000.
practices, Joint Universal Lessons Learned (JULLs) from exercises and experimentation, information from Air Force personnel, lessons from the Air War Over Serbia (AWOS), preliminary analysis of Operation Enduring Freedom (OEF) and Operation Noble Eagle (ONE), and results of our analysis of the current CS Command and Control (C2) operational architecture.

DEFINING CS EXECUTION PLANNING AND CONTROL AND OPERATIONAL ARCHITECTURE

Joint-service and Air Force doctrine defines C2 as the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Specifically, C2 includes the battlespace management processes of planning, directing, coordinating, and controlling forces and operations. It requires the integration of the systems, procedures, organizational structures, personnel, equipment, facilities, information, and communications that enable a commander to exercise command and control across the range of military operations. 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. We build on this definition of C2 and define CS execution planning and control to include the functions of planning, directing, coordinating, and controlling CS resources to meet operational objectives. An operational architecture, by definition, describes the tasks, operational elements, and information flows required to accomplish or support a Department of Defense (DoD) function or military operation. 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. For our study, we use these definitions, applied to Air Force CS activities, to identify and describe the processes involved in CS execution planning and control at each echelon and across each phase of operation.

Our study defines and analyzes the current doctrinal CSC2 (AS-IS) architecture, identifies changes needed in the AS-IS architecture to realize AEF operational goals.

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5Although our work here primarily discusses the operational and tactical levels of warfare, we believe that the CS execution planning and control definition includes the strategic level as well—e.g., over the Program Objective Memorandum (POM) process in which CS plans are assessed, monitored, and controlled.
6Department of Defense, CAISR Framework Document Version 2.0, December 18, 1997. The command, control, communications, computers, intelligence, surveillance, and reconnaissance (CAISR) 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.
7Rather 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.
and correct deficiencies identified during recent contingencies, and sets forth concepts in some detail for the future (TO-BE) architecture.

**CSC2 AS-IS SHORTFALLS AND RECOMMENDATIONS TO MEET THE TO-BE ARCHITECTURE**

Our analysis of the Air Force’s CS execution planning and control process revealed important shortfalls in the AS-IS architecture. These shortfalls can be grouped into four categories:

- Poor integration of CS input into operational planning
- Absence of feedback loops and the ability to reconfigure the CS infrastructure dynamically
- Poor coordination of CS activities with the joint-service community
- Absence of resource allocation/prioritization mechanisms across competing theaters.

We propose a TO-BE CS execution planning and control architecture system that would enable the Air Force to meet its AEF operational goals. The architecture would enable the CS community to quickly estimate support requirements for force package options and assess the feasibility of operational and support plans. The architecture would permit quick determination of beddown needs and capabilities, facilitate rapid Time Phased Force and Deployment Data (TPFDD) development, and support development and configuration of a theater distribution network to meet Air Force employment timelines and resupply needs. The TO-BE architecture would facilitate development of resupply plans and monitor performance, determine impacts of allocating scarce resources to various combatant commanders, indicate when CS performance deviates from desired states, and facilitate the development and implementation of “get-well” plans.

Finally, this report offers recommendations to help the Air Force CS community move from the current architecture to the future concept we describe. We recommend:

- Summarizing and clarifying Air Force CS doctrine and policy. The objectives and functions of execution planning and control must be recognized and codified in doctrine. The functions of concurrent development of plans among operators and CS personnel, assessment of plan feasibility, use of feedback loops to monitor CS performance against plans, and development of get-well planning need to be articulated and better understood.

- Creating standing CS organizations to conduct execution planning and control. The Air Force has supported one contingency after another for the last decade. Standing (permanent) organizations are needed to conduct CS functions and reduce turbulence and problems associated with the transition from supporting one contingency to reshaping support processes to meet the needs of another contingency.
• Training operations and CS personnel on each other’s C2 roles. Understanding each other’s responsibilities and methods can facilitate incorporation of both aspects into operational plans.

• Fielding appropriate information system and decision support tools to translate CS resource levels and processes into operational capabilities or effects. This will improve understanding of CS constraints or value for an operational planning option.

CONCLUSION

The strategic and operational environment and the AEF concept that addresses it present significant challenges to the current CS structure. To meet AEF stated objectives, the CS community is reexamining its current support system. Correcting deficiencies in CS execution planning and control as identified in this report is integral to the success of this effort.
Numerous persons inside and outside of the Air Force assisted and supported our work. We thank Lieutenant General Michael Zettler, Deputy Chief of Staff, Installations and Logistics (AF/IL), for sponsoring this effort. General Zettler also sponsored some of our earlier research on the Aerospace Expeditionary Force. At the Air Staff, we are especially grateful to Sue O’Neal (AF/ILX) and Grover Dunn (AF/ILM). They took a personal interest in the project and participated in frequent update briefings to provide senior leader guidance in developing the study. We also thank Brigadier General Robert Mansfield (AF/ILI), Brigadier General Theresa Peterson (AF/ILT), Brigadier General Patrick Burns (ACC/CE), Brigadier General Robert Elder (CENTAF/CV), and their staffs for their support and critique of this work.

We are also extremely grateful to the many individuals who contributed their time and knowledge during our visits to Air Force installations and organizations. We wish to thank the many people at Air Combat Command; Pacific Air Forces; United States Pacific Command; Central Command Air Forces; United States Air Forces Europe; the Aerospace Command, Control, Intelligence, Surveillance and Reconnaissance Center; the Joint Staff; and others who have helped us with this work. The individuals contributing their time to these interviews are listed in Appendix A.

Our research has been a team effort with the Air Force Logistics Management Agency (AFLMA), whose support has been critical to our work. We wish especially to thank Colonel Ronne Mercer (AFLMA/CC) and Lieutenant Colonel Mark McConnell (AFLMA/LGM) for their support.

Finally, we wish to thank our Air Staff project officer, Colonel Connie Morrow (AF/ILXS), for her encouragement and support. We also thank Mr. Dick Olsen (AF/ILXX) for his continuous support and exchange of ideas. At RAND, Robert Kerchner and Kenneth Evers made key contributions to the research reported here. Sally Sleeper and Eric Peltz provided critiques that improved the report. Special thanks to Gina Sandberg and Jeanne Heller for working many hours on preparing iterations of this document that led to the publishing of this report. Special thanks to Sandra Wade-Grusky for preparing the HTML flowchart and database.
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JFC  Joint Forces Command
JIPTL  Joint Integrated Prioritized Target List
JMC  Joint Movement Center
JTF  Joint Task Force
LRC  Logistics Readiness Center
LRU  Line Replaceable Unit
LS  Logistics Support
MAAP  Master Air Attack Plan
MAJCOM  Major Command
MOE  Measure of Effectiveness
MTW  Major Theater War
NAF  Numbered Air Force
OEF  Operation Enduring Freedom
OJT  On-the-Job Training
ONE  Operation Noble Eagle
OPLAN  Operations Plan
OPT  Operations Planning Team
OSC  Operations Support Center
PACAF  Pacific Air Forces
POL  Petroleum, Oils, and Lubricants
POM  Program Objective Memorandum
RAT  Redeployment Assistance Team
RSP  Readiness Spares Package
RSS  Regional Supply Squadron
SORTS  Status of Resources and Training Systems
SOS  Source of Supply
SRU  Shop Replaceable Unit
TACC  Theater Airlift Control Center
TDS  Theater Distribution System
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