supporting expeditionary aerospace forces

An Operational Architecture for Combat Support Execution Planning and Control

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PREFACE

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:

- S*upporting 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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SUMMARY

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

[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.[3] 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.[4] 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.[5] 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.[6] 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.[7]

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

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

[5]Although 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.

[6]Department of Defense, *C4ISR Framework Document Version 2.0*, December 18, 1997. The command, control, communications, computers, 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.

[7]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.

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.

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ACRONYMS

ACC	Air Combat Command
ACO	Airspace Control Order
ACS	Agile Combat Support
AC2ISRC	Aerospace Command and Control, Intelligence, Surveillance, and Reconnaissance Center
AEF	Aerospace Expeditionary Force
AF/IL	Hq USAF Installations and Logistics
AFFOR	Air Force Forces
AFLMA	Air Force Logistics Management Agency
AFMC	Air Force Materiel Command
AFTTP	Air Force Tactics, Techniques, and Procedures
AGE	Aerospace Ground Equipment
AIS	Avionics Intermediate Shop
ALC	Air Logistics Center
AMD	Air Mobility Division
AMOCC	Air Mobility Control Center
AOC	Air Operations Center
AOR	Area of Responsibility
AOS	Air Operations Squadron
ATO	Air Tasking Order
AWOS	Air War Over Serbia
CAP	Crisis Action Planning

CAT	Crisis Action Team
CE	Civil Engineering
CIRF	Centralized Intermediate Repair Facility
COA	Course of Action
CONOP	Concept of Operations
CONUS	Continental United States
CRC	Contingency Response Cell
CS	Combat Support
CSC2	Combat Support Command and Control
CSL	CONUS Support Location
C2	Command and Control
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
DIRMOBFOR	Director Mobility Forces
DSOE	Deployment Schedule of Events
EAF	Expeditionary Aerospace Force
FLOW	Focused Logistics Wargame
FMC	Fully Mission Capable
FMSE	Fuel Mobility Support Equipment
FOL	Forward Operating Location
FSL	Forward Support Location
GAMSS	Global Air Mobility Support System
GIC	Global Integration Center
ICP	Inventory Control Point
IS	Installation Support
JAC2C	Joint Aerospace C2 Course
JAOP	Joint Air Operations Plan
JEIM	Jet Engine Intermediate Maintenance
JFACC	Joint Forces Air Component Commander

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

TPFDD	Time Phased Force and Deployment Data
USAFE	United States Air Forces Europe
USTRANSCOM	U.S. Transportation Command
UTASC	USAFE Theater Air Support Center
UTC	Unit Type Code
WRM	War Reserve Materiel