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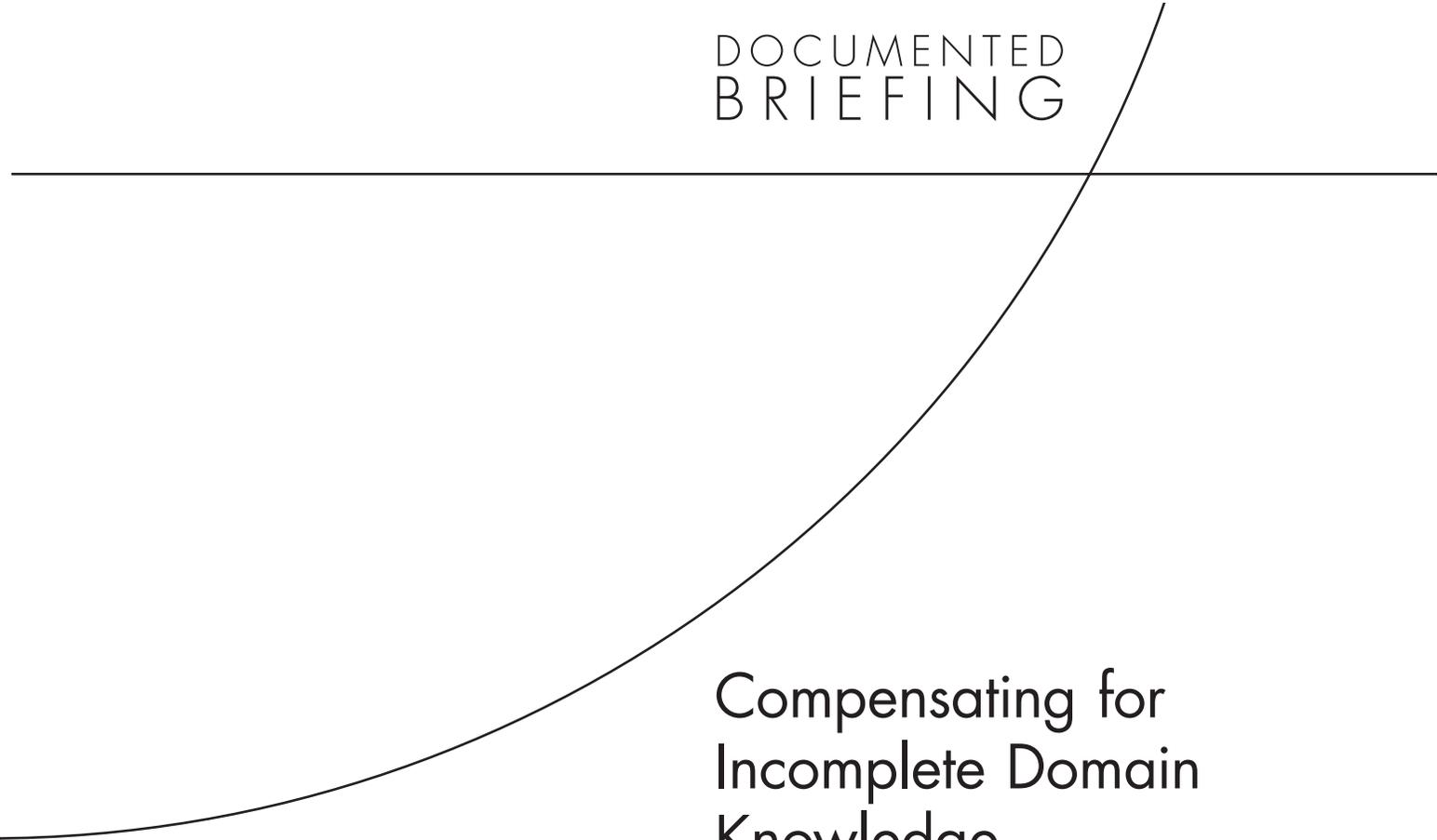
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BRIEFING



Compensating for Incomplete Domain Knowledge

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Prepared for the United States Air Force

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PROJECT AIR FORCE

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Preface

Organizations that encompass a wide variety of operational, technical, and business-oriented activities, such as the United States Air Force, are complex. The task of ensuring the continued availability of individuals having the competencies required to lead these activities effectively is also complex, especially in an organization that largely selects leaders from within its own ranks. As a consequence, many of its senior leaders are, by necessity, placed in positions for which they lack pertinent operational or functional experience—a competency set we call *domain knowledge*.

To address this subject, we examined the types of competencies Air Force senior leaders used when they were placed in positions for which they lacked domain knowledge. It was designed to provide an in-depth characterization of

- prevalent competencies and practices senior leaders used to address the critical demands of their jobs
- how they gained the competencies
- the extent to which the competencies used could compensate for domain knowledge
- whether the use of these competencies differed according to the level of domain knowledge the senior leaders possessed when they began their jobs.

The research described in this report was sponsored by the Air Force Senior Leader Management Office (AFSLMO) to identify competencies that would be particularly important to develop in current and potential senior leaders in preparation for uncertain leadership demands. The work was performed for a fiscal year 2005–2006 study, “Integrated Executive Force Planning,” and conducted within the Manpower, Personnel, and Training Program of RAND Project AIR FORCE.

Related Reading

- *Integrated Planning for the Air Force Senior Leader Workforce: Background and Methods*, by Albert A. Robbert, Stephen M. Drezner, John Boon, Larry Hanser, S. Craig Moore, Lynn M. Scott, and Herbert J. Shukiar (TR-175-AF, 2005).
- *Aligning the Stars: Improvements to General and Flag Officer Management*, by Margaret C. Harrell, Harry J. Thie, Peter Schirmer, and Kevin Brancato (MR-1712-OSD, 2004).

- *Something Old, Something New: Army Leader Development in a Dynamic Environment*, by Henry A. Leonard, J. Michael Polich, Jeffrey D. Peterson, Ronald E. Sortor, and S. Craig Moore (MG-281-A, 2006).

This documented briefing describes the background, methodology, and findings of the study. It concludes with recommendations for applying the findings to existing Air Force leadership-development programs. The briefing should be of interest to those involved in executive career development policy and the design of executive development programs for the armed forces and many government agencies.

RAND Project AIR FORCE

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Summary

Preparing senior leaders to take charge of organizations in functional domains in which they have limited operational or functional experience is an important issue for the Air Force. Ideally, all senior leaders are fully qualified for their positions, but, for a number of reasons, this is not always possible. First, many senior leader positions require experience in more than one functional or operational domain, but it is difficult to develop a corps of senior leaders with all the required combinations of domain knowledge. Next, the emergence of new weapon systems, technologies, and operating environments continues to create the need for expertise that is in short supply among senior leaders. Finally, as part of a long-term career-development strategy, the Air Force frequently assigns senior leaders to operational and functional domains in which they lack experience.

When senior leaders have incomplete domain knowledge, ranging from a little to none, they are challenged to use their existing skills and experience to become engaged and to begin adding value to their organizations as soon as possible. We have identified a particularly useful set of knowledge, skills, and abilities that these leaders use to achieve that goal, what we call *compensating competencies*. As we reviewed the current and future challenges Air Force senior leaders face, we concluded that the Air Force could benefit from an in-depth understanding of the characteristics of these competencies and how senior leaders use them.

The purpose of the study was to identify and characterize compensating competencies and to provide an in-depth understanding of how senior leaders use them in their jobs. Although it would have been useful to correlate the use of these competencies to objective or subjective measures of leader performance, such measures were not available to us. We interviewed 27 senior leaders, across all general officer ranks and senior executive tiers, to gather detailed examples of the knowledge, skills, and abilities they use to deal with the critical demands of their jobs. The content of the interview findings helped us identify the compensating competencies that were prevalent among these senior leaders and group into four distinct categories: *enterprise knowledge*, *integration skills*, *problem-solving skills*, and *people skills*. Enterprise knowledge consists of an understanding of how the leader's organization fits into the parent organization and how it relates to its external environment. Integration skills are used to create or improve interactions among experts, processes, functions, organizations, and/or capabilities. Problem-solving skills help senior leaders reduce the complexity of their decision space. People skills address power relationships between subordinates to create productive information flows. Collectively, these compensating competencies help senior leaders (1) manage the complexity surrounding stakeholder relationships and political, hierarchical, and technical operating envi-

ronments; (2) recognize or create synergies with other organizations; (3) motivate inputs from subordinates that contribute to problem solving, decisionmaking, and learning the technical domain; and (4) accelerate leaders' rates of learning.

Our analysis identified how senior leaders with incomplete domain knowledge use compensating competencies to gain domain knowledge and create decisionmaking and solution-development processes within their organizations. Enterprise knowledge compensates by providing a strategic orientation to problems and issues, enabling the development of comprehensive solutions and the learning of the organizational processes and relationships that are associated with the domain. Integration skills improve decisionmaking and learning processes. These skills also contribute to learning domain and enterprise knowledge and allow a senior leader to maximize the interaction among subordinate experts to enhance the leader's ability to generate robust problem definition and solution development in the particular organization. Problem-solving skills are important for every leader. Applying problem-solving skills at the senior level helps the leader identify the data and information that are central to defining problems and developing comprehensive solutions. The act of using problem-solving skills for domain-specific problems and issues also helps senior leaders gain domain knowledge. Senior leaders with insufficient domain knowledge use people skills to maximize the participation of their staff for decisionmaking and learning. These skills help remove barriers to communication from subordinates, creating an organizational climate that allows them to feel comfortable and empowered to approach senior leaders to bring up problems and to teach leaders what they need to know.

We also found that these competencies are useful to all the senior leaders we interviewed. These competencies not only assist senior leaders who have incomplete domain knowledge with learning an unfamiliar domain but are also useful for senior leaders with high amounts of domain knowledge. Senior leaders with domain knowledge use the competencies immediately to formulate solutions with subordinate experts, perform complex integrations, and facilitate the application of proven domain-specific problem solving strategies.

Because of the broad utility of compensating competencies among the senior leaders we interviewed, we recommend that the Air Force take steps to develop a deep pool of leaders who are proficient in these competencies within its education and development programs. Curricula designed around developing organizational analysis techniques, systems-level problem-solving strategies, and communication-analysis skills would be most instrumental to developing compensating competencies. Such an approach would augment the benefits already gained from broadening assignments. In return, the Air Force will have established a hedging strategy for developing leaders and staff members who can cope in a wider variety of organizations and operating domains in the future.

Acknowledgments

The RAND project team would like to thank the many individuals whose efforts made this research possible: first, the Air Force senior leaders who made the time to participate in the study. Their candid and insightful descriptions of how they perform their demanding jobs have provided highly valuable insights into the challenges of executive leadership. Correspondingly, we appreciate the diligent efforts of their administrative staffs, which found the typically scarce time windows for our interviews.

We also want to thank the staff of AFSLMO for its sponsorship of the research and coordination of our interview sessions with senior leaders. In particular, Brig Gen Rich Hassan, Director of AFSLMO, provided strong support for our conceptualization of the research need and subsequent project design. Gwen Rutherford, Deputy Director, AFSLMO, and Capt Meghan Szwarc provided critical coordination with senior leaders' staffs to schedule interviews.

Finally, numerous RAND colleagues made invaluable contributions throughout this research effort. Laura Miller conducted interviews and made important contributions to the design of the initial analysis taxonomy. Albert Robbert, Lawrence Hanser, and John Boon provided invaluable critiques of the analysis results and recommendations for the framing the results as policy recommendations. Bernard Rostker and David Gompert shared their insights about the challenges they faced as senior leaders in highly demanding DoD positions. Ivan Khilko, Arnu Balakrishnan, Taria Francois, and Tiffany Nichols performed the critical role of interview note-taking. Their efforts provided analyzable records of the senior leaders' accounts and insights that underpin the findings presented in this documented briefing. Emily Taylor provided valuable administrative and editorial assistance during the creation of this report.

Glossary

AFDD 1	Air Force Doctrine Document 1, <i>Air Force Basic Doctrine</i> . Establishes general doctrinal guidance for the application of air and space forces in operations across the full range of military operations, from nuclear or conventional warfare, to military operations other than war, and to operations within the homeland.
AFDD 1-1	Air Force Doctrine Document 1-1, <i>Leadership and Force Development</i> . Establishes leadership and force development principles and tenets that are experienced-based and rooted in all levels of the Air Force.
AFSLMO	Air Force Senior Leader Management Office. Air Force organization created to centrally manage the development and utilization of general officers, colonels, chief master sergeants, and Air Force Senior Executive Service civilians.
Air University	Air Force educational institution responsible for the design and delivery of professional military education, and selected in-residence advanced academic degree programs to uniformed and civilian members of the Air Force.
competency	the collection of knowledge, skills, and abilities possessed by an individual that is instrumental to accomplishing the requirements of a job
CONOPS	concept of operations. A written characterization of how the Air Force will operate to generate desired effects for joint war fighters and the capabilities necessary to produce those effects.
C4ISR	command, control, communication, computers, intelligence, surveillance, and reconnaissance

domain knowledge	The collective knowledge gained through education, training, or a series of progressive job assignments in an occupation. It includes the knowledge of the functional domain, such as intelligence analysis, logistics or acquisition management, the knowledge of how to conduct war fighting operations using fighter, bomber, or mobility aircraft; space and missile systems; and the knowledge of organizational processes and relationships within the functional or operational area.
elite universities	The nation's top 20 colleges and universities that offer executive development seminars and short courses and are under contract with the Air Force to provide executive education and training.
enterprise knowledge	Organizational knowledge comprising the knowledge of the operations and strategic intent of the parent organization such as the Air Force, or for positions outside the Air Force, the Department of Defense; an understanding of how the leader's organization fits into the parent organization; and an understanding of how the leader's organization relates to the external environment.
Global Strike CONOPS	Characterization of the Air Force's "high end" of Air Force combat capability that will allow joint commanders to employ all power-projection forces to counter adversary anti-access systems while simultaneously holding critical targets at risk.
HAF	Headquarters Air Force
information operations	The integrated employment of the core capabilities of electronic warfare, computer network operations, psychological operations, military deception, and operations security in concert with specified supporting and related capabilities to influence, disrupt, corrupt, or usurp adversary human or automated decision making while protecting U.S. automated decision making.
MAJCOM	major command
National Defense University	A Department of Defense educational institution responsible for preparing military and civilian leaders from the United States and other countries to address national and international security challenges through multidisciplinary education programs, research, professional exchanges, and outreach.
NSA	National Security Agency
OSD	Office of the Secretary of Defense

Persistent Global Response CONOPS	Characterization of the Air Force's operating capability to rapidly attack fleeting or emergent high-value and high-risk targets by applying air and space power precisely during a narrow window of opportunity.
senior leader	Air Force executives holding the rank of general, lieutenant general, major general, or brigadier general or a civilian member of the Senior Executive Service.
Space and C4ISR CONOPS	Characterization of Air Force space and C4ISR systems that will enable the development of advanced space, command and control (C2) battle management, ISR, and command, control, communications, computers, and intelligence (C4I) systems to conduct predictive battlespace awareness, facilitate precision attack, and compress the kill chain and air and space integration.

Background and Introduction

Why Incomplete Domain Knowledge Is an Issue for the Air Force

- Air Force must place its core elite in noncore functions to satisfy O-9 requirements
- Research indicates it is difficult for the Air Force to meet numerous multifunctional job requirements for senior leaders
 - Limited opportunities for multifunctional development
 - Air Force a closed system
- Changes in technology and operating environments have not yet grown domain-experienced senior leadership
 - e.g., information operations, unmanned aerial systems, space weaponization
- Management research provides limited insights about how to address gaps
 - Job
 - Domain
- Issue persists into the foreseeable future

RAND DB517-1

This briefing addresses research on an important strategy issue for developing Air Force senior leaders: preparing senior leaders to take charge of organizations in functional domains in which they have limited operational or functional experience. The study was chartered in 2005 by the Air Force Senior Leader Management Office to investigate the implications of Air Force future operating environments, capabilities, and missions for the development requirements for senior leaders.

Developing senior leaders who possess competencies that compensate for incomplete domain knowledge is an important issue for the following reasons. First, the Air Force routinely places officers from its core occupational elite (officers with pilot and navigator aeronautical ratings) in positions of responsibility for noncore (i.e., supporting) functions as they progress from the rank of brigadier general to major general. Previous RAND Corporation research (Robbert et al., 2005; Harrell et al., 2004) has determined that this practice is necessary because the Air Force has to create a sufficient pool of candidates for lieutenant general positions that require operational expertise. This practice occurs in other public organizations, which Fredrick Mosher has conceptually characterized. Mosher (1982) posits that the practice enhances the operational focus of noncore functions. He asserts that, if leaders are in positions for which they lack relevant domain knowledge in these noncore functions, their knowledge of the needs and constraints of the core functions nevertheless enhances the operational focus

of the supporting organization.¹ However, these contributions can also be offset by an inability to comprehend the complexities of the functional domain fully. The lack of domain knowledge can affect the extent to which a senior leader can recognize problems in the organization or introduce innovations. This assignment practice for producing candidates for rated lieutenant general positions downstream is accompanied by the risk that the senior leaders assigned to unfamiliar domains will not be fully prepared for their job responsibilities.

Second, earlier RAND research on senior officer career paths (Robbert et al., 2005) has also reported that many senior leader requirements are multifunctional. That is, the job requires expertise in more than one functional domain.

An analysis of the Air Force's ability to create a population of senior leaders who could satisfy all the multifunctional domain requirements concluded that such an objective cannot be fully achieved for two reasons. Certain time-constrained required job rotations are necessary for proficiency in a primary domain, particularly if it is operational, which limits opportunities for multifunctional development. While exceptions would occur, it is unreasonable to expect officers to acquire experience in more than two domains before being promoted to general officer. If each individual in the cohort of colonels promoted to brigadier general each year is limited to experience in two domains, previous modeling confirms that, even under ideal circumstances, some domain competency requirements in some jobs will remain unmatched (Robbert et al., 2005). The Air Force has a closed system for generating its uniformed leadership and cannot laterally hire uniformed senior leaders from other organizations to fulfill the multifunctional domain requirements of a particular job. It is forced to find the best ways to manage development and utilization of its senior leadership pool to satisfy all its general officer requirements.

Third, there is the operational direction in which the Air Force appears to be heading. Ongoing changes in technology and operating environments, such as information operations, unmanned aerial systems, and the weaponization of space, mean that current senior leaders have simply had limited opportunities to gain relevant experience.

The literature on senior leader development in the broader public and private sectors does not provide much insight into this question because the problem may not be as compelling for industry as it is for the military. When firms want to populate their executive ranks with people possessing specific kinds of experience but lack that experience in their organization, they have the option of hiring laterally from an open labor market. The same practice applies to finding executive talent to take firms into new operating domains. Private firms that do use a closed labor market model for executive placement are acting out of choice, rather than necessity. For these reasons, we think the assignment of senior leaders to positions in which they have incomplete domain knowledge will persist into the foreseeable future. Therefore, it is important to improve our understanding of what additional types of skills might be developed to compensate for the inevitable mismatches we have just described.

¹ It is an open question whether the limits of such practices are in the best interest of maximizing the effectiveness of organizations.

What Competencies Do Senior Leaders Need?

- Domain knowledge
 - Functional
 - Operational
- Enterprise perspective
 - Organizational alignment
 - Sensitivity to environment
- Leadership skills
 - Visioning and motivating
- Management skills
 - Deciding and marshalling resources

RAND DB517-2

RAND's research in military senior leader competencies has identified four major categories of competencies that are consistent with the broader research literature on executive skills first described by Chester Barnard (1938) and later by such leadership researchers as Henry Mintzberg (1973) and Stephen Zaccaro (1996, 2001).²

Domain knowledge is defined as the collective knowledge gained through education, training, or a series of assignments in a functional area, such as intelligence analysis, logistics or acquisition management. Domain knowledge also refers to knowledge of warfighting operations pertaining to fighter, bomber, and mobility aircraft and to space and missile systems.

An *enterprise perspective* is an understanding of how the parent organization operates, how the leader's organization fits within the larger parent organization, and the larger organization's operating environment—its stakeholders and their demands, its constraints, its competitors, and other external influences on its operations. For example, an understanding of how Headquarters Air Force (HAF) operates as an organization and how it interacts with other services, government agencies, and industries is valuable to senior leaders. This perspective broadens their interpretation of how their organizations should contribute to the strategic objectives of the parent organization.

Leadership skills focus on envisioning where to take an organization and developing and motivating subordinates to move in that direction. Stephen Zaccaro (1996, p. 14) defines executive leadership as

the set of activities toward the development and management of the organization as a whole . . . to reflect long-range policies and purposes that have emerged from senior leaders' interactions within and interpretations of the organization's external environment.

Management skills constitute a distinct category of senior leader competencies. Here, we define *management* as emphasizing a senior leader's responsibility for and control of the resources of an organization. Military organizations are frequently required to achieve goals

² Throughout this document, the terms knowledge, skills, and abilities will be used interchangeably with the term competencies.

despite constrained resources. Of particular importance to military leaders are skills in marshalling resources to optimize attainment of organizational goals.

The compensating competencies that we discuss in this briefing fall into the enterprise perspective, leadership, and management categories of this classification scheme.

How Do Senior Leaders Deal with the Domain-Knowledge Demands of Their Jobs?

- Ideally, senior leaders fully qualified for their positions
 - Sufficient domain knowledge
 - Training and experience that match job requirements
- But some senior leaders have incomplete domain knowledge
 - Must learn on the job
 - Must rely on other competencies
- These compensating competencies are
 - Distinct and prevalent
 - Teachable
 - Useful to all senior leaders

RAND DB517-3

We structured the research to enlarge our understanding of how senior leaders deal with the domain-knowledge demands of their jobs. Ideally, senior leaders are fully qualified for their positions, but for the reasons explained earlier, it will be difficult to achieve this goal completely. When senior leaders have incomplete domain knowledge, ranging from a little to none, the leader must learn on the job. Senior leaders need to become engaged and must begin adding value to their organizations as soon as possible. Therefore, it was important to understand how senior leaders learn on the job. We also wanted to gain insights about other competencies they had to rely on while they were learning about the new domains. The analysis distilled a wide variety of knowledge, skills, and abilities into a small set that was distinct and prevalent among the different senior executives we interviewed.³ We also found that the elements of the competencies we identified are teachable—they can be conveyed in a structured learning environment. An additional payoff from the analysis is that these competencies are useful to all the senior leaders we interviewed. Those who had incomplete domain knowledge used the competencies to accelerate learning, and senior leaders with high amounts of domain knowledge used them to shape processes and outcomes in their organizations.

³ Although it would have been useful to correlate the use of these competencies with objective or subjective measures of leader performance, such measures were not available to us.

Methodology

Senior Leader Interviews Explored Competency Requirements

- Knowledge, skills, and abilities needed to perform critical aspects of job
- Where, when, and how they were gained
- Gaps in domain knowledge at the time they started their job
- Compensating competencies for these gaps

RAND DB517-4

We gathered data through interviews scheduled to last 1 hour and 15 minutes. The actual length ranged from as long as 2 hours to as short as 45 minutes. We used that time to explore the kinds of knowledge, skills, and abilities senior leaders use to perform critical aspects of their jobs, as listed above. We also narrowed the discussion to the most critical aspects of their jobs and proceeded to uncover when, where, and how they gained the skills they used. It was also important to find out what gaps, if any, in domain knowledge they had when they started their jobs. Finally, we inquired in great detail how other competencies were used to fill these gaps. We followed a semistructured interview approach that used a standard set of questions but also permitted enough flexibility for the senior leader to give us information that we ultimately found we had not thought of in advance (see Appendix B). Note-takers accompanied the interviewers and attempted to transcribe the responses to interview questions and additional leader insights verbatim. Ultimately, the interview allowed the senior leaders to inform us about the actual skills they use for critical job demands.

Interviewed 27 Senior Leaders

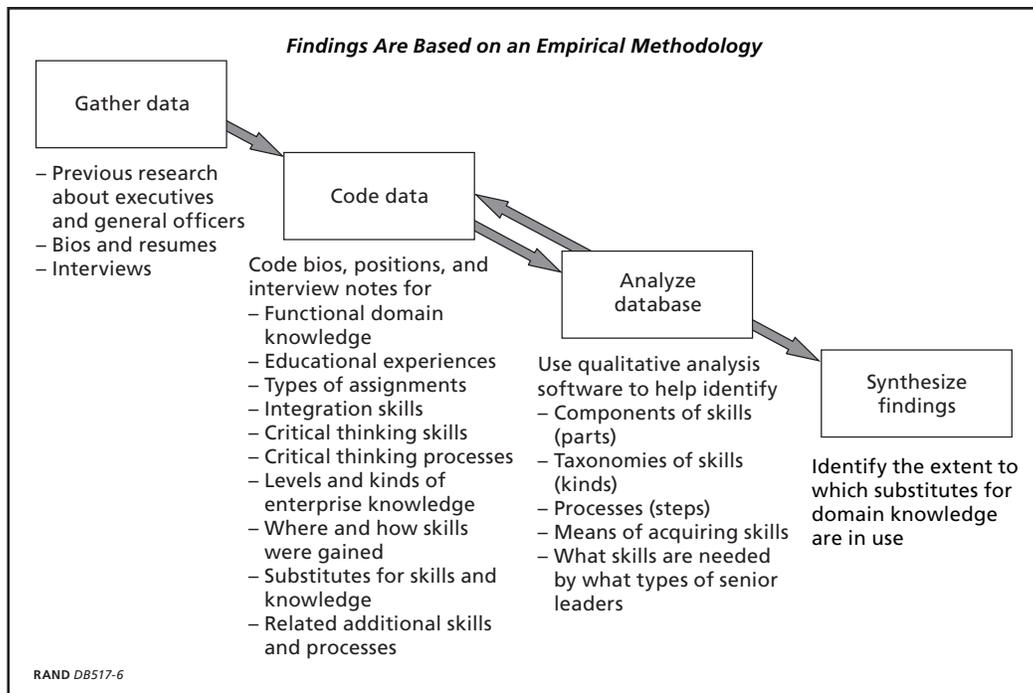
- Representation across all grades
 - 2 generals
 - 7 lieutenant generals
 - 6 major generals
 - 7 brigadier generals
 - 5 Senior Executive Service members
- Broad organizational representation
 - HAF
 - MAJCOMs
 - Centers
 - Agencies
 - Joint Staff and OSD

RAND DB517-5

We interviewed 27 senior leaders across all general officer ranks and Senior Executive Service tiers.¹ They held or had recently held positions that, ideally, required incumbent with functional experience in two domains. Their positions were also representative of senior leader jobs that required integrating either (1) levels of warfare, (2) weapon system capabilities, (3) activities across Air Force organizations, (4) across organizations outside the Air Force, or (5) Air Force resource-allocation processes with operations or programming processes. These positions were also selected to represent different Air Force organizational levels and at least one of three Air Force concepts of operations (CONOPS): Global Strike, Global Persistent Response, or Space and C4ISR.²

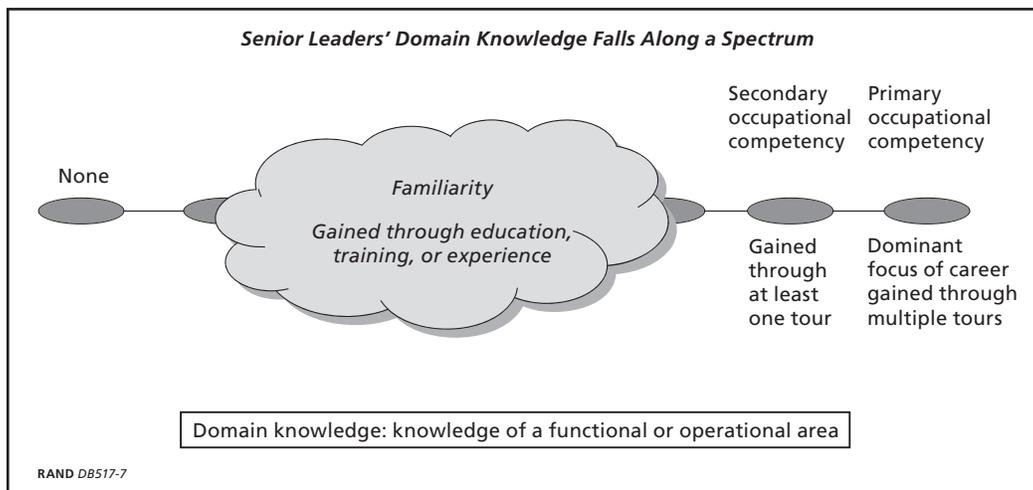
¹ At the time of this study, the Air Force had a total of 431 senior leaders—11 generals, 35 lieutenant generals, 88 major generals, 134 brigadier generals, and 163 Senior Executive Service members.

² The glossary in the front of this volume defines the Air Force CONOPS, and Appendix A explains the sampling strategy.



The interviews were part of a larger empirical methodology. We made use of previous research, most notably the work of the Army Research Institute on executive skill requirements (Harris and Lucas, 1991; Lucas and Markessini, 1993; Markessini et al., 1994). This research was valuable for structuring the interview protocol and forming a baseline understanding of military senior leaders' job demands. We also relied on John Gabarro's (1987) longitudinal study of business executives. His research resulted in a stage model of how executives gain and use domain knowledge. We also reviewed career histories of the senior leaders we interviewed to understand their backgrounds and extent of the domain knowledge they had for the positions they occupied. Each senior leader's career history was coded for number of months assigned to a functional domain, using a functional domain taxonomy developed by RAND. The calculations served as a proxy for the amount of domain knowledge the senior leaders possessed.

The research team then classified each leader's level of domain knowledge for the position by comparing the highest and second highest level of functional domain experience to the requirements of the job. The next step in the methodology was to identify instances of different types of knowledge, skills, and abilities in use in particular positions. The list above evolved into an extensive coding taxonomy for tagging specific examples of knowledge, skills, abilities, and processes in the interview transcripts (see Appendix C). The focus of the analysis was on identifying the extent to which substitutes for domain knowledge were in use. The coded interview transcripts were analyzed with qualitative data analysis software to (1) identify the prevalent knowledge, skills, abilities, and processes senior leaders use; (2) examine differences in competency use between leaders who had domain knowledge and those who did not; and (3) identify differences in competency use according to such structural and contextual dimensions as grade, organizational level, and CONOPS operational domain.



Dimensions of Domain Knowledge

Before laying out our findings, we will start by discussing domain knowledge. The analysis began with a definition of domain knowledge taken from RAND's research that established occupational competencies for Air Force senior leader jobs through domain knowledge pairings (Robbert et al., 2005). One of the products of that research was a taxonomy for specifying the competency requirements for senior leader jobs in terms of a *primary competency*, a *secondary competency*, and a *familiarity*. The primary job requirement specifies the competencies an incumbent should have gained through multiple tours in a particular functional area, such as logistics, acquisition management, or fighter operations. The secondary requirement specifies the competencies an incumbent could have gained in at least a single tour in a particular area. The occupational competencies senior leaders possess are characterized in the same way.

The research also specified that senior leaders can also achieve familiarity with a functional domain in at least three ways that lead to lower levels of domain knowledge. First, senior leaders can learn about a domain indirectly, as a consumer of the function's output—for example, during the leader's tour as a unit commander relying on functional organizations for

logistics support, financial management services, or manpower and personnel support. Experience as a consumer provides an intimate knowledge of how the function adds value to mission accomplishment but does not provide insight into the functional processes that produce the services.

Second, familiarity can also be gained through training, typically in wargaming exercises, or in highly focused classroom training that addresses specific roles and processes. Training has the potential to approach experiential learning about different organizational functions but may not impart complete knowledge about functional roles and processes.

Third, senior leaders can gain familiarity with a functional area through education (e.g., professional military education). The functional knowledge that education programs provide may be the least realistic about functional processes and therefore would constitute the lowest level of familiarity with a functional domain. This briefing addresses the situation in which a senior leader is placed in a position of responsibility but has only familiarity, at best, with the functional domain.

Two Important Dimensions of Domain Knowledge

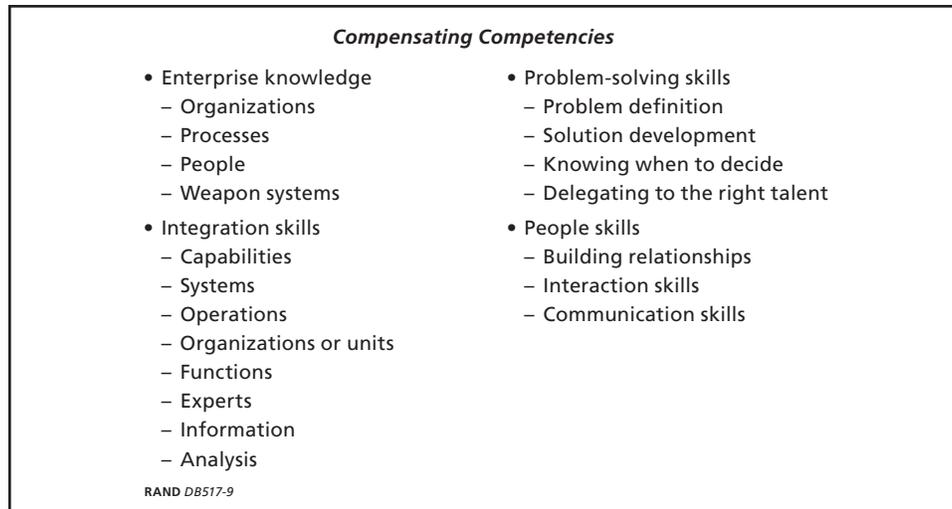
		Organizational processes and relationships	
		High	Low
Technical domain knowledge	High	Commander, Air Force Space Command Deputy Chief of Staff for Operations, HAF Commander, Space and Missile Systems Center Vice Commander, Air Combat Command Deputy Chief of Staff for Plans and Programs, HAF Dir. of Space Acquisition, HAF Dir. of Operations, Air Combat Command Dir. of Plans and Programs, Air Combat Command Dir. Comm. and Info. Sys., Air Combat Command Vice Commander, Air Intelligence Agency Dir. of Eng and Tech Mgt, AF Material Command Dir. Human Effectiveness, AF Research Laboratory Assoc. Dep. Asst. Sec. for Cost & Economics, HAF	Senior Advisor for National Security and Defense, Coalition Provisional Authority, Baghdad Dep. for Test and Assessment, Missile Def. Agency
	Low	[Hatched area representing missing data]	Dir. of the Joint Staff, Joint Chiefs of Staff Prin. Dep. Asst. Sec. of the Air Force for Acq., HAF Deputy Chief of Staff for Warfighting Integ., HAF Commander 8th Air Force Dir. of Operations, Air Force Space Command Commander, C2ISR Center Dir. of Global Power Programs, HAF Dir. of Log & Comm, Air Force Space Command Dir. of Logistics Readiness, HAF Dep. Chief, Central Security Service, NSA Dir. of Mission Support, Air Force Space Command Special Assistant for Gulf War Illness, OSD

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Our analysis identified two important dimensions of domain knowledge: technical domain knowledge—an understanding of how products or services are generated internally within the domain—and knowledge that focuses on organizational processes and relationships that may include elements external to the domain. The interviews revealed that senior leaders need to understand how their own organizations work and how other organizations that interface with their organizations operate.

As the slide shows, we categorized the interviewees according to these dimensions, working from their interview statements and their assignment histories. The interviewees in the high-high category are leaders who possess high technical domain knowledge and high knowledge of the processes and relationships pertaining to the domain. The low-low category has an equal number of leaders who, from the time that they arrived, had familiarity only with the functional domains of their organizations. They neither knew how their organizations worked nor had extensive knowledge about organizations they interfaced with to accomplish objectives. We learned that the principal challenge these leaders faced was learning the job as quickly as possible. Because the typical tour for general officers lasts two years, the learning curve needs to be compressed so that they can effectively lead their organizations. Tour lengths for Air Force civilian senior leaders are generally longer, but they face the same need to learn about organizations quickly, their responsibilities, and their operating environment. In the interest of accelerating domain learning, we contend that the lower left quadrant represents the proficiency objective that the occupants of the lower right quadrant should try to achieve first.

The fastest way for senior leaders who are in the low-low quadrant to add value to their organization quickly is to (1) learn the main points of how their organizations operate, (2) understand the nature of the relationships their organizations have with other organizations, and (3) learn the main operations of the other organizations. Acquiring technical domain knowledge is time consuming. It is relatively more productive to master an understanding of broader organizational processes and relationships first, then to tackle depth in technical domain knowledge. An understanding of broader organizational processes and relationships contributes more directly to the organizational integrating role that leaders are expected to perform.



Identifying Compensating Competencies

Our analysis identified these prevalent compensating competencies. The subcategories beneath each are its major components or dimensions. For example, the interviews indicated that enterprise knowledge comprises four major dimensions: organizations, organizational processes, key people, and Air Force weapon systems. We derived these by analyzing coded interview transcripts. The coding process began with a preliminary coding scheme to tag examples of types of competencies in use. The number of codes grew as examples of new competencies and contexts for their use emerged from the transcribed interview notes. We then developed logical categories and subcategories from the elements of the taxonomy.¹

¹ Appendix C sets forth our complete compensating competencies taxonomy.

Compensating Competencies Prevalent Among Senior Leaders
Number of interviews citing each compensating competency

	Less-Complete Domain Knowledge (12 interviews)	More-Complete Domain Knowledge (15 interviews)
Enterprise knowledge	8	11
Integration skills	5	8
Problem solving	9	10
People skills	12	13

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This table shows how prevalent these compensating competencies were among senior leaders. It displays the number of interviews that had at least one description of the use of each kind of competency.² The senior leaders' detailed descriptions of how they dealt with the critical demands that were specific to their jobs provided ample evidence that both groups of leaders use these competencies to learn and to solve problems. Their explanations of how they used compensating competencies provided contextually rich examples to populate our analysis taxonomy.

The rest of this briefing will present our finding at two levels: first at a macro level to explain the large-scale effects of each competency on decisionmaking and learning. Then we examine the details, explaining how leaders who possess domain knowledge and by those with insufficient domain knowledge used the compensating competencies.

² The interview approach did not restrict the number or type of critical job demands that the senior leaders described. Their use of a competency often depended on the kind of critical job demand they were describing. Consequently, the use of some of these competencies could have been higher if the scope of the interviews had addressed the full spectrum of senior leaders' job demands.

Enterprise Knowledge Complements Senior Leaders' Domain Knowledge

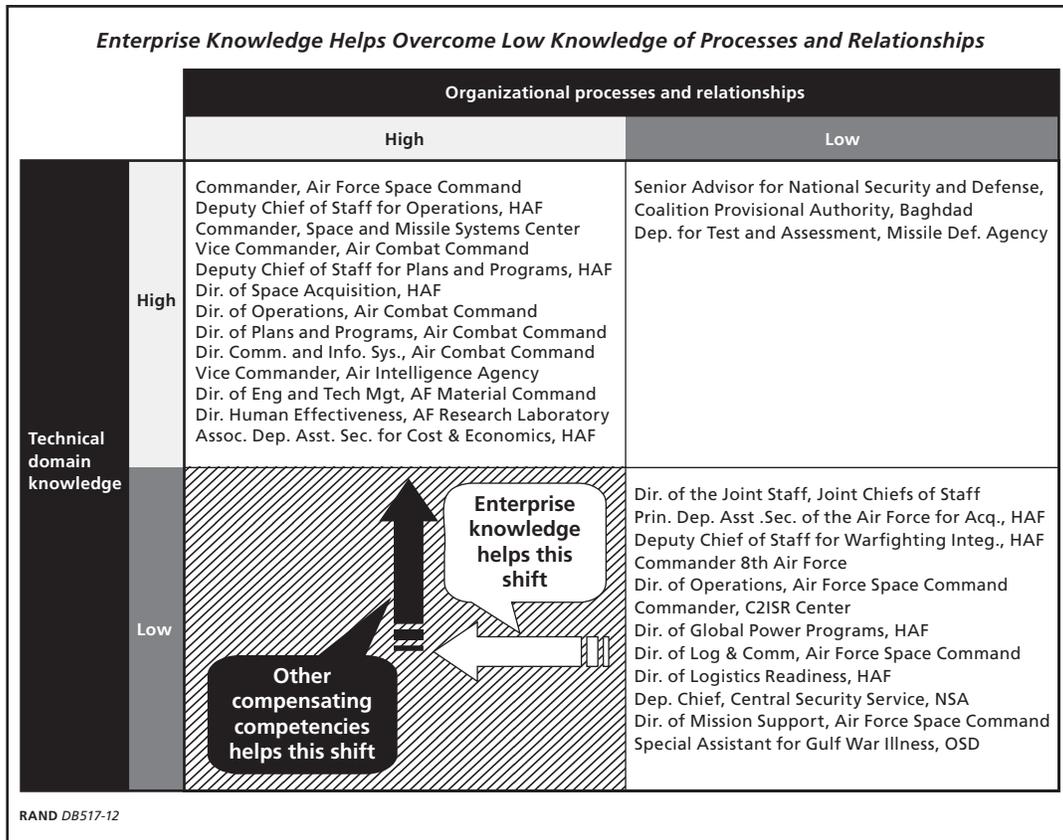
- Definition: how your function or unit fits into the whole enterprise and how your enterprise relates to its external environment
 - e.g., Air Force, Department of Defense
- Contributes to strategic-orientation, issue-definition, and solution-development processes
- Most valuable for senior leaders with incomplete domain knowledge

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Macro Level Effects of Compensating Competencies

Enterprise knowledge is an important tool for senior leaders, benefitting both those who have domain knowledge and those who do not. Our definition of *enterprise knowledge* has three parts: (1) knowledge of the parent organization, such as the Air Force or, for joint positions, the Department of Defense, Joint Staff, and other joint elements; (2) an understanding of how the leader's organization fits into the parent organization; and (3) an understanding of how the parent organization relates to its external environment. The interview analysis found that enterprise knowledge contributes greatly to developing a strategic orientation. An understanding of the parent organization's objectives and how it operates to achieve those objectives improves senior leaders' ability to position their own organizations to take actions and deliver outcomes consistent with the parent organization's strategic perspective. Enterprise knowledge also contributes broader perspectives, helping senior leaders define issues and develop solutions. This orientation is particularly valuable to senior leaders with incomplete domain knowledge. Enterprise knowledge serves as a cognitive map to facilitate understanding of established relationships and processes between different organizations.³

³ A cognitive map is a mental model or picture of the organization, its key actors, and the important factors that affect its functioning and performance (Gabarro, p. 20).



The analysis found abundant evidence of senior leaders using enterprise knowledge to shift their domain knowledge levels from the lower right quadrant to the lower left quadrant during their tenure. Of the 12 interviews assigned to this quadrant, 11 demonstrated how enterprise knowledge gained from past assignments, professional military education, professional reading, and similar sources allowed the leaders to structure their learning about organizational processes and relationships. For example, some senior leaders leveraged their knowledge of Pentagon staff processes:

My experiences in the air staff, joint staff gave me the functional knowledge I needed to be successful at 8th Air Force. . . . I went to the Pentagon for the first time as a lieutenant colonel, and I saw the importance of manpower and money. . . . Then to OSD [Office of the Secretary of Defense] staff. I learned that we don't do things in a closed circle, because everyone bumps into everyone else, how everything is integrated. . . . Last time I went to the Pentagon, I learned about presidential politics, budgets, congressional staff. . . . Each experience, you learn different things, and the key is to keep them in your pocket. Maybe I didn't necessarily think about it, but I observed it and learned from it. You say this is a problem at this level, and you must think about it this way.

Others used enterprise knowledge of weapon systems and combat organizations to facilitate learning:

I like to build a roadmap—a picture that allows the gaps to show up. I'm an operator trying to put up a view on this—I attribute my success to doing that. It allows for [sic] questions—why does that go there? Why do we do it that way? Why can't we put this over there?

While still others used their experience in different organizations to guide how they learned about new organizational processes and relationships

Here's the struggle: I am not a career space person. I have spent most of my time on the air side. Now, part of my time is learning . . . Fortunately, I have the space warfare center work experience, which gave me experience in a lot of different arenas, and this bridges between the air and space sides.

Enterprise knowledge provides cognitive maps that aid senior leaders' learning about how their own organizations do and should function, specifically understanding how processes and techniques within their domain contribute to working critical issues faced by the enterprise. The remaining compensating competencies are the best tools for moving senior leaders' proficiency towards the upper left quadrant.

Remaining Compensating Skills Help Senior Leaders

- Understand complexity
- Generate synergy across organizations
- Motivate input from subordinates
- Learn quickly

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As an overview, the remaining compensating competencies help in the following ways. First, the competencies help leaders understand complexity. The senior leaders we interviewed described how they were confronted with managing the complexity of their own organizations and of stakeholder and partner organizations. Their positions also required them to understand and navigate through the complexities of the political, hierarchical, and technical operating environments. The compensating competencies help to reduce the complexity surrounding senior leaders to a level that will allow effective decisionmaking to occur. Second, these competencies orient senior leaders to recognize or create synergies with other organizations. All of the interviewed senior leaders described how they accomplished their missions through interactions and collaborations with other organizations. Compensating competencies were used to either find common pathways for collaboration or, in some cases, to find opportunities for exceeding the expected outcome of the collaboration.

Third, the interviews revealed that some of the compensating competencies are used to enhance the input and performance of subordinates. Using the competencies both helped develop and reinforce the subordinates and motivated them to contribute to problem-solving, decisionmaking, and learning the technical domain.

Finally, we found that using compensating competencies helped senior leaders lacking domain knowledge learn about the domain. Many of these leaders described how this helped them learn the critical aspects of their positions quickly, typically in five to six months. The learning gains came when leaders were able to apply experience to current problems, focus their attention on the most critical learning and performance requirements of the new job, find ways to leverage stakeholders' strengths, and create an organizational climate that maximizes the use of subordinate expertise.

Senior Leader with Required Functional Domain Knowledge Use That Knowledge in a Variety of Ways

- Establishes credibility
- Helps learning and use of enterprise knowledge
- Serves as a template for understanding how organizations, processes, and problems are structured
- Provides an experience base for recognizing when current problems are similar to past problems
- Provides a well-learned set of systematic problem-solving approaches
- Aids in identifying experts who should contribute to problem solutions
- Results in knowledge of a network of similarly experienced professionals to help solve problems and implement solutions

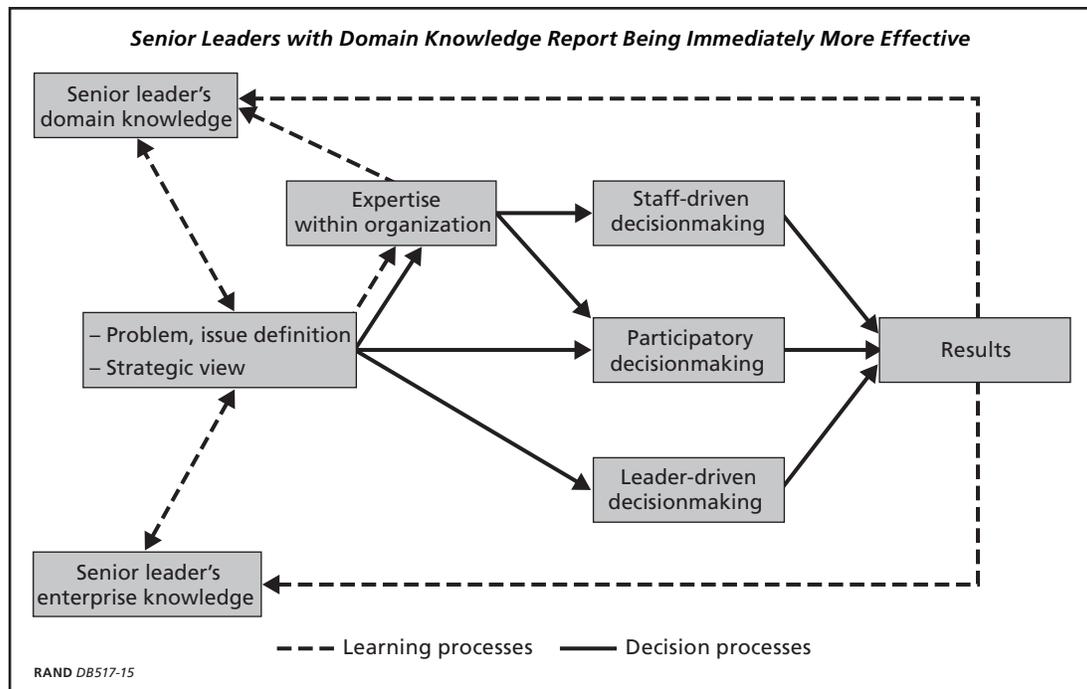
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Domain Knowledge Serves Many Purposes

Senior leaders *with* the requisite domain knowledge represent the desirable match between leader occupational competencies and job requirements. As a group, the senior leaders we interviewed who possessed domain knowledge explained how they use that knowledge along with enterprise knowledge to deal with a problem immediately or to define an issue. After reviewing these examples, we compiled the above list ways that domain knowledge is instrumental to senior leaders.

Leaders who possessed the requisite domain knowledge, gained particularly from multiple tours, enter their jobs with high levels of credibility. During their careers, these leaders also developed extensive networks of counterparts in specific functional domains within the Air Force; across service branches; and in some cases, internationally, whom the leaders use to assist in problem solving and solution implementation.

Domain knowledge provides a template for quickly gaining an understanding of an organization, its processes, and how its problems are structured. Furthermore, accumulated knowledge in the domain enables leaders to recognize when current problems are similar to those they have previously encountered. Domain knowledge also contributes to the ability to apply well-honed, domain-specific problem-solving approaches and readily identify the kinds of subordinate experts who should contribute to solution development. Senior leaders who possess domain knowledge are also able to learn, develop, and apply new components of enterprise knowledge quickly during problem solving and issue definition. Finally, senior leaders with domain knowledge are more likely to appreciate the second- and third-order consequences of alternative courses of action and therefore to make critical decisions more reliably, confidently, and expeditiously.



Decisionmaking and Learning Models

We also analyzed the interviews specifically for examples of processes that senior leaders designed and used in their jobs. Those with domain knowledge provided evidence of a common set of processes that enabled them to be effective immediately. The processes can be represented in a general model of decisionmaking and learning, as shown above. Decision processes are depicted as solid lines, and learning processes are depicted as dashed lines. The components of the model are described below.

Enterprise knowledge enhances the application of domain knowledge to problem solving and issue definition by allowing the leader to place problems and issues within the scope of the larger organization. Domain knowledge and enterprise knowledge are also used to develop a strategic view for the organization. The integration of the two types of knowledge leads to a clearer specification of an organization's long-term goals in light of the strategic orientation of its parent organization.

Senior leaders are still learning, despite the extent of their domain knowledge. The interviews also produced evidence showing that working through the unique aspects of problems, issues, and challenges of an organization actually enhances a leader domain and enterprise knowledge. We also have evidence that a leader with domain knowledge relies on subordinate expertise in the organization to begin the problem-solving and decisionmaking processes. While domain-experienced leaders contribute knowledge to their subordinate experts, the

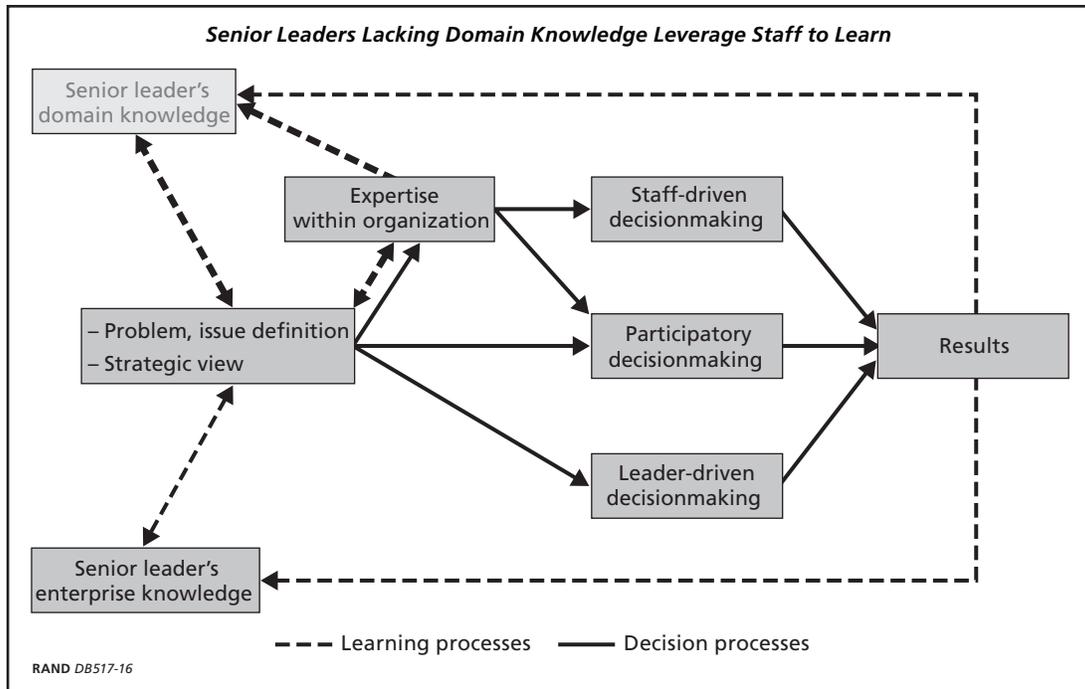
experts, in turn, provide additional technical information that ultimately enlarges to the senior leader's domain knowledge.

The principal activity for senior leaders with domain knowledge, however, is initiating decision processes with subordinate experts. We found examples of three different types of decisionmaking processes at work. Participatory decisionmaking—the extensive use of the subordinate experts in the decisionmaking process—was the most prevalent form of decisionmaking senior leaders used.

There were also examples of leader-driven decisionmaking, in which the leader accepts input from the subordinates but primarily makes decisions on his or her own. This makes the leader-subordinate dynamics different from those of participatory decisionmaking, which involves high levels of two-way engagements, with subordinate experts contributing to the leader's decision.

Finally, there was a single case of staff-driven decisionmaking. The senior leader was in charge of a highly technical organization, in which subordinates had tremendous expertise. That leader defined his role as primarily external, finding new organizational partners for the viability of the organization, and told the staff that he would approve anything they put before him.

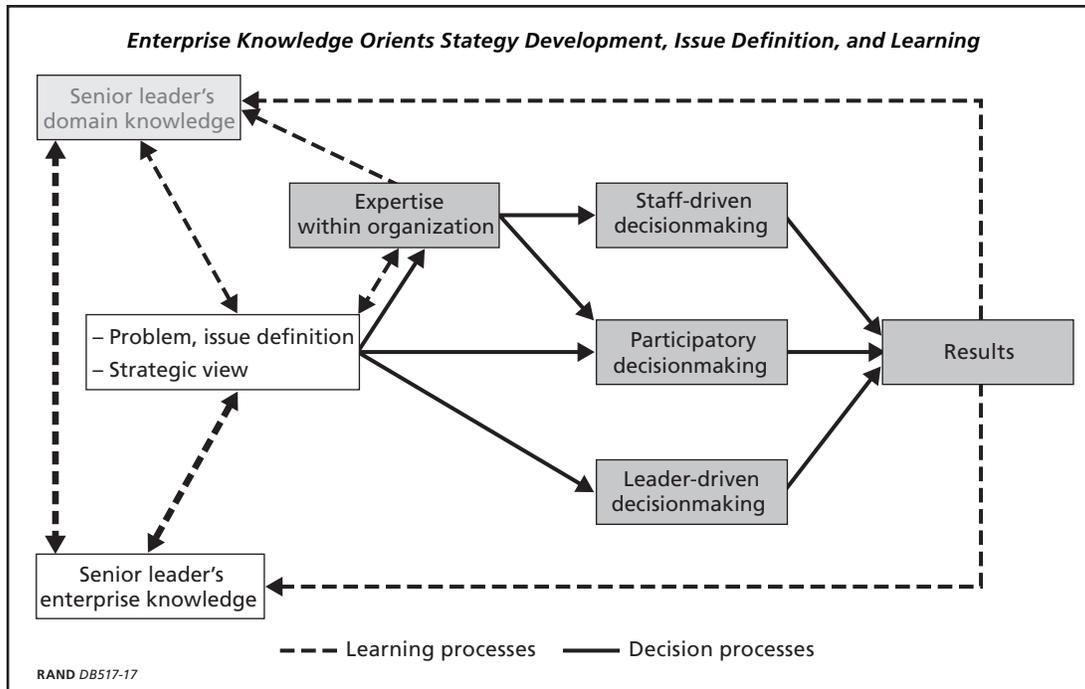
Regardless of the decision style in use, all culminate in results that enhanced domain and enterprise knowledge.



Our model of decisionmaking and learning could also describe the processes that senior leaders with insufficient domain knowledge developed and used, but these leaders cannot initially work at the same level of insight and comprehensiveness as an incumbent with requisite domain knowledge. Consequently, the initial months in the job are dedicated to tapping the expertise of the staff to gain domain knowledge. The significant dynamics of the decisionmaking and learning model in this situation are the educational interactions between the organization's subordinate experts and the leader, the senior leader's domain knowledge and problem-solving abilities, and how the issues are defined. These particular processes are depicted as bold, dashed lines in the above diagram.

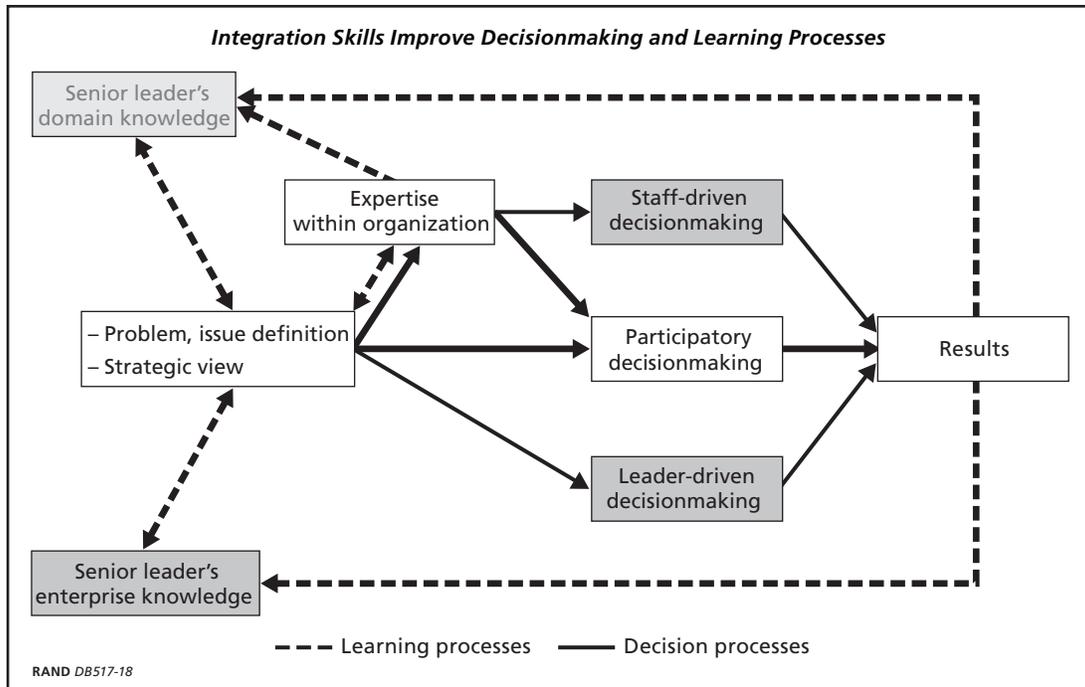
By using the staff experts, these leaders can gain knowledge and proficiency about the functional domain and quickly become able to add value to the organization. These learning processes are what distinguish our two models and will provide an undercurrent in this briefing.

Our analysis found that this group of leaders used the same types of and had the same preferences for decisionmaking processes that senior leaders with domain knowledge used. In the next section of the briefing, we will summarize how, at a macro level, compensating competencies are employed within this general model.

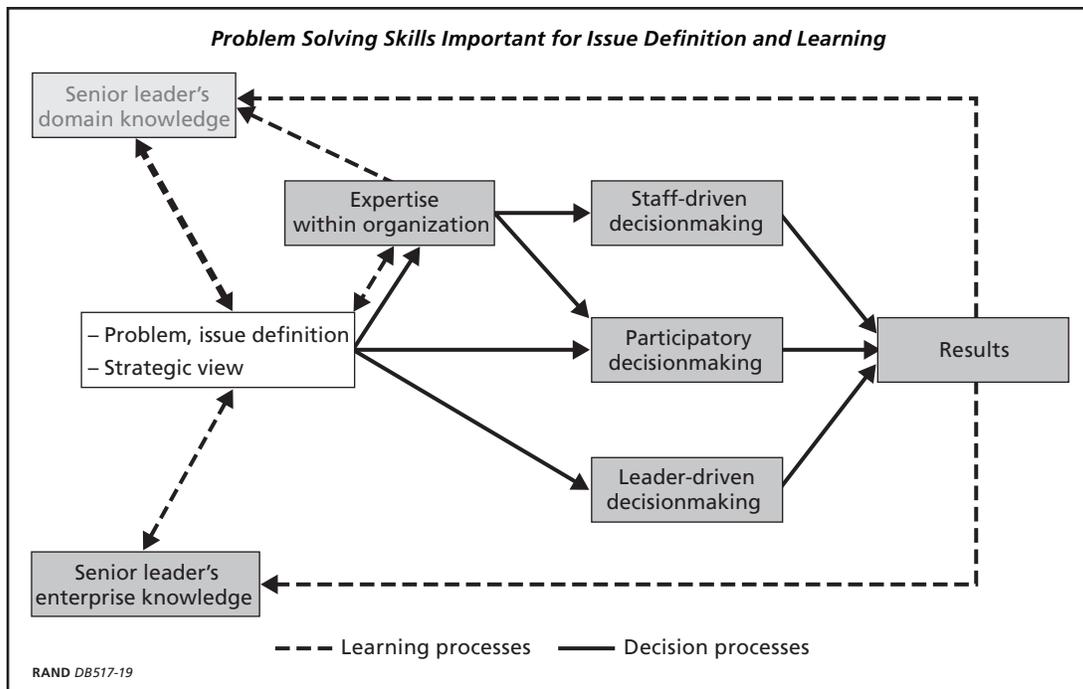


Role of Compensating Competencies in Decisionmaking and Learning

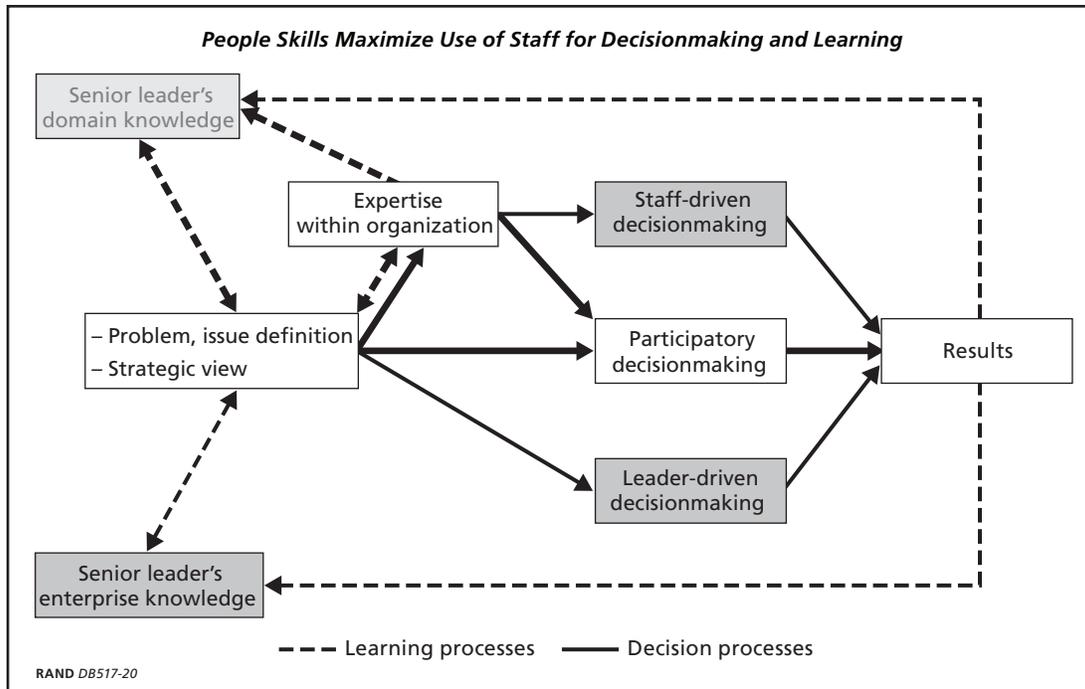
Enterprise knowledge orients strategy development, issue definition, and learning. When senior leaders possess domain knowledge, they can immediately become engaged in problem solving and issue definition and can develop a strategic view for the organization, regardless of their level of domain knowledge. For a leader lacking domain knowledge, the enterprise knowledge acts as a cognitive map to structure an approach to diagnosing problems or to developing a strategic orientation for the organization. Enterprise knowledge also provides an overarching structure for gaining domain knowledge.



Next, we investigated the importance of integration skills. These skills play a role throughout the process model. When senior leaders without domain knowledge talked about using integration skills, they described using them to create more-sophisticated definitions of problems, issues, or orientations for an organization's future. There were also examples of senior leaders using integration skills to help them gain domain and enterprise knowledge by becoming able to recognize the different parts of problems and issues and how these parts fit together. Integration skills also allow senior leaders to maximize the use of subordinate expertise, combining the talent in the organization not only to help solve problems through participatory decisionmaking but also to enhance learning. Finally, we found examples of senior leaders using integration skills to enhance their ability to structure robust solutions and outcomes in their organizations.



Problem-solving skills are essential for every leader. As a compensating competency, they contribute directly to senior leaders' efforts to define issues, develop solutions, and gain domain knowledge. During the interviews, most senior leaders recounted how they had to apply a structured approach to understanding issues and problems, particularly when they were new to the job. Applying problem-solving skills at the senior level is important for identifying information central to defining the problem and developing comprehensive solutions. The act of using problem-solving skills for domain-specific problems and issues also helps senior leaders gain domain knowledge. Deconstructing problems and issues into their component parts, critiquing processes for flaws, and analyzing organizational relationships expose senior leaders with insufficient domain knowledge to the essential elements of technical domain knowledge and domain-specific knowledge about organizational processes and relationships.



People skills is a very simple label for a very complex set of skills that also facilitate decision-making and learning.⁴ The interview analysis identified many examples of senior leaders maximizing the use of staff expertise to (1) define the problem or issue and (2) determine how to move forward strategically. There were also numerous examples of senior leaders creating an environment for their own learning, supporting participatory decisionmaking processes, and developing comprehensive results. The next section presents the third and final level of discussion about compensating competencies—our explanation of how senior leaders use each compensating competency.

⁴ The complete taxonomy for people skills is in Appendix C.

Enterprise Knowledge Contributes to Comprehensive Decisionmaking

- Includes essential knowledge about stakeholder, partner, or customer organizations
- Provides broader perspective for issue definition for all senior leaders
- Serves as a foundation for senior leaders with less domain knowledge to learn about processes and relationships

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Senior Leaders' Use of Compensating Competencies

Enterprise knowledge contributes to comprehensive decisionmaking. The following quote illustrates how a senior leader on the Air Combat Command staff uses enterprise knowledge to scope and orient his organization's activities:

You look at the Air Force level, the level where you can see the [separate pieces] of the Air Force picture. . . . You need to know how the Air Staff works If you don't, it's difficult to work within the system.

Other senior leaders we interviewed explained how they leveraged their knowledge of the enterprise to identify individual stakeholders and other organizations that should have a part in either structuring the problem or fashioning the solution. The broader perspective that enterprise knowledge provides was particularly valuable to senior leaders lacking domain knowledge. It provided them a foundation for learning about organizational processes and relationships during their initial months on the job. Examples from the interviews highlighted the importance of learning how organizational processes and relationships work in real life and understanding how their organizations support customer organizations' needs. Finally, a senior leader who has domain knowledge will use enterprise knowledge to move faster to actually constructing solutions.

Integration Skills Leverage Expertise to Produce Organization Outcomes and to Learn

- Helps create or improve interactions
 - e.g., expertise, processes, functions, organizations, or capabilities
- Aids learning for all senior leaders
- Senior leaders with more domain knowledge tend to integrate organizations and capabilities
- Senior leaders with less domain knowledge tend to integrate functions and processes

RAND DB517-22

The senior leaders we interviewed apply integration skills to find ways to leverage interactions that will produce organizational outcomes and to enhance learning. For example, one senior leader, a numbered air force commander, used conceptual integration to identify the kinds of interactions that needed to occur and relied on subordinate experts to establish how critical interactions would take place:

At this level, the main thing you have to do is conceptual integration. It's visualizing what pieces need to fit together and letting other guys figure out how to do that . . . Sometimes I have to . . . learn about the details.

Integration skills are used to improve or create interactions among experts, processes, functions, organizations, or capabilities. Integration skills also facilitate learning about the functional domain. When senior leaders described how they learned in their jobs, they provided examples of how they incorporated the expertise of their staff members to gain in-depth knowledge:

By assuming, when I show up, that I don't know anything and starting from ground zero and being willing to ask any question, I tell everyone that I'm not trying to insult their intelligence and "let's go back to slide 1." Rule number one is "no acronyms on the title slide." Like [my boss] told me, and he knows my background, "you're the perfect guy for this job because when you understand it, we'll all get it." That's a backhanded compliment, but he's right.

My experience has been, unless you happen to be omnipresent and omniscient, you're not going to know those things until other people tell you. When I came into [this job], I didn't know anything about bombers, so I found the brightest bomber guys and asked them questions. You can't be afraid to ask questions, but a lot of guys at my level are because they think, "I should know this."

Others talked about how they integrated the perspectives of their organizational counterparts to help learn the nuances of an issue or problem:

[I participate in an] enterprise integration forum with ESC [Electronic Systems Center], ASC [Aeronautical Systems Center], ACC [Air Combat Command] for product development to learn how to develop synergies with other research technologies. [It] forces you to think outside your frame of reference to broaden [your] ability to look at issues at a strategic level. [It] requires good insight, indications of where the issues are and what the correct buttons to push in order to get things done.

There was an important distinction in how integration skills are used. When senior leaders who possess domain knowledge described integration, they tended to talk about integrating at a higher level—organizational outcomes and operational capabilities. For example, they spoke about how they integrated air and space capabilities to produce an Air Force–level solution, developed synergies across research technologies from different organizations, and integrated the capabilities of the Air Force with those of other services to produce joint warfighting capabilities. Senior leaders with insufficient domain knowledge tended to describe integrating at a comparatively lower level—functions and processes. The examples these leaders mentioned included integrating the function’s information technology applications and logistics, planning, and programming processes. They also described integrating functional capabilities within their organizations. This and other similar observations suggest that, notwithstanding their strengths in the compensating competencies, senior leaders do not hit their full stride until they have gained at least a modicum of knowledge in a functional domain.

Problem Solving Skills Find a Critical Path Through Complexity

- Four components are prevalent
 - Strategic or long view
 - Diagnosis
 - Problem definition
 - Solution development
- Senior leaders with less domain knowledge use
 - Generic models or experience
 - Less-comprehensive approaches to problem definition
 - Less-sophisticated solution-development strategies

RAND DB517-23

The senior leaders we interviewed were responsible for complex organizations and complex functional systems. Problem-solving skills are the tools senior leaders use to reduce the complexity of their decision space. One senior leader described his position on the joint staff and suggested how these skills are important for decision speed:

You have to see the unknown and know that it is like everything else . . . [have the] ability to put a critical path on it . . . know when to make that decision before anyone sees it, and make it.

These skills are also important for developing comprehensive decisions. We identified four components of problem-solving skills in the slide,⁵ which act as cognitive maps for confronting complex situations when senior leaders either do or do not possess experience. Our analysis also indicated that a senior leader's level of domain knowledge affects the problem-solving strategies he or she employs. Senior leaders with less domain knowledge typically talked about using generic problem-solving strategies that they learned in academic programs or executive seminars. They also talked about using their own domain-related experience as the template, or cognitive map, for moving forward in problem solving.

Conversely, the senior leaders who had domain knowledge tended to talk about problem-solving approaches that were directly tied to the functional domain. Their approaches were tailored to the specific problems they faced or were directly transferable from previous experience in the functional domain. There were also differences in how the leaders applied problem-solving approaches. The approaches of senior leaders with less domain knowledge included formulating and testing hypotheses, identifying technical gaps between builders and users, engaging staff to characterize the problem, and establishing conditions for the problem to surface:

The key is asking questions. I bring everyone together. You have to have a presentation style that is not intimidating so that everyone will participate. I set rules at the beginning. Anyone can say anything. If your boss comes back and asks you—why did you say that in

⁵ The first two components, strategic long view and diagnosis, are the results of fine-grained analysis of the problem-solving techniques described in the interviews.

the meeting?—I want to know about it. They have to know you're not going to chew their head off if they say something the wrong way. And don't play your cards close to the chest, or you will cut yourself off from some information.

While apparently effective, these approaches are less comprehensive than the examples senior leaders with domain knowledge provided, which included thinking outside their frame of reference to identify issues and defining the problem to achieve mutual goals as this quote illustrates. For example,

Gen Q and I had a meeting in order to get better insight into each other's organizations. I had a series of issues that when put together made up a pretty strong argument. The result was an MOU that will have lasting effects on our organizations, long after my tenure is done.

Senior leaders with less domain knowledge described less-comprehensive strategies for developing solutions. These strategies were less complex than those of leaders who possessed domain knowledge for their jobs.

When the less-knowledgeable senior leaders talked about developing solutions, most of their approaches could be characterized as reviewing possible solutions, experimenting with different solutions, attempting to correct critical flaws or gaps, and choosing a solution that can achieve the goal. The examples we were given tended to focus on solving the specific problem and placed less emphasis on including contextual factors, stakeholder involvement, or the second-order effects of their solutions. For example,

I've been a wing commander three times. I've learned that, with insurmountable problems, you have to be persistent in your pursuit in closing each door one by one to make sure there isn't a way to solve it. People say "we can't do that," I say, why? What didn't work before? The information they give leads to questions, and eventually I find a niche they didn't follow.

Senior leaders with domain knowledge, on the other hand, tended to approach solution development by incorporating a wider range of factors that often emerged from more-extensive problem diagnosis. For instance,

We have [a division] that's been working on the science of chem-bio stuff—anthrax and engineering nonreproducing cells that do what you want. I've tried to focus and harness that research and connect them [the staff] politically with the right opportunities. I hired a guy to make the organization work. He now brings in about four times more money than I give him as core funding. We partner with other organizations: NIH [National Institutes of Health], universities, and businesses. It took a lot of teamwork to make that happen. I threw a lot of money at those organizations.

People Skills Create the Context for Engagement and Learning

- Address communication barriers with subordinates and managing organizational climate
- Senior leaders with less domain knowledge focus on
 - Creating conditions for approachability
 - Wider varieties of people skills and processes
- Most important components
 - Communication skills
 - Critical listening skills

We next explore these important components further.

RAND DB517-24

People skills are used to create a context for engagement and learning. The following quote is both representative and exemplary and comes from a numbered air force commander:

I've had captains in my meetings tell me I was wrong. And I've taken that as an incredible compliment because, as a captain, I would not have even talked to a general. You have to get to the point where the guys that know what the problems are tell you about them.

This illustrates an objective for building an organizational climate that supports purposeful communication throughout the organization. People skills address removing barriers that inhibit subordinate-generated communication. Senior leaders who use these skills create an organizational climate that allows subordinates to feel comfortable and empowered to approach senior leaders to bring up problems and teach the leaders what they need to know. Collectively, senior leaders who lacked domain knowledge provided numerous examples of creating conditions for approachability and identified a wide variety of techniques for creating the conditions for approachability. Two particular subcategories of people skills are very important and were described in nearly every interview: communication skills and critical listening skills.

Communication Skills Close Gaps Accompanying Functional and Organizational Integration

- Includes analyzing how to connect with the audience and building a communication strategy
 - Requires sufficient level of domain or enterprise knowledge
- Used within own organizations and among external stakeholders
- Everyone interviewed used translation skills
- Senior leaders with less domain knowledge rely more heavily on communication skills

RAND DB517-25

Communication skills are used to manage the seams between functions and organizations that accompany integration. A senior leader on the Air Force Space Command staff who, by his own admission, has limited exposure to space operations observed the following:

I know a lot about air but getting to how to modify air-space . . . Both sides don't understand each other, so we have to translate and move around what makes sense.

He was referring to an iterative process of communication. He had tried to apply the processes he was familiar with from fighter operations to space operations, but his staff had trouble understanding what he was talking about. In turn, the staff tried to convey the constraints inherent in current space operations, but the leader's limited domain knowledge slowed his ability to find an integrated solution. His communication with subordinate experts eventually converged around courses of action that made sense collectively.

One communication skill senior leaders use is known as *audience analysis*—assessing the knowledge and terminology of readers and listeners and using it to build a communication strategy. This, however, requires having enough domain knowledge to be able to analyze the audience. The interviews contain many examples of senior leaders using this skill set within their organizations and among external stakeholders. Another important skill is the ability to translate. Every senior leader we interviewed was eventually required to translate technical information for nontechnical audiences. This information ranged from science and engineering concepts to the technical aspects of air and space operations. Overall, senior leaders who lacked domain knowledge relied heavily on these kinds of communication skills.

Critical Listening Skills Help Craft Strategic Orientation and Issue Definition

- Involves acquiring and analyzing information from stakeholders, subordinates and other experts, and clients
 - Evidence found in nearly every interview
- Used by senior leaders with less domain knowledge to
 - Get at the heart of an issue
 - Understand needs
- Used by senior leaders with more domain knowledge to
 - Identify redundancies or potential synergies
 - Evaluate decisions or agencies

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Senior leaders used critical listening to craft strategic views for their organizations and define issues needing resolution. The following is an excerpt from a senior leader's explanation of the importance of engaging stakeholders and understanding their point of view when attempting to achieve consensus about issues or courses of action at the strategic level within the Pentagon:

Bringing groups together takes listening and communication skills . . . and that is hard to do. I would tell folks, “you are dual functioning now. Listen to what you are hearing. [Be ready to say] here is a place where I can work together [with you].”

The dual functioning he refers to includes advocating your own position and, at the same, time hearing and understanding others' positions. The use of critical listening was not limited to consensus-building. For example, other leaders used critical listening to enhance relationships with stakeholders:

You need to create a constant feedback loop. I do that on the Hill. If they ask for information, I don't just send it back. I check back with them, follow up: Is that what you needed? Do you need more?

Analysis skills are an important companion to critical listening skills. We found evidence of the use of these skills in every interview. For example, senior leaders created a context that would ensure they could get information. They structured time to seek advice and to listen to stakeholders and subordinates about issues, problems, and needs. The nature of the exchanges was open and direct and usually involved the senior leaders admitting what they did not know. They also listened so that they could adjust their strategies according to what subordinates and stakeholders told them. Leaders with less domain knowledge used critical listening to aid learning, to get at the heart of an issue, and to understand the needs of stakeholders and subordinates. However, senior leaders with domain knowledge employed critical listening skills to achieve higher-level objectives. They listened to identify redundancies and potential synergies in organizations and to evaluate decisions and agendas.

Compensating Competencies Can Be Developed

- Development modes
 - Experience
 - Academic education
 - Professional military education
 - Executive seminars
- Cannot rely on experience to deliver repeatable development
 - Circumstances often unrepeatable
 - Individual experiences differ, even in similar situations
 - Limited opportunities for key experiences

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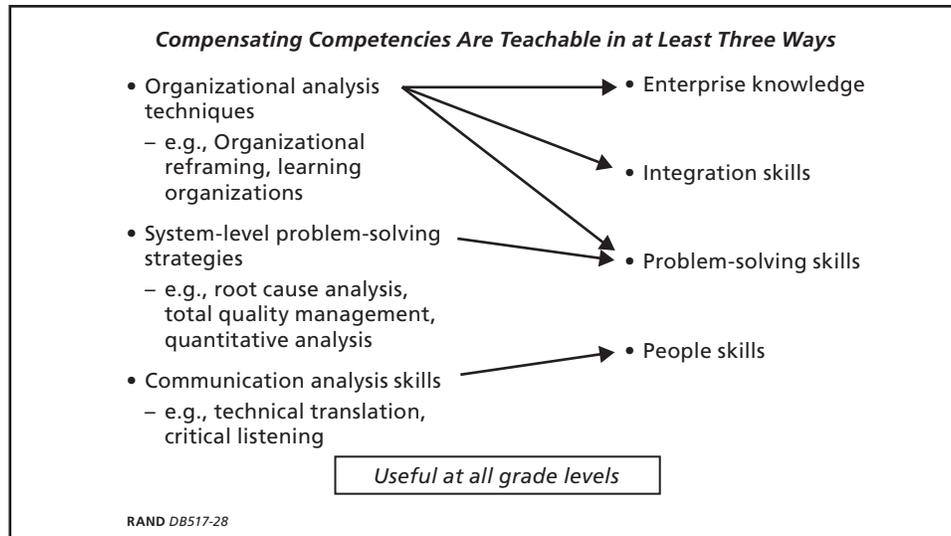
Strategies for Developing Compensating Competencies

These competencies can be developed. When we asked leaders where they gained these compensating competencies, the majority said that they had come from experience. They talked about how specific assignments contributed to their enterprise knowledge and problem-solving skills. Individuals had been executive officers to three- or four-star generals, interned at Air Staff early in their careers, and/or served at headquarters later in their careers. Others had gained integration skills from command positions, such as Joint Staff or OSD staff positions or in demanding assignments in their own functional domains. The leaders frequently mentioned mentors as being important for development. Some mentors actively taught these leaders to perform at higher levels, while others taught by example, with the leaders observing and internalizing the mentor's behaviors and problem-solving strategies. Some senior leaders also talked about the values of specific experience they accrued directly from combat or combat support operations.

Academic education, professional military education, and executive seminars were also cited as sources but to a lesser extent. The value of experience, even early career experience, contributes to the current skill sets of these senior leaders, particularly how they acquire enterprise knowledge. Despite the value of experience, we do not think the Air Force should rely solely on key types of career experience to provide these compensating competencies. First, it is difficult to ensure that specific learning events that are supposed to accompany an experience will occur. For example, the opportunity to learn compensating competencies may have diminished over time, or some mentors may not be able to teach them effectively. Second, learning outcomes can be different across individuals having the same experience. Finally, and most important, there are limited opportunities for the key, highly selective experiences, such as being a general's executive officer, which broadens younger officers and exposes them to strategic-level thinking.

The objective of senior leader development should be to increase the number of leaders having these compensating competencies. Developing such a pool is a hedging strategy for developing leaders who can be highly effective in a wider variety of organizations and operating domains. To create such a pool, the Air Force will need to employ additional methods for developing compensating competencies to supplement the kinds of career development experience the interviewees reported. Among the methods the Air Force could explore, offering current and potential leaders structured learning environments—in the forms of classroom delivery, simulations, and exercises—may offer the three advantages. First, the competencies can be taught in such educational settings. The behavioral and cognitive foundations of the compensating competencies are similar to those of various current management and executive development programs.⁶ Consequently, learning goals for the competencies can be established; teaching methodologies can be designed; and competency attainment can be evaluated. Next, a structured learning environment improves the standardization of the types of competencies that are learned, the time it takes to learn them, and when they are learned in a leader's career. Finally, the Air Force already has an educational system and infrastructure that it can use to develop compensating competencies in a structured setting.

⁶ For example, see Boyatiz et al. (2002)



If the Air Force chooses to leverage its existing educational system to increase the number of officers possessing these competencies, current curricula should emphasize at least three subject areas. The first is the development of organizational analysis techniques, which develop the ability to analyze organizations, their structures, and their processes. For example, management researchers Lee Bolman and Terrence Deal developed an approach called *organizational reframing* to look at an organization from structural, cultural, human relations, and political perspectives (Bolman and Deal, 1991). Each perspective reveals different processes, different types of interrelationships, and different consequences of organizational processes, which might not be apparent from a single perspective. Another example is diagnosing organizational learning processes. This kind of diagnosis requires the ability to analyze how information is processed, how it is enhanced, and how lessons learned are retained in an organization.

The second educational area is systems-level problem-solving strategies. Senior leaders can learn and practice a variety of strategies while enrolled in formal education and training programs. Examples include analysis of root causes, system dynamics, and systems of systems. Proficiency in such techniques will prepare senior leaders for more-robust problem solving, issue definition, creation of strategic views, and comprehensive solution development.

The third category is communication analysis. Training senior leaders in techniques to analyze stakeholder and subordinate knowledge levels will support efforts to establish common understandings of complex issues. These techniques also support development of the skills for translating technical information for nontechnical audiences. Finally, developing the ability to listen critically contributes to learning and problem-solving processes.

The slide maps the techniques for development to the compensating competencies. Organizational-analysis skills help leaders gain enterprise knowledge, integration skills, and problem-solving skills. System-level problem-solving skills directly tie to the problem-solving approaches we discussed. We concluded that these competencies are not valuable only to senior leaders but potentially to leaders in all grades. This means the Air Force should consider ways to impart these particular competencies, at the commensurate levels, to all grades of leadership

in the Air Force. For example, there is a rank-appropriate level at which to teach organizational analysis, system-level problem solving, and communication analysis at Squadron Officer College. Intermediate-level professional military education should build on that foundation and raise the skill capabilities in each area, and senior professional military education should include even more-advanced material. This tiered strategy would produce a deeper pool of officers who, if they rise to senior leadership, will already be proficient in compensating competencies. The strategy will also provide senior leaders with staff members who also possess these competencies, which should increase the quality of staff and organizational output.

Conclusions

Highly Useful Competencies for Senior Leaders

- Prevalent use among senior leaders
- Complement senior leaders' level of domain knowledge
 - Enhance effectiveness if domain knowledge is high
 - Speed learning and effectiveness if domain knowledge is low
- Development of these competencies a useful hedge for an unpredictable future
 - Training
 - Education
 - Experience

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This research has identified highly useful compensating competencies for senior leaders. These competencies are prevalent among the senior leaders we interviewed, regardless of grade, organizational level, CONOPS domain, or level of domain knowledge.

One important finding is that how these leaders use these competencies is a function of the senior leader's levels of domain knowledge for their positions. For the leaders with domain knowledge we interviewed, the compensating competencies appear to enhance the quality of problem-solving, issue definition, and decisionmaking processes. For those assigned to an unfamiliar domain, however, the compensating competencies facilitate the acquisition of domain knowledge and enable performance of executive-level problem solving, issue definition, and decisionmaking.

We have concluded that the sustained development of these competencies through training, education, or experience would be a useful hedge against the uncertainties of future operating environments and the certainty that many Air Force leaders will continue to be placed in positions of responsibility for which they lack the requisite domain knowledge. These competencies can be taught in the structured learning programs the Air Force currently uses for development. Curricula targeted at compensating competencies would augment the development already gained from broadening assignments and enlarge the pool of leaders who possess them.

Recommendations

Findings Can Guide Force Development Policy and Curriculum Content

- Integrate findings with force development synchronization policy
- Review curriculum of leadership education providers
 - Air University
 - National Defense University
 - Elite universities
 - Center for Creative Leadership

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We based our findings on 27 interviews with Air Force senior leaders. With that in mind, we have two sets of recommendations, one for further research and the other for development policy. The findings from this study enlarged our understanding of the kinds of competencies that a small set of senior leaders use to compensate for the lack of domain knowledge. This understanding sets the stage for follow-on research to understand the extent to which these competencies actually contribute to the effectiveness of senior leaders and the performance of the organizations they lead. Such a research effort would provide a stronger empirical basis for gauging the importance of the competencies and broader insight for designing executive development programs to hedge against the job demands for future senior leaders.

Although additional research will be useful, our current findings present a persuasive case for the value of the compensating competencies to senior leaders we interviewed. Taking into consideration the senior leaders we interviewed, the types of jobs they performed, and the wide use of this small set of competencies, we recommend that the Air Force seek ways to integrate these findings into its force-development synchronization strategy. This integration effort should include a review of the extent to which current leadership-development programs at Air University, the National Defense University, and elite universities currently teach these competencies. If the compensating competencies are being taught at the appropriate level, this research provides additional justification for retaining those topics. If the competencies are not being taught at the appropriate level, this research provides support for adding them to existing curricula. Integrating these findings with curriculum-development strategies for the various programs will start the Air Force down the road to developing leadership in ways that will hedge against future uncertainties and challenges.

Sampling Design

We designed our sampling strategy to enlarge our understanding of what the compensating competencies were and how senior leaders used them. These sampling objectives differ from the hypothesis-testing and generalizability goals that quantitative research typically pursues. We used this strategy because we knew very little about compensating competencies at the inception of the research. First, the understanding of the breadth of competencies used to compensate for lack of domain knowledge was limited. Next, we did not know whether their use was associated with specific CONOPS mission contexts. We also did not know whether they were associated with the complexity of the senior leader position. Finally, we did not know whether their use was associated with senior leaders' jobs at specific organizational levels or among specific senior leader grades. Consequently, our sample was not a statistical representation of the Air Force senior leader jobs. Instead, jobs were selected that would permit us to focus our investigation on the competencies incoming senior leaders used to respond to the demands of jobs requiring experience in multiple functional areas, whether competency use differed by CONOPS area, and whether competency use differed by organizational level or grade.

Interview subjects were selected according to a sampling design that identified senior leader jobs that represented the known competency requirements of Air Force senior leader jobs and the organizational complexity of the Air Force. First, we identified jobs from a RAND analysis database that ideally required incumbents to have experience in more than one functional domain. Second, we used that list to identify jobs that fell into one of six integration categories:

- platform integration—the integration of different Air Force weapon systems and/or space systems to accomplish military missions
- business-military integration—essentially, jobs that are part of the Air Force's planning and programming processes
- business-technology integration—jobs in the system-acquisition arm of the Air Force
- service-agency integration—jobs that integrate the organizational capabilities of the Air Force with those of other service branches or government agencies;
- within-service integration—jobs that manage the development or delivery of capabilities from different Air Force organizations

- technology integration—jobs in the research, development, test, and engineering arm of the Air Force.

Third, we stratified the jobs in each category by grade and organizational level. Finally, the jobs were classified according to their contribution to the Air Force's CONOPS for Global Strike, Persistent Global Response, or Space and C4ISR.

We selected 32 jobs that would provide a broad representation of grade, organizational level, and CONOPS focus within each of the six integration categories. The sponsor of this research, the Air Force Senior Leader Management Office, emailed the current and recent jobholders to request their participation in the interviews. Limitations on the availability of some senior leaders resulted in the final total of 27 participants, who collectively could provide insights about the competency demands of jobs at different grade levels, at different organizational levels, and for different Air Force CONOPS focuses within each integration category.

Interview Protocol

The interview protocol was designed to be semistructured and to last roughly 75 minutes. The questions addressed the major competency areas that were central to the research, along with follow-up prompts to gain more insights about how competencies were used and in what contexts. A set of optional questions was included in case extra time was available during an interview.

1. What are (were) the most critical job demands of this position?
 - How much of your time is spent on the most critical demands?
2. We've reviewed your career history, and you've obviously had a number of assignments in this functional area.
 - How are you using your functional experience in this position?
 - How did you gain these skills?
3. Is it possible for other general officers without experience in this functional domain to succeed in this position?
 - If so, what skills, knowledge, or experiences would be needed?
 - If not, why not?
4. The description of your responsibilities lists a number of integration tasks.
 - Could you tell us more about how you carry out these integration tasks and then perhaps walk us through one you've recently done?
5. Which additional skills, knowledge or experiences do you wish you'd had for this job before you started?
6. We're also interested in how you structure your decisionmaking process and define issues or problems that need attention.
 - What is your general style of problem-solving; what procedures do you like to follow?
 - Could you walk us through an example of a challenge or problem you've had to manage while in this position?
 - How did you learn about this problem?
 - How did you go about resolving it?
 - What in your background helped you work through this issue?
7. We also want to learn more about the use of enterprise knowledge, knowledge about how the entire organization works.

- What about your organization do you need to know to successfully carry out the duties at your level of assignment?
- How did you gain this enterprise knowledge?
- Could you give some examples of how you've used enterprise knowledge in your position?

Optional Questions

8. Ideally, what kinds of positions should a General have to prepare him or her for this position?
 - What kinds of positions above your grade does this position prepare you for?
9. Have the demands of this position changed since you've been here? If so, what was the source of the change? Reason?
 - Do you see the demands of this position changing in the future?

Compensating Competencies Analysis Taxonomy

The compensating competencies analysis taxonomy consists of the codes that members of the research team constructed while reviewing the interview notes. During the review, the team identified examples of knowledge, skills, and abilities and then created a “shorthand label” for each example. The complexity of the codes evolved as more examples were discovered across interviews. The team met periodically to review the creation and application of codes for consistency in the level of detail of the knowledge, skills, and abilities being labeled. Through the course of the coding and analysis stages of the project, the codes were refined and organized into the hierarchy listed below.

The resulting taxonomy served two purposes for the analysis. First, it provided a conceptual organization of a large number of codes that gave the team a common language with which to discuss the structure of the analysis and the emerging findings. The taxonomy also provided a way to aggregate codes (for which there were few examples) into higher-level, conceptually related categories enough examples to allow the them to recognize prevalent kinds of knowledge, skills, and abilities and common patterns of relationships among them.

Enterprise Knowledge Taxonomy

Organizations

- Own
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- One level below
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies

- Where to get information
- Rules and regulations
- How it functions
- One level above
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Two levels above
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Air Force
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
 - Major commands (MAJCOMs)
 - Headquarters Air Force
- Other services
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Department of Defense
 - What they do
 - Goals, vision, resources
 - Culture

- Existing policies
- Where to get information
- Rules and regulations
- How it functions
- OSD
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Joint organizations
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Congress
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Other government organizations
 - What they do
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information
 - Rules and regulations
 - How it functions
- Contractors
 - Goals, vision, resources
 - Culture
 - Existing policies
 - Where to get information

- Rules and regulations
- What they are good at
- Key people
- How it functions
- Other Nations
 - Culture
 - History
 - Existing relationships
- Processes
 - Where to get information
 - How do they do what they do
 - Key people in the decision loop:
 - o Originators
 - o Approvals
 - o Coordinators
- People
 - High quality performers
 - Who has good judgment
 - Who to go to for guidance
 - Who has relevant competencies
- Purpose
 - How to get things done
 - How not to step on your foot
 - How to buy time until you know something
 - To provide background information
- Weapon system
 - Platforms
 - Sensors
 - Kinetic weapons
 - Technology specific to job

Integration Skills Taxonomy

Integration of Analysis

- Analysis findings to identify requirements
- Analysis needs and constraints to identify requirements
- Analysis of damaged seams to produce an effect
- Analysis of competing needs and constraints to build future capability
- Deconstructing complexity to solve problems
- Multiple needs against constraints to identify future requirements

Capabilities Integration

- Breadth of operational capabilities to provide domain capability
- Domain capabilities to provide required forces
- Functional capabilities to eliminate stovepipes
- Functional capabilities to consolidate organizations
- Functional capabilities to prepare for long range outcomes
- Functional capabilities with tactical needs to fully develop functional capabilities
- Information generation capabilities to support operations
- MAJCOM functional capabilities with air operations to deliver full capability
- MAJCOM functional capability with air and sea to deliver full capability
- Organizational capabilities to produce an Air Force solution
- Organizational capabilities for complete information
- Organizational capabilities for product development
- Technology capability and technology need to build trust
- Unit capability to create overarching management structure
- Capabilities of other organizations to satisfy requirements
- Capability gap to produce an effect
- Service capability for joint capability

Domain Integration

- Functional components to produce information
- Functional domains to leverage strengths
- Functional domains to achieve change

- MAJCOM domains to achieve strategic objectives
- Operational domains to cross fertilize techniques
- Operational domains to fulfill strategic vision
- Components of the functional domain to achieve breadth

Integration of Expertise

- Functional experts to produce new capabilities
- Functional experts to integrate processes
- Staff expertise to ensure in-depth knowledge
- Staff expertise to analyze problems
- Military and civilian expertise to build an effective team
- Expertise of subordinates to create a cohort of experts
- Knowledge of experts (pulling it from them)

Goals Integration

- Goals to develop a corporate perspective
- Goals of other organizations to understand fundamental issues
- Goals with constraints to develop requirements
- Common goals to develop a corporate perspective
- Conceptual goals to operate at the three-star level

Information Integration

- Information to support strategic planning
- Information to solve cross functional problems
- Information to contribute to strategic planning
- Information gaps for common frame of reference
- Information gaps to provide complete picture
- Information products to support warfighting
- Insights and solutions from other organizations
- Instrumentality seams to achieve long term goals
- Repairing gaps in information to tie capabilities with requirements
- Common information needs to create efficiencies

- Use of information to generate efficiencies
- Functional information needs to produce a common information system

Functional Integration

- Logistics functions for operational readiness
- Training functions to support expanding missions
- Staff functions to mirror CONOPS
- Staff functions to create MAJCOM team identity
- Consolidate staff functions to create process synergy
- Operational and support functions to support Army's needs
- Operational and support functions with resources constraints to define priorities
- Operational functions to produce a capability
- Functional information technology applications to eliminate redundancies
- Functional outcomes to consolidate and reorganize staff
- Functional outcomes to create new organizational structure

Process Integration

- Macro organizational processes to implement vision
- Life cycle processes for efficiency
- Logistics processes to support warfighting
- Information processes to modernize
- Air Staff processes with MAJCOM processes for planning and programming
- Information technology processes for compatibility
- Software/information technology processes for joint operations
- Communications, operations, and planning processes for complete intelligence capability

Integrative Learning

- New experiences, information, and skills to personally develop
- New perspectives with background to work strategic to tactical issues

System Integration

- I/O networks to create a standard defense system
- Operational systems to produce a coherent capability

- IT systems to improve performance
- Organizational level information systems to achieve national objectives

Organizational Integration

- Organizational assets to achieve national objectives
- Organizational interface to enhance theater capability
- Organizational participants to collaborate on contractor performance
- Organizational resources to accomplish mission objectives
- Organizational responsibilities to create efficiencies
- Organizational workloads to produce efficiencies
- Organizations outside the enterprise to interact with counterparts
- Core background with other organizations' need to gain corporate perspective
- Multiple organizational venues to develop capability
- Approaches from other organizations to enhance effectiveness
- Eliminate organizational seams to improve operations
- Staff organizations to create synergy
- Staff organizations to produce improved capability
- Functional enterprises for product development

Integration of Perspectives

- Perspectives to fix seams
- Perspectives of external organizations to solve problems
- Perspectives of internal organizations to solve problems
- Perspectives of organizational counterparts to understand the environment
- Military and civilian perspectives for effective leadership
- Staff functional perspectives to produce quality answers
- Staff functional perspectives to solve problems
- Staff functional perspectives to produce a coordinated answer
- Staff perspectives to produce coordinated answers
- Functional perspectives to produce coordinated answers
- Different frames of reference to make change
- Different conclusions to create insight
- New perspectives with background to work strategic to tactical issues

Personnel Integration

- Military and civilian culture for effective leadership
- Military and civilian organizational roles for organizational viability
- Functional tribes to produce a common team
- Team characteristics to create a balanced staff
- Team characteristics to compensate for weaknesses

Integration of Technology

- Technological problems to make an integrated system
- Technology synergies at an organizational level for product development
- Research technologies to look at issues at a strategic level
- Science and technology programs to create an integrated system
- Identify technical and functional roles to produce a technical capability
- Existing technology to develop new capability

Unit integration

- Unit responsibilities to accomplish operational mission requirements
- Units within an enterprise to connect with counterparts
- Active duty and guard units to achieve future total force organization

Problem-Solving Taxonomy

Systematic Approach to Defining and Solving Problems

- Systematic methods, tools
 - Systems review/critique
 - Diagnosis to locate problems and exceptions or outliers
 - Looking for opportunities to increase productivity and efficiency
 - Find right model, conceptual framework
 - Large scale strategic view
 - Decision analysis
 - Decision trees
 - Follow through effects of possible choices on entire system
- Defining the problem
 - Form hypothesis
 - Locate issues
 - Figure out right questions to ask
 - Define or redefine the core issue
 - Define goal
- Gather information
- Getting enough information
 - Getting answers to the right questions
 - Collect expert opinion
 - Identify entire range of issues
 - Talk to customer to learn needs and issues
 - Look at all collected information to form gestalt

Systematic Approach to Finding a Solution

- Anticipate, predict, or shape the future
 - Anticipate potential problems and their consequences
 - Have solution ready
 - Be prepared to deal with problems when they arrive
 - Prevent problems
 - Crisis action planning
 - Help others understand and anticipate your future
 - Shape and influence the future
- Prioritize
 - Distribute limited resources within given restraints
 - Money
 - Time
 - Personal energy and attention
 - Prioritize according to gravity of consequences

- Take long view to put present needs in context
- Balance needs of all parties
- Make priority decisions fast under pressure
- Adapt as needed
 - Provide changing set of resources in response to changing needs
 - o Global situation
 - o Organizational structure or other local change
 - Change strategy in response to new information
 - Change strategy in response to short term changes in situation
 - Change organizational structure to respond to needs
 - Change personal role on manner for new situation
 - Change conceptual model to meet new contexts
 - Change conceptual model as Air Force thinking and conceptual models change
 - Feedback, refinement, iteration
 - o Get feedback from expert opinion
 - o Get feedback from real world results
 - Monitor/assess progress
 - o Find good metrics
 - Learn from mistakes to refine a given strategy
 - Learn from mistakes for long term improvements

When to Decide

- Make a decision when necessary, timed right
 - Time vs. quality of result
 - Time vs. quality of input to decision
 - Fast life and death decisions
- Intuition
 - Default to intuition honed by experience when necessary
 - Be prepared to revisit and change with better information

Right People and Capabilities for the Job

- Right people
 - Find the right people for the task
 - Find good people with unusual backgrounds
 - Get rid of bad people
 - Handpick staff
 - Assemble the right team
- Delegate
 - Trust and rely on subordinates
 - Structure environment to ensure that subordinates contribute

- Assess abilities
 - Diagnose and remedy gaps in capabilities and resources
 - Match capabilities/strengths to tasks

People Skills Taxonomy

Purpose

- To learn
- To motivate people to work together
- To communicate strategic direction and vision to the organization
- Identification of problems
 - Get to the point where people who know what the problems are tell you
- To impact decision processes
- To build consensus
- To effect change
- To win
- To make a decision

Effective Relationships With

- Internal
 - Subordinates
 - Supervisors/managers
 - Peers
 - Air Force leadership
- External
 - Other services
 - OSD
 - Congress
 - Other government organizations
 - Stakeholders
 - Community
 - Joint community

Personal Aura and Interaction Skills

- Personal aura
 - Tolerance
 - Integrity
 - Collegial
 - Trust people
 - Get along with everyone
 - Stand your ground (as appropriate)
 - Demonstrate adaptability

- Interaction skills
 - Tell the truth
 - Understand different personalities
 - Understand different perspectives
 - Mentoring
 - Encourage subordinates to speak the truth
 - Protect subordinates
 - Stroke people, develop friends for life
 - Do not rule by fear
 - Presentation style that is not intimidating
 - Assessing yourself
 - o Be flexible
 - o Admit mistakes
 - Assessing audiences' abilities

Communication Skills

- Two way
 - Develop and perfect art of critical listening
 - Must appear human and approachable
 - Do not blow up or become emotional
 - Lose your ego
 - Follow-up/get feedback
- Develop skill of asking questions and listening to the answers
- Establish networks
- Make communication as participatory as possible
- Motivating
 - Clear direction
 - Participatory decisionmaking
 - Make people feel cared for
 - Get them to do what you want without ordering
 - Get people on board early, show you are listening
 - Make your people heroes
- Public speaking
 - Always be sure the message is straight and direct
 - Perform an audience analysis
 - o Speak in a language the audience understands
 - o Develop strategy for getting the message to the audience

Bibliography

- Barnard, C. I., *The Functions of the Executive*, Cambridge, Mass.: Harvard University Press, 1938.
- Bloom, B. S., *Taxonomy of Educational Objectives, Handbook 1: The Cognitive Domain*, New York: David McKay Co. Inc., 1956.
- Bolman, L. G., and T. E. Deal, *Reframing Organizations: Artistry, Choice, and Leadership*, San Francisco: Jossey-Bass, 1991.
- Boyatzis, R. E., E. C. Stubbs, and S. N. Taylor, "Learning Cognitive and Emotional Intelligence Competencies Through Graduate Management Education," *Academy of Management Learning and Education*, Vol. 1, No. 1, 2002, pp. 150–162.
- Gabarro, John J., *The Dynamics of Taking Charge*, Boston: Harvard Business School Press, 1987.
- Harrell, Margaret C., Harry J. Thie, Peter Schirmer, and Kevin Brancato, *Aligning the Stars: Improvements to General and Flag Officer Management*, Santa Monica, Calif.: RAND Corporation, MR-1712-OSD, 2004. As of January 15, 2007:
http://www.rand.org/pubs/monograph_reports/MR1712/
- Harris, P. and K. W. Lucas, *Executive Leadership: Requisite Skills and Development Processes for Three and Four-Star Assignments*, Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, Research Note 94-28, 1991.
- Lucas, K. W., and J. Markessini, *Senior Leadership in a Changing World Order: Requisite Skills for Army One and Two-Star Generals*, Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, Technical Report No. 976, 1993.
- Markessini, J., K. W. Lucas, N. Chandler, and T. O. Jacobs, *Executive Leadership: Requisite Skills and Development Processes for the U.S. Army Executives*, ARI Research Note 94-26, Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, 1994.
- Mintzberg, H., *The Nature of Managerial Work*, New York: Harper and Row, 1973.
- Mosher, F. C., *Democracy and the Public Service*, New York: Oxford University Press, 1982.
- Robbert, Albert A., Stephen M. Drezner, John Boon, Lawrence Hanser, S. Craig Moore, Lynn Scott, and Herbert J. Shukiar, *Integrated Planning for the Air Force Senior Leader Workforce: Background and Methods*, Santa Monica, Calif.: RAND Corporation, TR-175-AF, 2005. As of January 15, 2007:
http://www.rand.org/pubs/technical_reports/TR175/
- U.S. Air Force *Air Force Basic Doctrine*, Air Force Doctrine Document 1, November 17, 2003. As of January 15, 2007:
http://www.dtic.mil/doctrine/jel/service_pubs/afdd1.pdf
- , *Leadership and Force Development*, Air Force Doctrine Document 1-1, February 18, 2004. As of January 15, 2007 (interim update):
http://www.dtic.mil/doctrine/jel/service_pubs/afdd1_1.pdf

Zaccaro, S. J., *Models and Theories of Executive Leadership: A Conceptual/Empirical Review and Integration*, Alexandria, Va.: U.S. Army Research Institute for the Behavioral and Social Sciences, 1996.

———, *The Nature of Organizational Leadership: Understanding the Performance Imperatives Confronting Today's Leaders*, San Francisco: Jossey-Bass, 2001.