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Assessment of the Air Force Materiel Command Reorganization

Report for Congress

Don Snyder, Bernard Fox, Kristin F. Lynch, Raymond E. Conley,
John A. Ausink, Laura Werber, William Shelton, Sarah A. Nowak,
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Preface

In fiscal year (FY) 2012, the Air Force Materiel Command (AFMC) reorganized from a 12-center construct to a 5-center construct. The reorganization was driven by Department of Defense (DoD) mandated cuts in civilian manpower levels to respond to the Budget Control Act of 2011 (Public Law 112-25) and was one part of much larger Air Force budget cuts. AFMC restructured its organization more around missions than locations and trimmed staff and overhead administrative positions rather than line positions. In FY 2012, Congress required a review of the reorganization and recommendations for alternative organizational structures, focused on the effects of the reorganization on life-cycle management of weapon systems. A response was completed and submitted in 2012.¹ Subsequently, Congress raised additional concerns about the reorganization in Section 2814 of the FY 2013 National Defense Authorization Act (NDAA) (Public Law 112-339), which is reproduced in full in the appendix. The purpose of this report is to present an assessment of the FY 2012 reorganization of AFMC to respond to the congressional reporting requirements in Section 2814 of the FY 2013 NDAA.

The work was sponsored by the Deputy Assistant Secretary for Acquisition Integration, Office of the Assistant Secretary of the Air Force for Acquisition, on behalf of the Secretary of Defense. The work was executed in the Resource Management Program of RAND Project AIR FORCE as part of the FY 2013 research project “Assessment of the Reorganization of Air Force Materiel Command Organizations.”

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¹ Robert S. Tripp, Kristin F. Lynch, Daniel M. Romano, William Shelton, John A. Ausink, Chelsea Kaihoi Duran, Robert G. DeFeo, David W. George, Raymond E. Conley, Bernard Fox, and Jerry M. Sollinger, *Air Force Materiel Command Reorganization Analysis: Final Report*, Santa Monica, Calif.: RAND Corporation, MG-1219-AF, 2012.

Contents

Preface.....	iii
Figures.....	vii
Tables.....	ix
Summary.....	xi
Acknowledgments.....	xvii
Abbreviations.....	xix
1. Introduction and Context of the AFMC Reorganization	1
Introduction and Purpose of This Report.....	1
Background to the Reorganization.....	2
Structure of This Report.....	6
2. The AFMC Reorganization.....	7
Introduction.....	7
Analytic Approach and Data Sources	7
AFMC Structure Before and After the Reorganization	8
Realignment of Functions and Changes in Reporting Lines	11
Realignment of Organizations to the New Air Force Test Center.....	11
Realignment of Organizations to the New Air Force Life Cycle Management Center.....	12
Realignment of Organizations to the New Air Force Sustainment Center.....	13
Manpower Changes Resulting from Various Initiatives.....	17
The Movement of Personnel and Manpower Positions Among Organizations	18
The Movement of Manpower Authorizations Among Locations.....	19
Summary	21
3. Methodology for Assessing the Effectiveness and Efficiency of the Reorganization.....	23
The Role of Organization in Determining Effectiveness and Efficiency	23
Organizational Design	24
Five Major Elements of Organizational Design for Assessing the Reorganization	25
Division of Labor: Unit Grouping	25
Design of Formal Reporting Relationships	27
Design of Additional Coordinating Mechanism: Standardization.....	29
Design of Additional Coordinating Mechanism: Centralization of Decision Rights	30
Design of Additional Coordinating Mechanism: Lateral Linkages.....	31
Other Considerations	32
Methodology Used in the Assessment of the AFMC Reorganization.....	33
4. Assessing the Effectiveness and Efficiency of the Reorganization	35
Assessing the Changes to Organizational Design.....	36

Division of Labor.....	36
Formal Reporting Relationships	38
Standardization	39
Centralization of Decision Rights.....	40
Lateral Linkages	41
Mitigating the Challenges	42
Realignment of Program Offices to AFLCMC from the ALCs	42
Separation of the 96 TW and the Armament Directorate	44
Placement of the Office of the PEO for Strategic Systems in AFLCMC.....	47
Exploiting the Opportunities.....	48
Process Standardization	49
Policy Rationalization.....	50
Resource Allocation.....	51
Single Face to Customer for AFMC Missions	52
Unified Culture for Each Mission Area	53
Overall Assessment and Summary	53
5. Institutional Synergies and the Test and Evaluation Mission.....	55
The Role of Test and Evaluation in Acquisition.....	55
Developmental Test and Evaluation	56
Operational Test and Evaluation	57
Test and Evaluation Working-Level Integrated Product Teams	58
Major Air Force Test Locations.....	59
Arnold Air Force Base.....	59
Edwards Air Force Base	59
Eglin Air Force Base	59
Interfaces and Synergies	60
Test and Evaluation Enterprise	60
Test and Evaluation Customers	61
Test and Evaluation Oversight.....	62
Assessment.....	63
6. Adherence with 10 U.S.C. Section 2687	67
7. Coordination with the Office of the Secretary of Defense	69
Appendix: Section 2814 of the FY 2013 National Defense Authorization Act	71
References.....	73

Figures

Figure 1.1. Active Duty and Civilian Personnel by Air Force MAJCOM	3
Figure 1.2. Air Force RMD 703A2 Reductions.....	4
Figure 2.1. AFMC’s Baseline Organizational Structure Prior to October 1, 2012.....	9
Figure 2.2. AFMC’s New 5-Center Structure as of October 1, 2012	10
Figure 2.3. Realignment of Organizations to AFTC.....	11
Figure 2.4. Realignment of Organizations to AFLCMC	12
Figure 2.5. AFLCMC PEO Chain of Command	14
Figure 2.6. Realignment of Organizations to AFSC.....	15
Figure 2.7. AFSC Organizations Introduced for Improved Communications.....	16
Figure 2.8. Manpower Positions Eliminated by Occupational Classification	18
Figure 2.9. Transition of Personnel Authorizations from the 12-Center Organization to the 5-Center Organization	20
Figure 3.1. Schematic Depiction of the Methodology for Assessing Effectiveness and Efficiency	33
Figure 4.1. Command Relationships at Eglin Air Force Base Under the 12-Center and 5-Center Constructs.....	46
Figure 5.1. Integration of Acquisition and Test and Evaluation Activities	56
Figure 5.2. Principal Air Force Science and Technology; Acquisition/Life-Cycle Management; DT&E; and OT&E Units at Eglin Before and After the Reorganization and Their Reporting Lines.....	64

Tables

Table 2.1. Manpower Functional Categories.....	19
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Summary

In FY 2012, the Air Force Materiel Command (AFMC) reorganized as one of a number of initiatives to achieve mandated budget reductions. Congress required an assessment of this reorganization in the Fiscal Year (FY) 2013 National Defense Authorization Act (NDAA) and a report to Congress. That report must assess the following five elements: (1) the effectiveness and efficiency of the reorganization; (2) the extent to which synergies due to collocation among developmental test and evaluation (DT&E), science and technology (S&T), and acquisition can be replicated in the new organization; (3) the reorganization's impact on other commands' ability to meet their responsibilities for operational test and evaluation (OT&E) and follow-on test and evaluation (FOT&E); (4) whether the reorganization is in adherence with 10 U.S. Code (U.S.C.) Section 2687; and (5) the extent to which the Air Force coordinated the reorganization with the Office of the Secretary of Defense (OSD) and if any concerns raised by OSD were addressed. This report fulfills these reporting requirements.

The AFMC Reorganization

The most significant attributes of the reorganization are:

1. The number of centers directly reporting to the AFMC commander was reduced from 12 to 5. Three new centers were created that consolidate the missions of sustainment (Air Force Sustainment Center [AFSC]), life-cycle management (Air Force Life Cycle Management Center [AFLCMC]), and test (Air Force Test Center [AFTC]). Although reporting lines changed, no missions or functions moved locations. The Air Force Nuclear Weapons Center (AFNWC) and the Air Force Research Laboratory (AFRL) were not affected.
2. By reducing staff and overhead positions in going from 12 to 5 centers, 1,051 civilian manpower positions were cut, yielding an approximate annual savings of \$109 million in FY 2011 dollars.¹ According to AFMC, none of these were via involuntary reduction in force notices. No individuals lost their jobs or were forced to move as a result of the reorganization. Any persons who moved location did so voluntarily. All personnel reductions were achieved with voluntary early retirement authority (VERA) or voluntary separation incentive payment (VSIP).
3. Base operating support reporting lines were rearranged. Air base wings at Hill, Tinker, and Robins no longer report to an Air Logistics Center at those locations but directly to the AFSC commander. The new Air Logistics Complexes are the former maintenance wings at those locations and the Air Logistics Complex commanders have a smaller span of control. Air base wings at Edwards and Eglin are blended with the test wings at those locations, and those test wing commanders have a larger span of control. The air base

¹ Tripp et al., Table 3.4, 2012, p. 22.

wing at Wright-Patterson and the air base group at Hanscom report directly to the AFLCMC commander.

4. Program managers now have product support oversight within their organizations and Designated Acquisition Officials are eliminated.² Program offices beyond the procurement phase will move location to the associated Air Logistics Complex after the procurement phase ends if the system is dominantly sustained organically, as was the practice before the reorganization, but these program offices will remain assigned to the AFLCMC.
5. The office for the organize, train, and equip functions of the Program Executive Officer (PEO) for Strategic Systems now resides in AFLCMC.
6. Although a PEO restructuring occurred concurrently with the AFMC reorganization and was implemented with the reorganization, no changes occurred in the PEO reporting chain to the Service Acquisition Executive.

In the next sections, we address each of the elements of the FY 2013 NDAA.

Element 1

Overall, we assess that the FY 2012 reorganization of AFMC created numerous opportunities for increasing effectiveness and efficiency. By eliminating 1,051 civilian manpower positions from staff and administrative overhead positions while retaining line positions, the command achieves an annual savings of \$109 million in FY 2011 dollars. To the extent that AFMC can continue to perform its missions as or more effectively than before the reorganization, this annual savings yields more efficient operations.

In assessing the effectiveness and efficiency of the reorganization, we note that (1) organization is just one component of doctrine, organization, training, materiel, leadership and education, personnel, and facilities, together with policy (DOTMLPF-P) that contributes to effectiveness and efficiency; (2) many of the benefits and possible problems associated with the reorganization will take a much longer time frame to come to full fruition; and (3) factors outside AFMC's control, such as budgetary constraints, also contribute. Despite these challenges, by using relatively established principles from organizational theory, it is possible to assess (1) the opportunities and challenges for effectiveness and efficiency created by the structural changes of the reorganization; (2) the extent to which these align with stated assigned missions and stated goals and priorities; and (3) the extent to which the Air Force has exploited the opportunities and mitigated the challenges.

We compared the key elements that changed during the reorganization in terms of organizational design. In these terms, we assess that the creation of centers that are mission

² Designated Acquisition Officials (DAOs) were individuals, acting in lieu of Program Executive Officers (PEOs), who were "dedicated to executive management at Air Logistics Centers of delegated ACAT II or ACAT III programs expending investment dollars." DAOs were chartered by and were accountable to the Service Acquisition Executive. Air Force Instruction 63-101, *Acquisition and Sustainment Life Cycle Management*, Washington, D.C., April 17, 2009, Incorporating Through Change 3, October 26, 2010, p. 209.

aligned, the design of formal reporting relationships, standardization, centralization of decision rights, and placement of the seams in the organization all facilitate the overall missions assigned to AFMC and are consistent with Air Force and OSD goals and priorities.

More seams were removed by the reorganization than were introduced. We identified three new seams of concern: (1) between the Air Logistics Complexes and the product support-focused program offices that resided in the Air Logistics Centers before the reorganization; (2) between the 96th Test Wing (96 TW) and the Armament Directorate at Eglin; and (3) between the Office of the PEO for Strategic Systems and the AFNWC. AFMC has put safeguards in place in the form of horizontal integration mechanisms roughly in proportion to the severity of each seam. It is too soon to know with confidence how effective each of these will be, but there are opportunities to continuously monitor the status and revisit the mitigations as needed.

AFMC is continuing to exploit the opportunities enabled by the reorganization. We group these efforts into five categories: process standardization, policy rationalization, better resource allocation, having a single face to the customer for the major AFMC missions, and providing a unified culture for major AFMC mission areas. These numerous initiatives span all centers and headquarters staff and are either early in their implementation or in the process of being implemented. AFMC directs that all endure as continuous process improvement. Headquarters AFMC and each center are developing metrics to track mission performance.

Elements 2 and 3

The reorganization did not relocate any test and evaluation (T&E) functions or activities. Hence, no synergies were altered due to collocation among (1) S&T, acquisition, and test; or (2) between DT&E and OT&E, either within AFMC or with other commands.

The two changes to the Air Force T&E community were (1) to merge the base support and test wings at Edwards and Eglin; and (2) to place all three test units in AFMC (96 TW, 412 TW, and Arnold Engineering Development Complex) under a center dedicated to DT&E (AFTC). By doing so, the reorganization eliminated the common center at Eglin to which the test wing for weapons and the armament directorate reported. Only the second change has potential to affect synergies between S&T, acquisition, and test.

Mitigations are in place to bridge the seam between the weapons (armament) acquisition and test missions in the form of monthly meetings of the Air Armament Enterprise Forum and quarterly meetings of Science and Engineering Resource Council. Issues could arise, but it is too early in this reorganization to see many impacts. Nevertheless, we did not observe any synergies that existed prior to the reorganization between acquisition and test that we assess cannot be replicated under the new organizational construct. As all S&T activities remain under AFRL and were not affected by the reorganization, no synergies that existed before the reorganization between S&T and either acquisition or test have been altered. Any synergies between S&T and the test and acquisition communities that existed prior to the reorganization did so with the S&T

area reporting to a separate chain of command than the test and acquisition communities. Because of the ability to transfer civilians with weapons expertise among S&T, test, and acquisition, and the benefits of proximity (especially for classified discussions), key stakeholders at Eglin attribute synergies there more to collocation than to reporting chain commonality.

No organizational design changes from the reorganization are expected to affect the other major commands' (MAJCOMs') abilities to carry out their OT&E or FOT&E responsibilities. The synergies between OT&E (53 Wing [WG]) and DT&E (96 TW) at Eglin are due to collocation, which enable some sharing of resources, and has not been changed by the reorganization. We also examined any implications of the reorganization on other MAJCOMs' abilities to carry out their OT&E or FOT&E responsibilities. We contacted the commander of the Air Force Operational Test and Evaluation Center, the commander of the U.S. Air Force Warfare Center, and the 53 WG that performs OT&E. None had seen any issues emerging from the AFMC reorganization that would impact their abilities to perform their test responsibilities and did not foresee any issues. We also contacted the commander or vice commander of Air Combat Command, Air Mobility Command, Air Education and Training Command, and Air Force Special Operations Command. We asked each whether the FY 2012 AFMC reorganization has caused any impacts on their command's abilities to carry out OT&E and follow-on OT&E missions. If there have been no noticeable impacts, we asked that they indicate that observation. If some issues have arisen, positive or negative, we asked them to document those and any communication that they had with AFMC regarding any concerns. Each responded in the June–July 2013 time frame that no impacts have been observed that were caused by the reorganization.

Element 4

At RAND's request, the office of the Air Force General Counsel assesses that:

The AFMC reorganization is in adherence with Section 2687. The reorganization is complex, and it reduces staff and restructures reporting chains, but such actions do not trigger the statute. Rather, the significant facts from a legal perspective are that the number of installations will not be reduced and civilian personnel positions will not be relocated. Accordingly, none of the actions to be taken constitute a base closure or a base realignment as defined by the law, and none of the statute's procedural requirements respecting closures and realignments are required to be accomplished.

Element 5

The services have the right and responsibility to organize. Under some circumstances, coordination with OSD is needed. Actions that cause a significant change to the T&E capability of a Major Range and Test Facilities Base (MRTFB) must be approved by the director of the

Test Resource Management Center (TRMC).³ And, since the Defense Acquisition Executive has statutory responsibilities for the defense acquisition workforce,⁴ continued lines of communication between the SAE and the Under Secretary of Defense for Acquisition, Technology, and Logistics are vital to managing the acquisition workforce.

In the case of the FY 2012 reorganization of AFMC, no changes were made that affect the T&E capabilities of an MRTFB.

The Air Force shared its plans for the FY 2012 AFMC reorganization with both the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD(AT&L)] and TRMC prior to the announcement on November 2, 2011. We found no evidence that any substantive concerns were raised by OSD.

³ DoDI 3200.18, 2010.

⁴ 10 U.S.C. Section 1702.

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That we received help and insights from those acknowledged above should not be taken to imply that they concur with the views expressed in this report. We alone are responsible for the content, to include any errors or oversights.

Abbreviations

AAC	Air Armament Center
ABG	Air Base Group
ABW	Air Base Wing
AEDC	Arnold Engineering Development Center; Arnold Engineering Development Complex
AESG	Aeronautical Systems Group
AFCEC	Air Force Civil Engineering Center
AFFTC	Air Force Flight Test Center
AFI	Air Force Instruction
AFGLSC	Air Force Global Logistics Support Center
AFLCMC	Air Force Life Cycle Management Center
AFMC	Air Force Materiel Command
AFNWC	Air Force Nuclear Weapons Center
AFOTEC	Air Force Operational Test and Evaluation Center
AFRL	Air Force Research Laboratory
AFSAC	Air Force Security Assistance Center; Air Force Security Assistance and Cooperation
AFSC	Air Force Sustainment Center
AFSOC	Air Force Special Operations Command
AFTC	Air Force Test Center
ALC	Air Logistics Center; Air Logistics Complex
AOC	Air and Space Operations Center
ASC	Aeronautical Systems Center
ASD	Aerospace Sustainment Directorate
BCA	Business Case Analysis
CFLI	Core Function Lead Integrator
DAO	Designated Acquisition Official

DASD(DT&E)	Deputy Assistant Secretary of Defense for Developmental Test and Evaluation
DoD	Department of Defense
DOT&E	Director, Operational Test and Evaluation
DOTMLPF-P	doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy
DT&E	developmental test and evaluation
ESC	Electronic Systems Center
FDE	Force Development Evaluation
FOA	field operating agency
FOC	full operating capability
FOT&E	follow-on test and evaluation
FY	fiscal year
IOC	initial operating capability
ITT	integrated test team
LG	Logistics Directorate
LFT&E	live fire test and evaluation
MAIS	major automated information system
MAJCOM	major command
MDAP	major defense acquisition program
MRTFB	Major Range and Test Facility Base
MXW	Maintenance Wing
NDAA	National Defense Authorization Act
O&M	operation and maintenance
OC-ALC	Oklahoma City Air Logistics Center
OCR	Organization Change Request
OO-ALC	Ogden Air Logistics Center
OSC	office symbol code
OSD	Office of the Secretary of Defense

OT&E	operational test and evaluation
PAF	Project AIR FORCE
PEO	Program Executive Officer
PID	Program Introduction Document
PM	Program Manager
PSM	Product Support Manager
RDT&E	research, development, test, and evaluation
RIF	reduction in force
RMD	Resource Management Decision
S&T	science and technology
SAE	Service Acquisition Executive
SAF/AQ	Assistant Secretary of the Air Force for Acquisition
SCMG	Supply Chain Management Group
SCMW	Supply Chain Management Wing
SCOW	Supply Chain Operations Wing
SOC	Statement of Capability
SPM	System Program Manager
SPU	Strategic Planning Unit
T&E	test and evaluation
TEMP	Test and Evaluation Master Plan
TRMC	Test Resource Management Center
TW	Test Wing
UMD	Unit Manpower Document
U.S.C.	U.S. Code
VERA	voluntary early retirement authority
VSIP	voluntary separation incentive payment
WIPT	Working-level Integrated Product Team
WR-ALC	Warner-Robins Air Logistics Center

1. Introduction and Context of the AFMC Reorganization

Introduction and Purpose of This Report

In 2011, Congress mandated budget reductions¹ that require the U.S. Department of Defense (DoD) to reduce its future spending by approximately \$487 billion over the next decade.² To realize one part of these reductions, the Office of the Secretary of Defense (OSD) called for all services to return to their fiscal year (FY) 2010 civilian staffing levels.³ That action required the Air Force to eliminate approximately 16,500 civilian manpower positions. Rather than distributing these cuts proportionally throughout the service, the Air Force sought specific initiatives that could achieve the necessary savings with minimal impact to missions. One initiative, a reorganization of the Air Force Materiel Command (AFMC), was undertaken to eliminate 1,051 of the approximately 16,500 positions and achieve an annual savings of about \$109 million in FY 2011 dollars.⁴

In the FY 2013 National Defense Authorization Act (NDAA), Congress mandated an assessment of this reorganization and a report to Congress.⁵ In summary, the report must assess the following five elements: (1) the effectiveness and efficiency of the reorganization; (2) whether synergies due to collocation among developmental test and evaluation (DT&E), science and technology (S&T), and acquisition can be replicated in the new organization; (3) how the reorganization has affected other commands' ability to meet their responsibilities for operational test and evaluation (OT&E) and follow-on test and evaluation (FOT&E); (4) whether the reorganization is in adherence with 10 U.S. Code (U.S.C.) Section 2687;⁶ and (5) the extent to which the Air Force coordinated the reorganization with OSD and if any concerns raised by OSD were addressed. This report fulfills these reporting requirements.

¹ Public Law 112-25, Budget Control Act of 2011.

² U.S. Department of Defense, *Defense Budget Priorities and Choices*, Washington, D.C., January 2012, p. 1.

³ OSD, *Resource Management Decision 703A2*, January 25, 2011 A Resource Management Decision (RMD) is a budget decision document issued by OSD to one of the services during the program budget review.

⁴ Robert S. Tripp, Kristin F. Lynch, Daniel M. Romano, William Shelton, John A. Ausink, Chelsea Kaihoi Duran, Robert G. DeFeo, David W. George, Raymond E. Conley, Bernard Fox, and Jerry M. Sollinger, *Air Force Materiel Command Reorganization Analysis: Final Report*, Santa Monica, Calif.: RAND Corporation, MG-1219-AF, Table 3.4, 2012, p. 22.

⁵ Public Law 112-339, National Defense Authorization Act for Fiscal Year 2013, Section 2814. The text in its entirety is provided in the appendix.

⁶ 10 U.S.C. Section 2687 is the statute regarding Base Realignment and Closure.

Background to the Reorganization

The FY 2012 AFMC reorganization was one of a number of complex responses to recent budgetary pressures. Other events taking place concurrent with the reorganization also affect the overall ability of the command to be effective and efficient and to properly fulfill all of its test and evaluation (T&E) responsibilities. The FY 2012 AFMC reorganization must be assessed in this broader context.

Prior to the Budget Control Act of 2011 that mandated the budget reductions, other OSD-directed initiatives shaped the environment in which the reorganization occurred. In April 2009, OSD issued RMD 802 to take effect in FY 2010. One of the initiatives in this directive required the services to reduce contractor funding by insourcing or converting some of the contractor workforce to the federal civilian workforce. The goal was to reduce the contractor workforce to FY 2000 levels over a five-year period.⁷ As a result, AFMC, along with the other major commands (MAJCOMs), shifted work from contractors to the civilian workforce, thereby increasing the Air Force civilian workforce by approximately 16,000 personnel. Further, the Joint Basing concept, implemented in the same time frame, increased the Air Force civilian workforce by approximately another 1,800 personnel. Also, in December 2009, OSD issued RMD 700, which directed efficiency initiatives, including reductions in support contracts. The goal was to save approximately \$1.7 billion across the Future Years Defense Program in tail-to-tooth efficiencies that would result in further contract workforce reductions.⁸ As a result, the Air Force as a whole, and AFMC in particular, grew more dependent on the civilian workforce to carry out its missions.

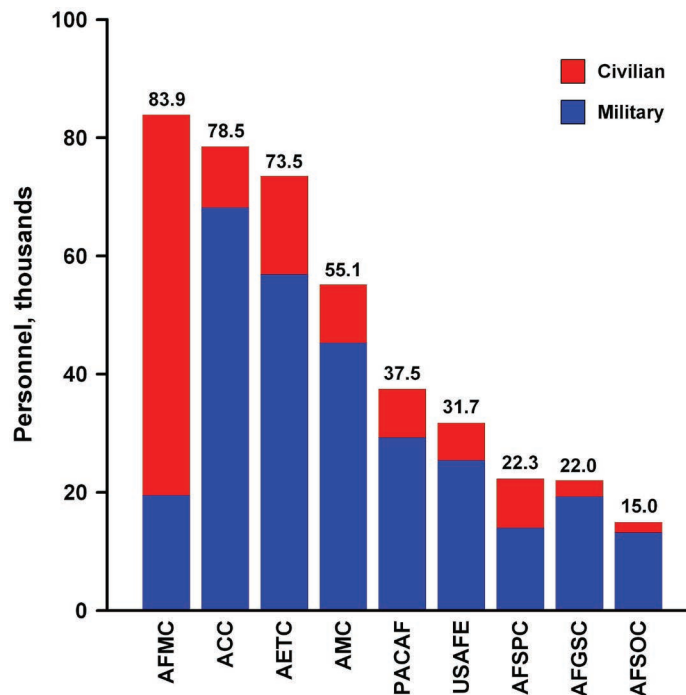
With the passage of the Budget Control Act of 2011, OSD released RMD 703A2, which called for all services to return to their FY 2010 civilian staffing levels. For the Air Force, this equated to an initial reduction of approximately 16,500 personnel. Of this number, approximately 15,500 were operation and maintenance (O&M)-funded personnel, a cut of approximately 13.6 percent to the FY 2012 President's Budget O&M United States Direct Hire civilian baseline.

Given the recent shift of workload from contractors to the civilian workforce, absorbing these cuts to the O&M-funded civilian manpower without negatively impacting mission performance was a challenge. For AFMC, the challenge was somewhat greater than for the other MAJCOMs for two reasons. First, AFMC relies more heavily on civilian employees than do other Air Force MAJCOMs. Figure 1.1 shows the active duty and civilian personnel by Air Force MAJCOM in the Air Force just prior to the reorganization (September 2011). Roughly 77 percent of the command was civilian, a much higher proportion than in the other MAJCOMs. Second, the preponderance of the cuts were to come from O&M accounts, but of the approximately 64,000

⁷ OSD, *Resource Management Decision 802*, April 8, 2009.

⁸ OSD, *Resource Management Decision 700*, December 23, 2009.

Figure 1.1. Active Duty and Civilian Personnel by Air Force MAJCOM



SOURCE: Data are from the Air Force Interactive Demographic Analysis System for personnel by owning MAJCOM for September 2011.

NOTE: ACC = Air Combat Command; AETC = Air Education and Training Command; AMC = Air Mobility Command; PACAF = Pacific Air Forces; USAFE = United States Air Forces in Europe - Air Forces Africa; AFGSC = Air Force Global Strike Command; AFSPC = Air Force Space Command; AFSOC = Air Force Special Operations Command.

civilian positions in AFMC, only approximately 22,000 are O&M-funded, placing a high burden of cuts on a concentrated segment of the civilian workforce.⁹ According to AFMC senior leaders, one priority that led to the structure of the reorganization was to absorb these civilian cuts with minimal, if any, impact to AFMC's assigned missions by targeting staff and overhead administrative positions in the AFMC reorganization.

RMD 703A2, issued in January 2011, directed the reduction to FY 2010 civilian manpower levels. In February and March 2011, Air Force senior leaders met to decide how to distribute the necessary reductions across MAJCOMs and Service Core Functions.¹⁰ The civilian workforce is managed in terms of dollars rather than end strength, so the Air Force sought efficiencies and cost

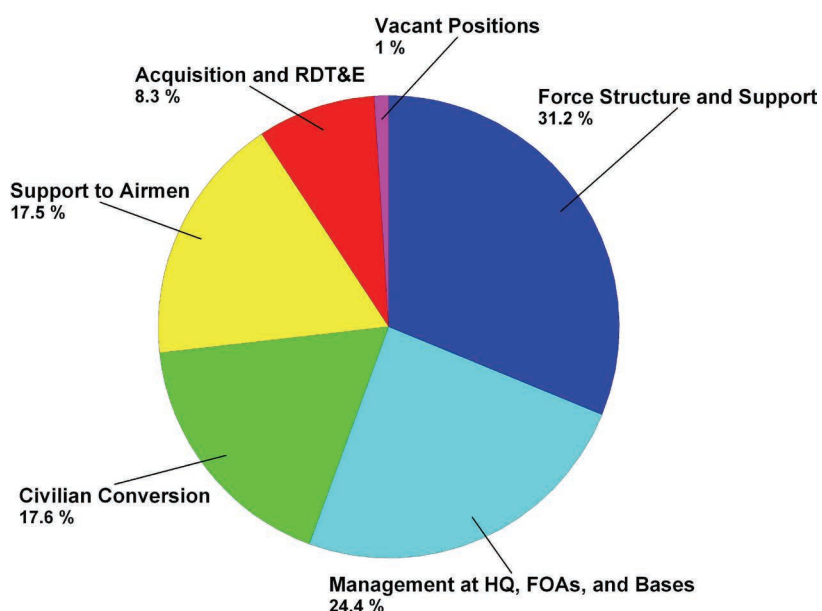
⁹ Many positions are funded under Working Capital Funds, Foreign Military Sales, and other accounts that were exempt from these cuts.

¹⁰ The Air Force has 13 Service Core Functions, each with a Core Function Lead Integrator (CFLI), selected from the MAJCOM commanders. The 13 are Nuclear Deterrence Operations; Air Superiority, Space Superiority; Cyberspace Superiority; Global Precision Attack; Rapid Global Mobility; Special Operations; Global Integrated Intelligence, Surveillance, and Reconnaissance; Command and Control; Personnel Recovery; Building Partnerships; Education and Training; and Agile Combat Support. The AFMC commander is the Core Function Lead Integrator for Agile Combat Support, per Air Force Mission Directive 4, *Air Force Materiel Command (AFMC)*, March 7, 2013.

reductions to reduce the civilian workforce to achieve the desired savings. From March through July 2011, MAJCOMs and CFLIs developed and presented proposals for reductions and savings to the Chief of Staff and the Secretary of the Air Force. There were several guiding principles used to develop these proposals, one of which was that the reductions would be strategically shaped rather than a coarse cut spread evenly across the Air Force. The goal was to retain as much mission capability as possible while divesting and cutting costs. Each MAJCOM and CFLI proposed initiatives to support this end.

Across the Air Force, reductions and savings initiatives fell into several categories. Authorizations that had been vacant for over a year were eliminated (for a cost avoidance of about 1 percent of the goal). Force structure reductions (in the MQ-9, RQ-4, KC-135, and HC-130 for the active duty)¹¹ as well as support reductions in logistics, maintenance, supply, civil engineering, communications, and law enforcement/security accounted for approximately 31 percent of the overall savings. Reductions and restructuring to management headquarters, field operating agencies (FOAs), and bases (including wing staff) accounted for another 24 percent. The AFMC reorganization was part of this tranche. Eliminating some positions that were slated for conversion from contractors to federal civilian workforce saved another 18 percent. Morale, welfare, and recreation as well as training and services were cut to save another 18 percent, and cuts to the acquisition and research, development, test, and evaluation (RDT&E)-funded workforce saved 8 percent. The categories of reduction and their proportions are shown in Figure 1.2.

Figure 1.2. Air Force RMD 703A2 Reductions



SOURCE: Data were provided by Headquarters U.S. Air Force, Deputy Chief of Staff, Manpower, Personnel & Services, Directorate of Manpower, Organization & Resources.

¹¹ The Air National Guard took force structure reductions in the KC-135, F-16, F-15, and F-22.

The initiatives were assessed by August 2011, and by late 2011 many initiatives were being implemented. For example, Air Mobility Command stood down a communications squadron and the Air and Space Operations Center (AOC) for 17th Air Force was consolidated with the 3rd Air Force AOC in Europe. The Air Force Civil Engineering Support Agency was redesignated the Air Force Civil Engineering Center (AFCEC), and two field operating agencies were inactivated and merged with AFCEC—the Air Force Real Property Agency and the Air Force Center for Engineering and the Environment.¹² Further, the Global Base Support concept was implemented Air Force-wide.¹³

Any military positions saved as a result of the initiatives were re-allocated to other mission areas. For example, military positions cut as a result of standing down 17th Air Force were repurposed to the F-35 maintenance and intelligence, surveillance, and reconnaissance missions. Likewise, military positions that were eliminated from Headquarters Air Staff and MAJCOMs were repurposed to fill other military shortfalls. Thus, civilian personnel were not replaced with military personnel.

During this same time, the Program Executive Officer (PEO)¹⁴ portfolios were realigned. In November 2011, there were 19 PEOs in the Air Force. Of the three PEOs that were dual-hatted with product center commands within AFMC, two were eliminated (PEO Aircraft and PEO C2 and CS) and their portfolios were redistributed. The PEO for Weapons remains (as a PEO only, not a center commander). At the same time, one additional PEO was created (PEO C3I&N) and two others had their portfolios realigned (PEO C2ISR and PEO ECSS) for a current total of 16 Air Force PEOs. This initiative was independent of the AFMC reorganization but was implemented along with the reorganization and affected the selection of directorate structure in the newly created Air Force Life Cycle Management Center.

Also during this time, the Air Force offered three rounds of early retirement. By incentivizing personnel to retire early, more civilian slots became vacant. These slots were either eliminated or filled by repurposed military personnel whose positions were eliminated. And, during FY 2013, the budget sequestration mechanism of the Budget Control Act of 2011 (Public Law 112-25) was activated, which led to numerous constraints on operations within AFMC and the Air Force as a whole (e.g., civilian hiring freezes, travel restrictions, and starting on July 12, 2013, for AFMC, civilian furloughs).

¹² Other changes to FOAs were the inactivation of the Air Force Logistics Management Agency and the inactivation and merger of the Air Force Manpower Agency and the Air Force Services Agency into the Air Force Personnel Center.

¹³ The Global Base Concept includes such concepts as standardizing levels of base services across the Air Force, consolidating and regionalizing some functions and services to reduce overhead, and partnering with the community to reduce or eliminate services on base when comparable services are available within the community.

¹⁴ A Program Executive Officer is a military or civilian person who has responsibility for multiple major defense acquisition programs or occasionally one very large program.

The AFMC reorganization that was announced on November 2, 2011, was just one of the many initiatives listed above aimed at responding to budgetary constraints and mitigating the mission impacts of those constraints. The remainder of this report focuses on the changes associated with the AFMC reorganization and their impacts, always separating as much as possible the assessments of impacts that are due to the reorganization alone.

Structure of This Report

The remainder of this report is organized as follows:

- Chapter Two explains the changes in the AFMC organizational structure in some detail and furnishes the background for the remaining chapters of the report. This description is based on the final Organization Change Request (OCR) for the reorganization and analysis of Unit Manpower Document (UMD) data from before and after the reorganization.
- Chapter Three discusses the principles of organizational theory and, based on this theory, presents the methodology we use for assessing the effectiveness and efficiency of the AFMC reorganization.
- Chapter Four assesses the effectiveness and efficiency of the reorganization. It is based on the methodology in Chapter Three and leverages extensive meetings RAND conducted with numerous individuals and organizations in the Air Force and OSD. Together, Chapters Three and Four respond to Element 1 of the Section 2814 language.
- Chapter Five describes the Air Force T&E missions and discusses the impact of the reorganization on (1) the synergies among DT&E, S&T, and acquisition; (2) the synergies between DT&E and OT&E; and (3) other commands' ability to carry out their OT&E and FOT&E missions. This chapter responds to Elements 2 and 3 of the Section 2814 language.
- Chapter Six assesses whether the reorganization is in adherence with 10 U.S.C. Section 2687 and responds to Element 4 of the Section 2814 language.
- Chapter Seven describes the coordination between the Air Force and OSD regarding the reorganization and responds to Element 5 of the Section 2814 language.
- The appendix reproduces the Section 2814 language of the FY 2013 NDAA.

2. The AFMC Reorganization

Introduction

The Air Force took advantage of the directed reductions in personnel described in Chapter One to implement a sweeping change in the organization of AFMC. This change was intended not only to achieve cost reductions by eliminating a number of manpower positions but also to increase the efficiency and effectiveness of the command.

Recent changes in personnel authorizations for AFMC are the result of several initiatives. For example, in addition to civilian personnel reductions attributable to the AFMC reorganization, Round 1 of the response to RMD 703A2 at AFMC included the following:

- reductions resulting from the restructure of MAJCOM headquarters
- reductions resulting from the elimination of T&E staff support positions
- reductions from consolidating communications units.

Round 2 of the response to RMD 703A2 at AFMC incorporates reductions from, among other initiatives, the adjustment of headquarters and center staffs and the “right-sizing” and termination of some programs.¹

On November 2, 2011, AFMC announced a command-wide reorganization aimed at reducing its overhead and administrative functions to address these mandated reductions. The new 5-center construct declared initial operating capability (IOC) on October 1, 2012, with full operating capability (FOC) planned for October 1, 2013. This chapter outlines the salient changes of the reorganization and forms the background for the discussion in subsequent chapters.

Analytic Approach and Data Sources

Our analysis compared manpower data after the AFMC reorganization to data before the reorganization to determine changes in the number of manpower authorizations, the locations of these authorizations, and the chains of command. The primary document used to assess the manpower impact of AFMC’s reorganization is the OCR.² This document explains why the change is being made, describes the expected benefits of the new structure, and provides details about organizations that will be changed, eliminated, or created. These details include estimates

¹ Descriptions of Rounds 1 and 2 of the AFMC reorganization are based on the Excel spreadsheet “AFMC Programming Redux File,” received from HQ AFMC/A1MP.

² The latest version of this document was approved by HQ USAF on June 18, 2012: Air Force Materiel Command, *Organization Change Request (OCR) for Air Force Materiel Command*, AFMC OCR 12-01, February 6, 2012 (Final Version: Change 5, May 2, 2012; Approved by HQ USAF, June 18, 2012).

of the numbers of civilian, military, and contract manpower equivalent positions that will be assigned to different organizations. This document is useful for determining manpower changes that can be attributed to the reorganization alone.

The second document used to assess changes to AFMC over time is the UMD. This document provides details about individual positions, including the position number, the office symbol code (OSC),³ the personnel accounting system code (an eight-digit code assigned to each Air Force unit), and the grade and Air Force specialty code associated with the position. The UMD also indicates whether changes are programmed in future fiscal years.⁴

We also referred to official Air Force briefings and testimony about the impact of the reorganization, and discussed the reorganization with key stakeholders.⁵

AFMC Structure Before and After the Reorganization

Figure 2.1 shows the baseline, 12-center organization of AFMC that existed until the 5-center organization reached IOC on October 1, 2012.⁶

The centers were:

- Oklahoma City Air Logistics Center (OC-ALC)
- Ogden ALC (OO-ALC)
- Warner-Robins ALC (WR-ALC)
- Air Armament Center (AAC)
- Aeronautical Systems Center (ASC)
- Electronic Systems Center (ESC)
- Air Force Global Logistics Support Center (AFGLSC)
- Air Force Flight Test Center (AFFTC)
- Arnold Engineering Development Center (AEDC)
- Air Force Nuclear Weapons Center (AFNWC)

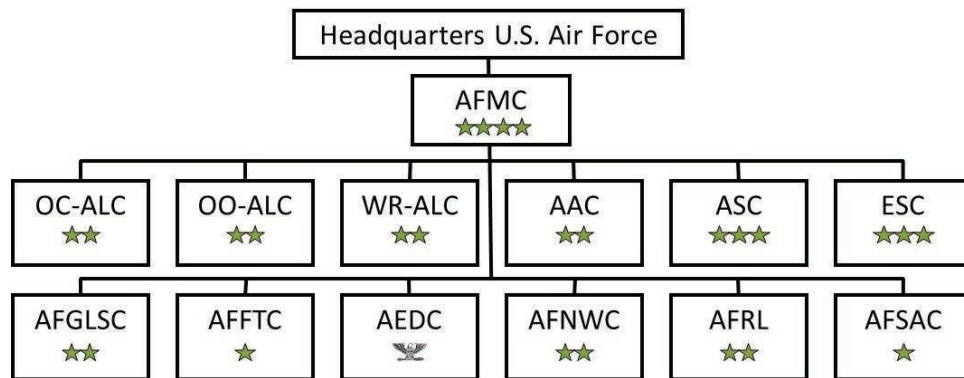
³ OSCs identify the organizational structure and functional responsibilities within a unit. For instance, “HO” is the OSC for the history office in the wing headquarters. (See Air Force Instruction [AFI] 38-101, *Manpower and Organization*, Washington, D.C., March 16, 2011.) Air Force Manual 33-326, *Preparing Official Communications*, Washington, D.C., November 25, 2011, provides guidance on OSCs, which were formerly called organization structure codes (AFI 38-101, 2011, paragraph 4.4).

⁴ For this analysis, we used a February 2011 end-of-month AFMC UMD using FY 2012 funded positions as the baseline for the organization. For post-reorganization structure, we used an updated UMD that was provided by AFMC/A1M on March 22, 2013.

⁵ For example, “Update on Air Force Initiatives: AFMC 5-Center Construct and Global Base Support,” briefing, November 3, 2011. The briefing was presented at a “commander’s call” to inform Air Force personnel about the reorganization. This information was also included in a widely disseminated email from AFMC Commander Gen Donald Hoffman, dated November 3, 2011. We also referred to a December 9, 2011, Memorandum of the Secretary of the Air Force concerning the reorganization, and answers to confirmation questions asked of Lt Gen Janet C. Wolfenbarger when she was nominated to command AFMC (letter from Lt Gen Wolfenbarger to The Honorable Saxby Chambliss, March 16, 2012).

⁶ See “AFMC Reorganization,” PowerPoint briefing presented to RAND by AFMC/A8/9, March 21, 2013.

Figure 2.1. AFMC's Baseline Organizational Structure Prior to October 1, 2012



- Air Force Research Laboratory (AFRL)
- Air Force Security Assistance Center (AFSAC).

The symbols in the boxes of Figure 2.1 indicate the grade of the commander of each center. For example, ESC had a 3-star commander, and AEDC had a colonel commander. Each of these 12 centers had staffs.

AFMC has four core missions: S&T, life-cycle management, T&E, and sustainment.⁷ In the structure prior to the reorganization, the S&T mission was located in AFRL. The consolidation of this mission into AFRL took place in 1997 when the S&T mission (previously distributed among four laboratories—Armstrong, Phillips, Rome, and Wright) was combined by a reorganization similar in spirit and purpose to the FY 2012 AFMC reorganization.⁸ Prior to the FY 2012 reorganization, life-cycle management⁹ was distributed among the three product centers (AAC, ASC, and ESC), the three Air Logistics Centers (ALCs) (OC-ALC, OO-ALC, and WR-ALC), and the AFNWC. T&E was distributed among AFFTC, AEDC, and one product center (AAC). The sustainment mission was distributed among the three ALCs, AFGLSC, and the AFNWC.

Air Force leaders highlighted several problems with this structure when justifying the reorganization: (1) multiple centers were performing the same mission; (2) single centers were performing multiple missions; and (3) the organization presented “multiple faces to the warfighter.”¹⁰

Figure 2.2 shows AFMC’s new 5-center structure.

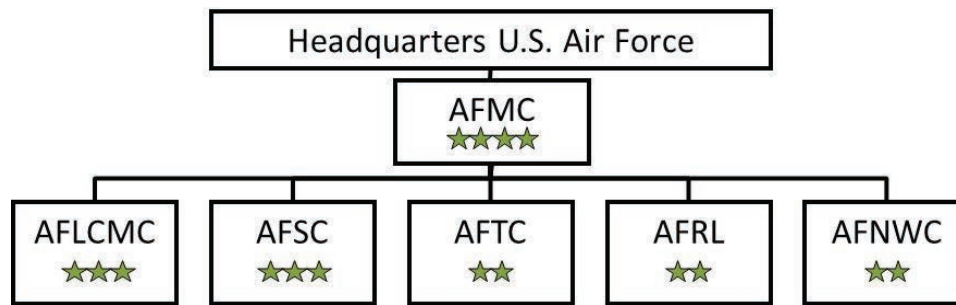
⁷ Air Force Mission Directive 4, 2013; AFMC, *Strategic Plan*, 2013.

⁸ Robert W. Duffner, *Science and Technology: The Making of the Air Force Research Laboratory*, Maxwell Air Force Base, Ala.: Air University Press, 2000.

⁹ *Life-cycle management* is “the implementation, management, and oversight, by the [program manager], of all activities associated with the acquisition, development, production, fielding, sustaining, and disposal of a DOD system.” *Manual for the Operation of the Joint Capabilities Integration and Development System*, January 19, 2012, p. B-E-2.

¹⁰ “AFMC Reorganization,” 2013.

Figure 2.2. AFMC's New 5-Center Structure as of October 1, 2012



The five new centers are:

- Air Force Life Cycle Management Center (AFLCMC)
- Air Force Sustainment Center (AFSC)
- Air Force Test Center (AFTC)
- Air Force Research Laboratory (AFRL)
- Air Force Nuclear Weapons Center (AFNWC).

All the new centers are led by 2- or 3-star commanders.

In this new structure, the S&T mission remains unchanged and located in AFRL. The organize, train, and equip portion of the life-cycle management mission is now predominantly concentrated in a single center, the AFLCMC; the reporting lines for acquisition still flow from the PEOs to the Service Acquisition Executive (SAE).¹¹ The program offices in the AFNWC are now the only life-cycle management in AFMC that is not in AFLCMC.¹² After the reorganization, the organize, train, and equip functions of the PEO for Strategic Systems, who has responsibilities for the Air Force nuclear portfolio, now resides in the AFLCMC, but the PEO acquisition reporting line to the SAE remains unchanged. The PEO for Strategic Systems remains collocated with the AFNWC and retains a close connection with and use of AFNWC staff. The sustainment mission is now dominantly consolidated into a single center, the AFSC, with the exception of the few nuclear functions that remain in the AFNWC. Finally, the test mission is consolidated into a single center, the AFTC.

AFMC's OCR indicates that the expected outcomes of the reorganization were to simplify and reduce overhead structure, improve lines of communication, produce effectiveness and efficiency improvements, and improve warfighter support by presenting a "single face to the customer," while eliminating 1,051 civilian manpower positions from staffs.¹³ The reorganization was a matter of changing chains of command—suborganizations were realigned from the old centers to the new centers in ways calculated to improve organizational

¹¹ In accordance with 10 U.S.C. Section 1704.

¹² The program offices for the Minuteman III Intercontinental Ballistic Missile and the AGM-86 Air Launched Cruise Missile remain under the AFNWC.

¹³ AFMC, 2012.

performance; manpower reductions focused on AFMC staff and other overhead positions. There was no change in the number of AFMC bases, and there were to be few, if any, personnel relocations.

Realignment of Functions and Changes in Reporting Lines

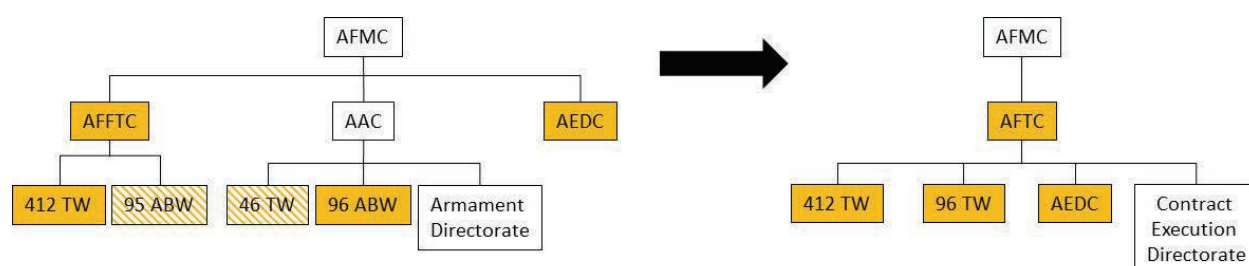
The next series of figures display the details of the organizational realignment below the center level to highlight changes in the chain of command and span of control.¹⁴ Only AFTC, AFLCMC, and AFSC are described, since the AFNWC and AFRL were not changed by the reorganization.

Realignment of Organizations to the New Air Force Test Center

Figure 2.3 shows how chains of command changed for organizations that realigned to the new AFTC. Organizations highlighted in orange on the left side of the figure realigned to the organizations highlighted in orange on the right side of the figure. Organizations on the left that are cross-hatched were inactivated, but their suborganizations were retained and realigned under the new AFTC.

Reading from the top down in the figure, the AFFTC is redesignated the AFTC in the new organization and oversees all T&E units in AFMC. AEDC, which was formerly a center “peer” of AFFTC, now reports to AFTC. The 412 TW (Test Wing) remains in the new organization, but the 95 ABW (Air Base Wing) is inactivated and organizations in the wing realign (and are renamed) under the new 412 TW. The 46 TW inactivates and its mission realigns to the 96 ABW, which is redesignated the 96 TW in the new organization. The new AFTC also has a

Figure 2.3. Realignment of Organizations to AFTC



NOTE: Organizations in a solid orange on the left can be found as organizations in solid orange under the new center on the right (sometimes with a slight name change). Organizations on the left in white cannot be found as organizations in the new center on the right (they may no longer exist, or they may have been realigned to a different center). AFMC is left in white. Organizations that are cross-hatched on the left are realigned under new organizations in the new center on the right.

¹⁴ The term *span of control* is used with various meanings in the organizational theory literature. We use the term to mean number of employees or subordinates who report to a single supervisor.

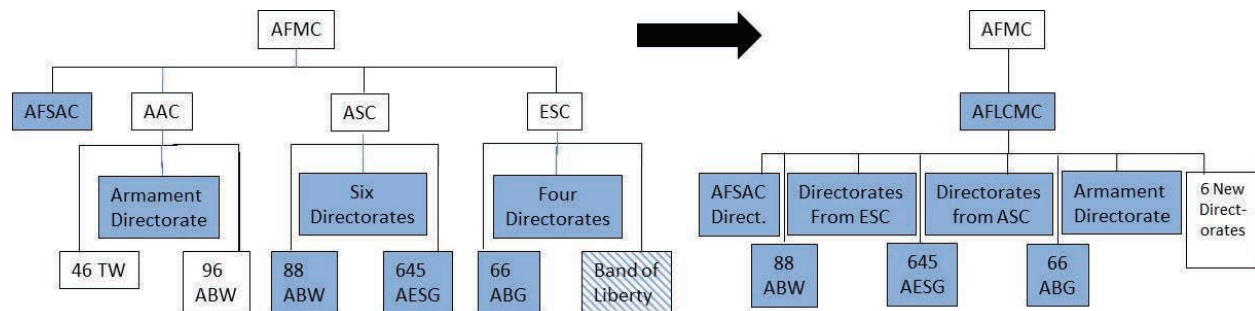
Contract Execution Directorate.¹⁵ The Armament Directorate realigns to the AFLCMC and is discussed further in the next section. No changes occurred within the Arnold Engineering Development Complex other than the change of name. All three major test organizations now report to a single test center commander.

Realignment of Organizations to the New Air Force Life Cycle Management Center

Figure 2.4 shows how chains of command changed for organizations that realigned to the new AFLCMC. Organizations highlighted in blue on the left side of the figure realigned to the organizations highlighted in blue on the right side of the figure.

Again reading from the top down in the figure, the Air Force Security Assistance and Cooperation (AFSAC) Directorate, formerly a center, becomes a directorate under AFLCMC. AAC's Armament Directorate remains a directorate, but is under the new AFLCMC organization. ASC and ESC had six and four directorates respectively, and all of these are now under AFLCMC.¹⁶ In addition, AFLCMC now has six new directorates and one new office.¹⁷

Figure 2.4. Realignment of Organizations to AFLCMC



NOTE: Organizations in solid blue on the left can be found as organizations in solid blue under the new center on the right (sometimes with a slight name change). Organizations on the left in white cannot be found as organizations in the new center on the right (they may no longer exist, or they may have been realigned to a different center). AFMC is left in white. Organizations that are cross-hatched on the left are realigned under new organizations in the new center on the right.

¹⁵ Several cross-center mission workloads are being moved into new organizations (non-PEO) that are being created in all of the new centers. The Contract Execution Directorate is one of these; for example, the one in AFLCMC will provide “world-class, enterprise-level contracting support for AFLCMC programs, including award of new contracts and modification, administration, and closeout of existing contracts” (AMC, 2012, pp. 3 and 126).

¹⁶ The six ASC directorates are the Agile Combat Support Directorate, Mobility Directorate, Airborne Laser Directorate, KC-X Tanker Modification Directorate, ISR Directorate, and Fighter and Bombers Directorate. The four ESC directorates are the Battle Management Directorate, Cyber/Netcentric Directorate, Enterprise Information Directorate, and Enterprise Logistics Directorate; the last two are combined to become the Business and Enterprise Directorate in AFLCMC. Also, the Cyber/Netcentric Directorate joins with the C2ISR Directorate from WR-ALC to become the C3I Networks Directorate in the new organization.

¹⁷ These are the Office of Strategic Systems, and Propulsion Directorate, Program Development and Integration Directorate, Technical Engineering Services Directorate, Program Execution Directorate, Contract Execution Directorate, and Cost and Financial Analysis Directorate.

Finally, the base operating support units 88 ABW at Wright-Patterson Air Force Base and the 66 Air Base Group (ABG) at Hanscom Air Force Base realign to AFLCMC, as does the 645 Aeronautical Systems Group (AESG) (also known as Big Safari).¹⁸ Overall AFLCMC has 10 PEO directorates, 14 functional and execution support directorates, and 2 base operating support units.¹⁹

As shown on the left side of Figure 2.5, acquisition management responsibilities continue to flow from the SAE to the PEOs to the accountable System Program Managers (SPMs).²⁰ Under the new organization, the PEO now has responsibility for the total life-cycle management of all programs within his portfolio.²¹ Under the previous construct, for the product support-focused program offices that were aligned under the Air Logistics Centers, system support managers reported to a Designated Acquisition Official (DAO).²² DAOs are eliminated under the new construct and there are no longer two paths for life-cycle management, one through a DAO for product support and one through a PEO for development and procurement.

The “execution organizations” at the right of the figure are the new directorates noted in Figure 2.4. These execution organizations provide shared resources for organization, training, and equipping functions through the AFLCMC chain to support the PEOs.

Realignment of Organizations to the New Air Force Sustainment Center

Figure 2.6 shows how chains of command changed for organizations that realigned to the new AFSC. Organizations highlighted in green in the left side of the figure realigned to organizations in green in the right side of the figure. Organizations on the left with that are cross-hatched were inactivated, but their suborganizations were realigned in the new AFSC.

The three Air Logistics Centers were redesignated as complexes and placed under AFSC. Substantively, the three Air Logistics Complexes are the former maintenance wings at the three depot locations. AFGLSC is inactivated, but all its components and functions are retained: the 448 Supply Chain Management Wing (SCMW) and the 635 Supply Chain Operations Wing (SCOW) are realigned to AFSC and the 591 Supply Chain Management Group (SCMG) inactivates and realigns into the Logistics Operations Directorate (within AFSC). The three air

¹⁸ 645 AESG (Big Safari) is a direct report to AFLCMC/CC, but acquisition reporting is to the PEO for intelligence, surveillance, and reconnaissance, Special Operations Forces.

¹⁹ Air Force Life Cycle Management Center, *A Revolution in Acquisition and Product Support*, 2013.

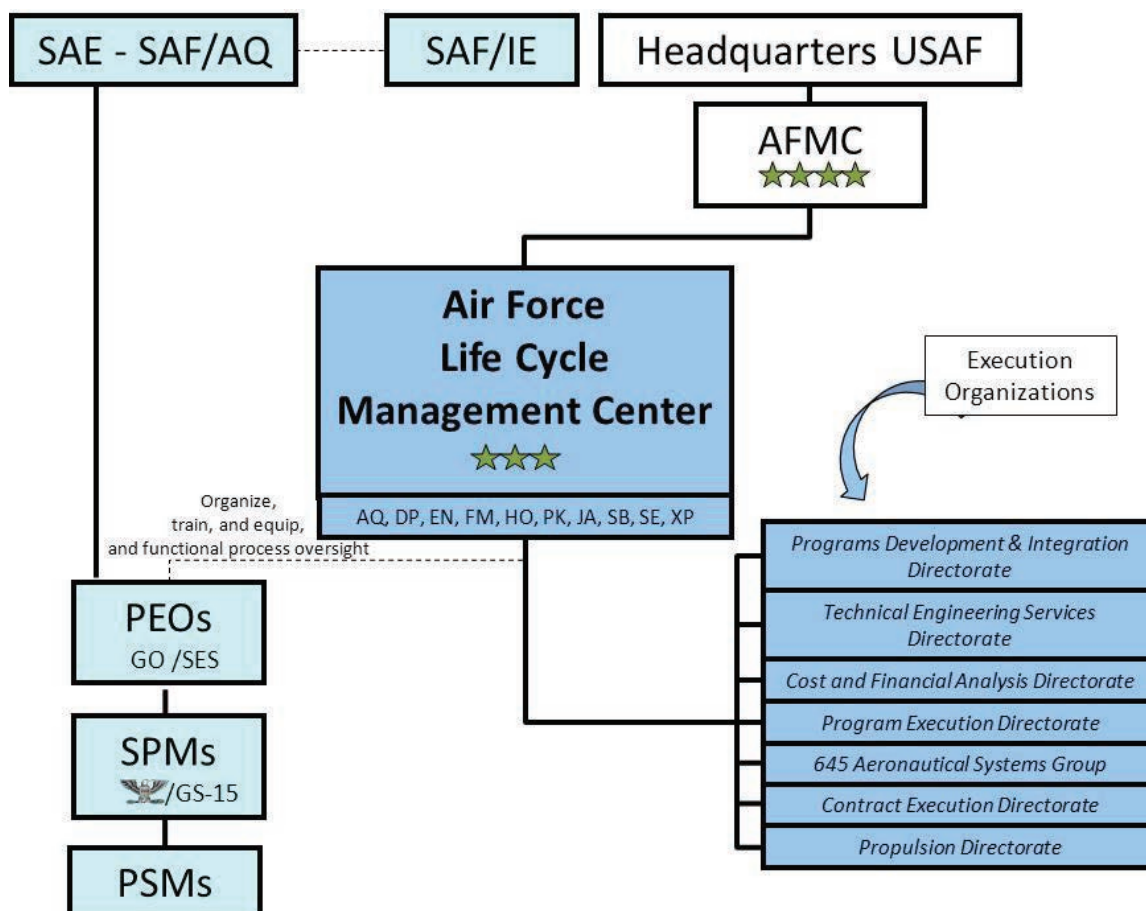
²⁰ In accordance with 10 U.S.C. Section 1704.

²¹ Air Force Instruction (AFI) 63-101/20-101, *Integrated Life Cycle Management*, Section 2.4, March 7, 2013.

²² Designated Acquisition Officials (DAOs) were individuals, acting in lieu of Program Executive Officers (PEOs), who were "dedicated to executive management at Air Logistics Centers of delegated ACAT II or ACAT III programs expending investment dollars." DAOs were chartered by and were accountable to the Service Acquisition Executive. Air Force Instruction 63-101, *Acquisition and Sustainment Life Cycle Management*, Washington, D.C., April 17, 2009, Incorporating Through Change 3, October 26, 2010, p. 209.

base wings from the ALCs now report directly to AFSC. Other organizations are inactivated and/or realigned.²³ It is important to note that all product support functions from the former Air

Figure 2.5. AFLCMC PEO Chain of Command



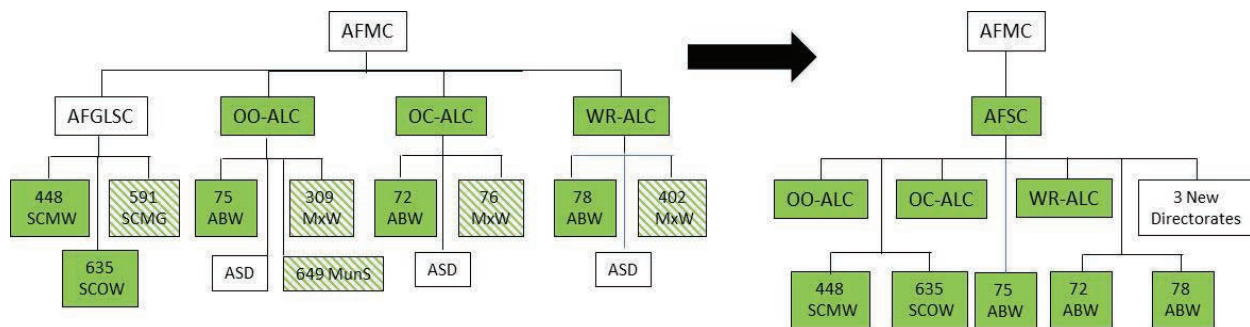
NOTE: SAF/IE = Assistant Secretary of the Air Force for Installations, Environment, and Logistics. SES = Senior Executive Service, GO = general officer. AFLCMC headquarters functions are as follows: AQ (acquisition), DP (manpower and personnel), EN (engineering and technical management), FM (financial management), HO (command historian), PK (contracting), JA (staff judge advocate), SB (small business), SE (safety), XP (strategic plans and programs). Although not in the OCR used in this analysis (and thus not shown in this figure), the AFLCMC is currently standing up a logistics (LG) function on the center staff.

²³ The 649 Munitions Squadron realigns to the 75 ABW. The 309 Maintenance Wing (MXW) inactivates and its subordinate organizations realign to the OO-ALC; the 76 MXW inactivates and its subordinate organizations realign to the OC-ALC; the 402 MXW inactivates and its subordinate organizations realign to the WR-ALC.

Logistics Centers realign to applicable PEOs under AFLCMC, but remain where currently physically located.²⁴ Finally, AFSC created several new organizations.²⁵

The AFSC also creates several organizations designed to maintain close coordination with the acquisition processes managed by the PEOs and AFLCMC. Figure 2.7 displays these and their connections to AFLCMC.

Figure 2.6. Realignment of Organizations to AFSC

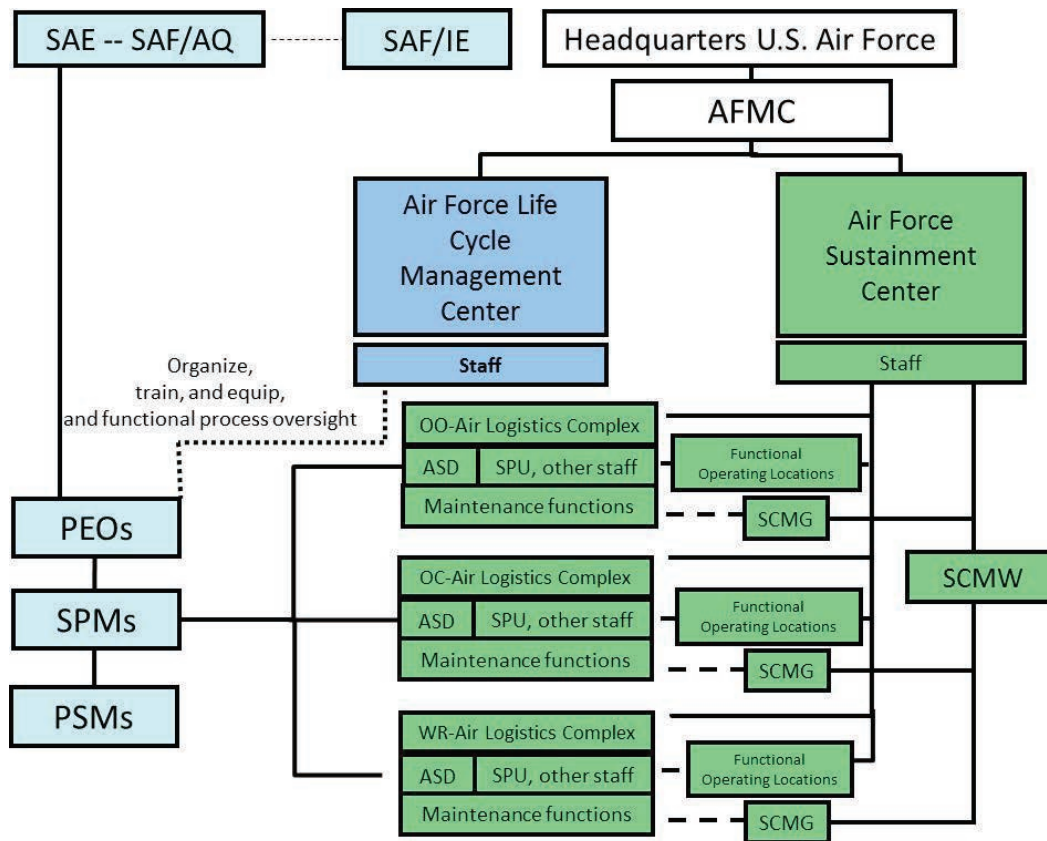


NOTE: Organizations in solid green on the left can be found as organizations in solid green under the new center on the right (sometimes with a slight name change). Organizations on the left in white cannot be found as organizations in the new center on the right (they may no longer exist, or they may have been realigned to a different center). AFMC is left in white. Organizations that are cross-hatched on the left are realigned under new organizations in the new center on the right.

²⁴ AFMC, 2012, p. 61.

²⁵ New organizations are the Cost and Financial Analysis Division, Logistics Operations Directorate, and, as with AFLCMC and AFTC, a Contract Execution Directorate.

Figure 2.7. AFSC Organizations Introduced for Improved Communications



NOTE: SAF/AQ provides SAE process oversight.

According to the OCR, each ALC will have a new Aerospace Sustainment Directorate (ASD) to “provide horizontal integration across program management/product support, depot operations and the supply chain associated with the Air Logistics Complex location.”²⁶ (These units are now called Aerospace Sustainment Divisions.) The unit manpower document shows that each ALC has an Aerospace Sustainment Division ranging from 11 to 24 persons who report to the complex commander. The OCR and a Secretary of the Air Force memo also direct that each ALC staff will include an SPU responsible for “devising and implementing long-term complex infrastructure and mission plans” to promote the efficiency and effectiveness of ALC operations. The UMD shows that each ALC has about 10 manpower positions for an SPU.

Finally, each ALC will have a supply chain management group (SCMG) that provides “around-the-clock, world-wide support” for those portions of the supply chain at each ALC, and

²⁶ AFMC, 2012, p. 3.

a “functional operating location” that helps resolve critical functional related issues and provides “low density/high demand skill sets.”²⁷

Manpower Changes Resulting from Various Initiatives

Early announcements emphasized that the AFMC reorganization would lead to a reduction in 1,051 civilian manpower positions (from O&M-funded and RDT&E-funded positions) and annual savings of \$109 million. RAND’s FY 2012 analysis of the reorganization confirmed that the planned position cuts, as detailed in the February 2012 UMD, were consistent with these numbers.²⁸ The breakout of the manpower positions eliminated by career field is shown in Figure 2.8.

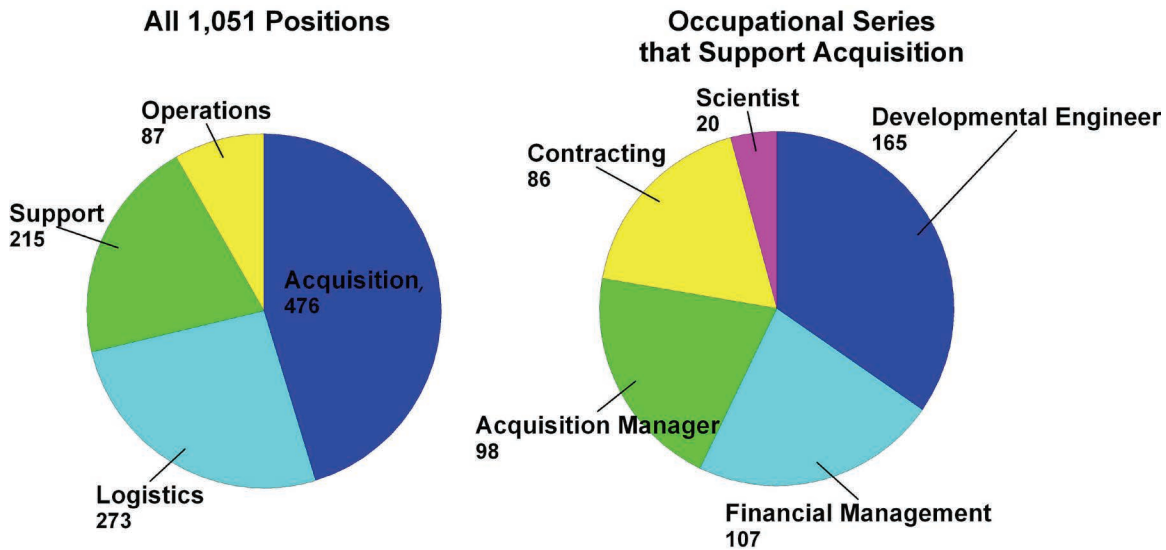
The following discussion compares the funded positions in the March 2012 UMD with the funded positions in the February 2011 UMD. We will focus on civilian and military positions. Since the new UMD includes changes related to initiatives that are in addition to the 5-center reorganization, some of the numbers differ from the 1,051 value. However, we still are able to assess how changes are at least in keeping with the cuts associated with the reorganization alone.

²⁷ Secretary of the Air Force memo, p. 4.

²⁸ OCR 12-01 and other documents state that the manpower reduction associated with the reorganization is 1,000 O&M authorizations and 209 T&E authorizations, for a total of 1,209. The arithmetic to get to 1,051 is as follows:

- 67 of these positions were already planned to be returned to the Air Force, and had not yet been added to the UMD. This leaves 1,142 positions cut. This is the value obtained if the “Recommended To-Be State” authorization numbers in OCR 12-01 (p. 2) are subtracted from the “Current State” authorization numbers (OCR 12-01 p. 1).
- 61 civilian communications positions were eliminated through consolidations related to an initiative to develop an installation support command. The cuts were made even though the command idea was dropped (at one point, 4 of the 61 positions cut were going to be enlisted positions). This leaves 1,081 positions.
- 30 additional military cuts.
- This leaves 1,051 civilian positions.

Figure 2.8. Manpower Positions Eliminated by Occupational Classification



NOTE: These numbers are based on the occupational classification codes. The figure on the left shows the 1,051 civilian manpower positions eliminated by broad occupational categories. The figure on the right breaks out the acquisition category into occupational subdivisions.

The Movement of Personnel and Manpower Positions Among Organizations

In its 2012 analysis, RAND developed several functional groupings of personnel to determine whether critical functions were maintained under the new organization. Table 2.1 lists and describes these functions.

All personnel positions in the UMD were categorized using these functions, and using them allows a convenient display of how personnel moved from the 12-center organization to the 5-center organization, as shown in Figure 2.9.

Figure 2.9 shows that the number of civilian and military positions cut from February 2011 to March 2013 was 1,556.²⁹ The figure also shows how some of the goals of the reorganization were realized. For example, depot maintenance personnel in WR-ALC, OO-ALC, and OC-ALC in the old organization are now together in AFSC, and test personnel in AFFTC, AEDC, and AAC in the old organization are now under AFTC in the new organization. The “Position Adjustments” category of personnel authorizations represents positions in the new UMD that did not exist in the old UMD.

²⁹ The reductions were 41 officer positions, 534 enlisted positions, and 981 civilian positions. This is more than indicated by comparing the authorized positions in the new organization to those in the old organization as shown in the OCR. We emphasize again that the UMD includes position changes beyond those associated with the reorganization.

The Movement of Manpower Authorizations Among Locations

The various manpower initiatives in response to RMD 703A2 and the AFMC reorganization have resulted in numerous administrative changes. Some position numbers have been eliminated, some formerly unfunded positions have been funded, some formerly funded positions are now

Table 2.1. Manpower Functional Categories

Category	Location in the 12-Center Organization	Location in the 5-Center Organization
Life-cycle management at the former product centers	Within directorate organizations at the product centers (AAC, ASC, and ESC) and AFSAC	Within AFLCMC directorate organizations Within the Air Force Security Assistance and Cooperation Directorate
Life-cycle management at the former Air Logistics Centers	Within the ASDs under the Air Logistics Centers (OC-ALC, OO-ALC, and WR-ALC)	Within AFLCMC directorate organizations collocated with the new Air Logistics Complexes
Depot-level maintenance	Within maintenance wings under the Air Logistics Centers (OC-ALC, OO-ALC, and WR-ALC)	At the new Air Logistics Complexes
Supply chain management and operations	Within supply chain operations wings and groups under the AFGLSC ^a	Within supply chain management and supply chain operations wings and groups under the AFSC
Center-level staff	Within center-level staff offices at each of the 12 centers except AFNWC and AFRL	Within center-level staff offices at AFLCMC, AFSC, or AFTC in the proposed structure
Base operating support	Within ABWs or groups	Within ABWs or groups, and at Edwards and Eglin, blended with the test wings
Test	Within non-staff organizations at AEDC and all positions within the 46 TW (AAC) or 412 TW	Within AEDC or a test wing ^b
Other (for example, AFNWC, AFRL, Headquarters AFMC, FOA)	Within AFNWC, AFRL, Headquarters AFMC, or in a FOA	Within AFNWC, AFRL, Headquarters AFMC, or in a FOA

^aThe 591st Supply Chain Operations Group, 448th Supply Chain Operations Wing, and 635th Supply Chain Operations Wing.

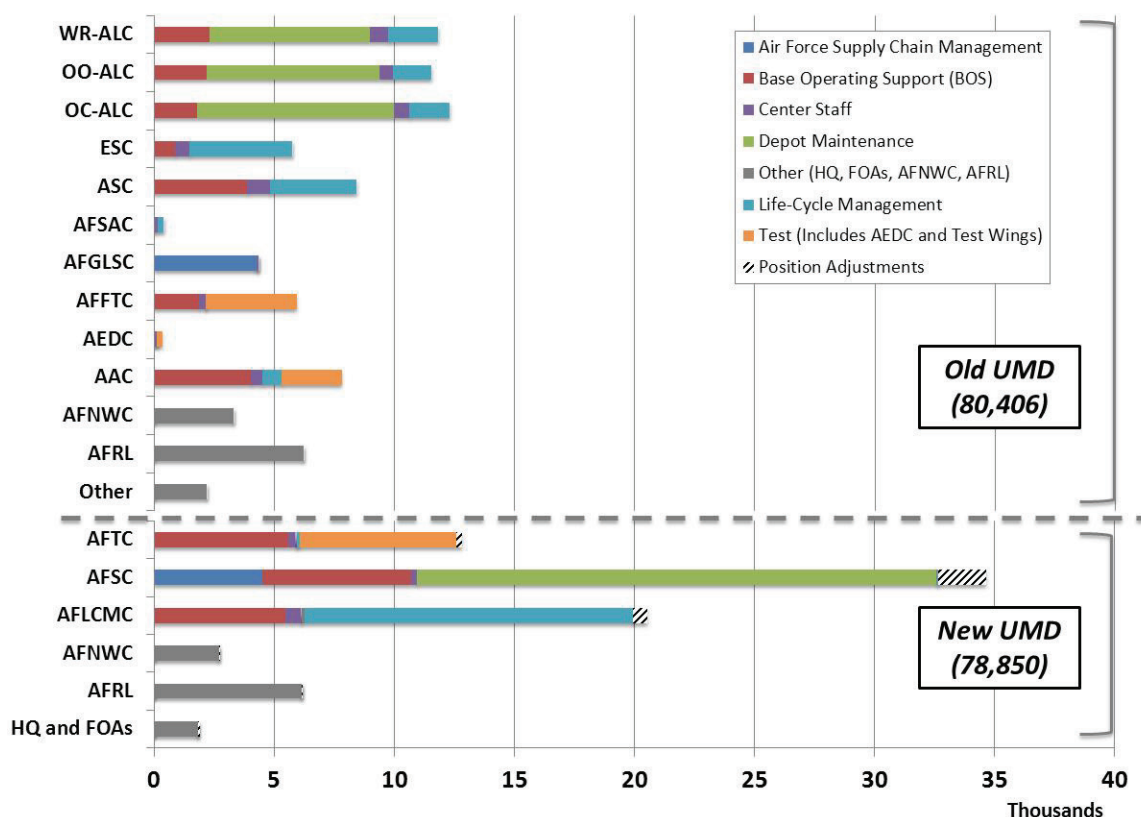
^bAEDC is redesignated as a "complex."

unfunded but kept on the books, and many new position numbers have been created.³⁰ These changes have had varying effects on the position authorizations at installation locations. Almost

³⁰ One auditing method shows that the 78,850 civilian and military positions in the new UMD are distributed as follows: 74,829 military/civilian positions in the new UMD that were funded in the February 11 UMD, 1,060 military and civilian positions that were *not* funded in February 2011 but are funded in the new UMD, and 2,961 new position numbers for military and civilian positions.

all of these movements were structural alone—while position numbers may have been moved among organizations, very few personnel physically relocated.³¹ According to AFMC Manpower, Personnel, and Services (AFMC/A1), there was no involuntary reduction in force

Figure 2.9. Transition of Personnel Authorizations from the 12-Center Organization to the 5-Center Organization



(RIF) at any of the installations. Some personnel were moved to new positions at their existing locations, and any personnel departures were voluntary through the voluntary separation incentive payment (VSIP) program or the voluntary early retirement authority (VERA) program. According to AFMC, there were three rounds of VSIP offers.³²

³¹ Page 23 of the OCR says “Under the proposed organization concept outlined in this OCR, physical moves which impact encumbered manpower positions are not planned.” We do not know if a similar goal existed with other initiatives.

³² AFMC/A1, personal communication, March 21, 2013. For more on VERA/VSIP, see U.S. Office of Personnel Management, *Workforce Reshaping Operations Handbook: A Guide for Agency Management and Human Resource Offices*, July 2009.

Summary

For the purposes of this analysis, we highlight the following major changes to the organizational structure of AFMC, as well as important aspects that did not change:

1. The number of centers directly reporting to the AFMC commander was reduced from 12 to 5. Three new centers were created that consolidate the missions of sustainment (AFSC), life-cycle management (AFLCMC), and test (AFTC). Although reporting lines changed, no missions or functions moved locations. The AFNWC and AFRL were not affected.
2. By reducing staff and overhead positions in going from 12 to 5 centers, 1,051 civilian manpower positions were cut, yielding an approximate annual savings of \$109 million in FY 2011 dollars.³³ According to AFMC, none of these were via involuntary reduction in force notices. No individuals lost their jobs or were forced to move as a result of the reorganization. Any persons who moved location did so voluntarily. All personnel reductions were achieved with VERA/VSIP.
3. Base operating support reporting lines were rearranged. Air base wings at Hill, Tinker, and Robins no longer report to an Air Logistics Center at those locations, but directly to the AFSC commander. The new Air Logistics Complexes are the former maintenance wings at those locations and the ALC commanders have a smaller span of control. Air base wings at Edwards and Eglin are blended with the test wings at those locations, and those test wing commanders have a larger span of control. The air base wing at Wright-Patterson and the air base group at Hanscom report directly to the AFLCMC commander.
4. Program managers now have product support oversight within their organizations and Designated Acquisition Officials are eliminated. Program offices beyond the procurement phase will move location to the associated ALC after the procurement phase ends if the system is dominantly sustained organically, as was the practice before the reorganization, but these program offices will remain assigned to the AFLCMC.
5. The office for the organize, train, and equip functions of the PEO for Strategic Systems now resides in AFLCMC.
6. Although a PEO restructuring occurred concurrently with the AFMC reorganization and was implemented with the reorganization, no changes occurred in the PEO reporting chain to the SAE.

³³ Tripp et al., Table 3.4, 2012, p. 22.

3. Methodology for Assessing the Effectiveness and Efficiency of the Reorganization

The Role of Organization in Determining Effectiveness and Efficiency

Element 1 of Section 2814 of the FY 2013 NDAA calls for an assessment of the effectiveness and efficiency of the FY 2012 AFMC reorganization.¹ As overall military capabilities emerge from a combination of the elements of doctrine, organization, training, materiel, leadership and education, personnel, and facilities, together with policy (DOTMLPF-P),² the effectiveness and efficiency of mission performance result from how well each element of DOTMLPF-P is designed, integrated, and implemented by a military command. Organization, therefore, is just one of many factors that affect the effectiveness and efficiency of AFMC prior to and after the reorganization.

Since all the elements of DOTMLPF-P intertwine to yield the effectiveness and efficiency of AFMC, disentangling the isolated contribution of the organizational change presents a challenge for assessment. A further challenge is that, as of FY 2013, many of the initiatives enabled by the reorganization that are expected to alter the effectiveness and efficiency of the AFMC are not yet fully realized or have not yet reached fruition. Some of the anticipated benefits are expected to take years to accrue, as was the case after the creation of AFRL.³ A final challenge is that other events also have an impact on the effectiveness and efficiency with which AFMC carries out its missions. Some are internal to the command (e.g., other initiatives) and some are external (e.g., the civilian hiring freezes, travel restrictions, and furloughs induced by the budget sequestration mechanism of the Budget Control Act of 2011, Public Law 112-25).

Despite these challenges, we can use established principles from organizational theory to assess (1) the opportunities and challenges for effectiveness and efficiency created by the structural changes of the reorganization; (2) the degree to which these changes align with stated assigned missions and stated goals and priorities; and (3) the extent to which the Air Force has exploited the opportunities and mitigated the challenges. This chapter develops a framework for such an assessment; the next chapter applies that framework to assess the effectiveness and efficiency of the reorganization.

¹ The NDAA language does not explicitly define these terms. For precision, we will use the term *effectiveness* to mean “the ability to execute the assigned missions” and the term *efficiency* to mean “the ability to execute the assigned missions at minimal cost.”

² Chairman of the Joint Chiefs of Staff Instruction 3010.02c, *Joint Concept Development and Experimentation (JCD&E)*, Washington, D.C., January 15, 2012.

³ Duffner, 2000.

Organizational Design

In developing this framework, we first examined the use of the terms “organizational design” and “organization structure” in the scholarly literature, and based on this review, we identified the key elements of organizational design pertinent to the FY 2012 AFMC reorganization. We subsequently developed an approach to document which key elements or aspects of organizational design changed in the reorganization and what opportunities and challenges are expected from these changes.

There is no universally accepted definition of organizational design. Many definitions of organizational design refer to both the division of labor and coordination or integration within and across those divisions.⁴ Dalton and his colleagues⁵ discuss these two aspects of design in terms of the distinction between organization *structure* (e.g., size, number of levels of hierarchy) and *structuring* (e.g., centralization, formalization). A recurring theme in definitions of organizational design is the importance of promoting the flow of work, information, and/or decisions in the right direction and with the appropriate frequency. Another theme is the need to ensure the alignment or fit between organizational design choices and an organization’s intended purpose or strategy. Further, organizational *design* and organizational *structure* are not synonymous; rather, organizational structure is an aspect of organizational design, and the latter term is generally used to describe both the division of labor and coordination.

Accordingly, in our methodology, we define organizational design as *a set of parameters that determine the division of labor and specify how coordination should occur within and across those divisions to promote efficient, effective flow of work, information, and decisions throughout the organization*. Optimal organizational design comprises both organization structure and other design elements that best suits an organization’s mission.

We reviewed scholarly literature in the fields of management, sociology, strategy, and economics to identify the major elements of organizational design. The list below provides our conceptual framework for major organizational design principles, which, as noted above, does not have a strong paradigm that organizes the various elements and guides research in the area. An asterisk denotes that the topic was (1) germane to the AFMC reorganization; and (2) a topic of organizational research that spanned decades, scholars, and publications. For example, how members of AFMC are selected, trained, and compensated did not change as a direct consequence of the reorganization, and thus we did not conduct an extensive review of this aspect of organizational design. Similarly, the role of technology in organizational design is

⁴ See, for example, Robert Duncan, “What Is the Right Organization Structure? Decision Tree Analysis Provides the Answer,” *Organizational Dynamics*, Vol. 79, No. 7, 1979, pp. 59–80; Jay R. Galbraith, *Organization Design*, Reading, Mass.: Addison Wesley Publishing Company, 1977; and Henry Mintzberg, *The Structuring of Organizations: A Synthesis of the Research*, 1st ed., Englewood Cliffs, N.J.: Prentice Hall, 1979.

⁵ Dan R. Dalton, William D. Todor, Michael J. Spendolini, J. Fielding Gordon, and Lyman W. Porter, “Organization Structure and Performance: A Critical Review,” *Academy of Management Review*, Vol. 5, No. 1, 1980, pp. 49–64.

increasingly the subject of research, but the lack of technology changes from the reorganization meant that reviewing this line of inquiry was not necessary.⁶ Organizational design research also includes studies that examine factors that influence the choice of design elements, such as uncertainty and complexity, and/or change as a result of organizational design choices, such as innovation. We have incorporated those topics into the discussion that follows and into our analysis. The principal organizational design elements we identified are:

- division of labor
 - task grouping
 - unit grouping (i.e., superstructure)*
 - specialization
 - relative size of the support component (e.g., line versus staff distinction)
- design of formal reporting relationships*
 - span of control
 - levels of hierarchy
- design of additional coordinating mechanisms
 - standardization*
 - centralization of decision rights*
 - lateral linkages*
- design of personnel management systems
 - selection
 - training
 - rewards

Five Major Elements of Organizational Design for Assessing the Reorganization

Using the list above, we focused our assessment on five major elements of organizational design relevant for assessing the AFMC reorganization: (1) division of labor: unit grouping; (2) design of formal reporting relationships; (3) design of additional coordinating mechanisms: standardization; (4) design of additional coordinating mechanisms: centralization of decision rights; and (5) design of additional coordinating mechanisms: lateral linkages.

Division of Labor: Unit Grouping

The highest level of the division of labor is an organization's "superstructure" or, in more common parlance, the grouping of workers or positions into units.⁷ How positions are grouped into units and what size those units should be are important considerations for both

⁶ The change of some of the reporting chains does require more use of video-teleconferencing in some cases, but these kinds of interactions were common prior to the reorganization. For example, many units reporting to the Electronic Systems Center were not collocated with the headquarters at Hanscom Air Force Base.

⁷ Mintzberg, 1979.

organizational design practitioners and scholars. According to Mintzberg, positions or workers that are grouped together typically share resources, fall under common supervision, and are evaluated using the same or similar performance metrics.⁸ He also identified six bases for grouping: the knowledge and skills an organization's members bring to the job; the work process or activity performed by members; the time when the work is performed; the place where the work is performed; the goods produced or services rendered; and the client(s) for which work is performed. Interdependencies may also influence the grouping of positions or units.

Several types of superstructure are discussed in organizational design literature. The predominant two are *functional structure* and *divisional structure*. A functional structure is one in which all knowledge, skills, and abilities related to a specific activity (e.g., research and development, accounting) are grouped together in the same unit. In other words, there are "seams" between activities such as research and development and accounting. Alternatively, a divisional structure, also referred to as a product structure or strategic business unit, is one in which the basis for grouping is some form of output. A division structure consists of units organized according to individual products, services, projects, programs, locations, or lines of business. As a result, the organization is less centralized than an organization with a functional structure would be; decisionmaking occurs at lower levels of hierarchy than would typically be the case in a functional structure. A *matrix structure* is a combination of both types, and other forms of division, such as a *horizontal structure* (i.e., process-based) and *virtual network structure* (i.e., one in which major processes are contracted out), have also been discussed in the literature, albeit to a more limited degree.⁹

Strengths of a functional structure include the following:

- maximum economies of scale
- a minimal amount of effort required of specialized workers for administrative tasks or coordination
- a simple chain of command for communication and decisionmaking
- high levels of control, reliability, and efficiency.

However, these strengths may not be fully realized if the environment in which an organization operates is not stable; a functional structure is not readily adaptable in response to a dynamic environment or uncertainty. If an organization has multiple products, programs, or other forms of output, a functionally based division of labor may be less suitable as well.

Along those same lines, the downsides of a functional structure include slower decision response times when the operating environment shifts, bottlenecks for tasks with sequential interdependence, and limited ability for coordination across functions (i.e., horizontal linkages). Moreover, in some cases it may be difficult to fully decompose certain tasks and processes along functional lines, which can lead to incomplete or redundant coordination across functional

⁸ Mintzberg, 1979.

⁹ Richard L. Daft, *Organization Theory and Design*, 9th ed., Mason, Ohio: Thomson South-Western, 2007.

areas.¹⁰ An organization with a functional structure also tends to have a limited ability for learning and innovation.¹¹ Finally, an organization's size can strain a functional structure as well; as an organization grows, a functional structure can be unwieldy and present coordination challenges.¹²

There are also a number of strengths associated with a divisional structure:

- suitability for a dynamic, rapidly changing, unpredictable environment and for other conditions of environmental complexity
- higher customer satisfaction because response times to changing demands tend to be faster
- high visibility product, program, or project lines
- clearer visibility of task responsibilities and points of contact to customers and other external stakeholders.

Innovation, learning, and adaptation can also occur more readily in a divisional structure than a functional one, but this can come at the expense of efficiency. The lack of centralization makes it more difficult to share assets or pool resources, standardize outputs, and coordinate across divisions—even when there is interdependence among them. Instead, conflicts stemming from different divisional priorities may arise if mechanisms are not in place to prevent them. Finally, when innovation does happen, it may be at a local or product level rather than at a level that benefits the entire organization.¹³

Design of Formal Reporting Relationships

Pugh and his colleagues¹⁴ define unit configuration as the shape of roles within the superstructure. This includes formal reporting relationships both within and between levels of hierarchy. Formal reporting relationships *within* levels of hierarchy are referred to as “span of control,” which is defined as the number of employees or subordinates who report to a single supervisor. Formal reporting relationships *between* levels of hierarchy are typically described in terms of the number of hierarchical levels within an organization. These two ideas can be viewed, respectively, as the width and the height of an organization.¹⁵ Span of control and hierarchy can both be regarded as ways to coordinate work, but they differ from the coordinating mechanisms we discuss in the next subsections because they also dictate the actual physical

¹⁰ Oliver E. Williamson, *Markets and Hierarchies: Analysis and Antitrust Implications*, New York: Free Press, 1983; Albert Chandler, *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*, Cambridge, Mass.: MIT Press, 1962.

¹¹ Daft, 2007; Duncan, 1979.

¹² Williamson, 1983; Chandler, 1962.

¹³ Daft, 2007; Duncan, 1979.

¹⁴ D. S. Pugh, D. J. Hickson, C. R. Hinings, and C. Turner, “Dimensions of Organization Structure,” *Administrative Science Quarterly*, Vol. 13, No. 1, 1968, pp. 65–105.

¹⁵ Mintzberg, 1979.

context of an organization. Span of control and hierarchy are coordinating mechanisms that provide structure, while other coordinating mechanisms, such as standardization, centralization, and lateral linkages offer a basis for operating, or structuring, within that physical context.

There is limited research on the “ideal” span of control.¹⁶ More typically, research has focused on determinants of span of control¹⁷ or the relationship between span of control and performance.¹⁸ Bohte and Meier¹⁹ explained that in the case of simple, routinized tasks, tight (i.e., narrow) spans of control are inefficient because rules and standard operating procedures are sufficient to guide behavior. Bell²⁰ and Daft²¹ both reported that spans of control tended to be tighter when the complexity of the work is higher. Galbraith²² also described this relationship, and, moreover, noted that the span of control tends to be narrower under conditions of uncertainty or when the level of skill or professionalization of workers is high. To illustrate, he discussed how an engineering department or task has a higher level of uncertainty and involves a higher level of skill than either maintenance work or manufacturing work, and thus the span of control for engineering tasks tends to be smaller than that for maintenance or production-focused tasks. Daft²³ corroborates and builds on Galbraith’s insights,²⁴ explaining that engineering units tend to have a moderate span of control; units with routine technologies have a wide span of control; and units that primarily rely upon non-routine technologies tend to have a moderate to narrow span of control.

Organizations that have many units with narrow spans of control in turn have more separate reporting units. Having more units creates more seams within the organization than it would have with fewer units, thereby increasing the need for lateral linkages to coordinate operations. Hence, narrow span of control throughout an organization increases the transaction costs of operations.²⁵

¹⁶ John Bohte and Kenneth J. Meier, “Structure and the Performance of Public Organizations: Task Difficulty and Span of Control,” *Public Organization Review*, Vol. 1, No. 3, 2001, pp. 341–354.

¹⁷ See, for example, Gerald D. Bell, “Determinants of Span of Control,” *American Journal of Sociology*, Vol. 73, No. 1, 1967, pp. 100–109.

¹⁸ See, for example, William W. Ronan and Erich P. Prien, “An Analysis of Organizational Behavior and Organizational Performance,” *Organizational Behavior and Human Performance*, Vol. 9, No. 1, 1973, pp. 78–99; Joan Woodward, *Management and Technology*, London: Her Majesty’s Stationery Office, 1958; Joan Woodward, *Industrial Organization: Theory and Practice*, London: Oxford University Press, 1965.

¹⁹ Bohte and Meier, 2001.

²⁰ See, for example, Bell, 1967.

²¹ Daft, 2007.

²² Galbraith, 1977.

²³ Daft, 2007.

²⁴ Galbraith, 1977.

²⁵ Kenneth J. Meier and John Bohte, “Span of Control and Public Organizations: Implementing Luther Gulick’s Research Design,” *Public Administration Review*, Vol. 63, No. 1, 2003, pp. 61–70.

Span of control is closely linked to the structure of an organization's *hierarchy*. Hierarchical-based authority is regarded by scholars as one of the canonical elements of organizational structure. It compensates for bounded rationality²⁶ by promoting information flow and decomposing problems that are difficult if not impossible for a single individual to solve.²⁷ Put another way, hierarchy provides a clear, legitimate basis for authority and is regarded as an efficient approach to information processing; it streamlines direct communication across interdependent units through the chain of command.²⁸

Hierarchy structure tends to be discussed in terms of the number of levels of hierarchy, also referred to as the “flat/tall” hierarchy distinction²⁹ or vertical differentiation.³⁰ Mintzberg suggested that organizations are generally tall, with small units and narrow spans of control, or flat, with large units and wide spans of control.³¹ Larger organizations (in terms of number of employees) tend to have more levels of hierarchy, as do those with few major divisions, and more automation.³² There is no definitive guidance on the “ideal” number of levels of hierarchy, however. When tasks, problems, and decisions are routine or repetitious, rules or procedures are a more efficient choice of coordinating mechanism than multiple levels of hierarchy.³³ On the other hand, the presence of uncertainty or complexity suggests the need not only for narrower spans of control, as noted above, but also for more hierarchy to accommodate tighter spans. However, as an organization's hierarchy grows in height, the transaction costs associated with maintaining multiple levels of hierarchy may exceed the benefits they offer, and another mechanism to coordinate activity or process information may be superior.³⁴

Design of Additional Coordinating Mechanism: Standardization

Standardization (referred to by some scholars as formalization) is the use of rules and procedures, often codified, to prescribe and limit the actions of an organization's members.³⁵

²⁶ *Bounded rationality* is a concept developed by Herbert Simon to account for individual decisionmaking behavior. He argued that individuals are not perfectly rational in their decisionmaking due to three major limitations: the incomplete information they possess, the cognitive limits of the human mind, and the finite amount of time they have to make a decision. See H. A. Simon, *Models of Man*, New York: Wiley, 1957.

²⁷ Peter M. Blau, “The Hierarchy of Authority in Organizations,” *American Journal of Sociology*, Vol. 73, No. 4, 1968, pp. 453–467.

²⁸ Galbraith, 1977.

²⁹ Dalton et al., 1980.

³⁰ Andrew H. Van de Ven, “A Framework for Organization Assessment,” *Academy of Management Review*, Vol. 1, No. 1, 1976, pp. 64–78.

³¹ Mintzberg, 1979.

³² Blau, 1968.

³³ Daft, 2007.

³⁴ Galbraith, 1977.

³⁵ Daft, 2007; Dalton et al., 1980.

While formal lines of reporting can also accomplish these objectives, standardization is sometimes more efficient (e.g., in the case of routine work noted above) and also supplements what can be achieved by individual managers within the formal lines of reporting. Standardized procedures help compensate for members' bounded rationality; when standard practices are in place, members do not need to exert time, energy, or other resources in search of the right course of action.³⁶ While standardization typically refers to the development of common operating procedures and definition of similar outputs, standardization may also pertain to tacit forms of coordination. For instance, Mintzberg describes socialization as the standardization of norms, and his work suggests that well-socialized members of an organization can coordinate their behavior through shared norms.³⁷

The use of standardization as a coordinating mechanism can promote efficiency and reliability in pursuit of desired outcomes. It also helps organizations avoid role ambiguity, which can have negative implications for job-related attitudes and performance.³⁸ However, standardization can be difficult to achieve under conditions of uncertainty and complexity. Further, too much standardization, at least as perceived by an organization's members, can have dysfunctional results if it overly limits job scope. These consequences include job dissatisfaction, absenteeism, turnover, mistreatment of clients, and rigidity in behavior that includes the rejection of innovative ideas.³⁹

Design of Additional Coordinating Mechanism: Centralization of Decision Rights

Centralization refers to the vertical distribution of power in an organization. It is a type of coordination that stems from the locus of decision authority within a hierarchy.⁴⁰ A highly centralized organization is one in which decision rights (i.e., decisionmaking authority) are at the highest echelon, and the ultimate case of centralization is one in which "[a]ll decisions are made by one individual, in one brain, and then implemented through direct supervision."⁴¹ Conversely, in decentralized organizations, decision rights reside at lower levels of the hierarchy, and at the extreme, an organization in which all members have equal power in decisionmaking is decentralized to the maximum extent possible. Mintzberg also described a second type of decentralization, which he referred to as *horizontal decentralization*.⁴² This pertains to the extent

³⁶ G. Gavetti, D. Levinthal, and W. Ocasio, "Perspective—Neo-Carnegie: The Carnegie School's Past, Present, and Reconstructing for the Future," *Organization Science*, Vol. 18, No. 3, 2007, pp. 523–536.

³⁷ Mintzberg, 1979.

³⁸ Dalton et al., 1980.

³⁹ Dalton et al., 1980; Mintzberg, 1979.

⁴⁰ Daft, 2007; Galbraith, 1977.

⁴¹ Mintzberg, 1979, p. 182.

⁴² Henry Mintzberg, "Structure in 5's: A Synthesis of the Research on Organization Design," *Management Science*, Vol. 26, No. 3, 1980, pp. 322–341.

to which decisionmaking authority is dispersed to include individuals outside the chain of command. Perhaps not surprisingly, organizations that have more highly qualified personnel tend to be decentralized.⁴³

No particular level of centralization (or decentralization) is inherently superior. Rather, the right amount of centralization is relative; it is a matter of finding the ideal degree of centralization given relevant task, organizational, and environmental conditions and their relative importance in achieving the organization's goals.⁴⁴ High centralization can accelerate problem-solving, but the quality of solutions tends to be higher with greater decentralization,⁴⁵ and research suggests that innovation thrives more readily in a decentralized environment as well.⁴⁶ Other strengths and weaknesses of high centralization are similar to those described earlier for the functional organizational form, and, similarly, the advantages and disadvantages of a divisional form resemble those for greater decentralization. For example, when quick responsiveness is required, such as in a dynamic environment, a more decentralized form of decisionmaking is typically more effective. But not all parts of a functionally organized unit are highly centralized, nor are all parts of a division-based organization highly decentralized. Regardless of superstructure type, when decisions are delayed or are of inferior quality, this could indicate that decisionmakers are overwhelmed by the problems and decisions they are responsible for handling.⁴⁷

Design of Additional Coordinating Mechanism: Lateral Linkages

While formal reporting relationships provide a clearly defined basis for coordination and communication up and down the chain of command, under certain conditions, coordinating mechanisms in the form of *lateral linkages* are just as important if not more important than these influences on vertical coordination. Lateral linkages enable horizontal integration and reduce the need to refer decisions up the chain of command, thereby facilitating more effective decentralization. Types of lateral linkages, ranging from the simplest to the most costly and complex, are as follows:

- *direct contact* between two members who need to make a decision or resolve a problem
- *liaison roles*, which temporarily link two units that have substantial, ongoing communication

⁴³ Blau, 1968.

⁴⁴ Galbraith, 1977.

⁴⁵ J. Mihm, C. H. Loch, D. Wilkinson, and B. A. Huberman, "Hierarchical Structure and Search in Complex Organizations," *Management Science*, Vol. 56, No. 5, 2010, pp. 831–848.

⁴⁶ Fariborz Damanpour, "Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators," *Academy of Management Journal*, Vol. 34, No. 3, 1991, pp. 555–590.

⁴⁷ Daft, 2007.

- *task forces*, which are similar to liaison roles but draw members from multiple units within an organization to serve in a temporary, coordinating role
- *full-time integrator*, a permanently designated position or department created solely for the purpose of coordination across units—unlike someone serving in a liaison role or on a task force, this type of integrator is located outside the units it coordinates
- *teams* or, essentially, permanent task forces to provide horizontal coordination over a long period of time.⁴⁸

These varied forms of horizontal integration are especially useful to help organizations operate more efficiently under conditions of uncertainty,⁴⁹ to communicate information that is less quantifiable,⁵⁰ and to promote knowledge sharing more generally.⁵¹ Some organizational scholars have asserted that vertical coordination through hierarchy and other mechanisms is not sufficient in modern organizations. Insufficient use of lateral linkages may account for a lack of innovation and adaptation in dynamic environments as well as for conflicts between different departments due to a focus on departmental goals at the expense of organizational ones.⁵² The costs associated with developing and maintaining horizontal integration can be great, however, so organizations need to consider carefully their choice of lateral linkage.

Other Considerations

For the purposes of this discussion, we have isolated different aspects of organizational design. However, the strategic fit or coherence between different design elements is critical,⁵³ and some organizational design choices are highly related to others. For example, as a functional organization grows in size, the nature and extent of horizontal integration across functions may become more important. In addition, aspects of organizational design also need to fit with the environment in which an organization operates. Environmental uncertainty, for instance, is best handled pushing decision rights to lower levels in the hierarchy to reduce the managerial burden on top leaders.⁵⁴

Accordingly, in our assessment, we are conservative in what impacts, positive or negative, it could attribute to the specific changes brought about by the AFMC reorganization. Instead, we

⁴⁸ Daft, 2007; Galbraith, 1977.

⁴⁹ Galbraith, 1977.

⁵⁰ Michael L. Tushman and David A. Nadler, "Information Processing as an Integrating Concept in Organizational Design," *Academy of Management Review*, Vol. 3, No. 3, 1978, pp. 613–624

⁵¹ Annick Willem and Marc Buelens, "Knowledge Sharing in Public Sector Organizations: The Effect of Organizational Characteristics on Interdepartmental Knowledge Sharing," *Journal of Public Administration Research and Theory*, Vol. 17, No. 4, 2007, pp. 581–606

⁵² Daft, 2007.

⁵³ John F. Price, "Strategic Distraction: The Consequence of Neglecting Organizational Design," *Air and Space Power Journal*, July–August, 2013, pp. 129–139; Tushman and Nadler, 1978.

⁵⁴ Danny Miller, "Environmental Fit Versus Internal Fit," *Organization Science*, Vol. 3, No. 2, 1992, pp. 159–178.

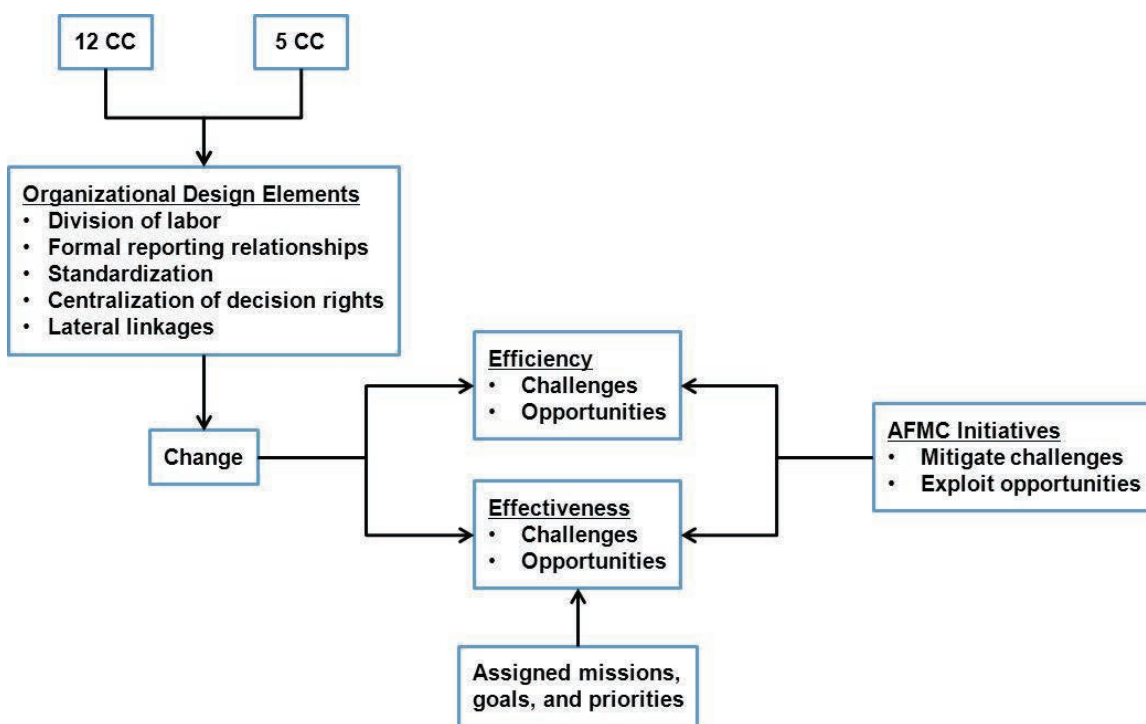
use organizational design theory and research to identify potential challenges and opportunities that might be realized as a result.

Methodology Used in the Assessment of the AFMC Reorganization

From the first section of this chapter, we conclude that organizational structure is just one factor that contributes to effectiveness and efficiency. From the second section of this chapter, we conclude that five organizational design elements are relevant to the AFMC reorganization and can be used to assess the reorganization. Further, there is no ideal organizational design. Any organizational design brings with it both benefits and risks, and the choice of design is guided by the environment in which the organization operates and its strategic priorities. Putting these ideas together, we seek to document in this report which organizational design parameters changed in going from the 12-center construct to the 5-center construct, and what opportunities and challenges are expected from these changes. Figure 3.1 depicts this methodology.

The figure reads from the upper left to the lower right. First, the changes in the organization are described in terms of the five organizational design elements. Given what has been observed about these parameters in the literature, we describe what opportunities have arisen to improve effectiveness and efficiency, and what challenges are introduced. The assessment, then, has two dimensions:

Figure 3.1. Schematic Depiction of the Methodology for Assessing Effectiveness and Efficiency



- First, because certain organizational constructs reduce risk in some areas and increase it in others, it is vital to shape this discussion in terms of the missions and priorities of the command. Are the opportunities and challenges induced by the changes consistent with the missions assigned to AFMC, and are they consistent with Air Force and DoD goals and priorities?
- Second, what has the command done to mitigate the challenges and to exploit the opportunities?

The next chapter summarizes the results of this assessment.

4. Assessing the Effectiveness and Efficiency of the Reorganization

In this chapter, we assess the effectiveness and efficiency of the FY 2012 AFMC reorganization. We emphasize again that (1) organization is just one component of doctrine, organization, training, materiel, leadership and education, personnel, and facilities, together with policy (DOTMLPF-P) that contributes to effectiveness and efficiency; (2) many of the benefits and possible challenges associated with the reorganization will require a much longer time frame to come to full fruition; and (3) that factors outside AFMC's control, such as budgetary constraints, also contribute.

In conducting this assessment, we restrict the analysis to the elements that changed as a result of the reorganization. Any issues that existed prior to the reorganization and that were unaffected by the reorganization have been excluded from the assessment. We also assess the effectiveness and efficiency of the reorganization on the Air Force enterprise as a whole, not on a particular unit or location.

One motivation behind the reorganization was to cut O&M costs by eliminating civilian manpower positions. The reorganization trimmed 1,051 positions from staff and overhead while retaining line positions, yielding an approximate annual savings of \$109 million in FY 2011 dollars.¹ After extensive discussions with relevant stakeholders within AFMC, Headquarters U.S. Air Force, and other MAJCOMs, we identified only one concern attributed directly to the loss of these staff positions—that a Strategic Weapons Roadmap might not be replicated that was once done by the staff at the former Air Armaments Center.² Whether the staff reductions will impact other tasks, such as document flow and approval, is difficult to assess at this time. Not enough time has elapsed since the reorganization to observe any potential consequences in these processes and if there were observed changes, it would be quite challenging to disentangle any affects due to the reorganization from the other changes to AFMC listed in Chapter One.

To the extent that AFMC can continue to perform its missions as or more effectively than before the reorganization, this annual savings yields more efficient operations. The remainder of this chapter will assess any impacts to effectiveness or efficiency as can be ascertained so far by using the principles of organizational design. The first section addresses whether the opportunities and challenges induced by the organizational changes as defined by the five organizational design elements discussed in the last chapter are consistent with the missions assigned to AFMC and with Air Force and DoD goals and priorities. The second and third

¹ Tripp et al., Table 3.4, 2012, p. 22.

² AFMC notes that producing such a roadmap is not typically a responsibility of a center staff.

sections document what the Air Force has done to mitigate the challenges incurred and what it has done to exploit the opportunities.

Assessing the Changes to Organizational Design

This section's structure will mimic the structure of the organizational design element discussion in the previous chapter. For each organizational design element, we discuss the changes that occurred under the reorganization, then we assess each change type; these subsections set up the discussion of potential challenges and opportunities later in the chapter.

Division of Labor

Changes

Under the 12-center construct, the second organizational level just under the commander (the center level) was a hybrid form that did not correspond overall to any typical superstructure in the organizational literature. The centers were aligned neither by mission (functional alignment) nor by weapon system/customer (divisional alignment).³ One product center, the Air Armament Center, had a mixed mission of both test and life-cycle management of weapons and was loosely aligned by product (weapons). The Air Logistics Centers had a mixture of depot maintenance and product support. Supply chain management was in a separate center (AFGLSC). Life-cycle management was spread among the three product centers for development and procurement and three Air Logistics Centers for product support, as well as the AFNWC.

To some extent, the organizational structure below the center level was loosely organized around products, in some areas more strongly than others. To cite some examples, in the test area, the 46 TW was focused strongly on weapons testing; a separate shop at the Ogden Air Logistics Center performed depot-level maintenance on landing gear; and the directorates in the former product centers were roughly organized around weapon systems.

The new 5-center construct for AFMC is organized around missions at the center level and corresponds to what is often called a functional structure in the organizational literature. Testing is now consolidated in the AFTC; sustainment, in the form of depot maintenance and supply chain management, in the AFSC; and life-cycle management in the AFLCMC. The exception is that nuclear activities remain in the AFNWC. The structure below the center level remains the same as before, loosely aligned by product. The main change below the center level has been in the reporting lines for the base operating support units.

³ In the last chapter, we used the common terms of organizational theory, where *function* is used generically. In the organizational literature, the term *function* roughly corresponds to the Air Force use of the term *mission*, and the term *function* in the Air Force is used to refer to supporting staff activities such as manpower management, contracting, financial management, and so forth. A *divisional structure* in AFMC would be aligned around products (weapon systems) or customers (MAJCOMs).

In the 5-center construct, some aspects of matrix management are being used, especially in the AFLCMC, through increased sharing of functional support (e.g., contracting, financial management) among the directorates. By putting all the AFMC PEOs in one center, functional support can now be more easily shared among the PEOs so that they do not have to rely exclusively on their own personnel.

Assessment

The mission alignment of AFMC fosters tighter oversight, economies of scale, and opportunities for higher efficiencies. The main weaknesses generally seen in mission-aligned organizations are that they can be less adaptive in rapidly changing environments and that they do not facilitate innovation and learning as much as divisional structures tend to. Alignment around missions rather than divisions (e.g., weapon systems or customers) is often adopted by firms operating in environments of relatively high certainty.

In the continuum from environments of high certainty (e.g., a household products manufacturer) to those of high uncertainty (e.g., consumer electronics design), the process related task responsibilities of AFMC lie toward the end of higher certainty and are consistent with the choice of moving to a mission-aligned structure. The chosen structure also aligns with the four principal missions assigned to AFMC: test, S&T, sustainment, and life-cycle management.⁴

Limited matrix management of functional support personnel, especially within AFLCMC, also creates an opportunity for AFMC to absorb the loss of 1,051 staff positions with less impact to functional support than without the reorganization, and presents opportunities for more efficient operations by exploiting economies of scale with manpower resources. In this manner, PEO directorates have the potential to be more effective and efficient as part of AFLCMC than they could be as stand-alone directorates or when spread across three centers, as they were prior to the reorganization. Anecdotal evidence, such as cross-directorate use of engineering staff to more rapidly resolve an engineering matter in AFLCMC, indicates that such opportunities are being exploited, at least on a small scale.

The lost opportunities for enhanced adaptability and innovation from not adopting a divisional structure alignment (more product or customer focused) at the center level is partially offset by the loose organization around weapon systems (somewhat of a divisional structure) at lower levels in the organization. As this part of the structure did not change during the reorganization, it is expected to have no net effect on overall effectiveness and efficiency.

Overall, the move from a hybrid structure to a mission-oriented structure is consistent with AFMC missions and the environment in which AFMC operates and is expected to yield opportunities for tighter oversight of the missions and more efficient operations. By placing product support in the AFLCMC and giving full cradle-to-grave weapon system oversight to the

⁴ Air Force Mission Directive 4, 2013.

program managers (PMs), including product support, the new structure conforms to the OSD Product Support Business Model.⁵ And, the existence of centers that consolidate life-cycle management (AFLCMC) and nuclear activities in AFMC (AFNWC) conforms to the Chief of Staff of the Air Force's priorities to "recapture acquisition excellence"⁶ and to "continue to strengthen the nuclear enterprise." Overall, the move from a hybrid structure at the center level to a mission-oriented structure is consistent with Air Force and OSD goals and priorities.

Formal Reporting Relationships

Changes

Formal reporting relationships are expressed in organizational design in terms of span of control and the overall hierarchy in the organizational structure. Through the AFMC reorganization, the span of control at the center level was increased by reducing the number of direct reporting centers. The three newly created centers have both a greater number of subordinate personnel and a higher diversity of activities than most centers prior to the reorganization. The AFSC now has overall responsibilities for the three depots, their associated air base wings, and supply chain oversight. The AFLCMC has all the program offices that were in the three former product centers plus the product support-focused program offices that were under the Air Logistics Centers. The AFTC has all three test units. Spans of control at the AFNWC and AFRL remain unchanged.

Spans of control at lower levels changed in both directions. The Air Logistics Complexes now have a narrower span of control than the former Air Logistics Centers, and the new 96 TW at Eglin and 412 TW at Edwards have larger spans of control given that the air base wings at those locations are part of the test wings.

The hierarchy in AFMC, defined as the number of vertical organizational levels, remains unchanged by the reorganization.

Assessment

The larger spans of control at the center level are a natural consequence of mission alignment and enable the decentralization of decision rights discussed below. While the air base wings do not report to the Air Logistics Complexes, the substantive decrease in the span of control at the depots is due to the loss of the product support activities in the program offices, which moved to AFLCMC. This issue will be discussed in more detail in the section below on challenges introduced by seams. But in a strict sense, the change at the depots is not one of span of control

⁵ The FY 2010 NDAA mandated the creation of a PSM for major defense weapon systems (Public Law 111-84, National Defense Authorization Act for Fiscal Year 2010, October 29, 2009, Section 805). For implementation, see Department of Defense, *Product Support Manager Guidebook*, Washington, D.C., 2011.

⁶ See also Initiative #1, "Revitalize the Air Force Acquisition Workforce" in Office of the Assistant Secretary of the Air Force (Acquisition), *Acquisition Improvement Plan*, May 4, 2009.

(the current Air Logistics Complexes are the former maintenance wings renamed as ALCs) but a change in reporting lines. The 96 TW at Eglin and the 412 TW at Edwards now contain the former air base wings and have significantly increased span of control. While this increase gives a more diverse portfolio of responsibilities to the commanders of these wings, we also note that the test activities have a close dependency on the range and its instrumentation, which yields opportunities for better integrated oversight. It is too early to have empirical evidence on whether the benefits accrued from having the test and base operating support combined at these locations outweighs the burden of large span of control on the commanders.

One significant benefit from the wider span of control at the three newly created centers is that the resulting span of control corresponds to major mission areas and thereby removes seams that previously cut through these missions. The changes in span of control are consistent with AFMC missions and do not conflict with Air Force/DoD goals and priorities.

Given that the hierarchy did not change, it does not affect effectiveness or efficiency.

Standardization

Changes

Standardization is a priority of AFMC and was a goal of the reorganization. The OCR stated that “AFMC’s proposed structure will drive standard processes and procedures across mission areas to produce long-term effectiveness and efficiencies.”⁷ Of the five priorities listed in AFMC’s Strategic Plan, the second is to “standardize & continually improve processes . . .”⁸ Standardization is both a part of the reorganization—one of the conditions of full operating capability, expected to be reached on October 1, 2013, is to have reviewed and implemented process standardization efforts—and is an expected outcome of the reorganization.

Assessment

Standardization provides oversight and tends to promote efficiencies. When overdone, standardization can stifle initiative. Using standardization as a means of control within an organization is consistent with the relatively predictable (higher certainty) environment in which AFMC operates. The types of standardization that are being pursued (listed below in the section on exploiting opportunities) are consistent with the goal of increasing effectiveness and efficiency. Because these efforts are ongoing, it is premature to assess whether they are yielding the expected benefits. It will be important for AFMC to continually monitor and assess the success of these efforts as they are implemented and mature.

⁷ AFMC, 2012, p. ii.

⁸ AFMC, *Strategic Plan*, 2013, p. 9.

Centralization of Decision Rights

Changes

One of the most important changes resulting from the reorganization is the vertical distribution of power and the locus of decision rights in AFMC. Under the previous 12-center construct, oversight and integration of these missions were driven to the headquarters level, requiring adjudication by either the headquarters staff or a 3-star vice commander or 4-star commander with a large span of control. Under the new construct, the consolidation of the mission areas of sustainment, life-cycle management, and test into their own centers naturally decentralizes the decision rights (i.e., assigns decision authority to a lower level of hierarchy) for many of the oversight and integration matters in these missions to the center level.

By decentralizing decisions about the mission to the center level rather than the headquarters level, decisionmaking is nimbler. Having center commanders with spans of control that correspond to those decision spaces puts decisions closer to the locus of relevant knowledge and experience and reduces the number of levels of hierarchy through which information needs to flow before an oversight decision is made.

By placing the product support-focused program offices that were once under the Air Logistics Centers in the AFLCMC and eliminating the DAO reporting chain, there is a single, unambiguous reporting chain from each SPM to a PEO.

Assessment

Both the 12-center and 5-center constructs are relatively centralized, but the 5-center construct is more decentralized than the highly centralized organizational design that existed before the reorganization. Given the very large span of control of the AFMC commander, moving the primary execution decisions for the command's major mission areas to centers organized around those mission areas is consistent with effective and efficient mission operations. In particular, by placing the product support-focused program offices that had been in the Air Logistics Centers in the AFLCMC with the other program offices, the program managers now have oversight and responsibility for all aspects of acquisition, production, fielding, and product support (sustainment), in accordance with DoD policy.⁹ By placing the product support responsibilities together with other life-cycle management responsibilities, the organizational design facilitates better incorporation of sustainment considerations early in the acquisition process. Given that 60–70 percent of system life-cycle costs are frequently in operations and support costs rather than research, development, testing, and production, this management structure facilitates more efficient operations and conforms to the OSD Product Support Business Model.¹⁰

⁹ DoD Directive 5000.01, *The Defense Acquisition System*, Washington, D.C., November 20, 2007.

¹⁰ DoD, 2011, p. 10.

Because the changes to centralization place the decisions closer to the knowledge and experience base of the missions and streamlines decisionmaking by reducing the number of participants needed, these changes are also in accord with the general principles concerning where decision rights should lie in an organization to yield more effective and efficient operations.

Lateral Linkages

Changes

The need for lateral linkages arises because of the existence of seams. By changing the superstructure, i.e., the grouping of workers and formal reporting lines, the reorganization removed some seams that existed in the prior organizational structure and introduced some new seams.

The major seams that were removed by the reorganization are:

1. between the product support–focused program offices in the Air Logistics Centers and other program offices in AFMC
2. among the three test units (46 TW, 412 TW, and AEDC)
3. among the three depots at Ogden, Oklahoma City, and Warner-Robins
4. between supply chain management (AFGLSC) and the three depots
5. between the Office of the PEO for Strategic Systems and the other AFMC PEO directorates.

The major seams that were introduced by the reorganization are:

1. between the ALCs and the program offices that were previously aligned to the ALCs
2. between the 96 TW and the Armament Directorate at Eglin
3. between the Office of the PEO for Strategic Systems and the AFNWC.

Assessment

Overall, the reorganization reduced the number of major seams in the organization. In organizational design, the choice of location of seams is done according to where an organization chooses to take risk, which in turn is guided by its overall strategy, goals, and priorities.

The seams removed largely cut across major mission areas assigned to AFMC. Removing the seam cutting through life-cycle management eliminates the DAO and creates a single chain of command for life-cycle management (acquisition and product support) and is consistent with the OSD Product Support Business Model, which advocates for program managers having oversight of product support as well as development, production, and disposal of weapon systems, and conforms to the Chief of Staff of the Air Force’s priority to “recapture acquisition excellence.”¹¹ The removal of seams in both the test and depot maintenance areas is consistent with a strategic

¹¹ See also Initiative #1, “Revitalize the Air Force Acquisition Workforce” in Office of the Assistant Secretary of the Air Force (Acquisition), 2009.

emphasis on the overall mission responsibilities of AFMC to provide test and sustainment for the Air Force. The remaining seams we treat in more detail below, since the overall assessment depends on the severity of the seam and the mitigations that AFMC has put in place, in the form of lateral linkages, to address them.

Mitigating the Challenges

All organizational structures group together some workers and separate others, creating seams. As discussed in the previous chapter, the choice of where to place these seams should be made to reduce risk to the mission assigned to the organization and to align with the organization's overall goals and priorities. Some formal or informal lateral linkages should also exist to provide horizontal integration to mitigate these seams. Some mitigations are more costly than others, and hence the choice of mitigation depends on how critical the seam might be, given strategic priorities. In this section, we discuss the most salient seams introduced by the reorganization and assess the seams in terms of consistency with mission, goals, and priorities and describe the mitigation strategies AFMC has put in place to manage the risk.

Realignment of Program Offices to AFLCMC from the ALCs

The Challenges

We judge the most significant seam introduced by the reorganization, given the missions and priorities of the command, to be the one inserted between the Air Logistics Complexes (the former maintenance wings at the three depots) and the product support-focused program offices that once resided in the former Air Logistics Centers. We make this assessment because this seam cuts across a wide range of weapon systems and two large, significant processes cross the boundary between the AFSC and the AFLCMC in which the program offices that once resided in the Air Logistics Centers play important roles: depot maintenance and supply chain management. This topic was a central focus of the FY 2012 report to Congress on the reorganization and the reader is also referred to that report for a more extensive discussion.¹²

Life-cycle management and sustainment are intimately related missions that benefit from close coordination. For depot maintenance, overall responsibility for weapon system readiness resides on the life-cycle management side. Among other activities, AFLCMC determines maintenance requirements and performs sustaining engineering functions. The AFSC is responsible for executing depot-level maintenance on weapon systems and depot-level reparable spare parts. The ALCs and AFSC are responsible for having the capacity, supply chain support, and proper scheduling to execute this mission both at the present and into the future.

For the supply chain, the program offices in AFLCMC and the supply and maintenance units in AFSC also must coordinate activities to ensure that this process operates effectively and

¹² Tripp et al., 2012.

efficiently. The program offices are responsible for technical specifications of parts, requirements for parts reliability, determination of which parts are likely needed for specific bills of work, as well as other engineering-related oversight. For example, when a part needs to be refurbished, AFSC needs to get engineering authority from the program office for this activity. Also, when a new contract is written for parts from a commercial vendor, the program office has the authority for the technical specifications of the part.

AFMC has instituted a number of organizational design elements to mitigate the potential negative consequences of this seam. First, it has established a formal council co-chaired by the commander of AFSC and the commander of AFLCMC to adjudicate issues across the centers. Second, formal units exist to facilitate horizontal integration, as shown in Figure 2.7. Each Air Logistics Complex has an Aerospace Sustainment Division to “provide horizontal integration across program management/product support, depot operations and the supply chain associated with the Air Logistics Complex location.”¹³ The AFSC has also created a strategic planning unit (SPU) responsible for “devising and implementing long-term complex infrastructure and mission plans” to promote the efficiency and effectiveness of ALC operations. Third, the AFSC has created a Logistics Directorate (LG) to help integrate sustainment efforts across the AFSC, and the AFLCMC is in the process of standing up a parallel organization in AFLCMC. Peer-to-peer communications between these two LG organizations provide a third lateral linkage between the two centers. Fourth, the four 3-star generals in the sustainment community meet as needed to manage weapon system sustainment and other integration matters across AFSC and AFLCMC (the Air Force Deputy Chief of Staff for Logistics, Installations, and Support; the vice commander of AFMC; the commander of AFSC; and the commander of AFLCMC). This ability for peer-to-peer discussions regarding the management of weapon system sustainment and other matters among the Air Staff, Headquarters AFMC, and two center commanders is enabled by the reorganization and provides an additional mechanism for mitigating any potential negative consequences arising from this seam.

Assessment

Significant seams require significant formal and informal mechanisms to provide horizontal integration to bridge those seams. AFMC has treated this seam accordingly by setting up two formal mechanisms and two informal mechanisms to provide horizontal linkages across the seam between the program offices and the ALCs/AFSC. It is too early to obtain empirical evidence regarding either what negative consequences this seam has led to or how well the new lateral linkages have mitigated them. It will be important for the Air Force to monitor and assess any performance issues that might arise and whether the mitigations in place are sufficient.

¹³ AFMC, 2012, p. 3.

Separation of the 96 TW and the Armament Directorate

The Challenge

We judge the second most significant seam to be the one introduced between the 96 TW and the Armament Directorate. We judge it to be less significant than the movement of the program offices out of the ALCs because it cuts through just one set of systems (weapons), and the cut coincides with the seam between missions (test and life-cycle management) rather than cutting across missions. We discuss this seam in more detail than the others because this issue pertains to the synergies in the T&E community discussed in the next chapter.

Under the 12-center construct, the test wing at Eglin Air Force Base for weapons testing (46 TW) and the life-cycle management directorate for weapons acquisition (Armament Directorate) reported to a common center commander (Air Armament Center). Under the new 5-center construct, the 46 TW is merged with the 96 ABW and redesignated the 96 TW, which reports to the AFTC. The Armament Directorate (AFLCMC/EB) now reports to the AFLCMC for organize, train, and equip responsibilities. Research and development for weapons at Eglin has not changed; it reports both before and after the reorganization to AFRL. A potentially negative consequence of this seam is that conflicts involving test and acquisition for weapons can no longer be resolved by a common commander for the test wing and Armament Directorate but need to be resolved at the AFMC headquarters level.

Weapon system programs typically require testing through every phase of their life cycle, excepting disposal. The purpose of T&E is to verify for all stakeholders that the system or component under test meets technical and performance specifications (development test) or to verify that it is operationally effective and suitable for use in its intended environment (operational test).

The primary customer for development testing is the PM who is responsible to the PEO and ultimately to the service and defense acquisition executive for the development, production, and now product support of the system within cost, schedule, and performance guidance. To achieve these objectives, testing must be an integral part of program planning because of the interdependence of development and test activities.

A Chief Developmental Tester is required by law for all major defense acquisition programs (MDAPs) and all major automated information system (MAIS) programs to facilitate test planning and to act as a liaison to the T&E activities.¹⁴ To better integrate development test activities and resources as well as those needed for operational test, the initial Acquisition Decision Memorandum directs program managers to establish a T&E Working-level Integrated Product Team (T&E WIPT) chaired by the Chief Developmental Tester. The T&E WIPT, and its analog for non-MDAP/MAIS programs, the Integrated Test Team (ITT), are composed of

¹⁴ In accordance with 10 U.S.C. Section 139b. For non-MDAP/MAIS programs, where a full-time T&E representative is not appropriate, one is normally assigned from the PEO staff.

representatives from the program office, the system contractor, the test activities, operational testers, as well as the acquisition, requirements, operations, intelligence, and sustainment communities, as appropriate.¹⁵ The T&E WIPT and its predecessor the ITT have proven to be key enablers for maximizing the overall efficiency and effectiveness of test programs.

Figure 4.1 shows the primary interfaces used by a nominal weapons program to execute its required tests. Under the previous AFMC structure, the PEO/PM would select a Lead DT&E Organization to oversee/conduct development testing.¹⁶ In the case of Air Force weapons or munitions programs, that organization was typically the 46 TW at Eglin. The T&E WIPT/ITT worked directly with the Lead DT&E Organization to plan, schedule, and execute the development test program. Under the previous organization, the AAC commander acted as the product center commander, reporting to AFMC, with the 46 TW and 96 ABW reporting to that commander. In addition to those responsibilities, the AAC commander was also the Air Force PEO (Weapons) and thus had responsibility for all Armament Directorate program offices and reported to the Air Force SAE for program execution and to AFMC to provide the organization, training, and infrastructure needed to execute the entire AAC mission.

Under the 5-center construct, the PEO (Weapons) remains at Eglin and retains responsibilities for program execution and for the workforce and infrastructure of the Armament Directorate and now shares the same organization construct as other program areas. The 96 TW commander at Eglin assumed responsibility for the combined test wing and air base wing and now reports to the AFTC. Weapons test programs continue to be executed by program T&E WIPTs/ITTs working with the 96 TW.

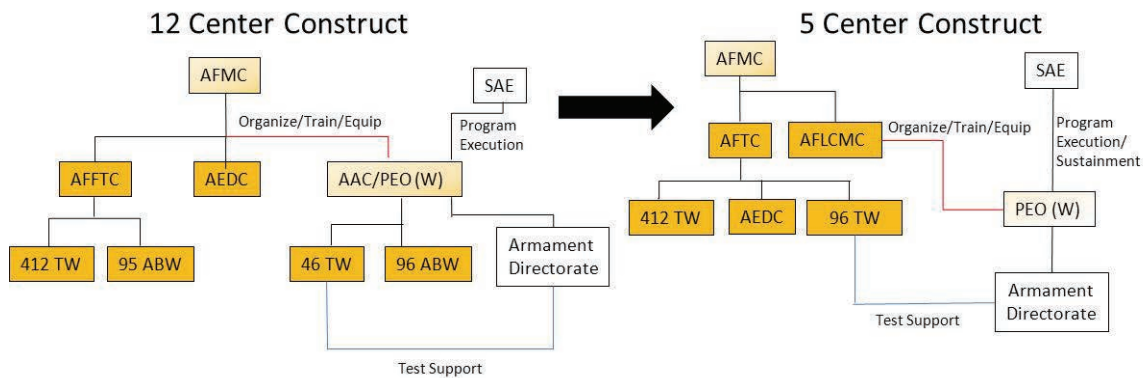
Assessment

The Air Force has several coordinating mechanisms in place to promote horizontal integration across this seam. To better pursue these opportunities and reduce the risks, the acquisition and test communities at Eglin hold monthly meetings of the Air Armament Enterprise Forum to facilitate communication and provide early problem identification among all

¹⁵ Defense Acquisition University, *Defense Acquisition Guidebook*, Chapter 9, June 28, 2013; AFI 99-103, *Capabilities-Based Test and Evaluation*, Washington, D.C., February 26, 2008, Incorporating Change 2, March 20, 2009.

¹⁶ See 10 U.S.C. Section 139b. Formerly known as a Responsible Test Organization.

Figure 4.1. Command Relationships at Eglin Air Force Base Under the 12-Center and 5-Center Constructs



NOTE: PEO(W) = Program Executive Officer for Weapons.

tenant activities. Similarly, a group called the Science and Engineering Resource Council convenes quarterly to coordinate workforce development across S&T, acquisition, and T&E. In addition, since the reorganization did not move any functions from Eglin, the advantages of geographic proximity of key armament activities and expertise have been retained.

Collocation of weapons acquisition/life-cycle management and test missions at Eglin Air Force Base also provides a mechanism for horizontal integration. Collocation facilitates the transfer of civilians with weapons expertise between test and acquisition/life-cycle management, and such transfers occur at Eglin. Having employees in acquisition who once worked in test and vice versa helps bridge this organizational seam. Further, proximity of workers on one base facilitates the logistics of discussions, especially for classified programs.

We also note that acquisition and test activities for aircraft and electronic systems reported to a different commander both before and after the reorganization. Weapons do occasionally undergo rapid acquisition that places strains on such seams, but other systems do as well, and nothing in the current construct prohibits ad hoc arrangements to bridge these seams when needed for urgent matters. The directorate for research and development of weapons technologies, both before and after the reorganization, reports to a separate chain (AFRL). The coordination has occurred by the same mechanisms in place to coordinate between acquisition and test and is likewise facilitated by collocation.

Also, under the new organizational structure, there are increased opportunities for streamlining and standardizing processes in both acquisition and test, since these are part of larger, functionally oriented commands (AFLCMC and AFTC). Eliminating duplicative activities and standardizing on "best of breed" processes are two of the most obvious areas for potential savings in manpower, cost, and time that result from this realignment.

The reorganization also reduced or eliminated command and staff positions from both organizations. Given the diversity of responsibilities and operations with the number of tenants

on the base, this reduction in personnel may be a challenge for a diminished staff, but insufficient time has elapsed to observe empirical effects.

On the other hand, as with any major organizational change, there are potential pitfalls as well. By organizing along functional or mission lines, the Air Force faces the risk that the responsive and adaptive characteristics of a product-focused organization will become diluted as leaders emphasize mission standardization and process discipline in the quest for improved efficiency. Another potential issue expressed by several key stakeholders concerned the Strategic Weapons Roadmap to coordinate and integrate future weapons technologies and development efforts. The development of the roadmap was previously led by the development planning staff at AAC.¹⁷ Since that staff has been reduced, there is concern that this capability might atrophy.

Placement of the Office of the PEO for Strategic Systems in AFLCMC

The Challenge

We judge the least significant of these three seams introduced to be the one between the PEO for Strategic Systems and the AFNWC because this is not a simple addition of a seam but the movement of a seam from one location to another. The reorganization placed the Office of the PEO for Strategic Systems and his staff of eight in the AFLCMC and by doing so shifted the seam from one between the PEO and AFLCMC to one between the PEO and AFNWC. As mentioned above, the PEO continues to report to the SAE on acquisition matters and remains collocated at Kirtland Air Force Base with the AFNWC. The placement of the Office of the PEO for Strategic Systems under the AFLCMC creates a seam in the acquisition oversight of the Air Force nuclear portfolio but removes a seam between this PEO and the other life-cycle management in AFMC.

The acquisition and life-cycle management responsibilities for nuclear systems are complicated, and understanding some of this complication helps to place this seam in context. Nuclear acquisition and life-cycle management programs that involve the Department of Energy, such as those for life-extension programs for the nuclear bombs and warheads, are governed by an interagency process.¹⁸ Those that are within DoD are governed by the same policies as other systems.¹⁹ For interagency programs, Lead Program Officers head an interagency integrated project team called a Project Officers Group that has responsibility for the life extension programs of the nuclear bombs and warheads and reports to the Nuclear Weapons Council.²⁰ For programs internal to DoD, an SPM reports to a PEO, who in turn reports to the SAE and, ultimately, to the Defense Acquisition Executive. Some initiatives have programs that require

¹⁷ AFMC notes that producing such a roadmap is not typically a responsibility of a center staff.

¹⁸ Department of Defense Instruction 5030.55, *DoD Procedures for Joint DoD-DOE Nuclear Weapons Life Cycle Activities*, Washington, D.C., January 25, 2001.

¹⁹ DoDD 5000.01, 2007.

²⁰ Established by 10 U.S.C. Section 179.

both chains. This seam between the interagency and intra-DoD reporting lines is more severe than the one between the PEO and the AFNWC and was not changed by the reorganization. The main concern is whether the movement of the PEO has exacerbated this larger seam.

To mitigate the potential negative consequences of the seam between the PEO for Strategic Systems and the AFNWC, the PEO and the AFNWC have a memorandum of understanding that allows the PEO to use AFNWC staff; this cooperation operates much as it did prior to the reorganization.

Assessment

Given the existence of an AFNWC and an AFLCMC, placing the Office of the PEO for Strategic Systems in either one of the centers introduces a seam. In this case, a seam between this PEO and the rest of the acquisition community was replaced by one between the PEO and the AFNWC. Yet, in either case, the placement is consistent with overall Air Force strategic priorities. Placing the PEO in the AFNWC would adhere to the Chief of Staff of the Air Force's priority to "continue to strengthen the nuclear enterprise" by reducing risk in the nuclear mission area by grouping nuclear portfolios together. Placing the PEO in the AFLCMC adheres to the Chief of Staff of the Air Force's priority to "recapture acquisition excellence" by reducing risk in the acquisition area by grouping acquisition support portfolios together. AFMC has a horizontal linkage mechanism in place to mitigate this seam in the form of a memorandum of understanding between the PEO and AFNWC, although the quality of the interaction is somewhat dependent on the personalities who hold the positions of PEO and commander of the AFNWC. Any challenges introduced are at least partially offset by potential benefits—most notably, (1) the AFLCMC commander can exercise oversight of processes of all AFMC PEOs and programs, enabling for example standardization of the implementation of acquisition regulations including the nuclear portfolio; and (2) the PEO can, in theory, draw on the larger AFLCMC staff to support his mission—and has done so in practice.²¹

Exploiting the Opportunities

AFMC has many ongoing initiatives to exploit the opportunities listed above. The categories below are groupings of these initiatives and are not mutually exclusive. Some examples could reasonably be placed in more than one category. Nor is this list exhaustive; the intent is to capture the most salient ongoing efforts and the ones most likely to yield substantial gains in effectiveness and efficiency.²²

²¹ Brig Gen Daryl Hauck, personal communication, July 18, 2013.

²² These findings are consistent with the findings by the Government Accountability Office's study of the effects of the AFMC reorganization on Hanscom Air Force Base. See U.S. Government Accountability Office, *Air Force Electronic Systems Center: Reorganization Resulted in Workforce Reassignments at Hanscom Air Force Base, but Other Possible Effects Are Not Yet Known*, GAO-13-366, Washington, D.C., April 2013.

Process Standardization

As noted above, process standardization is a principal goal of the reorganization²³ and is explicitly listed as a priority in AFMC's Strategic Plan.²⁴ The standardization of processes in the command is an ongoing effort, and part of the spirit of this effort is that of continuing process improvement via monitoring, learning, and adjustment.²⁵ As such, process improvement is an evolving effort; the list of initiatives in this section is representative of efforts as of July 2013 and is not meant to be exhaustive.

Headquarters AFMC is driving process standardization through policy and procedures. Headquarters developed a Standardization Checklist that provides the steps that must be taken to standardize new or existing processes.²⁶ These same steps are to be used when processes are revised. Until AFMC Instruction 90-104 is updated to incorporate the checklist, the AFMC commander has issued a guidance memorandum instructing all process owners to use the checklist methodology to standardize processes as AFMC moves toward FOC.

Each of the five centers is also driving process standardization within its own mission area. For example, although acquisition processes are regulated by DoD 5000 series instructions, under the 12-center construct, each center implemented the guidance differently (e.g., different implementation of business case analyses). Under the new 5-center construct, the AFLCMC created a Standards and Processes Team that developed an AFLCMC standard process methodology to formalize the documentation of a process across the center. As of July 2013, the AFLCMC is standardizing 42 critical and key processes. Similarly, under the 12-center construct, the three logistics centers had varying processes that the new AFSC is working to standardize. For example, each depot used a slightly different Depot Maintenance Workload Review process; now, the AFSC uses a standard Requirements Review Depot Determination process across the ALCs. The AFSC also has initiatives under way to standardize its awards program and AFSC publications.

Another example is in the depot repair process. The assignment of depot repair (whether it will be conducted organically or commercially) should include a business case analysis (BCA). Under the 12-center construct, a BCA may or may not have been conducted depending on the center involved. If there was a BCA, it was not always vetted, and the costs considered in the BCA were not consistent across centers. The new 5-center construct has enabled the implementation of a standard BCA process.

²³ AFMC, 2012, p. ii.

²⁴ AFMC, 2013, p. 9.

²⁵ AFMC, 2013, p. 9.

²⁶ The Standardization Checklist includes a requirement for process documentation in the AFMC Business Environment tool (ABE), which is an online tool that documents AFMC's business architecture in terms of policies, activities, processes, business systems, system interfaces, records, and organizations.

Because the AFTC has different mission foci at different geographic locations, that center is in the process of evaluating which processes should be standardized and where the investment to standardize would be too costly. For example, aircraft instrumented to fly in the Eglin test range cannot fly in the Edwards range, and vice versa. Re-instrumenting these ranges and aircraft to a common standard is costly. AFTC is exploring what makes sense from a cost perspective. Having an AFTC helps ensure that future instrumentation is standardized across the ranges. Work is under way at the AFTC to standardize Program Introduction Documents (PIDs) and Statements of Capability (SOCs),²⁷ special instrumentation, mission control, test information technology such as the hardware and software used to support the test mission, and test safety across the test sites.

Within the centers, the functional mission areas are also standardizing processes. For example, the order fulfillment process within contracting and funds control and cost-estimating activities in financial management are adopting standardized processes. At the AFSC, the base operating support units are developing “best practices” in different focus areas such as energy, space utilization, communications, safety, and infrastructure, which are also standardized across AFSC.

According to the literature discussed in Chapter Three, process standardization can promote efficiencies; however, it is too early to point to specific efficiencies gained through these initiatives. Some of these changes are just being implemented and others have not had the time to produce the expected efficiencies. Given the results expected according to the literature, the planned process standardization initiatives should provide cost and schedule efficiencies. Headquarters AFMC and the centers are developing metrics to track the performance of the major mission areas, which will help in assessing and, if needed, adjusting these initiatives.

Policy Rationalization

Another area of AFMC focus is policy rationalization. One reorganization milestone to achieve FOC is to review policy documents throughout the command and to eliminate non-value-added publications. The goal is to maximize publication consolidation and elimination while providing accurate and streamlined policy within AFMC.

In the summer of 2012 a Headquarters AFMC team with members from all five centers was established to review and standardize policy processes and procedures across AFMC. The team reviewed and validated all AFMC-level policy to ensure that it was accurate and still necessary in light of the new 5-center construct. Overall, the team evaluated 332 documents and found that 140 publications need to be rewritten, 13 can be rescinded, 66 are obsolete, and 26 new publications are needed. Likewise, the centers are now reviewing policy at the center level.

Although this was not an initiative enabled by the reorganization, the reorganization served as a catalyst for AFMC policy evaluation. Many publications need to be updated with the new

²⁷ A PID is the program manager’s description of program test requirements. The test activity responds with a SOC.

organizational structure, thus it was an opportune time to reevaluate AFMC policy command-wide.

Resource Allocation

The reorganization has facilitated better resource allocation, both across mission areas and within mission areas. Resource allocation is enabled by two organizational design changes: (1) by creating centers with spans of control that align with major mission areas, which enables better resource allocation within missions; and (2) by decentralizing decision rights for these decisions from headquarters to the next level of hierarchy (the centers), thereby placing the decisions in the organizational element with more mission-specific expertise and freeing headquarters from mission-integration tasks. The latter enables the headquarters to focus on better resource allocation across the command.

We observed some examples of these opportunities being exploited, but this summary is not meant to provide a complete list. One example shows the interplay of process standardization and span of control. By standardizing processes in AFLCMC, functional staff can be more effectively shared across directorates (PEOs) much like a matrix organization does. This ability is important, as the manpower reductions affected the acquisition workforce disproportionately.²⁸ After the reorganization, each geographic location no longer has its own center staff. Some functionals have consolidated their staffs and are sharing resources across a location and sometime across locations. For example, in AFLCMC, PEO directorates share some functional staff across the center. In financial management, for example, there are not enough cost and pricing personnel for every PEO at every location to have his own cost and pricing staff so these personnel are now a shared resource within the center. Standardization of processes enables this sharing of manpower resources and mitigates the loss of staff positions in the reorganization.

Functional organizations also share resources across centers. For example, AFLCMC program offices are tenants on AFSC installations. As mentioned above, in some areas of expertise such as contracting, AFSC assets support AFLCMC activities. This is accomplished through a memorandum of understanding between AFLCMC contracting and AFSC contracting. Financial management and engineering have similar arrangements between the centers and accomplish this coordination through the use of operating locations.

Consolidating a mission area within one center allows that center to reallocate the resources within its purview to best meet its mission objectives. For example, within the test mission, AEDC had a shortfall of funds and the 412 TW had funding earmarked for a lower priority that could be reallocated. Under the new center structure, by removing the seams separating the test mission, communication was facilitated that revealed the possibility of transferring these funds. And, because decision rights were decentralized to a center commander with a span of control

²⁸ The civilian acquisition workforce in AFMC is O&M-funded. Most of the working capital funded positions in AFMC are in AFSC, and many of the civilian positions in the AFTC are RDT&E-funded.

over the test mission, he was able to assess the enterprise risk to the test mission of transferring the funds. It is unlikely that this kind of resource allocation decision would have happened under the previous organizational construct.

Similarly, workload has been shared across test locations, in particular by flying some software (operational flight programs) test points at Edwards rather than Eglin to perform this work in a more timely manner given resource constraints at Eglin at the time.

Single Face to Customer for AFMC Missions

The realignment of AFMC into five centers provides single points of entry for each of the five mission areas and increases the number of peer-to-peer channels available at the general officer level for reaching across organizations. Nearly every discussion we had with commanders emphasized this opportunity, and most indicated that they have used this opportunity with benefit. We list some examples.

For the test mission, there is now a 2-star commander of the AFTC who has responsibility for the test mission in AFMC. The existence of this position gives other 2-star commanders a peer-to-peer single entry point into the AFMC test mission, namely, the commander of AFRL,²⁹ the commander of the Air Force Operational Test and Evaluation Center (AFOTEC), and the commander of the U.S. Air Force Warfare Center. Although not peer-to-peer in all cases, the existence of a commander for all tests within AFMC gives the AFLCMC commander and each PEO a single point of entry into the test mission area.

The same holds true for the other consolidated areas of sustainment and life-cycle management. As mentioned above, there are now four 3-star general officers who can meet as needed to resolve issues of common concern across the Air Staff, Headquarters AFMC, AFSC, and AFLCMC.

All of these new opportunities for peer-to-peer interactions provide lateral linkages across the Air Force providing horizontal integration.

With a single point of entry also comes a single voice for the mission area within AFMC. For example, Program Objective Memorandum integration and trade-offs can take place within a mission area instead of across the command as it was under the 12-center construct. Under the old construct, integration occurred at headquarters AFMC. The new construct enables more decisions and allocations to be prioritized within a mission area before going to headquarters AFMC for integration and simplifies the integration task (from coordinating among 12 to among 5 centers).

²⁹ One need for such horizontal integration is to ensure that the test community is planning for the appropriate future capabilities to meet the needs being created by current research.

Unified Culture for Each Mission Area

Our final example is that by creating centers with spans of control that correspond to mission areas, the organizational design encourages cultures to grow around mission areas rather than geographic locations. Each of the three new centers is working to establish a single culture for its mission area. The development of these cultures will take time. In the process, each is breaking down geographic allegiances and providing a potential form of oversight. As discussed in Chapter Three, standardization of norms is a tacit form of coordination, and a standard, unified culture may serve a similar function.

One initiative toward this end is a Senior Leaders' Development Course being developed at AFSC. The goal is to acculturate new leaders into a community of shared common goals and priorities, an "AFSC way," rather than cultures local to each depot. AFLCMC is developing a similar course for its leaders. Each center is promoting the "one team" concept and a unity of purpose around its missions.

Overall Assessment and Summary

The FY 2012 reorganization of AFMC created numerous opportunities for increasing effectiveness and efficiency. The reorganization trimmed 1,051 positions from staff and administrative overhead positions while retaining line positions, yielding an approximate annual savings of \$109 million in FY 2011 dollars.³⁰ We compared the key elements that changed during the reorganization in terms of organizational design. Focusing on these elements, we assess that the creation of centers that are mission-aligned, the design of formal reporting relationships, standardization, centralization of decision rights, and placement of the seams in the organization all facilitate the overall missions assigned to AFMC and are consistent with Air Force and OSD goals and priorities.

More seams were removed by the reorganization than were introduced. We identified three seams of concern: (1) between the Air Logistics Complexes and the product support-focused program offices that were previously aligned to the Air Logistics Centers; (2) between the 96 TW and the Armament Directorate at Eglin; and (3) between the Office of the PEO for Strategic Systems and the AFNWC. AFMC has put safeguards in place in the form of horizontal integration mechanisms roughly in proportion to the severity of each seam. It is too soon to know with confidence how effective each of these will be, but there are opportunities to continuously monitor the status and revisit the mitigations as needed.

AFMC is continuing to exploit the opportunities enabled by the reorganization. We group these efforts into five categories: process standardization, policy rationalization, better resource allocation, having a single face to the customer for the major AFMC missions, and providing a unified culture for major AFMC mission areas. These numerous initiatives span all centers and

³⁰ Tripp et al., Table 3.4, 2012, p. 22.

headquarters staff and are either early in their implementation or in the process of being implemented. AFMC directs that all endure as continuous process improvement. Headquarters AFMC and each center are developing metrics to track mission performance.

5. Institutional Synergies and the Test and Evaluation Mission

This chapter responds to Elements 2 and 3 of the Section 2814 language by describing the Air Force T&E missions and assessing the impact of the reorganization (1) on the synergies¹ among DT&E, S&T, and acquisition; (2) on the synergies between DT&E and OT&E; and (3) on other commands' ability to carry out their OT&E and FOT&E missions.

T&E is a key component of the acquisition process. It has two primary goals: (1) to identify problems as early in a program's life-cycle as possible to minimize the cost and schedule impacts of redesign and rework; and (2) to ensure that the weapon system, when fielded, can perform as expected.

The relationships among T&E stakeholders can be somewhat complex because of the variety of customers and funding sources, the demand for specialized capabilities to test state-of-the-art systems, and the external organizations that influence T&E priorities and decisions. This chapter provides an overview of key aspects of Air Force T&E and assesses the impact of the reorganization on its operations.

The Role of Test and Evaluation in Acquisition

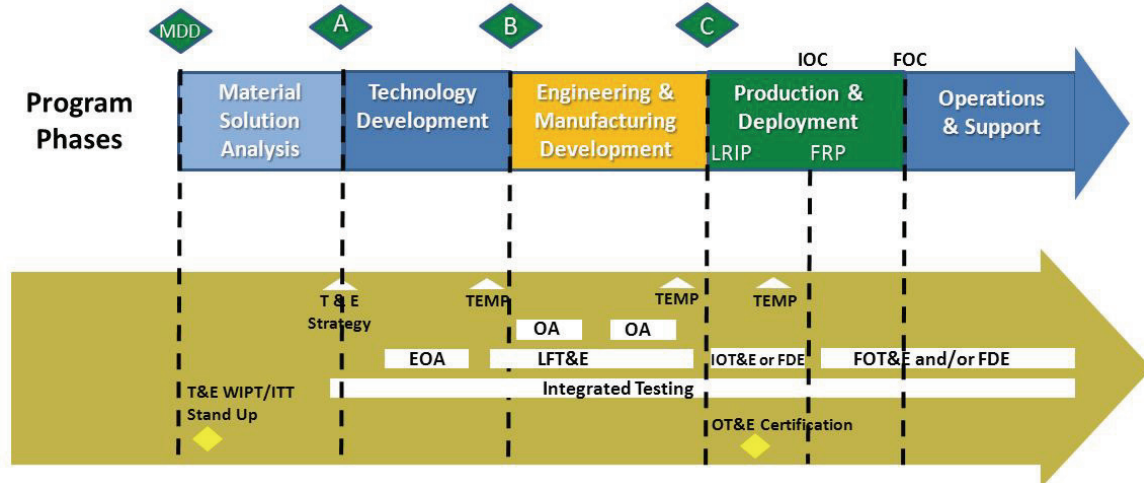
The fundamental purpose of T&E is to provide essential information to decision makers, verify and validate performance capabilities documented as requirements, assess attainment of technical performance parameters (DT&E), and determine whether systems are operationally effective, suitable, survivable, and safe for intended use.²

Figure 5.1 shows the interrelationship of test and acquisition activities throughout the program life cycle. Prior to the Milestone C decision, most T&E effort is focused on DT&E including the development of a T&E strategy, followed by Test and Evaluation Master Plans (TEMPs) and the execution of developmental (DT&E) and live fire test and evaluation (LFT&E).

¹ The NDAA language does not explicitly define *synergies*. For precision, we will use the term institutional *synergy* to mean "the ability of an organization to perform more effectively or efficiently than the sum of its independent components."

² See DoDD 5000.01, 2007, p. 6.

Figure 5.1. Integration of Acquisition and Test and Evaluation Activities



SOURCE: Adapted from: AFI 63-101/20-101, 2013. LRIP = Low Rate Initial Production; FRP = Full Rate Production; TEMP = Test and Evaluation Master Plan; EOA = Early Operational Assessment; OA = Operational Assessment; LFT&E = Live Fire Test and Evaluation; IOT&E = Initial Operational Test and Evaluation; FOT&E = Follow-on Test and Evaluation; FDE = Force Development Evaluation.

Developmental Test and Evaluation

DT&E supports the development of new systems or new capabilities for existing systems. It is focused on testing the technical characteristics and performance of a system to provide confidence that the system, as designed and built, will meet its required specifications. An effective DT&E program helps evaluate design alternatives, characterize technical risks, illustrate progress and maturity of the development program, demonstrate interoperability and information assurance (if applicable), and assess safety and readiness for initial operational test and evaluation. It also evaluates maturity of production processes prior to full rate production.³ Although government personnel are heavily involved in DT&E activities, depending on the type of testing involved, the contractual arrangements with the system contractor, and program priorities, a considerable part of the test execution may be accomplished by the system contractor under the oversight of government personnel.

A specialized type of DT&E is LFT&E. LFT&E tests lethality for weapons and vulnerability (susceptibility to damage or injury) for systems to be used in direct combat. Test approaches must be approved by the Director, Operational Test and Evaluation (DOT&E) and can involve analysis, sophisticated modeling and simulation, component testing, as well as full-up system level testing. LFT&E is required for all “covered” systems prior to a full rate production decision.⁴

³ DoDI 5000.02.

⁴ See 10 U.S.C. Section 2366 and Defense Acquisition University, *Defense Acquisition Guidebook*, Chapter 9, June 28, 2013.

A variety of testing approaches are used in DT&E depending on the type of article and its stage of maturity, its relationship to other systems, and the objectives of the testing. These approaches include modeling and simulation, precision measurement, integration, hardware in the loop, installed system, and open air (normally on a test range). Testing normally progresses in stages from constructive (modeling and simulation), through component, subsystem, and finally full system tests to provide timely feedback to system design teams and managers in the most cost- and schedule-efficient manner.

The infrastructure required to support various types of test activities is typically both specialized and relatively expensive to acquire and maintain. For example, the McKinley Climatic Laboratory at Eglin Air Force Base is the world's largest environmental test chamber, accommodating large aircraft and their support equipment for environmental testing, including extreme high and low temperature and a variety of weather conditions. This facility is used by the Air Force, other services, other federal agencies, and even private sector companies because of its unique capabilities. Other examples include hypervelocity and very large capacity wind tunnels, high fidelity threat simulators, and large open air ranges, all with sophisticated data collection and analysis capabilities. In addition, because some test requirements for future systems may be beyond current capabilities, the T&E community must remain abreast of S&T research plans to anticipate what test capabilities must be developed for the future.

A highly qualified and experienced staff is needed to design cost-effective test programs tailored to the needs of each customer and utilize the capabilities of this sophisticated equipment. For this reason, T&E personnel tend to be specialized in both their technical discipline and the type of testing that they focus on. This expertise is developed by combining technically qualified personnel and hands-on experience in planning, executing, and analyzing tests.

Operational Test and Evaluation

Whereas DT&E is focused on testing the technical characteristics of a system, OT&E is concerned with assessing whether or not military personnel can operate the system effectively in likely operational scenarios.⁵ Unlike DT&E, during dedicated operational test events contractors are involved only to the extent that they would be in the normal operation of the system. Performance is assessed in two broad areas: operational effectiveness⁶ and operational suitability.⁷ AFOTEC is the independent organization responsible for conducting Air Force OT&E tests.

⁵ See 10 U.S.C. Sections 139 and 2366.

⁶ "DoD defines operational effectiveness as the overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, training, doctrine, tactics, survivability or operational security, vulnerability, and threat." Defense Acquisition University, *Defense Acquisition Guidebook*, Section 9.3.2.1, June 28, 2013.

⁷ "Operational suitability defines the degree in which a system satisfactorily places in field use, with consideration given to reliability, availability, compatibility, transportability, interoperability, wartime usage rates, maintainability,

The AFOTEC commander is responsible to the Chief of Staff of the Air Force for the independent OT&E of all major and non-major system acquisitions. AFOTEC is supported by the operational MAJCOMs (e.g., Air Combat Command, Air Mobility Command, Air Force Special Operations Command (AFSOC), Air Force Space Command, and the Air National Guard/Air Force Reserve Test Center) and others in planning and conducting OT&E. AFOTEC also reviews operational requirements, employment concepts, tactics, maintenance concepts, and training requirements and provides early operational assessments during the technology development phase and operational assessments during the engineering and manufacturing development phase to inform decisionmaking in addition to its primary mission of conducting formal OT&E on production representative systems. The operational MAJCOMs provide operational concepts, personnel, and systems to support AFOTEC in performing OT&E. (For ACC, the U.S. Air Force Warfare Center's 53 WG supports its OT&E requirements.)⁸

The Air Force MAJCOMs also have responsibility for conducting Force Development Evaluation (FDE). FDEs constitute a broad range of MAJCOM-led operational testing including traditional system-level tests, system-of-systems tests, tactics, techniques, and modification/update testing. FDEs are conducted throughout a system's life cycle. Typically, the MAJCOMs are the sponsors for their own FDE tests, and test operations must compete within existing MAJCOM budgets for funding.

Test and Evaluation Working-Level Integrated Product Teams

To better integrate all of the activities and resources required for both development and operational testing, the initial program Acquisition Decision Memorandum for all MDAPs and MAIS programs includes direction to the PM to establish a T&E WIPT chaired by the Chief Developmental Tester. The T&E WIPT is composed of personnel from the program office, the system contractor, the test activities, and operational testers, as well as representatives from the acquisition, requirements, operations, intelligence, and sustainment communities as appropriate.⁹ The T&E WIPT is where all program T&E activities are planned and managed. A key objective of every T&E WIPT is to maximize the integration of development testing and operational testing to avoid unnecessary duplication while respecting the required independence of the operational test analysis function. The T&E WIPT also fosters more effective communication and coordination among all the organizations involved in T&E for the program. The T&E WIPT and its predecessor the ITT have proven to be key enablers for maximizing the overall efficiency and effectiveness of test programs.

safety, human factors, manpower supportability, logistics supportability, documentation, environmental effects, and training requirements." Defense Acquisition University, *Defense Acquisition Guidebook*, Section 9.3.2.2, June 28, 2013.

⁸ The 53 WG also provides support to developmental testing if appropriate assets are not available in the developmental test wings.

⁹ Defense Acquisition University, *Defense Acquisition Guidebook*, Chapter 9, June 28, 2013.

Major Air Force Test Locations

Arnold Air Force Base

The Arnold Engineering Development Complex (AEDC) is located at Arnold Air Force Base, Tennessee. It is a ground test facility that provides a broad range of capabilities to test aerospace vehicles and propulsion systems in realistic operational environments. AEDC tests aircraft, missile, and space systems and operates 58 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environment chambers, ballistic ranges, and other specialized units. Some of the facilities are unique and are used occasionally by commercial companies. Mission partners and tenant organizations at Arnold include the Advanced Missile Signature Center, Missile Defense Agency, Missile Defense Data Center, and the Naval Surface Warfare Center—Corona Division.

Edwards Air Force Base

Edwards Air Force Base, California, is located in the Mojave Desert, adjacent to the largest dry lakebed in North America, and has the country's longest runway. Because of Edward's three paved runways, over 68 miles of lakebed runways, and favorable weather conditions, the base provides unique advantages in recovering test aircraft or aircraft returning with in-flight emergencies. The headquarters of the recently created AFTC is located at Edwards. The 412 TW supports development and operational T&E for aircraft, aircraft subsystems and weapon systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachute delivery and recovery systems, cargo-handling systems, communications, information operations, and electronic warfare systems for DoD. It is also the host wing to the base, providing base operations and support functions. Edwards is also host to the Air Force Test Pilot School.

Eglin Air Force Base

Eglin Air Force Base is located in Florida and has an extensive range of airspace over water. At Eglin, the 96 TW is the host unit and provides the institutional test infrastructure and workforce required for the developmental and operational T&E of conventional air armaments (including aircraft guns, ammunition, bombs, and missiles); command, control, communications, computers, and intelligence systems; and target acquisition and weapon delivery systems. It also has a large climatic simulation capability and capabilities to test guided weapon seeker performance and the integration of weapons and stores with other systems and the aircraft itself. There are also several associate units at Eglin, including the AFLCMC Armament Directorate, Air Force Research Laboratory Munitions Directorate, U.S. Air Force Warfare Center's 53 WG, 33rd Fighter Wing, 20th Space Control Squadron, AFOTEC Detachment 2, the Naval Explosive Ordnance Disposal School, 6th Ranger Training Battalion, 7th Special Forces Group, Joint

Deployable Analysis Team, Defense Threat Reduction Agency, 919th Special Operations Wing, and the 728th Air Control Squadron.

Interfaces and Synergies

Any new organizational form provides both opportunities and challenges. In assessing these for the T&E mission area, we examined how interfaces among organizations and functions changed and how these changes could affect future performance. We also examined potential synergies enabled by the new structure. Since the new organization is in the early stages of implementation, there were few definitive metrics or indicators available with which to evaluate current results, much less compare with those in the previous organizational structure. (AFTC and its subordinate units are all in the process of developing and refining these.) However, we did collect from our interviews specific examples of improved communication and cooperation among the three previously independent test centers. We likewise attempted to identify areas of concern where new organizational seams have been introduced.

Below, we discuss these issues from the three perspectives of the T&E enterprise, T&E customers, and the OSD T&E oversight organizations.

Test and Evaluation Enterprise

Within the Air Force T&E community, a number of potential benefits are enabled by unifying the three test centers under AFTC.

- Consolidated management of the T&E enterprise facilitates standardization of policies and processes where appropriate, integrated resource management to allocate resources (funding and staff) to the areas according to enterprise priorities, and reduction of the unnecessary duplication of functions.
- Although the three test locations possess many unique capabilities, reduced internal competition among the three test locations and the removal of incentives to develop or preserve redundant or obsolete capabilities should increase the efficiency and cost-effectiveness of the entire enterprise. The AFTC commander has weekly meetings with the commanders of the test wings and AEDC. This lateral linkage provides an opportunity for these commanders to exchange information, to identify and resolve problems, and to encourage the development of a common culture across all Air Force T&E organizations. At the wing level, similar meetings are occurring to discuss common problems and increase understanding between the test and air base operations communities.
- The new organization should allow for more effective advocacy for T&E concerns to higher-level Air Force and OSD decisionmakers.

Since there is no “perfect” organizational structure, the consolidated T&E organization also faces risks to be avoided or mitigated. Yet, as noted below, we see little evidence of these concerns to date.

- Standardization is often an attractive approach from a headquarters perspective to achieve some of the benefits listed above. Policies mandated by a higher headquarters will often be perceived as problematic by at least some parts of an organization, since there are few decisions that do not involve trade-offs at some level. In an enterprise as diverse and complex as T&E, insistence on conformity to a common policy or process might ignore or underestimate the unintended consequences to organizations that may not neatly fit the conceptual model being applied for standardization. When asked about this issue in our discussions with stakeholders, we found a general consensus that, to date, the views of representatives from each of the T&E locations were solicited and fairly considered prior to making key policy and process decisions.
- Less-responsive decisionmaking can be another side-effect of high centralization (i.e., decision rights at a higher level of hierarchy). Higher centralization at times means a lack of familiarity with the issues involved by a decisionmaker, or limited desire/need to coordinate with other actions/actors. In the case of the test wings, the reductions to local functional staffs have increased their reliance on AFTC functional staff to provide equivalent support with fewer people. This will likely require some process streamlining to achieve the necessary increases in productivity. In our interviews, we found little evidence of these problems at this early stage of the transition.

Test and Evaluation Customers

Ultimately the T&E enterprise is a service organization providing information about system performance to PMs and decisionmakers. The range of customers for T&E services includes Air Force PMs, operational testers, other services and DoD agencies, Congress, non-DoD government organizations such as the National Aeronautics and Space Administration, allied countries, and in some cases, commercial companies. Customers expect to get test results that meet their needs in a timely, cost-effective fashion. Customers also value assistance in test planning, test logistics, and flexibility to accommodate unusual or changing needs. As a service organization, the test enterprise has to strike a balance between individual customer preferences (e.g., schedule priority) with those of the greater enterprise (e.g., cost-effective operations). Another complicating factor is the ability of the system contractor to select program test facilities based on the test plan contained in its proposal.

From the customer's perspective, the T&E reorganization has a number of potential benefits.

- Presenting a consistent face to the customer representing the entire T&E enterprise potentially simplifies planning with consistent policies and procedures among test facilities, and offers customers the full range of available capabilities, regardless of location.
- Improved test program execution can be realized through the ability to tap other locations for additional support in the case of resource constraints such as pilot, facility, or aircraft availability; unfavorable environmental conditions; or schedule changes. However, the ability to shift workload to meet program needs will generally depend on the type of testing, the availability of assets, and the commonality of relevant test processes and support infrastructure.

- Increased cost-effectiveness can result from the efficiencies gained to the extent that all locations standardize on “best of breed” solutions, eliminate redundant operations and infrastructure, and better match available assets to customer needs.

History shows that there are dangers to centralizing operations. However, in our interviews we found no evidence of problems at this point. Some areas to monitor as the organization matures include the following:

- Test location selection based on T&E enterprise priorities that might not coincide with those of the customer. For example, most PMs prefer to work with a consistent set of individuals to foster commitment to the program and to avoid loss of program-specific knowledge due to changing test venues. However, from the enterprise perspective, it can be desirable to have facilities specialize in certain types of testing to increase their capabilities, provide economies of scale, or reduce redundancy. This could lengthen some test programs or require programs to “travel” to several locations to accomplish their full range of testing.
- There is a tendency for centralization to result in decreased responsiveness to individual customers. A continuing challenge to leaders will be to ensure that customer priorities are always considered in both decisionmaking and normal operations as well as encouraging innovative solutions to customer challenges.

Our interviews with Air Force PEOs revealed little evidence of problems in these areas.

Test and Evaluation Oversight

OSD exercises oversight over T&E within the services through three organizations: The Deputy Assistant Secretary of Defense for Developmental Test and Evaluation DASD(DT&E),¹⁰ the Director of the Test Resource Management Center (TRMC), and the Director, Operational Test and Evaluation (DOT&E).

DASD(DT&E) is focused on improving DT&E planning and execution, building the T&E professional workforce, and providing data-driven support to the DoD Components. T&E responsibilities include:

- T&E program oversight for major defense acquisition programs
- T&E policy and guidance
- Test and Evaluation Strategy/TEMP approval (shared with DOT&E)
- Advocacy for the DT&E workforce
- T&E capabilities in the components.

The DASD(DT&E) is dual-hatted as the Director of TRMC. TRMC oversees the T&E infrastructure managed by the components. These key national assets are referred to as the Major Range and Test Facility Base (MRTFB). In addition, TRMC supports the T&E mission in the components through funding the Central T&E Investment Program, T&E Science and

¹⁰ Established by 10 U.S.C. Section 139b.

Technology program, and the Joint Mission Environment Test Capability program to continually improve MRTFB capabilities.

Another key OSD test oversight organization is DOT&E. DOT&E sets policy and reviews test plans and results for OT&E and LFT&E throughout the Department. Most direct interaction between the Air Force and DOT&E occurs through AFOTEC rather than with AFMC test organizations.

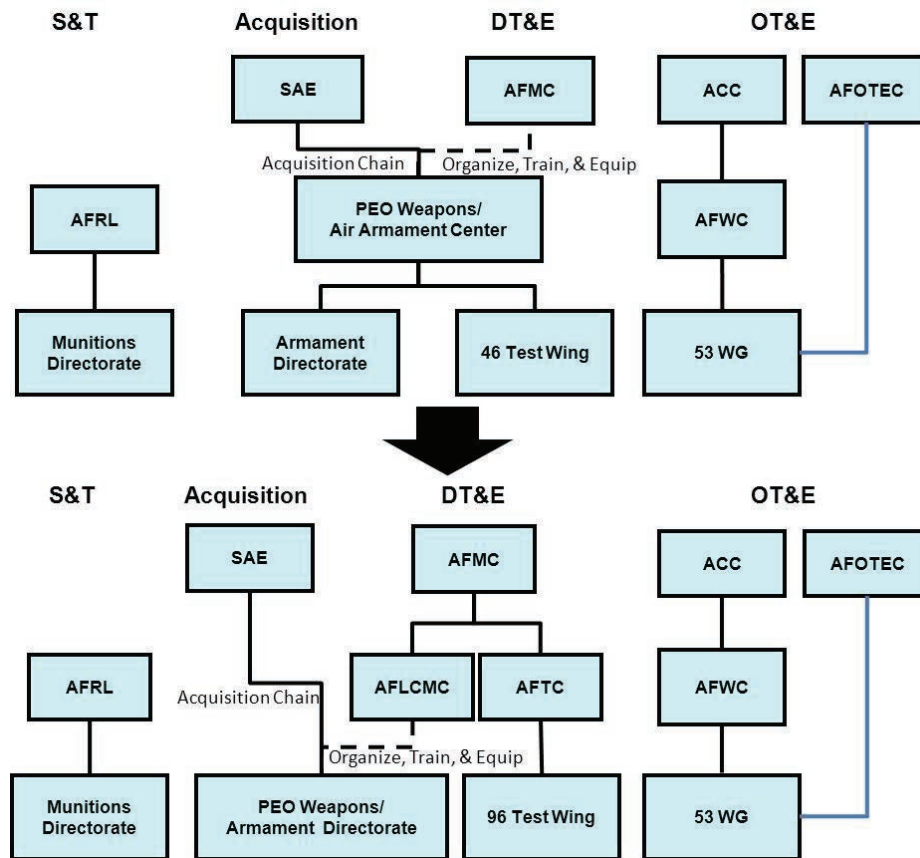
Assessment

The reorganization did not relocate any T&E functions or activities. Hence, no synergies were altered due to collocation among (1) S&T, acquisition, and test; or (2) between DT&E and OT&E, either within AFMC or with other commands.

The two changes to the Air Force T&E community were (1) to merge the base support and test wings at Edwards and Eglin; and (2) to place all three test units in AFMC (96 TW, 412 TW, and AEDC) under a center dedicated to DT&E (AFTC). By doing so, the reorganization eliminated the common center at Eglin to which the test wing for weapons and the armament directorate reported, as shown in Figure 5.2. Only the second change has potential to affect synergies between S&T, acquisition, and test.

As discussed in the previous chapter, mitigations are in place to bridge the seam between the weapons (armament) acquisition and test missions in the form of monthly meetings of the Air Armament Enterprise Forum and quarterly meetings of Science and Engineering Resource Council. It is early too in this reorganization to see what impacts might arise, if any. Nevertheless, we did not observe synergies that existed prior to the reorganization between acquisition and test that we assess cannot be replicated under the new organizational construct. As all S&T activities remain under AFRL and were not affected by the reorganization, no

Figure 5.2. Principal Air Force Science and Technology; Acquisition/Life-Cycle Management; DT&E; and OT&E Units at Eglin Before and After the Reorganization and Their Reporting Lines



NOTE: The upper panel shows the reporting lines before the reorganization and the lower panel shows the reporting lines after the reorganization. AFWC = U.S. Air Force Warfare Center; S&T = Science and Technology.

synergies that existed before the reorganization between S&T and either acquisition or test have been altered. Any synergies between S&T and the test and acquisition communities that existed prior to the reorganization did so with the S&T area reporting to a separate chain of command than the test and acquisition communities. Because of the ability to transfer civilians with weapons expertise among S&T, test, and acquisition, and the benefits of proximity (especially for classified discussions), key stakeholders at Eglin attribute synergies there more to collocation than to reporting chain commonality.

No organizational design changes from the reorganization are expected to affect the other MAJCOMs' abilities to carry out their OT&E or FOT&E responsibilities. The synergies between OT&E (53 WG) and DT&E (96 TW) at Eglin are due to collocation, which enable some sharing of resources, and has not been changed by the reorganization. We also examined any implications of the reorganization on other MAJCOMs' abilities to carry out their OT&E or FOT&E responsibilities. We contacted the commander of AFOTEC, the commander of the U.S. Air Force Warfare Center, and the 53 WG that performs OT&E. None had seen any issues

emerging from the AFMC reorganization that would impact their abilities to perform their test responsibilities and did not foresee any issues. We also contacted the commander or vice commander of Air Combat Command, Air Mobility Command, Air Education and Training Command, and Air Force Special Operations Command. We asked each whether the FY 2012 AFMC reorganization has caused any impacts on their command's abilities to carry out OT&E and follow-on OT&E missions. If there have been no noticeable impacts of the AFMC reorganization on their command's abilities to carry out its missions, we asked that they indicate that observation. If some issues have arisen, positive or negative, we asked them to document those and any communication that they had with AFMC regarding any concerns. Each responded in the June–July 2013 time frame that no impacts have been observed that were caused by the reorganization.

6. Adherence with 10 U.S.C. Section 2687

The following assessment of the compliance of the AFMC reorganization with 10 U.S.C. Section 2687 was provided at RAND's request by the office of the Air Force General Counsel on April 26, 2013:

10 U.S.C. Section 2687 requires that the Secretary of the Air Force notify Congress in advance of certain planned base closures or base realignments. When one of the statutory requirements for notification is triggered, the Secretary must identify the criteria that were used to consider the closure or realignment and submit an evaluation of its fiscal, local economic, budgetary, environmental, strategic, and operational consequences. This submission must be included as part of the annual request for authorization of appropriations. After the Secretary has notified Congress, the Air Force must wait for either 30 legislative days or 60 calendar days, whichever is longer, during which no irrevocable action may be taken to implement the closure or realignment decision.

Section 2687, however, does not apply to all possible actions that significantly affect an installation. By its terms, the statute applies only to the closures of installations having at least 300 DoD civilians authorized to be employed, and it applies only to realignments of such installations whenever either 1,000 civilian positions or at least half of the civilian positions at the installation are to be relocated to another installation. Actions affecting smaller installations, or actions relocating fewer DoD civilians, fall outside of the statute. Similarly, changes in mission and changes in organizational structure also fall outside the statute, unless an indirect consequence will be that a sufficiently large installation is to be closed or sufficiently numerous civilian positions will be relocated from such a base.¹ Finally, reductions of military personnel are irrelevant to Section 2687 and do not trigger the statute in any way.²

The AFMC reorganization is in adherence with Section 2687. The reorganization is complex, and it reduces staff and restructures reporting chains, but such actions do not trigger the statute. Rather, the significant facts from a legal perspective are that the number of installations will not be reduced and civilian personnel positions will not be relocated. Accordingly, none of the actions to be taken constitute a base closure or a base realignment as defined by the law,³ and none

¹ The relocation of civilian positions from one installation to another is a key element to the statutory definition of realignment. Not only must there be a base that loses the civilian positions, there also must be a base that gains them. Section 2687 specifically provides that reductions in force alone, such as those resulting from workload adjustments, reduced personnel, funding levels, or other similar causes, are not actions within the meaning of the term "realignment."

² Section 2687 applies to closures and realignments affecting large numbers of civilian personnel. 10 U.S.C. Section 993 is the counterpart statute that applies to substantial reductions of military personnel. It imposes similar notification and wait procedures whenever a military department has plans to reduce the number of military personnel assigned to an installation by more than 1,000.

³ Were civilian positions to be relocated among installations in small numbers, such relocations technically would be considered "realignments" as defined by the statute, but they would not be sufficiently large to trigger the

of the statute's procedural requirements respecting closures and realignments are required to be accomplished.

statutory reporting requirements. At the large depots, Section 2687 is not triggered unless at least 1,000 civilian positions are to be relocated to another Air Force installation, and even at the smaller AFMC installations it would require relocations of 150 civilian positions or more from each installation to trigger the statute's requirements.

7. Coordination with the Office of the Secretary of Defense

The services have the right and responsibility to organize. Under some circumstances, coordination with OSD is needed. Actions that cause a significant change to the T&E capability of a Major Range and Test Facilities Base (MRTFB) must be approved by the director of the Test Resource Management Center (TRMC).¹ And, since the Defense Acquisition Executive has statutory responsibilities for the defense acquisition workforce,² continued lines of communication between the SAE and the Under Secretary of Defense for Acquisition, Technology, and Logistics are vital to managing the acquisition workforce.

In the case of the FY 2012 reorganization of AFMC, no changes were made that affect the T&E capabilities of an MRTFB.

The Air Force shared its plans for the FY 2012 AFMC reorganization with both the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD(AT&L)] and TRMC prior to the announcement on November 2, 2011. We found no evidence that any substantive concerns were raised by OSD.

¹ DoDI 3200.18, 2010.

² 10 U.S.C. Section 1702.

Section 2814 of the FY 2013 National Defense Authorization Act

The Section 2814 language is:¹

SEC. 2814. REPORT ON REORGANIZATION OF AIR FORCE MATERIEL
COMMAND ORGANIZATIONS.

(a) REPORT REQUIRED.-Not later than 180 days after the date of the enactment of this Act, the Secretary of Defense shall submit to the congressional defense committees a report on the reorganization of Air Force Materiel Command organizations.

(b) ELEMENTS.-The report required under subsection (a) shall include the following elements:

(1) An assessment of the efficiencies and effectiveness associated with the reorganization of Air Force Materiel Command organizations.

(2) An assessment of the organizational construct to determine how institutional synergies that were previously available in a collocated center can be replicated in the new Air Force Materiel Command Center reorganization, including an assessment of the following Air Force Materiel Command capabilities:

(A) Science and Technology, Acquisition.

(B) Developmental Test and Evaluation.

(3) An assessment of synergistic efficiencies associated with capabilities of collocated organizations of other commands, including an assessment of the impact of the reorganization of the Air Force Materiel Command on the responsibilities of other commands regarding the following:

(A) Operational Test and Evaluation.

(B) Follow-on Operational Test and Evaluation.

(4) An assessment of how the Air Force reorganization of Air Force Materiel Command is in adherence with section 2687 of title 10, United States Code.

(5) An analysis of the extent to which the proposed changes in the Air Force management structure were coordinated with the Office of the Secretary of Defense and the degree to which any concerns raised by such Office were addressed in the approach selected by the Air Force.

¹ Public Law 112-33

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