

AIR WAR COLLEGE

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CAPABILITIES-BASED RESOURCING FOR
AIR FORCE WEAPON SYSTEM SUSTAINMENT:
EFFICIENCY VS EFFECTIVENESS

by

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Introduction

“Seven years have passed since I first stood before you at this rostrum. In that time, our country has been tested in ways none of us could have imagined.”

President George W. Bush: State of the Union Address, January 2008¹

The United States Air Force (USAF) never experienced a significant reduction in the scope and intensity of operations in the turbulent years following the overwhelming victory of Operation DESERT SHIELD/DESERT STORM. Today, support of United States (U.S.) national interests consistently require over two million flying hours per year. Moreover, our airmen must accomplish this Herculean task with an aircraft inventory that is now approximately 31% smaller and 42% older than it was in 1991.² In this time of unrelenting competition for limited fiscal resources, the window of opportunity for the USAF to implement an aggressive weapon system recapitalization and modernization plan is rapidly closing. Moreover, the Department of Defense (DoD) remains burdened by a cumbersome acquisition process that is “influenced by threat assessments to national security, national military priorities, and domestic political considerations.”³

In his book, *The Sling and the Stone: On War in the 21st Century*, Colonel Thomas Hammes laments the inability of the U.S. to quantify the current enemy. He identifies this problem as the impetus for adopting a capabilities-based approach to defense.⁴ As such, he stresses the importance of building military forces with a more narrow focus, based on a

¹ Bush, George W., The Whitehouse, “State of the Union 2008,” <http://www.whitehouse.gov/stateoftheunion/2008/index.html> (Accessed, 1 Nov 2008).

² Briefing, Headquarters Air Force A4/7P, *Weapon System Sustainment*, 29 Feb 2008.

³ David S. Sorenson, Air War College International Security Studies Course Book, Part 1: National Security and Decision Making AY2009, Instructional Period 6713 Introduction, 26 Aug 2008, 671.

⁴ Thomas X. Hammes, *The Sling and the Stone: On War in the 21st Century*, (St Paul, Minnesota: Zenith press, 2004), 247.

determination of the nature of the most likely conflict, for example, one similar to the current wars in Iraq and Afghanistan.⁵ However, notwithstanding the potential for reductions in defense spending associated with this strategy, the U.S. simply must maintain the ability to respond to a broad range of conflicts, including a major conventional war. As such, the Air Force must focus on providing the capabilities required to support identified current and future warfighter requirements. Unfortunately, an extremely high operations tempo amidst growing fiscal shortfalls remains a stark reality. Consequently, Air Force logisticians must continue to develop and implement a capabilities-based “efficiency” approach for resourcing weapon system sustainment. This effort must place an emphasis on providing the appropriate mix and balance of the capabilities required in support of U.S. National Security Strategy.

The Air Force utilizes capabilities-based planning (CBP) to “more effectively inform decision makers involved in the Planning, Programming, Budgeting, and Execution (PPBE) cycle, the capabilities requirements process, and the acquisition process.”⁶ AFI 10-604, *Capabilities Based Planning*, defines CBP as “the planning, under uncertainty, to provide capabilities suitable for a wide range of challenges and circumstances, all designed to achieve certain battle effects.”⁷ A weapon system in and of itself does not represent a capability. Broadly speaking, capability represents “the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks.”⁸ Accordingly, during development of the FY10/11 Program Objective Memorandum (POM), the Air Force Corporate Structure (AFCS) began a tentative move towards defining capability in terms of Global Reach, Global Power, and Global Vigilance when deliberating on weapon

⁵ Thomas X. Hammes, *The Sling and the Stone*, (St Paul, Minnesota: Zenith press, 2004), xiii.

⁶ Air Force Instruction 10-604, *Capabilities Based Planning*, 10 May 2006, 5.

⁷ Ibid, 3.

⁸ Air Force Instruction 10-601, *Capabilities-Based Requirements Development*, 10 May 2006, 52.

system sustainment. To understand the rationale behind this decision requires a brief explanation of each of these capabilities.

According to *America's Air Force Vision 2020*, Global Reach, Global Power and Global Vigilance “will provide balanced aerospace capabilities key to meeting national security objectives and realizing full-spectrum dominance.”⁹ Former Chief of Staff of the Air Force (CSAF), General T. Michael Moseley, further defined these three concepts in a White Paper published in late December of 2007:

Global Reach: The ability to move, supply, or position assets—with unrivaled velocity and precision—anywhere on the planet.

Global Vigilance: The persistent, world-wide capability to keep an unblinking eye on any entity—to provide warning on capabilities and intentions, as well as identify needs and opportunities.

Global Power: The ability to hold at risk or strike any target, anywhere in the world, and project swift, decisive, precise effects.¹⁰

Additionally, during the recent POM build programmers placed systems not readily identified with one of these specific mission areas in a fourth category entitled “Cross-Cutter.” The Logistics Panel and applicable Mission Panel members of the AFCS were primarily responsible for ensuring the placement of all Air Force weapon systems into one of these four capability areas. Not surprisingly, weapon system sustainment funding represents a significant portion of the Air Force budget. For example, the AFCS allocated \$3.5 billion dollars for depot purchased equipment maintenance (DPEM) for FY10. However, this figure represents less than 62% of the established DPEM requirement for that year.¹¹ This raises the immediate question as to how to distribute the available resources within the four capability areas previously discussed. Clearly,

⁹ “America's Air Force Vision 2020”, <http://www.army.mil/thewayahead/afvision.pdf>, (Accessed 3 Nov 2008).

¹⁰ T. Michael Moseley, General, USAF, CSAF White Paper, *The Nation's Guardians: America's 21st Century Air Force*, 29 Dec 2007, 1. Reprinted with permission in Air War College AY2009 Basic Strategy Documents.

¹¹ Briefing, Headquarters Air Force A4/7PY, *FY10 POM Depot Maintenance Assessment*, (no date provided).

answering this difficult question first requires a brief exploration of the case between “efficiency” versus “effectiveness.”

Efficiency or Effectiveness

“There is nothing so useless as doing efficiently that which should not be done at all.”

Peter F. Drucker¹²

As described by *Business Dictionary*, “effectiveness is determined without reference to costs and, whereas efficiency means doing the right thing, effectiveness means doing things right.”¹³ Historically, public sector organizations such as the DoD approach spending primarily from the perspective of effectiveness. Certainly, when developing the Air Force budget, or any military budget for that matter, guaranteeing successful mission accomplishment, and thereby effectiveness, must take precedence. However, while this may be true, the recent U.S. (and worldwide) economic crisis, when combined with the change in administrations, foretells a significant reduction in spending for U.S. national defense with an emphasis on efficiency. In fact, one prominent lawmaker recently advocated a cut in defense spending of as much as 25%, which equates to approximately \$150 billion. Weapon system procurement and personnel-end strength decreases represent the primary “targets” of these cuts.¹⁴ Undoubtedly, senior Air Force leaders face significant challenges regarding their ability to influence efficiency in the “future force.” This is due to, in part, Congressional limitations and restrictions on aircraft retirements and basing. Recent examples of weapon systems experiencing retirement restrictions include the KC-135E, C-130E, B-52, C-5, and the U-2.¹⁵

¹² James C. Rainey, ed., et al., *Quotes for the Air Force Logician: Volume 2*, (Air Force Logistics Management Agency), 2006, 71.

¹³ Business Dictionary, <http://www.businessdictionary.com/definition/effectiveness.html>, (Accessed 30 Oct 2008).

¹⁴ Barney Frank, Representative (D-Mass), “Space & Missile Defense Report”, <http://www.defense.daily.com/publications/smr/4497.html>, (Accessed 2 Nov 2008).

¹⁵ Michael Bruno, “Aircraft Retirement Again Major Policy Bill,” *Aviation Week*, 13 Dec 2007, http://www.aviationweek.com/aw/generic/story_generic.jsp?channel+defense&id+news/RETIRE121307.xml, (Accessed 15 Jan 2009).

Interestingly, during a lecture delivered at Kansas State University, Defense Secretary Robert M. Gates highlighted the disproportionately high budget of the DoD in comparison to that of the State Department, and actually advocated diverting more funds to sources of “soft power,” such as international diplomacy and information technology. He did this, however, while also highlighting the deleterious effects of the dramatic defense cuts of the 1990s, which also included significant reductions in military manpower. In fact, current U.S. military spending represents approximately 4% of GDP, well below the historic norm despite the country’s current involvement in two wars.¹⁶ Unquestionably, this relatively low level of defense spending affects negatively the ability to reconstitute, recapitalize, and modernize the U.S. military. Furthermore, the incoming administration of Barack Obama faces the dual challenge of “overseeing the first wartime transition of civilian power at DoD in four decades,” while also addressing “the sweeping review of U.S. military force structure, global posture and composition called the 2010 Quadrennial Defense Review (QDR).”¹⁷ This review “could reduce investment decisions to a choice between additional ground forces, which are essential to counterinsurgency operations, and capital-intensive ships and aircraft key to conventional wars.”¹⁸ Indeed, current indicators, such as the stated intent by the Obama Administration to accelerate an end to the war in Iraq and an increase in the size and role of the State Department point toward more reliance on the political and economic instruments of power vice the military, at least in the immediate future.

Consequently, probable public sector spending reductions, at least for the DoD, will compel defense programmers to search for ways to operate more efficiently. As such, implementation of an aggressive efficiency-based planning and resourcing strategy for weapon

¹⁶ Robert M. Gates, Secretary of Defense, “Landon Lecture (Kansas State University)”, 26 Nov 2007, <http://www.defenselink.mil/speeches/speech.aspx?seechid=1199> (Accessed 2 Nov 2008).

¹⁷ David Eberhart, “Obama Team Considers High-Profile Military Cuts,” *Newsmax*, 6 Nov 2008, http://www.newsmax.com/insidecover/obama_military_cuts/2008/11/06/148450.html (Accessed 15 Nov 2008).

¹⁸ *Ibid.*

system sustainment should ensure a proper balance of capabilities, while facilitating the reallocation of funding for other high priority Air Force programs. Potentially, this includes funding for the necessary recapitalization and modernization of Air Force weapon systems. That is to say, the most efficient budget maximizes procurement while taking the appropriate risk in sustainment funding. A proper balance between efficiency and effectiveness, though a formidable challenge, remains critical for ensuring the long-term viability of an aging Air Force inventory and the nation's defense.¹⁹ With this in mind, understanding the rationale behind the decision to use Global Reach, Power, and Vigilance (and to a lesser extent the Cross-Cutter category) in the requirements determination process necessitates a clear explanation of the current definition of weapon system sustainment, particularly when considering Air Force programming actions.

Defining Weapon System Sustainment

"I don't know what the hell this "logistics" is that Marshall is always talking about, but I want some of it."

E.J. King: To a staff officer, 1942.²⁰

Weapon system sustainment (WSS) represents a key enabler for current and potentially imminent conflicts -- "fight tonight," and a key component of preparing for future conflict -- the "fight tomorrow."²¹ Historically, programmers addressed sustainment primarily in terms DPEM and Contractor Logistics Support (CLS). Additionally, they normally consider the elements of sustainment more or less in isolation from each other. However, beginning with the most recent POM, Air Force logisticians attempted to combine these two programs with the under-funded

¹⁹ Online Business Advisor, "*The Struggle Between Efficiency and Effectiveness*," <http://www.onlinebusadv.com/?PAGE=159> (Accessed 14 Oct 2008).

²⁰ Robert Debs Heinl, Jr., *Dictionary of Military and Naval Quotations*, (Annapolis, MD: United States Naval Institute, 1966), 175.

²¹ Briefing, Headquarters Air Force A4/7P, *Weapon System Sustainment*, 29 Feb 2008.

components of Sustaining Engineering (SE), and Technical Orders (TOs) in order to create one comprehensive sustainment portfolio. A brief description of these programs follows:

DPEM: Includes eight commodities: aircraft, engines, software, other major end items (e.g., cryogenic systems, support equipment, hush houses, etc.), missiles, non-Defense Working Capital Fund exchangeables, area support and base support. Major overhaul and/or rebuild of parts, assemblies, subassemblies and end items. Includes manufacture of parts, modifications, technical assistance, all aspects of software maintenance, and storage.

CLS: Contract support for a program, system, training system, equipment or item used to provide all or part of the sustainment elements in direct support of an approved sustainment strategy. Covers a variety of support elements: flying hours, material management, configuration management, technical data management, training, failure reporting and analysis, depot level maintenance (contract/and/or partner), supply/repair parts management, etc.

SE: Engineering efforts required to review, assess, define, and resolve technical or supportability deficiencies revealed in fielded systems, products, and materials. The general objective is to sustain the fielded systems, products, and materials.

TOs: Technical orders for aircraft, engines, missiles, software, and exchangeables. Concept of Operations is to provide user friendly, technically accurate, and up-to-date technical data at the point of use that is required, sustained, distributed and available for all users.²²

These four components do not represent end items in and of themselves, and all are vitally important to overall weapon system performance. Consequently, ensuring the appropriate balance and mix between them is necessary to provide efficiently the required weapon system capability for both newly procured and legacy systems during the potentially long road to force recapitalization and modernization. By necessity, this includes the appropriate allocation of funds between Global Reach, Global Power, Global Vigilance, and cross-cutters. The following chapters focus on the key requirements for making this balance/mix a reality. This includes identifying the primary offices responsible for weapon system sustainment, describing the requirements determination process, the importance of enterprise prioritization, and objectively

²² Briefing, Headquarters Air Force A4/7PY, FY10 POM Depot Maintenance Assessment, (no date provided).

measuring risk. AFI 10-604 alternatively defines capability as, “the combined capacity of personnel, material, equipment, and information in measured quantities, under specified conditions, that, acting together in a prescribed set of activities can be used to achieve a desired output.”²³ Figure 1 presents a simplistic depiction of the relative complexity of ensuring the appropriate capability for USAF operations via weapon system sustainment. (As noted in this figure, WSS does not include the manpower required to generate and repair systems at the operational level.)



*Figure 1. Weapon System Sustainment Summary*²⁴

²³ AFI 10-604, Capabilities Based Planning, 3.

²⁴ Briefing, Headquarters Air Force A4/7P, *Weapon System Sustainment*, 29 Feb 2008.

Responsibilities

“Don’t be afraid to take a big step when one is indicated. You can’t cross a chasm in two small jumps.”

David Lloyd George: British Prime Minister.²⁵

Centralized Asset Management

The primary responsibility for ensuring the successful implementation of an enterprise approach to sustainment rests with the Centralized Asset Management (CAM) program office located at Headquarters, Air Force Material Command (AFMC). In December 2005, CSAF endorsed a program then known as Future Financials, an “initiative focused on improving Air Force management of sustainment resources utilizing the enterprise business concept.” In general, an enterprise approach “recognizes that no single organization or command, no matter how large, is capable of autonomously providing the full breadth of logistics services required.”²⁶ The name changed to CAM in July 2006 to reflect a “broader, yet focused role” for managing sustainment issues.²⁷ Under this construct, and beginning especially with development of the FY10/11 POM, the CAM office assumed primary control for managing all elements of Air Force weapon system sustainment from a fleet-wide programming perspective. In essence, CAM does not “own these funds but, instead is responsible and accountable to Headquarters AF and the Lead Commands for their execution.”²⁸

The establishment of CAM in and of itself is a testament to the recognized value of an efficiency-based approach to requirements determination and resource allocation. CAM seeks to

²⁵ James C. Rainey., ed., et al., *Quotes for the Air Force Logistician: Volume 2*, (AFLMA), 2006, 33.

²⁶ Ann E. Dunwoody, “An Enterprise Approach to Logistics,” *Army*, http://findarticles.com/p/articles/mi_qa3723/is_200805/ai_n25501390/pg_1?tag=artBody;col1 (Accessed 7 Nov 2007).

²⁷ Headquarters Air Force Material Command CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 5.

²⁸ Headquarters Air Force Material Command CAM, *Centralized Asset Management Fact Sheet*, 2.

develop “a financial framework that facilitates, leverages, and enhances our reengineered logistics business processes by motivating and reinforcing desired behaviors to best support expeditionary operations, improving control over operating and support costs, and providing trace-ability of resources to outcome.”²⁹ Accordingly, CAM received a designation under a unique Operating Agency Code (OAC) as an Air Force sustainment account. Unfortunately, several Air Force funds holders function outside the CAM OAC, providing unique challenges both throughout the program build and during the year of execution. In particular, Air National Guard (ANG) and Air Force Reserve Command (AFRC) lobbied successfully with DoD and Congress for mandated exclusion. The resultant inability of the Air Force to control all funding allocated for a specific weapon system hinders the ability of CAM and, to an extent, System Program Managers to manage the affected system from an enterprise perspective. However, at the same time, a robust CAM governance structure exists (see Figure 2), which includes the Vice Commanders of the Major Commands. This structure includes representation from funds holders outside of CAM, to include ANG and AFRC, which facilitates their involvement in the decision-making process for weapon system sustainment.

The CAM Executive Committee approves the proposed POM position prior to submission to the AFCS. This further emphasizes the critical role played by the weapon system Lead Commands, the primary advocate for all issues affecting a weapon system, and highlights the collaborative enterprise nature of CAM. Therefore, the Air Force must continue efforts to centralize fiscal responsibility for all funds holders where possible under CAM (or at least within one central office within AFMC). Still, this may represent an insurmountable task, especially when considering Congressional support for the desires of ANG and AFRC to remain excluded.

²⁹ Ibid, 1.

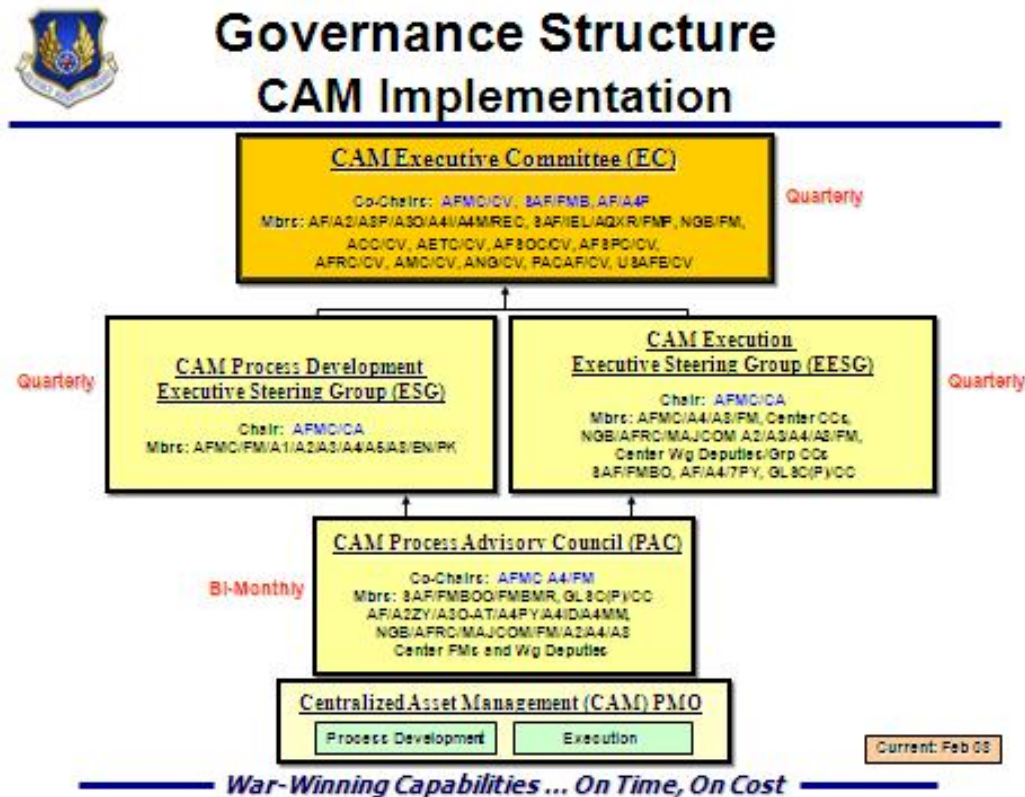


Figure 2. CAM Governance Structure³⁰

Lead Commands

The CSAF, or an authorized representative, designates systems as weapon systems and assigns each to a lead command.³¹ According to AF Policy Directive 10-9, *Lead Command Designation and Responsibilities*, this designation establishes primary advocacy for Air Force weapon systems throughout their life cycle, in addition to ensuring a proper force structure balance concerning capabilities.³² Once again, stressing the necessity for efficiency, this directive establishes a “basis for rational allocation of scarce resources among competing requirements.”³³ Specifically, a lead command will:

³⁰ Briefing, Headquarters Air Force Material Command CAM, *Centralized Asset Management Executive Committee (EC)*, 26 Feb 08.

³¹ Air Force Policy Directive (AFPD) 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*, 8 Mar 2007, 1.

³² AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*, 8 Mar 2007, 1.

³³ *Ibid*, 1.

Advocate for the weapon system and respond to issues addressing its status and use. Advocacy includes capabilities-based planning, programming, and budgeting for designated system-unique logistics issues, and follow-on test and evaluation. In addition, for advocacy issues identified above, perform and manage modernization and sustainment planning across MAJCOMs and agencies, and in coordination with system program managers (SPMs) and Headquarters AF (HAF) functional offices.³⁴

Moreover, this directive designates AFMC as the Executive Agent (EA) for CAM. For that reason, lead commands advocate for their weapon system sustainment requirements through AFMC in support of the PPBE process “to establish depot capabilities and sustain weapon systems under CAM.”³⁵ Clearly, lead commands play a critical role in developing comprehensive, executable weapon systems sustainment plans from a total force perspective. They must work closely with other funds holders, CAM and, perhaps most importantly, the SPMs. Finally, their active advocacy during AFCS deliberations is vital to ensuring adequate funding for their assigned programs.

Other Funds Holders

Using commands work sustainment issues through the lead command for their applicable weapon systems. However, as implied earlier, non-AFMC managed programs do not fall within the auspices of CAM. As an example of this, Air Force Space Command (AFSPC) advocates for sustainment of, and maintains overall responsibility for, the majority of space systems. Other funds holders not centralized under CAM include (but are not limited to) ANG; AFRC; Air Force Special Operations Command (AFSOC), Major Force Program (MFP) 11 and the Air Force Weather Agency (AFWA). The fact that so many organizations remain outside the CAM structure shows that CAM manages Air Force weapon system sustainment from an enterprise perspective, but only to a point. As such, the complex challenge/struggle for efficient coordination of sustainment requirements continues between all of the major participants --

³⁴ Ibid, 2.

³⁵ Ibid, 2.

AFMC/CAM, the lead and supported commands, AFCS mission and support panels, and perhaps the most important players, the System Program Managers (SPM). Once again, whenever feasible, the Air Force must maximize the centralization of the weapon system sustainment portfolio, preferably within CAM.

System Program Manager

Strictly speaking, the SPM is “the individual designated in accordance with criteria established by the appropriate Component Air Force Acquisition Executive to manage an acquisition program.”³⁶ Ultimately, the SPM maintains responsibility and accountability for a weapon system throughout the life cycle of the program.³⁷ This includes development of a sustainment plan with an adequate balance between DPEM, CLS, SE, and TOs, as appropriate. Additionally, the SPM retains responsibility for system engineering integrity and must approve all proposed permanent and temporary modifications (as does the lead command).³⁸ The SPM plan must develop a total force perspective through close collaboration with the lead command, CAM, and non-CAM funds holders.³⁹

Historically, the importance of the relationship between the SPM and lead command was evident, but often varied in its effectiveness. For instance, the two offices work together in developing, signing, and distributing an Expectation Management Agreement (EMA) that provides the details of the sustainment and modification plans previously mentioned.⁴⁰ However, during the year of execution the lead command maintained primary control over funding and frequently diverted resources to higher priorities within the command. High value but low visibility programs such as SE and TOs often suffered in consequence of such

³⁶ AFMC CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 21.

³⁷ Air Force Instruction 21-118, Improving Air and Space Equipment Reliability and Maintainability, 2 Oct 2003, 24.

³⁸ Air Force Instruction 21-101, *Aircraft and Equipment Maintenance Management*, 29 Jun 2006, 22.

³⁹ AFMC CAM, FY09 Centralized Asset Management Program EMA, 10.

⁴⁰ AFD 10-9, Lead Command Designation and Responsibilities for Weapon Systems, 8 Mar 2007, 3.

diversions. Conversely, CAM makes it easier for the SPMs to exercise additional control over funding priorities for their programs. Understandably, the lead commands retain a key voice in the expenditure of these funds, but the increased integration of and role of the SPMs can help ensure the long-term viability of Air Force weapon systems. As such, all key players – CAM, lead commands, funds holders, AFCS panel members, SPMs – must work closely together in ensuring that the Office of the Secretary of Defense (OSD) and Congress have a clear understanding of the Air Force’s rationale for sustainment planning, including the requirements determination process. However, ultimately, responsibility for sustainment decisions must reside in one central location. With this in mind, the SPM serves as the logical focal point for final decisions regarding specific actions proposed for weapon system sustainment.

Requirements Determination

“The first prerequisite for any regular logistics system is, of course, an exact definition of requirements.”

Martin Van Creveld⁴¹

Not surprisingly, the process to determine/define system requirements represents one of the most difficult challenges for programmers. Defense of budgetary requests without a traceable, validated requirement seldom ends in success, especially in today’s resource-constrained environment. Surprisingly, many well-established programs lack objectively definable requirements; or even if they do, the process is ambiguous and difficult to explain. The Joint Requirements Oversight Council (JROC) maintains that requirements “are not handed down on tablets of stone but should instead be seen as outputs of decisions reached after consideration of challenges, desired capabilities, technical feasibility, economics, organizational

⁴¹ James C. Rainey., ed., et al., *Quotes for the Air Force Logician: Volume 1*, (AFLMA), 2006, 33.

realities, and other factors.”⁴² Above all, efficiency-based resourcing demands a well-defined, measurable approach for requirements determination based on a proper balance/mix of the desired capabilities.

Historically, the AFCS deliberated on funding for weapon system sustainment based primarily on established DPEM and CLS requirements. Additionally, in most aspects, programmers presented senior decision-makers with the unconstrained requirement individually for each weapon system or, at the most, broken out by MAJCOM, but only for DPEM and CLS. Consequently, discussions frequently marginalized the importance of some aspects of weapon system sustainment, for example, sustaining engineering and technical data. The time-constrained nature of AFCS deliberations precludes an in-depth discussion on each weapon system. Unfortunately, in practice, only the high visibility programs pushed by Air Force senior leadership, a key member of the AFCS, or perhaps one of the mission panels, normally receive full vetting. Indeed, this adds further value to discussions centered on funding a specific capability, such as Global Reach, Global Vigilance, Global Power, or Cross-Cutters.

Assuredly, a cumbersome requirements determination process led to a solution that was little understood (some would say) by the AFCS. This process centers on the Maintenance Requirements Review Board (MRRB), an Air Force Panel that “assures **all** (emphasis added) valid depot level maintenance requirements are evaluated and scheduled for appropriate fiscal year accomplishment.”⁴³ This panel consists of Air Staff members and representatives for the Commands that will use the system, as well as AFMC engineering and aircraft maintenance experts.⁴⁴ Additionally, using commands meet annually for a Logistics Support Review (LSR)

⁴² Paul K. Davis, Russell D. Shaver, and Justin Beck, *Portfolio-Analysis Methods for Assessing Capability Options*, (Santa Monica, CA: RAND Corporation, 2008), 5.

⁴³ TO 00-25-4, Depot Maintenance of Aerospace Vehicles and Training Equipment, Change 4 - 1 April 2006, 1-2.

⁴⁴ Ibid, 1-2.

with the Air Logistics Centers (ALCs) to discuss their requirements. Understandably, the requirements workload consistently changes up to and including the budget year of execution, because of unforeseen requirements changes caused by such things as unanticipated maintenance issues/problems and shifting MAJCOM and/or Air Force priorities. Nevertheless, this process represented the logical result of an attempt to determine accurately the total anticipated sustainment requirement for each system. Subsequently, when presenting the DPBM/CLS program for PPBE consideration to the AFCS, the Logistics Panel presented their recommendation in terms of the total dollars required based on this unconstrained requirement. The AFSC then established a funding decision based on a percentage of this requirement. In short, a cumbersome unconstrained requirements determination process presented a “bill”, and the AFCS made a decision on how much of the bill the Air Force could afford to pay. With this in mind, CAM continues efforts to simplify the requirements determination process. SPMs currently provide sustainment requirements using the Centralized Access for Data Exchange (CAFDEx) system.⁴⁵ CAM now monitors the requirements process through three distinct phases: “Define Requirements,” “Collaboration,” and “Validate and Prioritize.”⁴⁶

Not surprisingly, Air Force funding decisions for weapon system sustainment receive critical scrutiny, not only from OSD, but also from Congress. To be sure, any major change in how the Air Force makes weapon system sustainment funding decisions must survive a detailed analysis from both these entities. Ironically, this represents a tremendous challenge for any efficiency-based approach for sustainment. The Congressional Depot Caucus, a group of members with defense depots in their districts, closely monitors DoD spending for depot

⁴⁵ CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 9.

⁴⁶ Ibid, 9.

maintenance, purportedly out of concern for “military readiness and capabilities.”⁴⁷ For example, Title 10 USC, Section 2466 directs that “not more than 50 percent (known as 50/50) of the funds made available in a fiscal year to a military department or a Defense Agency for depot-level maintenance and repair workload may be used to contract for the performance by non-Federal Government personnel.”⁴⁸ This law, designed to protect the government’s industrial capability, places significant limitations on the flexibility that would otherwise be afforded the Air Force when making critical sustainment decisions. By specifically mandating that Federal Government personnel complete a minimum of 50 percent of depot-level maintenance and repair, the law precludes the ability to make best value decisions, and to take advantage of capabilities only available in the private sector.⁴⁹ Additionally, Congress routinely directs minimum funding levels for depot maintenance, and issues written reprimands in Congressional legislation to the military departments when they fail to meet these expectations. For instance, one Senate Appropriation Committee (SAC) report contained the following:

“SAC considers a vigorous depot maintenance program to be integral to maintaining military readiness. Growth in backlogs above certain thresholds could negatively affect force operations and degrade readiness in the near future. Therefore, SAC directs the military services to allocate funding for depot maintenance programs requested in their annual budget submissions at levels equal to or greater than 80 percent of the annual; requirements for airframes and engines, combat vehicles, and ships.”⁵⁰

Understandably, Congress equates depot backlogs with the ability of the military departments to sustain an acceptable level of combat readiness.⁵¹ Additionally, the depots base all aspects of

⁴⁷ Peter M. Steffes, “Military Depots: Politics Undermines Cooperation,” *National Defense Magazine*, Jul 2003, <http://www.nationaldefensemagazine.org/ARCHIVE/2003/JULY/Pages/Public-provate3827.aspx> (Accessed 7 Nov 2008).

⁴⁸ U.S. Code, Title 10, Section 2466, Subtitle A, Part IV, Chapter 146, *Limitations on the Performance of Depot-Level Maintenance of Material*, (19 Jan 2004), http://caselaw.lp.findlaw.com/cascode/uscodes/10/subtitles/a/parts/iv/chapters/146/sections/section_2466.html (Accessed 7 Nov 2008).

⁴⁹ Peter M. Steffes, “Military Depots: Politics Undermines Cooperation,” *National Defense Magazine*, Jul 2003.

⁵⁰ U.S. Congress, Senate Appropriation Committee Report Language, SRPT 104-124, *FY96 Defense Appropriation Act*, 28 Jul 1995.

⁵¹ *Ibid.*

work force management on projected funding, including personnel hiring, equipment purchases, and parts ordering. As such, it becomes increasingly difficult to expend funds added during the year of execution efficiently. Finally, Congress has historically asserted that the Military Departments “willfully delete or refuse to commit funding for other high priority programs” which, if left unfunded, create depot backlog and negatively affect readiness.⁵² Ironically, over time DoD recognized the inherent value of the Air Force’s cumbersome requirements determination process, both in terms of its measurability, and their ability to influence specific programs. Consequently, the Air Force faces an uphill struggle, with both DoD and Congress, in changing the current process. Implementation of CAM and, perhaps most importantly, a capabilities-based Enterprise Approach to sustainment funding, represents a critical first step in winning this battle.

Enterprise Prioritization

“It is no use saying, “We are doing our best.” You have got to succeed in doing what is necessary.”⁵³

Winston S. Churchill

As previously mentioned, the Air Force implemented CAM as a tool to manage sustainment from an enterprise perspective. CAM seeks to reform the prioritization process through enterprise sustainment for weapon system and mission support based on “measurable criteria and effects.”⁵⁴ Similarly, the U.S. Army implemented Single Army Logistics Enterprise (SALE) to provide an environment that “builds, sustains and generates warfighting capability through an integrated logistics enterprise based upon collaborative planning, knowledge

⁵² U.S. Congress, House Appropriation Committee Report Language, HRPT 105-206, *FY98 Defense Appropriation Act*, 25 Jul 1997.

⁵³ James C. Rainey., ed., et al., *Quotes for the Air Force Logistician: Volume 1*, (AFLMA), 2006, 121.

⁵⁴ AFMC CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 21.

management and best-business practices.”⁵⁵ In other words, the services now recognize the necessity of prioritizing requirements across the enterprise to maximize the limited funds available in today’s fiscally constrained environment. With this in mind, CAM combines an integrated view of the total sustainment costs for all Air Force weapon systems with a risk-based prioritization approach.⁵⁶

Senior leaders view risk from many different perspectives, both positively and negatively. In *Developing Resource-Informed Strategic Assessments and Recommendations*, RAND researches define risk as “a measure of those negative consequences of uncertainty that can be recognized and are appropriate to account for.”⁵⁷ Uncertainty is the central concept in this definition. As military theorist Carl von Clausewitz wrote, “Countless minor incidents—the kind you can never really foresee—combine to lower the general level of performance, so that one always falls far short of the intended goal.”⁵⁸ On the other hand, placing uncertainty and chance aside, maximizing acceptable risk by programmers translates into the efficient use of limited resources within additional high priority programs. During the FY10/11 POM build, key CAM leadership attempted to define risk by placing weapon systems into one of three tiers based primarily on Lead Command assessments:

Tier 1: Weapon system requires the highest level of mission readiness. Risk taken against this weapon system will gravely impact national defense/emergency management objectives (i.e. operational expectation, weapon system availability, training production).

Tier 2: Risk taken against this system will moderately impact national defense/emergency management objectives (i.e. operational expectation, weapon system availability, training production).

⁵⁵ Ann E. Dunwoody, “An Enterprise Approach to Logistics,” *Army*, http://findarticles.com/p/articles/mi_qa3723/is_200805/ai_n25501390/pg_1?tag=artBody;col1 (Accessed 7 Nov 2007).

⁵⁶ CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 12.

⁵⁷ Paul K. Davis, et al., *Developing Resource-Informed Strategic Assessments and Recommendations*, (Santa Monica, CA: RAND Corporation, 2008), 147.

⁵⁸ Michael Howard and Peter Paret, ed., Carl von Clausewitz: *On War*, (Princeton NJ: Princeton University Press, Eighth Printing, 1984), 119.

Tier 3: Risk taken against this system may impact national defense/emergency management objectives (i.e. operational expectation, weapon system availability, training production).⁵⁹

The difficulty of this approach lies in the apparent subjectivity inherent in the process. The individual Commands established criteria on how and why to place a weapon system within a specific tier. In addition, how to translate the tiers into a measurable performance, in the form of Performance Based Outcomes (PBOs), within the Reach, Power, and Vigilance capability portfolios represents an even greater challenge. A critical tenet in Performance-Based Logistics, PBOs must be measureable and aligned to warfighter needs. Additionally, they must focus clearly on optimization of weapon system “readiness, availability, reliability, cycle time, and affordability.”⁶⁰

Measuring Performance and Risk

Take calculated risks. That is quite different from being rash.

Gen George S. Patton, Jr, USA⁶¹

As stated previously, during past POM cycles, the AFCS established a position on a funding level for weapon system sustainment (specifically, DPEM and CLS) based on support for a percentage of the established unconstrained requirement. Generally speaking, the using commands submitted an initial request based on the stated requirement, and the AFCS funded a portion of this request based primarily on available funding. The DPEM/CLS cell at Headquarters Air Force then worked with AFMC and the Lead MAJCOMs to make minor funding adjustments between programs based on specific weapon system requirements identified

⁵⁹ CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 19.

⁶⁰ Kate Vitasek and Steve Geary, “Performance-Based Logistics Redefines Department of Defense Procurement,” *World Trade Magazine*, http://bus.utk.edu/utpbl/documents/In_the_news/062Feature7Performance-3.pdf (Accessed 18 Jan 2009) 63.

⁶¹ James C. Rainey., ed., et al., *Quotes for the Air Force Logistician: Volume 2*, (Air Force Logistics Management Agency), 2006, 12.

as critical. The final recommended funding position submitted to OSD measured/quantified risk with an emphasis on “the number of Programmed Depot Maintenance (PDM) and whole-engine overhaul deferrals.”⁶² Once again, upon receiving an approved budget, the using commands and AFMC adjusted these projections (in the truest sense) prior to and during the year of execution due to changing requirements and/or priorities. Generally, the MAJCOMs funded the requirements for each weapon system as budgeted whenever feasible. However, with a few exceptions, they retained control of their funding allocations, and maintained flexibility to reallocate based on emerging/changing requirements and new priorities.⁶³ Consequently, the so-called “budgeted deferrals” in practice rarely manifested themselves, making it virtually impossible to produce an audit trail demonstrating the impact to the portion of the requirement not funded by the AFCS, and subsequently OSD and Congress. Though some deferrals actually occurred, the depots normally reflowed their production schedules, thereby preventing the grounding of aircraft or spare engine shortages. However, in essence, this invalidated the request for funding argument used by logistics programmers during the POM build. Finally, the availability of supplemental funding during the year of execution, if received early enough in the year, frequently compensated for a portion of the funding shortfall. By contrast, the implementation of CAM began a fundamental change in the requirements determination and funding processes for weapon system sustainment and, ultimately, how programmers measure performance and risk.

Performance-Based Outcomes (PBO) represent the logical starting point in an environment where the need for efficiency competes with effectiveness in the decision-making process. Simply stated, PBOs “describe the expectations of performance provided to the Lead

⁶² John Flory, Capt, et al., Letter Report: Capability Based Resourcing for DPEM, (Air Force Logistics Management Agency, 19 Apr 2007), 1.

⁶³ John Flory, Capt, et al., Letter Report: Capability Based Resourcing for DPEM, (AFLMA), 19 Apr 2007, 1.

Command (customer) by the SPM of a given weapon system.”⁶⁴ The established performance outcome “is based on collaboration between the Lead Command and SPM and starts with customer ‘desired’ outcomes tempered with SPM constraints.”⁶⁵ Interestingly, the rationale behind defining standards falls in line with historical guidelines for Air Force logisticians. For example, Air Mobility Command’s *Metrics Handbook for Mobility Forces* lists the following general purposes for establishing standards: “measure usage of resources required/allocated; measure performance against operational requirements; inspire performance.”⁶⁶

Until recently, many logisticians considered a weapon system’s Mission Capable (MC) rate the key indicator for weapon system health/performance. Simply stated, MC rate is “the percentage of possessed hours that aircraft can fly at least one of its assigned missions,” which translates into operational readiness for a given weapon system.⁶⁷ However, Air Force senior leaders recognized the need for a more analytical method for determining weapon system effectiveness. Consequently, in 2003, CSAF “directed establishment of Air Force standards rooted in operational requirements and resources dedicated to the weapon system.”⁶⁸ Subsequently, in FY04, the Air Force adopted the Aircraft Availability (AA) metric as a primary determinant of fleet health/performance, using MC rate as the logical starting point.⁶⁹ The AA calculation determines the percent of an aircraft fleet available for established operational mission requirements and readiness.⁷⁰ Eventually, CSAF adopted AA as a primary weapon system health metric for use during his Weapon System Reviews (WSR), conducted bi-annually.

⁶⁴ CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 21.

⁶⁵ Ibid., 21.

⁶⁶ Livingood, Lt Col, ed., et al, *Mobility Handbook for Mobility Forces*, 3rd Edition, (Scott AFB, IL: Headquarters Air Mobility Command, May 2005), 5-6.

⁶⁷ Ibid., Appendix 2.

⁶⁸ Briefing, Headquarters Air Force A4M, History of Air Force Maintenance and Aircraft Availability Standards, (no date provided).

⁶⁹ Ibid.

⁷⁰ CAM, FY09 Centralized Asset Management Program Expectation Management Agreement, 22.

Finally, in the absence of a logical alternative, logistics programmers replaced “percent funded” with AA as the key funding determinant during FY10/11 POM development and deliberations.

During the most recent POM deliberations, the Logistics Panel took a significant step toward using PBOs as a key determinant in both advocating for, and allocating available funding. Specifically, they used current CSAF WSR aircraft availability standards and applied the following criteria to each weapon system (see Figure 3 for a graphic depiction of this concept):

Green: System is forecasted to achieve performance within 2.5% of AA target/standard.

Yellow: System is forecasted to achieve performance between -2.5% to -5.0% of AA target/standard.

Red: System is forecasted to achieve performance below -5.0% of AA target/standard.⁷¹

Though clearly intended as an objective criterion, some subjectivity eventually went into determining these three standards. Additionally, aircraft do not represent all AF weapon systems and, consequently, not all systems have established AA standards. As such, SPMs and lead commands must work closely with air staff and AFMC representatives in developing objectively measurable AA or similar mission readiness standards for all AF weapon systems. The initial attempt to base funding decisions on projected AA standards during the FY10/11 POM build was an example of the difficulty of applying current thinking to such a complicated task. Though based on expected performance outcomes, i.e. AA standards, it nevertheless remained difficult to quantify the operational impact of not funding a specific capability, i.e., Reach, Power, Vigilance, or those systems identified as Cross-Cutters. Clearly, the key players involved must build on this limited success when determining a direction for the future.

⁷¹ Briefing, HQ AFMC/CAM, Centralized Asset Management Executive Committee (EC), 26 Feb 08.



CAM FY10/11 POM Global Reach

Lead Command	Program Group (CAFDEr)	FY 10 OAC 87 TAI/	SPM Acct/Ao Snd/Ao	FY 10 Funding (\$M)	FY 11 OAC 87 TAI/	SPM Acct/Ao Snd/Ao	FY 11 Funding (\$M)
Tier 1							
AMC	C/KC-135	181	78.8/70.3	345.5	185	78.8/71.4	355.4
AMC	C-5	36	68.2	41.5	37	68.2/77.7	40.8
AMC	C-17	172	83.5/72	236.4	172	83.5/72	242.9
AMC	C-130	102	68.6/67	136.8	92	68.6/67	130.1
AMC	C-130J	37	68.6/62.8	75.8	53	68.6/64	102.3
AMC	HC-119	59	77.8/64	356.2	59	77.8/64	378.6
AETC	T-1A	179	69.2/	60.8	179	69.2/	60.8
AETC	T-43	3	70/	7.8	0	70/	3.9
AMC	UC-25	2	N3	80.1	2	N3	137.4
AETC	T-6	450	61/	113.5	450	61/	115.5
AMC	C-32	4	N3/2 grounded	50.8	4	N3/2 grounded	55.7
AMC	C-37	10	N3/70	40.6	10	N3/70	40.6
AMC	C-40	4	N3/75	48.1	4	N3/75	55.1
AETC	T-37/38	475	T37 68.6/63-65 T38 68.1/63-65	31.9	473	T37 68.6/63-65 T38 68.1/63-65	31.8
AETC	UH-1H/TH-1H	24	80.6/80.1	1.2	24	80.6/80.1	1.2
AFSPC	UH-1H	62	N3/	8.6	62	N3/	8.9
Tier 2							
AFMC	C-12	18	N3/9 grounded	6.7	18	N3/4 grounded	8.0
AMC	C-20	10	N3/	25.1	10	N3/	25.1
AMC	C-21	57	N3/	28.5	57	N3/	28.5
ACC	E-9	2	MCR 80/	5.8	2	MCR 80/	5.8
AMC	Loaders			17.1			21.8
Tier 3							
AETC	Academy	17	N3/7 REDUCED AA/	3.9	17	N3/7 REDUCED AA/	3.9
TOTAL GLOBAL RE		1,904		1,722.5		1,910	1,854.1
War-Winning Capabilities ... On Time, On Cost							

Figure 2. Weapon System Assessment Criteria Example⁷²

Conclusion

He who will not apply new remedies must expect evils; for time is the greatest innovator.

Viscount Francis Bacon⁷³

An accurate description of a growing proportion of the Air Force inventory must now include the word aged vice aging. The aggressive recapitalization and modernization plan envisioned for the future force by recent Air Force senior leaders appears less and less attainable with the passage of time. The current economic crisis and a growing emphasis on domestic spending issues add to the growing opposition to procurement of increasingly expensive modern weapon systems. Likewise, the current wars in Iraq and Afghanistan support those who argue that the U.S. should focus on counterinsurgency efforts and soft power. There remains the

⁷² Briefing, HQ AFMC/CAM, Centralized Asset Management Executive Committee (EC), 26 Feb 08.

⁷³ James C. Rainey, ed., et al., *Quotes for the Air Force Logician: Volume 2*, (Air Force Logistics Management Agency), 2006, 13.

possibility that the U.S. could use savings garnered by ending the war in Iraq for recapitalizing and modernizing the force. However, in all likelihood, a redoubling of the effort in Afghanistan will negate these savings. In consequence, the overall cost of maintaining existing legacy systems will continue to escalate into the foreseeable future. As such, Air Force logisticians must accept the potential for, and the reality of, a shrinking portfolio and, therefore, must seek efficiency in weapon system sustainment funding, versus the historical desire for effectiveness in public spending. The current fiscal situation demands a capabilities-based approach to requirements determination, with a focus on performance-based outcomes.

The FY10/11 POM build witnessed a concerted effort at utilizing an enterprise approach to funding weapon system sustainment. All of the key decision-makers, including CAM, lead commands, major funds holders, applicable AFCS representatives, and, most importantly, the SPMs, worked toward the common goal of maximizing every dollar spent on weapon systems sustainment. Most importantly, despite initial resistance from OSD, emphasis within the Air Force shifted towards capabilities-based resourcing. Understandably, difficulties (and confusion) frequently occurred as organizations found themselves outside of their historical comfort zones. For example, lead commands and funds holders witnessed a reduction in their influence concerning funding choices for their primary weapon systems. Interestingly, to overcome these difficulties, the SPMs must serve as the single focal point for consolidating inputs and making final, well-informed, sustainment decisions for the weapon systems for which they bear ultimate responsibility. Of equal importance, the Air Force must continue developing the philosophy codified in the establishment of CAM. The concept embodied in CAM still exists, at least partially, in name only, as long as AFMC lacks the authority to establish one office responsible for overseeing **all** sustainment accounts for the Air Force (including the

current non-CAM funds holders). Of course, this requires support from not only Air Force senior leadership, but also DoD and Congress. Similarly, the recent POM witnessed the beginning of much needed change in the requirements determination process.

The unwieldy, unconstrained process for determining requirements proved inadequate for a fiscally constrained environment requiring efficiency over effectiveness. Consequently, AFMC and CAM moved aggressively toward a more refined process in the months leading up to the FY10/11 POM. Initial funding baselines considered historical obligation trends: known program content changes; aircraft inventory, flying hour, and performance adjustments; and, adjustments from SPMs and Lead Commands.⁷⁴ However, this approach represents only the beginning of the necessary refinement in defining requirements. In addition to the initiatives listed above, the Air Force must pursue reform in the development of CLS contracts in order to provide more flexibility and affordability in an area that consumes an increasingly disproportionate percentage of sustainment resources. Likewise, relief from the previously mentioned Congressional 50/50 legislation must be a key component of the way-ahead plan for how the Air Force affects a permanent “fix” to the requirements determination process. This would significantly increase the flexibility afforded logisticians when making key sustainment decisions. Finally, logistics programmers must discount “anticipated” supplemental funding when developing weapon system sustainment requirements/shortfalls during the POM build. The volatility of today’s fiscal environment significantly diminishes the likelihood of continuing supplementals, and logisticians simply cannot afford the implications of a budget crafted with this “assumed” funding. Above all, programmers must base resourcing decisions for weapon system sustainment on desired/required capabilities.

⁷⁴ Briefing, HQ AFMC/CAM, Centralized Asset Management Executive Committee (EC), 26 Feb 08.

An efficiency-based requirements determination process must maximize acceptable risk. This implies an identification of shortfalls in projected capability, opportunities for reallocation of funding to other areas, and the identification of surplus capabilities.⁷⁵ Accurately measuring the amount of risk already taken, as well as identifying opportunities for additional risk, represents one of the greatest challenges for programmers. Repeated attempts by Air Staff representatives and AFMC consistently fell short in developing a measurable, logical process for a risk-based requirements determination process. Finally, just prior to the FY10/11 POM, programmers implemented a “bucketized” approach described earlier in this paper. Defining requirements in terms Global Reach, Power, Vigilance, and Cross-Cutters, combined with the three-tiered approach to risk, represented a significant departure from the cumbersome “percent-funded” approach of the past. Though the AFCS initially accepted a capabilities-based approach as a valid process for defining requirements, deliberations revealed the necessity for further refinement of this concept. The final solution for a capabilities-based requirements determination process must stand the test of time; that is, it must retain flexibility to adapt in an ever-changing resource constrained environment.

The Air Force must continue the development of an efficient capability-based resourcing strategy for weapon system sustainment. This strategy should entrust the SPM with the authority/ability for affecting key sustainment decisions, centralize funding where possible for all funds holders within AFMC (CAM), and provide leadership with a program built on objective measurements. Programmers must effectively maximize risk in support of legacy systems, while identifying opportunities for diverting available resources to assist with vital recapitalization and modernization efforts. In so doing, senior leadership must openly, and efficiently, communicate

⁷⁵ Paul K. Davis, Russell D. Shaver, and Justin Beck, *Portfolio-Analysis Methods for Assessing Capability Options*, (Santa Monica, CA: RAND Corporation, 2008), 30-31.

Air Force intent to DoD and Congress. The eventual solution for a viable capabilities-based requirements determination approach for weapon system sustainment must provide the flexibility required for responding to an ever-changing strategic environment.

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