Officer Accession Planning

A Manual for Estimating Air Force Officer Degree Requirements

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RAND Project AIR FORCE

Prepared for the United States Air Force
Approved for public release; distribution unlimited

For more information on this publication, visit www.rand.org/t/TL196

Published by the RAND Corporation, Santa Monica, Calif.

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Preface

This publication describes and provides implementation guidance for the process RAND Project AIR FORCE created to document degree requirements for officer accessions. This process was developed to address the concern that requirements across Air Force functional areas for science, technology, engineering, and mathematics (STEM)–degreed officers were not consistently supported by evidence. Career field managers (CFMs) can use the process outlined in this publication not only to understand better the need for STEM-degree officers in their respective career fields, but also how different types of undergraduate degrees can help to meet critical career field needs.

The research reported here was sponsored by the Air Force Deputy Assistant Secretary for Acquisition Integration; Office of the Assistant Secretary of the Air Force for Acquisition (SAF/AQX); and by the Director, Force Development, Deputy Chief of Staff for Personnel, Headquarters U.S. Air Force (AF/A1D) as part of fiscal year 2013 study “Science, Technology, Engineering, Mathematics (STEM)–Establishing Air Force Requirements.” It was conducted within the Manpower, Personnel, and Training Program of RAND Project AIR FORCE. While the document is intended primarily for use by U.S. Air Force CFMs and their staff, it should also be of interest to Air Force leadership and staff involved in the policy and execution of officer accessions, civilian hiring, and management of the STEM workforce.

RAND Project AIR FORCE

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This report documents work originally shared with the U.S. Air Force in September 2014. The draft report, issued in May 2015, was reviewed by formal peer reviewers and U.S. Air Force subject-matter experts.

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Abbreviations

A/O	action officer
AETC	Air Education and Training Command
AF/A1D	Director, Force Development, Deputy Chief of Staff for Personnel, Headquarters, United States Air Force
AFDD	Air Force Doctrine Document
AFOCD	Air Force Officer Classification Directory
AFSC	Air Force Specialty Code
CFM	career field manager
CIP	classification of instructional programs
CPT	Career Path Tool
DoD	U.S. Department of Defense
FY	fiscal year
ID	Identifier
KSAO	knowledge, skills, abilities, and other characteristics
NCES	National Center for Education Statistics
O*NET	Occupational Information Network
OAo	Occupational Analysis Office
OMB	Office of Management and Budget
PAF	Project AIR FORCE
PK	Public Key
PKE	Public Key Enabling
PME	professional military education
SAF/AQX	Air Force Deputy Assistant Secretary for Acquisition Integration, Office of the Assistant Secretary of the Air Force for Acquisition
SCN	Survey Control Number
STEM	science, technology, engineering, and mathematics
USAF	United States Air Force

USC

United States Code

1. Introduction

Background and Motivation

The U.S. Air Force (USAF) sets varying requirements for education to ensure that officer career fields are staffed with individuals that can carry out the required activities to meet mission needs, and many of these educational requirements call for individuals with undergraduate degrees in science, technology, engineering, and mathematics (STEM) fields. RAND research suggests that in some fields such as Intelligence, Logistics, and Space and Missile, there are substantial gaps between the desired and actual numbers of officers with STEM degrees, and these gaps can lead to issues of reduced capability and a need to pull STEM-degreed officers from other career fields (Harrington et al., 2014).

On the other hand, Harrington et al., 2014, noted that the processes for determining mandatory and required educational requirements are not typically rigorous, and the decisions are not always based on evidence. Without a rigorous approach, career fields may be under- or overestimating the actual need for STEM-degreed officers, and RAND recommended that the USAF adopt a more rigorous and standardized approach for determining educational needs and requirements (Harrington et al., 2014). In response to these concerns, Air Force Deputy Assistant Secretary for Acquisition Integration, Office of the Assistant Secretary of the Air Force for Acquisition (SAF/AQ) asked RAND Project AIR FORCE (PAF) to develop a process for estimating degree requirements.

This manual describes the process developed by RAND researchers to estimate STEM degree needs for USAF career fields. Specifically, RAND developed an approach and documented the approach in a draft manual, implemented the draft manual through technical assistance with several career fields, and refined the manual based on the implementation experience. RAND's approach was developed based on prior experience with workforce-planning research and several resources that detail specific approaches (Lucia and Lepsinger, 1999; Parry, 1996; Shippmann et al., 2000; Williams and Crafts, 1997). In 2013 and 2014, five career fields—including Acquisition Management (63A), Space (13S), Personnel (38P), Contracting (64P), and Airfield Operations (13M)—served as pilot test cases to provide feedback on the process itself as well as on the instructions drafted to guide career field managers (CFMs) and their staff in implementation. Given the approach was intended to ultimately be used by CFMs and their staff without RAND's involvement, RAND sought to create an approach that provided rigor yet was feasible given the resources available to CFMs. A companion report that summarizes this approach, among other efforts and issues related to accession planning, was released by RAND in June 2016 (Harrington and Terry, 2016).

Overview of Evidence-Based Approach

RAND's approach is depicted in Figure 1.1. It consists of five major steps and requires the input not only of the CFM and his or her staff, but also of officers currently assigned to jobs in the career field. While classic job/task analysis often focuses on the full inventory of knowledge, skills, abilities, and other characteristics (KSAOs), an individual needs to succeed at a specific job. RAND's approach aims to reduce the level of effort required in two ways by: (1) focusing on clusters (i.e., groupings) of officer jobs or positions instead of prescribing a position-by-position analysis and (2) determining the set of capabilities an officer needs to succeed within a specific cluster instead of assessing the full inventory of KSAOs.

In RAND's approach, each CFM and his or her staff divide their career field into distinct job clusters, identify the capabilities they believe officers need to perform their jobs effectively within a specific cluster, and then administer a survey to officers in their career field to understand the level of proficiency needed in each cluster for officers to perform their jobs effectively and where or how officers acquire those capabilities. Survey results, coupled with additional information about how different college degrees relate to different capabilities, are then used to inform changes to existing estimates of degree requirements. Capabilities needed at a higher level of proficiency and that are best obtained or only acquired via a college degree will be especially critical to capture in those estimates.

Figure 1.1. Overview of Process for Estimating Degree Requirements for Accessions

How This Manual Is Organized

The rest of this manual is written expressly for the CFM or career field management staff to use. The next chapter of the manual discusses job/position clusters and capabilities and how to develop them for a career field. Chapter Three describes the process to use to survey officers currently in the career field, and Chapter Four provides step-by-step instructions on how to analyze their responses. Chapter Five discusses how to tie in survey results with additional data sources to inform degree requirement estimates. Finally, Chapter Six provides an example to illustrate how a CFM might apply RAND's approach. The manual also includes several detailed appendixes, as follows:

- Appendix A is the form that CFMs must submit to the Air Force Survey Office to obtain approval for their survey.
- Appendix B includes the surveys themselves.¹
- Appendix C contains sample letters CFMs can use to invite officers to take the survey.
- Appendix D covers how to field surveys using Adobe Acrobat.
- Appendix E provides step-by-step instructions on how to prepare the survey data files produced by Adobe Acrobat for analysis.
- Appendix F provides step-by-step instructions on how to perform various functions in Microsoft Excel that are referenced in the manual.
- Appendix G includes references to external data sources that a CFM may use at different points in this process to include capability definitions and descriptions.

¹ Electronic versions created in Adobe Acrobat are available from PAF.

2. Identifying Job Clusters and Capabilities for Your Career Field

Identifying Job Clusters

What Is a Job Cluster?

A *job cluster* is essentially a grouping of jobs that are similar in terms of the work being performed, fall within the same duty area, or tend to represent a career path for an officer. Additionally, a cluster could be the same kind(s) of job, but in different duty locations across the USAF. In general, a job cluster can be viewed as a grouping of similar types of jobs based on a definition that is meaningful for you, the CFM. Your career field may already be managing officers in groupings of this nature such as Manpower Staff or Management Engineering within Personnel (38P) or Operations Crew, Operations Support, Instructors/Evaluators, and Staff within Space (13S). It is possible that your career field has already done some grouping like this as part of its work with/for the new Career Path Tool (CPT).

Rationale for Using Clusters

As Figure 1.1 indicates, developing clusters is the first step in identifying educational needs. The purpose of developing job clusters is to arrive at a unit of analysis that is finer grained than focusing on an Air Force Specialty Code (AFSC) as a whole, but not as resource intensive as a job-level unit of analysis. There is no one best way of determining job clusters for your career field; they should correspond to how you and others involved in career field management tend to group officers as you manage them across jobs.

The Process for Developing Clusters

All officers in your career field should fall within a cluster. Ideally, these clusters will be mutually exclusive (i.e., officers fit into only one cluster), but if there is a lot of lateral movement or cross-functional work within a community, it may make more sense to allow officers to fall within two clusters. Alternatively, creating a cross-functional cluster may be a solution. There is no one best way of determining job clusters for your career field; they should correspond to how you and others involved in career field management tend to group officers as you manage them across jobs. That said, the number of clusters should be relatively small. The reasons we recommend a small number of clusters is twofold: (1) sufficient sample size within a cluster is important for the ability to measure statistically significant differences (i.e., more than 100 and ideally more than 500) and (2) data collection can be resource intensive, and each job cluster will entail a distinct data collection effort (i.e., its own surveys).

Identifying Capabilities

What Is a Capability?

A *capability* is “a cluster of related knowledge, skills, and attitudes (KSAOs) that affects a major part of one’s job (a role or responsibility), that correlates with performance on the job, that can be measured against well-accepted standards, and that can be improved via training and development” (Parry, 1996, p. 50, as cited in Lucia and Lepsinger, 1999, p. 5). A capability often is a synthesis or combination of KSAOs to accomplish a specific job responsibility or mission. It may reflect not only possessing specific knowledge, skills, or attitudes, but also having the ability to apply them in a job-specific context. Capabilities generally focus on behaviors and abilities, but there are some circumstances in which deep-level knowledge or advanced skills could be considered as a capability, particularly when it is a unique or critical characteristic. Capabilities most certainly are *not* credentials, degrees, or certifications. These may contribute to the development of a capability (i.e., are a means to an end). Table 2.1 presents sample capabilities for one career field.

This description may be reminiscent of a term often used within the USAF, *competency*, but here the emphasis is on the occupational- and career field-specific qualities an officer needs to succeed in his or her job. In contrast, USAF *competencies* tend to focus on institutional-level qualities. For example, Air Force Doctrine Document (AFDD) 1-1, Leadership and Force Development, lists competencies that could be thought of as the capabilities that officers need to be good leaders and good generalists. For the purpose of estimating degree requirements, the emphasis should be on occupational-specific and/or unique capabilities for a job cluster.

Rationale for Using Capabilities

Figure 1.1 indicates that, after job clusters are identified, capabilities for each cluster should be identified. Just as relying on job clusters is less resource-intensive than analyzing all the jobs within a career field, so too is relying on capabilities rather than analyzing the full set of KSAOs that an officer needs to perform effectively his or her duties in a specific job. In addition, the focus on a relatively small or narrow set of capabilities rather than an exhaustive list of everything an officer needs to know or be able to do in order to succeed will push you to think carefully and critically about the most important qualities an officer new to your career field must possess or quickly acquire.

The Process for Developing Capabilities

While an organization such as Air Education and Training Command’s Occupational Analysis Office (AETC’s OAO) will travel to different locations around the world to conduct interviews and focus groups with officers to develop an inventory of KSAOs needed for effective job performance, this approach will require your expert judgment, as well as the expertise of your

staff, to develop job-cluster specific capabilities. These will be validated in the third step of the process (the third box in Figure 1.1, “Verify the level of proficiency needed for each capability”), in which job incumbents are asked to provide feedback on the capabilities.

For each job cluster, we recommend focusing on a moderate number of capabilities (e.g., 20) to ensure that analyses are focused on the most critical capabilities and to reduce survey burden on individual respondents.² Increasing the number of capabilities that you examine and incorporate into decisionmaking about accessions will make the process more complex. If you have a large number of capabilities, consider combining several capabilities into a single unified capability. Table 2.1 provides examples developed by career fields that participated in the 2012–2013 pilot test. The emphasis should be on capabilities that are relatively unique to the job cluster (e.g., occupation specific), but not all have to be unique, especially if you feel some capabilities needed USAF-wide are especially important in one of your job clusters. It may be helpful to consider, “If all officers entered my career field as equally qualified generalists, what additional 25 capabilities would they need to excel in their specific cluster, shred, or duty area?”

As shown in Figure 1.1, developing job clusters and capabilities may be an iterative process. For example, you may start off with two distinct job clusters, but then realize almost all of their most important capabilities are the same. Conversely, there may be too many different jobs represented in a single cluster to capture needed capabilities in a relatively short list (25 or fewer). Both cases suggest a need to reconfigure the job clusters.

In addition to the career field–specific examples provided in Table 2.1, the following materials are available to assist you with developing sets of capabilities:

- Air Force Doctrine Annex 1-1 lists and defines institutional competencies for USAF members
- Occupational Information Network (O*NET), a national database of standardized occupational descriptors sponsored by the U.S. Department of Labor/Employment and Training Administration, lists *work activities* that may be the building blocks for career field– and job cluster–specific capabilities. (See, in particular, O*NET OnLine, undated [a] and O*NET OnLine, undated [b].)
- Career field–specific information may be culled from occupational studies conducted by the AETC OAO (particularly if the analysis focused on knowledge types rather than tasks or skills). Career Field Education and Training Plans and previous career field studies may also be of assistance.
- A list of capabilities, along with definitions and descriptions amassed from several resources, can be found in Appendix H.

² The survey templates that accompany this manual provide the option of 18 or 25 capabilities.

Table 2.1. Capabilities Examples from 2012–2013 Pilot Test Career Fields

Space/Operations Crew

- Quantitative reasoning: Ability to synthesize data; work with incomplete data
- Weapons system knowledge: Functionality/mission/operation of a specific weapon system/set of weapon systems
- Communicate effectively: Conveys information and ideas; listens and responds to others

Space/Instructors and Evaluators

- Training: Ability to help students learn the basics of systems they use; demonstrate proper use of checklists, documentation, etc.; ability to run training classes and explain complex systems/processes
- General space knowledge: Non-weapons–specific knowledge needed for instruction/evaluation

Personnel/Manpower Staff

- Manpower data systems: Clear understanding of USAF manpower data systems, including their impact on other USAF data systems and business practices; awareness of which organizations use those data systems as well as how and why they do so
- Critical, analytical, logical thinking: Ability to think inductively and deductively, critically review documents, determine the root cause a problem, identify connections between issues or phenomena, understand implications of statutory/policy changes and other leadership decisions, and draw conclusions from limited or related information
- Stress tolerance: Ability to handle work pressures within an uncertain and variable environment; maintaining poise even when subject to brusque treatment; effective under high-pressure situations with short-term deadlines and multiple top priorities

Personnel/Management Engineering

- Continuous learning: Willing to seek opportunities for continuous learning; thrive on the opportunity to explore new areas and delighting in acquiring new knowledge about the USAF structure and missions, the determination of manpower requirements, and organizational principles
- Data synthesis: Ability to use different types of data from multiple sources to detect relationships and draw implications
- Modeling and simulation development: Able to plan, create, evaluate, use, and obtain stakeholder endorsement for mathematical models, stochastic models, choice models, business process models, and simulations for application to USAF manpower problems. Able to operate a range of modeling and simulation platforms

Acquisition Management

- Cost estimating: Knowledge of policies and practices used in developing resource requirements and associated costs (e.g., funds, personnel, material, and facilities) for systems, structures, or facilities
 - Writing: Recognizes or uses correct English grammar, punctuation, and spelling; communicates information (e.g., facts, ideas, messages) in a succinct and organized manner; produces written information, which may include technical material that is appropriate for the intended audience
 - External awareness: Identifies and keeps up to date on key international policies and economic, political, and social trends that affect the organization. Understands near-term and long-range plans and determines how to best be positioned to achieve a competitive business advantage in a global economy
-

3. Gathering Evidence About Capabilities for Your Career Field

The Survey Process

This chapter describes how to use a survey to collect the information from officers currently in your career field, data that is integral to estimating degree requirements. Specifically, this chapter outlines the administrative requirements for the survey and the technical requirements for administering the survey using an email platform. It also provides guidance in selecting a sample (or subset) of officers to survey, administering the survey, and preparing the survey responses for analysis. Chapter Four focuses on analyzing the data collected as a result of this survey process.

Administrative Requirements for the Survey

Surveys provide a relatively low-cost way to collect standardized information from a large number of individuals. As such, their use has proliferated both inside and outside of the USAF. To ensure surveys are high in quality, to avoid redundant data collection efforts, and to protect the rights of USAF personnel as human subjects, the USAF has procedures in place to review and license most survey efforts before a survey can be administered. As a result of the approval process, a survey is issued a Survey Control Number (SCN), which indicates that it is a formally approved data-collection effort.³ The Air Force Survey Office oversees this approval process, and its website provides information on how to navigate the survey approval process (see AF Portal). Appendix A includes the “Request for Survey Control Number” template that you should use to apply for an SCN.

Technical Requirements for the Survey

In order to avoid time-consuming data entry of survey responses by hand, we created a process that could be administered electronically. Administering a survey electronically is also advantageous because it provides the ability to reach USAF officers at any location with computers and Internet or email connectivity. The approach we developed in fiscal year (FY) 13 uses Adobe Acrobat and Microsoft Outlook to field the survey and initially process the survey responses. Survey administrators (i.e., you and/or your staff) will need Adobe Acrobat 10 and Microsoft Outlook to field the survey. Survey respondents will need to have a computer, access to an email account, and Adobe Reader in order to complete and return the survey.

³ SCNs are required by AFI 38-501, Air Force Survey Program. Some surveys are exempt from this review process. For example, the Inspector General is permitted to administer surveys without going through the review process. The career field surveys used in this process are subject to this administrative oversight.

A Description of the Surveys

The process entails the use of two distinct surveys. Text versions of the instruments are provided in Appendix B, and electronic versions of the instruments created using Adobe Acrobat are available from PAF upon request. The first survey, referred to as the “Capabilities Survey,” will enable you to learn from the officers in your career field what level of proficiency is believed to be required for each of the capabilities you developed as part of working through Chapter Two. Respondents are asked to rate each capability on a scale of 1 to 5, where 1 equals introductory level and 5 equals expert level; 0 equals “Not Required for my Current Job.” The second survey, referred to as the “Modes Survey,” will provide you with information about where or how the officers in your career field acquired each of the capabilities you listed for their respective job cluster. Response options include the officer’s first or second bachelor’s degree, a master’s or graduate degree, training, normal duty assignments, Professional Military Education (PME), deployments and exercises, and outside the USAF. Both surveys also include a short series of background questions, including a question in which the responding officer is asked to indicate the field of study in which he or she obtained a bachelor’s and/or master’s degree.

Sampling for the Survey

In an ideal world, feedback from every individual in the USAF would be collected to identify job-related capabilities and determine the optimal means for ensuring these capabilities are adequately represented in the workforce. However, surveys take time to build, can cost money to field (both for materials and incentives for respondents), and require the respondents’ time, so it is important to balance these concerns against the desire for high-quality data. Choosing a sample (or subset of the population) is one way to reduce the burden on respondents to complete surveys. In addition, focusing on a smaller group of respondents may allow the survey coordinator to devote more time and resources to each potential respondent in order to ensure strong response rates. Box 3A describes the ideal versus practical considerations when choosing a survey sample size. Each career field may have different priorities, so the desired sample sizes may vary across career fields. In addition, the size of career fields and job clusters likely vary, and it may be more useful and feasible to select a sample if dealing with a large cluster.

Table 3.1 presents some minimum and recommended sample sizes based on the size of the job cluster. The minimum sample size provides the smallest sample necessary to make statistically valid statements. For clusters with fewer than 69 individuals, you will be required to survey all individuals. The recommended sample size represents what would be required using typical standards for research. For clusters with fewer than 69 individuals you will be required to survey all individuals. Given you will use the surveys primarily to develop education targets for accession and describe your workforce, the minimum sample size may be sufficient for your needs.

Box 3A. Considerations When Choosing a Survey Sample

- ❖ In an ideal world, without any constraints on resources and high participation rates, you may want to survey the entire population. Surveying the population provides several benefits:
 - **Full representation:** Given that the survey covers all individuals in the population, one can be sure that sampling has not resulted in the exclusion of unique cases and small subsamples.
 - **Statistical precision:** Larger numbers of observations and greater coverage of the population ensure the ability to measure characteristics and differences of the population precisely.
 - **Population buy-in:** Participating in a study can sometimes help to ensure buy-in to findings and related policies and procedures by virtue of providing individuals with a voice in the process.
- ❖ However, there are also a number of reasons you may want to limit your sample. Many of these focus on the importance of ensuring good response rates. The reasons to consider limiting to a sample include:
 - **Limited resources:** In general, surveying can be a resource-intensive activity, including costs of survey materials (if not electronic), time to collect and analyze the data, and the extensive efforts that are often involved with increasing response rates. By sampling a portion of the population for survey, the required resources will be minimized.
 - **Survey fatigue:** It is unlikely that your survey is the only one required of individuals in a year, as surveys have become an increasingly popular means of collecting data. Overburdening individuals with surveys may lead to lower response rates across all surveys, so it is important to consider the full survey landscape for the population, in addition to the specific concerns of your specific survey.
 - **Opportunity costs:** When individuals are completing surveys, they are potentially contributing less to other important work duties. With fewer individuals surveyed, the costs to work efficiency are minimized.

The numbers presented in Table 3.1 represent the final number of *respondents* needed to meet standards for statistical validity. If response rates are not 100 percent, then these sample sizes must be scaled appropriately to determine the number of individuals to which the survey should be sent. The following equation should be used to determine the total number of individuals that should be surveyed to achieve the desired sample size:

$$\text{Total Number Surveyed} = \text{Final Minimum or Recommended } N \text{ from Table 3.1} / \text{Expected Response Rate}^4$$

For example, the recommended sample size for larger clusters is 129. If the expected response rate is 80 percent, then the survey should be sent to $129/0.8 = 161$ individuals.

⁴ Note that, if the expected response rate is less than the minimum/recommended survey percentage, you should survey the full population.

Table 3.1. Sample Sizes Required for Statistical Analysis of Survey Results⁵

Population Size	Minimum Size		Recommended Size	
	N	Percentage of population	N	Percentage of population
25	25	100	25	100
50	50	100	50	100
100	69	62	100	100
150	69	52	129	86
200	69	45	129	65
300	69	35	129	43
500	69	29	129	26
750	69	24	129	17
1000	69	14	129	13
2000	69	8	129	6

As the number of individuals to survey is dependent upon the expected response rate, it is exceptionally important to achieve the expected response rate. This could entail performing one or more of the activities in Box 3B, if necessary, to ensure the expected response rate. Expected response rates may vary widely across surveys and survey populations. Guidance from the Office of Management and Budget (OMB) suggests that a response rate of 80 percent or higher is considered high and should be the standard for all surveys (OMB, 2006). However, in practice, surveys may not often achieve a response rate of 80 percent; an Air Force Occupational Survey report from 2003 suggests that response rates of 50 to 70 percent are common (Air Education and Training Command, 2003). The National Science Foundation suggests that the decline in response rates over the past decade may be due to increasing demands on individual's time and media-specific challenges (e.g., fewer home phones, telephone sales calls) (National Science Foundation, undated). One way to identify the expected response rate for your population is to determine what response rates have been for other recent surveys conducted with the same population.

⁵ The minimum sample size is calculated using the following relatively liberal assumptions: Group 1 has 65 percent of respondents choosing a response, versus 75 percent for Group 2, 10 percent error level, 50 percent power. This results in a required sample size of 69. The minimum sample size is calculated using the following assumptions: Group 1 has 50 percent of respondents choosing a response, versus 55 percent for Group 2, 5 percent error level, 80 percent power. This results in a required sample size of 129.

Box 3B. Methods to Increase Response Rates

- ❖ **Consider timing.** Try to avoid times of year, week, or day when individuals might be less likely to respond to a survey. For example, you might expect people to be more likely to sit in front of a computer to complete a survey in winter months. Individuals may be more likely to miss emails that come late in the day or late in the week. On the other hand, if individuals are very busy on Mondays, it may not be optimal, because they may receive the survey but will not have time to complete it. Choosing an optimal time to survey individuals can help to maximize response rates.
- ❖ **Create an organized opportunity to complete surveys.** Many people are busy throughout their workday, so it will be difficult to complete additional tasks. Carving out a specific time to complete surveys within the workday brings two benefits: it demonstrates leadership and organizational support for the effort; and it removes the burden from individuals to balance the extra obligation with regular work activities.
- ❖ **Send out reminders.** Individuals are busy, and reminders can help to get additional respondents. However, there are diminishing returns to additional reminders, so it may not be useful to send out more than four or five. It is also important to not annoy individuals with reminders, as this may diminish future response rates. If possible, avoid sending reminders to those who have completed the survey.
- ❖ **Give individuals a reason to complete surveys.** Telling individuals why the survey is being fielded and how their responses will be used to inform policies and practices can provide a greater incentive to the individual to complete the survey. In addition, it may be useful to appeal to other values such as teamwork, contributing to the greater good, and leadership to provide incentives to complete surveys.
- ❖ **Limit the length and number of surveys.** The more time a survey takes to complete, the less likely an individual may be to respond. Keeping surveys short and informing individuals about the minimal requirements may be useful in convincing individuals to respond. In addition, overburdening individuals with multiple surveys may also diminish response rates.
- ❖ **Provide incentives.** Providing monetary or nonmonetary rewards for completion of a survey can help to encourage survey completion by enhancing the value of survey completion.
- ❖ **Consider anonymity.** It may be useful to allow for anonymous responses so that individuals are not prevented from responding by concerns about risk. On the other hand, other populations may see a lack of anonymity as a benefit, so it is important to understand the population and the topics being covered within the survey.

To ensure that the sample is representative of the population as a whole, we recommend choosing a *random* sample through a random numbering approach.⁶ We caution against other approaches that may seem random (e.g., sorting alphabetically and choosing the first 40 names or every fifth name), as there is no way to be certain these approaches are truly random. As noted in Box 3A, there may be issues with small subgroups of interest not being represented, as it may be unlikely these individuals happen to be chosen for the sample. To avoid this, one can select key subgroups and sample within these subgroups. This can help to ensure sufficient

⁶ The easiest way to choose a random sample is to sort the names of individuals within a cluster in a Microsoft Excel spreadsheet and generate random numbers using the =RAND() command. After copying and pasting the values generated by this command as “values” to ensure the initial random numbers are retained, you can sort the list of names from smallest to largest random number. This will sort the names randomly, allowing you to choose the list of names that are required to achieve your desired sample size. In the case of sampling within subgroups, simply create separate lists of names by subgroup and repeat the random number generation and name sorting for each.

participation from individuals in small subgroups. However, the number of characteristics on which you select subgroups should remain limited, as the number of subgroups for sampling increases the total number of individuals you must sample.

Conducting the Survey

Choosing a Survey Platform and Developing the Survey

The ideal survey platform is one that both facilitates completion of the survey by would-be respondents and minimizes the need for data entry or manipulation of survey responses to prepare them for survey analysis. This suggests that a hard copy–based survey is inferior to one administered online, via a web site, or using an email-based distribution process. For many reasons, a web survey is the platform of choice. Appendix B includes the survey instruments for use in creating a web survey, and Appendix C includes sample letters CFMs can use to invite officers to take the survey. However, it can be difficult to identify the right place to house a web survey, and there may be additional approval processes required to do so. Under those circumstances, using surveys created in Adobe Acrobat and distributed—and returned—via email, may be the most viable approach. Appendix D features a detailed breakdown of how you can use Adobe Acrobat to customize surveys for each of your job clusters, send them to your survey sample(s), and then process the results to prepare them for analysis. We provide editable Adobe Acrobat survey templates to accompany this manual.

Testing the Survey

We recommend that, after the survey has been developed, it circulates to some respondents within the career field management office. The purpose of this is twofold. First, it will allow you to conduct a quality check for any errors or bugs that may have been introduced in the process of editing the survey. Second, this will allow you to develop a profile of what the CFM and carrier field management staff think are the most important capabilities for the career field. These results can then be compared with the results from survey respondents and may indicate the degree of misalignment existing between the perceptions of managers and of officers in the field.

Preparing the Data File

After you have fielded your surveys and stopped accepting new survey responses, the data files that contain survey responses may need to be cleaned before they can be used for the data analysis described in the next chapter. For example, some fields/columns, or what we will refer to as *variables*, will need to be added, and others will need to be transformed or combined to create important variables for the analysis. In particular, you may want to create the following variables:

- On the Capabilities Survey, an indicator variable is equal to 0 if a person did not report a capability being needed at advanced levels (i.e., individuals need to have some degree of

expertise on a particular capability) or 1 if they did report it being needed at advanced levels.

- On the Modes Survey, an indicator variable is equal to 0 if a person did not learn a capability through a first or second bachelor's degree or 1 if they did report it being learned through a bachelor's program.
- An identical variable to the one above, but focusing on whether a capability is *best learned* in a bachelor's program.

Appendix E includes a description of how to create these variables. In addition to these added variables, you may want to recode some variables to group together different academic degree fields or recode pay grade or AFSC fields. Lastly, you may also want to delete some data columns to get rid of unnecessary information in your spreadsheet.

The look and organization of the data files will depend on the survey platform you choose to field the survey. The guidance on “data cleaning” provided in Appendix E assumes the survey output was derived from surveys created using Adobe Acrobat.

4. Learning About Capabilities for Your Career Field

Analyzing the Survey Data

Survey responses on capabilities can provide a range of information that can be used to shape education targets for accession and other workforce management decisions. While CFMs may want to go above and beyond the basic analysis, these are the five primary goals for the data analysis that should be accomplished first and foremost:

- Goal 1: Describe the nature of the survey sample, including its size and important characteristics, and compare to the overall population of the career field/cluster.
- Goal 2: Identify capabilities that are needed at an advanced level of proficiency within each cluster.
- Goal 3: Examine the profiles of capability needs over careers.
- Goal 4: Identify where proficiency in capabilities is best learned.
- Goal 5: Examine variation in where capabilities are learned by academic field in which degrees were earned.

Beyond these five goals, there are other potential uses of the survey data. For example, in Box 4A we describe how survey data can be used to validate clusters.

Goal 1: Describing the Survey Respondents

The first step in analyzing survey data is to describe the respondents. This will help you to better understand the individuals who are represented in the data and determine whether the survey sample appears to be representative of the larger population.

For both the Capabilities and Modes Surveys, calculate the number and percentage of respondents (i.e., descriptive statistics) across each of the following characteristics (as shown in Table 4.1, in the columns “Respondents to Capabilities Survey” and “Respondents to Modes Survey”):

- grade
- bachelor’s degree program
- job/occupation identifier (e.g., duty AFSC, core identifier).

In addition, if you have added additional descriptive questions to the survey, you will want to analyze those characteristics as well. The easiest way to tabulate number and percentage of respondents in Microsoft Excel is to create a pivot table. A description of how to create basic pivot tables is provided in Appendix F.

To calculate descriptive statistics for the academic field of the first bachelor’s degree program, it may be necessary to aggregate (or roll up) the responses of subfields within a larger academic field. For example, the Engineering and Operations Research academic field includes

31 different subfields (see the academic fields listed in Appendix B for a full list of subfields). If there are subfields that are of particular interest or that may include a large number of respondents (e.g., 1437, Operations Research), you may find it useful to calculate descriptive statistics at academic major level as well as the academic field level. Table 4.1 contains an example of the analytical results that this type of analysis would produce.

Table 4.1. Descriptive Statistics Example

	Respondents to Capabilities Survey		Respondents to Modes Survey		Actual Job Cluster	
	N	Sample (%)	N	Sample (%)	N	Population (%)
Grade						
O-1	35	25	42	27	100	8
O-2	42	30	21	14	200	17
O-3	21	15	54	35	400	33
O-4	16	12	20	13	300	25
O-5	24	17	18	12	200	17
Academic field						
Business, management, marketing, and related support services (52XX)	32	21	38	21	564	47
Biological and biomedical sciences (2600)	12	8	11	6	48	4
Physical sciences (40XX)	21	14	26	14	144	12
Engineering and operations research (14XX)	15	10	22	12	132	11
Social sciences (4500)	22	15	22	12	180	15
History (5400)	4	3	8	4	36	3
Mathematics and statistics (2700)	7	5	12	6	48	4
Etc.	X	XX	X	XX	XX	XX
Duty AFSC/Core ID						
63A1	29	19	45	24	312	26
63A3	63	42	72	39	396	33
63A4	36	24	32	17	288	24
Etc.	Y	YY	YY	YY	YYY	YY

Next, you will want to obtain or calculate these same descriptive statistics for the actual job cluster as a whole. Ideally, you will end up with results that resemble the rightmost column of Table 4.1 (currently with hypothetical statistics about a whole job cluster). These figures would not come from the survey, but rather would be obtained from career field personnel data. In the

summary statistics in Table 4.1, the survey respondents differ from the actual job cluster in that there is a higher proportion of O-1s in the survey sample as well as a lower proportion of officers with degrees in business, management, marketing, and related support services. To test whether the difference between the sample and the population is meaningful, you will want to determine if the difference is statistically significant.⁷ (See EasyCalculation.com, undated, for a basic online tutorial for calculating statistical significance. For more on statistical significance, see Fowler, 2013.) If the sample differs significantly from the population on key characteristics, you may consider resampling until your sample does reflect the characteristics of the population.

Goal 2: Identifying Capabilities That Are Needed at an Advanced Level of Proficiency

Although all the capabilities included in the survey are regarded as important to an officer's success in his or her job, some may be needed at advanced or expert proficiency levels (i.e., a rating of 4 or 5 on the survey), while others may be needed at more basic proficiency levels. When identifying needs for accessions, it may be prudent to focus on capabilities that require higher levels of expertise, under the assumption that a bachelor's degree confers advanced knowledge or expertise in an area. This analysis will help to identify the capabilities that are needed at a higher level of proficiency, regardless of whether this higher level of proficiency necessitates a bachelor's degree is required to reach the level of knowledge or expertise noted. In some cases, one might choose to directly specify the level of degree associated with different levels of knowledge or expertise directly for survey respondents to ensure a common benchmark for advanced knowledge and expertise.

There are several different statistics that may be useful for analyzing the data on level of proficiency required. The first is the *average proficiency level required*. Averages of the responses to the Capabilities Survey can be calculated in Microsoft Excel using a formula⁸ or by using pivot tables. A second statistic that might be useful for analysis is the *percentage of respondents reporting that advanced/expert proficiency (rating of 4 or 5) is required*. These tabulations of responses can be calculated in Microsoft Excel using pivot tables. Chapter Four and Appendix E include a description of an additional variable that can be created to help with this analysis, an indicator variable that is equal to 1 if an individual reports advanced proficiency is needed and is otherwise equal to 0.

Ideally, after analyzing the data, you will end up with a table that looks similar to the one in Table 4.2, which illustrates the different information that can be provided by these two statistics. Capability 2 and Capability 3 have equal percentages of respondents reporting that advanced/expert skills are needed, yet Capability 2 has a substantially higher average, suggesting that overall level of proficiency needed across the full cluster is somewhat higher for Capability

⁷ Statistical significance can be calculated by hand or using online software. To calculate statistical significance you will need the percentage, the standard error, and the *N*.

⁸ The exact Microsoft Excel formula to calculate an average is =average(range of data).

2. The opposite case can also be true, as illustrated by Capability 3 and Capability 4. The average for these two capabilities are equivalent, yet a greater percentage of respondents reported needs for high levels of Capability 3. This indicates that, while the overall level of proficiency needed across the workforce is similar for both capabilities, a larger portion of the workforce must be at the highest proficiency levels for Capability 3.

Table 4.2. Proficiency Analysis Example

	Average of Proficiency Levels	Percent Reporting High Level of Proficiency Needed (Rating of 4 or 5)
Capability 1	2.4	22
Capability 2	4.1	64
Capability 3	3.5	64
Capability 4	3.5	48
Capability N	1.2	5

Once you have completed the analysis as shown by Table 4.2, sort the table from the capability requiring the highest level of proficiency to the lowest level of proficiency needed (choice of statistic, average or percent, to sort on is left to your discretion). Capabilities that are required at higher levels of proficiency are likely to be those that may require baccalaureate-level education, so we suggest these capabilities be prioritized in setting educational requirements for accession.

Goal 3: Examining the Profiles of Capability Needs Over Careers

In addition to knowing the overall proficiency needs, it is important to consider how capability needs evolve across an officer's career. If the highest level of proficiency is required early in a career, accessions may be a primary means of acquiring the skill, as there is little time for training or on-the-job experience. If the highest level of proficiency is required later in an officer's career, accessions may be a less-desirable method for acquiring skills for two reasons: (1) The long lag time between college education and the time when high-level skills are needed may be accompanied by a decline in the individual's proficiency; and (2) this time provides additional opportunities to build proficiency in a variety of methods that may be more directly related to workforce needs.

For this analysis, you will be calculating the statistics from Goal 2 for officers at different grades. A pivot table can be used to calculate the statistics for subgroups in Microsoft Excel, as described in Appendix F. These statistics can be collected in a table similar to Table 4.3.

Table 4.3. Capability 1 Career Proficiency Profile

	Average of Proficiency Levels	Percent Reporting High Level of Proficiency Needed (4+)
O-1	3.5	65
O-2	3.6	70
O-3	2.9	34
O-4	2.6	30
O-5	2.4	26

Box 4A. Using Survey Data to Validate Job Clusters

As we described in Chapter Two, it is important to get the clusters right. The Capabilities Survey data can actually be used to validate clusters. You will want to ask yourself two questions:

- ***Are there certain subgroups within a cluster that may have different proficiency needs than the rest of the cluster?*** For example, there may be a group within a career field or cluster that are considered “analysts”; individuals used for rigorous analytic work and may therefore require greater expertise in analytical skill sets.

If this is the case, you may want to conduct subgroup analysis by looking at proficiency ratings by duty AFSC or other descriptive characteristics that were included in the survey and help to identify this unique subgroup. If differences are apparent in the survey data, this may indicate a need for unique accession requirements for this group in the future, and this group may potentially be considered for its own cluster in future surveys. To conduct this analysis, we suggest creating a pivot table in Microsoft Excel that looks at proficiency level rankings by duty AFSC within a single cluster.

- ***Are there groups of similar jobs that are spread across the clusters?*** For example, you may have decided to break down the clusters according to the weapons system with which individuals are associated. But eventually you begin to think that this may have been the wrong way of classifying, as skill needs are more strongly determined by the actual job function than the weapons system being managed.

You can test to see whether this alternative set of clusters is a better fit by looking at differences in reported capability needs across clusters for individuals with different job functions. If duty AFSC is not a sufficient measure of job function, you may want to ask an additional question on the survey to get this information. To conduct this analysis, we suggest creating a pivot table that looks at proficiency level rankings by duty AFSC across different clusters. To the degree that clusters were surveyed on different capabilities, the analysis may be limited.

In addition, it may be insightful to plot these data. An example of these profiles is shown in Figure 4.1. The example illustrates a capability that is required at a high level of proficiency among most officers early in a career, but the needed proficiency level diminishes substantially among mid-career officers in the cluster.

Moving forward, you should focus your analyses on capabilities that require a high level of proficiency early in careers. Advanced proficiency needs in these capabilities are suggestive of potentially requiring accessions to meet workforce needs.

Figure 4.1. Capability 1 Career Proficiency Profiles

Goal 4: Identifying Where Proficiency in Capabilities Is Best Learned

To determine whether proficiency in capabilities may be best obtained through accessions, data from the Modes Survey should now be analyzed. If respondents report that a capability an officer needs at an advanced proficiency level at an early stage in his or her career is best learned or only learned through an academic degree program, then this analysis provides further evidence that accessions are likely to be a primary way of meeting these workforce needs.

The primary statistic of interest is the percentage of respondents who say they *best learned* a capability in a bachelor's program. To calculate this, you will need to create a new variable as described at the end of Chapter Three and Appendix E. This variable will identify whether the skill was best learned in an individual's first or second bachelor's degree program. Since these bachelor's degrees are both likely to have been learned prior to accession, it is important to capture the data on both degrees.

After calculating the statistics from the Modes Survey data, they can be placed next to statistics from the previous analyses to further extend the analysis. An example of the combined statistics is provided in Table 4.4.

Table 4.4. Data from Analysis Goals 2 Through 4

	Reporting High Level of Proficiency Needed (%)	O-1s Reporting High Level of Proficiency Needed (%)	Those Who Best Learned Through a Bachelor's (%)
Capability 2	64.2	76.0	89.4
Capability 3	64.2	52.6	22.2
Capability 4	48.3	73.2	58.5
Capability 1	22.1	28.3	74.5
Capability N	5.3	13.3	12.4

In our example, the data on Capability 2 suggest that accessions might be needed to build workforce proficiency in this area. Nearly two-thirds of individuals in the cluster report a need for advanced/expert proficiency in Capability 2, and among O-1s the need for advanced proficiency is particularly high. In addition, the vast majority of survey respondents (89 percent) reported that the capability is best learned in a bachelor's program. The data for Capability 3 look somewhat different. Despite having the same overall report that advanced/expert proficiency needed, the percentage requiring proficiency immediately upon accession is significantly lower. In addition, relatively few individuals reported that this capability was best or only learned through a degree program.

Goal 5: Examining Variations in Where Capabilities Are Learned by Academic Field

To understand better the relationship between academic fields and capabilities, the Modes Survey offers some evidence. The analysis is basic: calculate the percentage of survey respondents who reported that the capabilities are learned from a bachelor's degree program. In contrast to the analysis for Goal 4, which focused on where capabilities were best learned, this analysis includes anyone who reported a capability was obtained through his or her degree program should be included in the analysis, regardless of whether this was the best way. You should combine "first bachelor's degree" and "second bachelor's degree" responses into a single

variable, as described in Appendix E. You may also wish to roll academic fields into broader major groups, as described in Appendix E.

Once these variables have been created, the next step is to calculate the percentage of respondents who reported learning a capability from their bachelor's degree by academic field. This will require a pivot table that calculates average percentages by academic field and will include data similar to Table 4.5 below. In this case, nearly all of the respondents with engineering or operations research degrees indicated that the capability was learned in their undergraduate degree program, while relatively few history-degreed respondents reported a similar sentiment. This suggests that the capability is more likely to be learned in an engineering or operations research major than in a history major.

Table 4.5. Proportion of Individuals Who Learned Capability 1 Through a Degree Program, by Academic Field

	Percent Who Learned from Bachelor's Degree
Business, management, marketing, and related support services	25
Engineering and operations research	89
History	12
Mathematics and statistics	64
Other	32

It is important to emphasize that the survey sample does not capture a representative population of degree holders, so many academic fields will not be represented. The respondents in the survey data may be drawn from particular subsamples of the academic fields and may not be representative of the field at large. For example, an officer with a degree in a business, management, marketing, and related support services field who happens to be in a space cluster may have a unique skill set relative to other officers with similar degrees (e.g., from a minor in engineering) that make him or her capable of successfully performing in that cluster. This individual cannot be used to represent all officers with that academic degree. In addition, small sample sizes are associated with large errors in the estimates, so the survey calculations may be far from the actual percentages in the full population. For these reasons, evidence from the survey should be used alongside other qualitative data to determine how the full range of academic fields contributes to the capabilities needed of officers in the career field. The next chapter addresses how this other evidence can be collected and used to supplement your survey data.

5. Bringing It All Together: Using Clusters and Capabilities to Inform Degree Requirements

Supplementing the Survey Analysis Results with Other Evidence

Given that a career field does not have a representative sample of individuals across all degree types to survey, there are challenges in identifying the full set of degrees that could provide the capabilities deemed critical to success in a particular career field. For example, an officer with a degree in operations research may have obtained from his or her degree program the capabilities needed to perform well in a particular job cluster, but if there are no officers with an operations research degree in the cluster, and therefore no potential survey respondents that hold this type of degree, there is no opportunity to learn about their capabilities from a survey.

In addition, one key piece of information that would be necessary to link types of degrees to capabilities is missing: the actual proficiency levels of individuals that have degrees in specific academic fields. You have asked officers what level of proficiency is required for specific job-related capabilities, but did not assess the actual proficiency levels those officers possess, and, consequently, cannot determine whether respondents holding degrees in different academic fields have different levels of proficiency for those capabilities.

Given these limitations, the analyses in support of Goal 5 of the previous chapter can tell you whether survey respondents learned proficiencies through different methods, but they cannot tell you if they are representative of the entire officer pool with that academic field, and they cannot provide the exhaustive list of academic fields that deliver this capability, unless all academic fields are represented in a career field. Therefore, additional data must be used to complement and validate the survey data.

At minimum, you should review and incorporate existing descriptive materials on the content of various academic field programs to validate and build on your survey results. For example, the Department of Education provides a list of academic field descriptions according to the Classification of Instructional Programs (CIP), and descriptions of U.S. Air Force Academy majors can be obtained from the academic catalog. Appendix H includes samples of such resources. To determine whether majors provide a capability, you can conduct a text search of the documents using the Find option in Microsoft Word or Adobe Acrobat. One note of caution is that these descriptions do not provide an exhaustive list of capabilities provided by the degree, and they may use different words to describe the same capabilities. As a result, word searches of descriptive text may not be sufficient to identify the full list of degrees that provide the capability. An alternative is to conduct a careful read of the full text to ensure that differences in exact language do not prevent the identification of majors that provide a certain capability. If the capabilities attributed to degree programs by survey respondents are not aligned with other

resources that describe the knowledge, skills, and abilities associated with a particular academic field, more research may be needed to ensure that the degree requirements for accession are based on strong evidence. In addition, if there is evidence of linkages between certain academic fields and the types of jobs in a cluster (e.g., crosswalks, documentation) that is not accounted for by survey respondents, additional data collection may be necessary to determine whether those academic fields should also be included in degree accession requirements.

One potential option to build stronger evidence on the capabilities associated with various academic fields is to conduct a survey of recent or soon-to-be graduates from the officer pool. For example, the U.S. Air Force Academy cadets who are nearing graduation could be sampled. Graduates should be asked to rate the levels of proficiency in varying capabilities. The capabilities on the survey may include a list of the capabilities identified across all USAF career fields or only a subset of those deemed more critical in some way. An alternative method would be to use expert panels from academic institutions to provide guidance on which degrees would provide the capabilities at the levels needed. This could be done through surveys or meetings between the career fields and these experts to review a list of the highest priority capabilities. Given that U.S. Air Force Academy cadets may not be representative of the overall officer pool in terms of academic fields or levels of proficiency, it may be wise to conduct a survey among the Reserve Officers' Training Corps (ROTC) pool. Another option is to collect data from faculty, program administrators, or other subject-matter experts through a survey, focus group, or advisory boards to determine the expected capabilities and capability levels of a graduate in a particular academic field.

Using Evidence to Inform Accession Requirements

Appendix G features a fictional example that illustrates how Analysis Goals 1 through 5 could be addressed. It also describes how additional evidence would be used to complement survey data. The last step is to pull all of this information together to inform accession requirements.

Figure 5.1 provides a sample table of education requirements for accessions from the Acquisition Management field.⁹ The most straightforward way to use the evidence to inform accession requirements is to test existing targets for degree fields. In the Figure 5.1 example, you could test the following hypotheses:

- 1) There are one or more capabilities that are needed at high levels of capability and are uniquely provided by physical sciences and engineering degree programs. ***If true, this indicates the need for mandatory accession requirements.***
- 2) These high-level needed capabilities are provided, to a lesser extent, by majors such as computer science, mathematics, biological sciences, and science and engineering technologies. ***If true, this indicates the need for desired degree targets for accessions.***

⁹ After the time of publication, the USAF may choose to alter the reporting mechanism for educational requirements, in which case this specific example may not be relevant.

- 3) There are one or more capabilities needed at a moderate proficiency level (not a full major required), and these capabilities are generally provided by officers who have earned a degree in the fields of business, economics, law, etc. ***If true, this indicates the need for hourly course requirements in education targets for accessions, as opposed to full-degree requirements.***

To test these hypotheses, you should conduct the analyses described in Chapter Four to identify the critical capabilities for accession. Next, use the survey data and the qualitative data described above to identify whether the degrees currently in the accession table uniquely provide these capabilities. If there is evidence that these academic fields do provide unique capabilities in these areas, then education targets for accessions can be retained and potentially refined. If there is no evidence that certain degree fields provide the advanced capabilities needed, then these education targets for accessions should be reconsidered and revised.

While the Modes Survey plays an important role in identifying the academic fields for which education targets for accessions should potentially be set, the Capabilities Survey can be used to compare stated needs for competencies to current target percentages for accessions. The *Percent Reporting a Capability Is Needed at Advanced Levels (a 4 or 5)* is the best measure against which to compare accession percentages. For example, if 60 percent of individuals report that a capability is needed at advanced levels, and the capability is uniquely provided in two majors (e.g., mathematics and computer science), then a target accession percentage of 60 percent mathematics or computer science degrees would be reasonable. While survey data is a useful tool for checking and validating accession requirements, it is not sufficient for identifying the mandatory, desired, and permitted requirement percentages. CFMs will need to use a range of evidence to inform discussions around the specific target numbers and degree areas. A companion report provides more information on this process (Harrington and Terry, 2016).

Setting ideal education targets for accession becomes trickier when there are multiple capabilities needed at advanced levels, and these capabilities are provided in different majors. Expert judgment must be used to balance different needs and identify the best targets to balance these needs. The survey data is not likely to point to exact targets, but should instead be used to inform decisions around these targets. In the case where there is no evidence to support the prioritization of some academic fields over another, the education/requirements should be removed to ensure that the full pool of qualified individuals are able to be accessed into the career field. It is only when capability needs are uniquely met by an undergraduate degree that education targets for accession should be set.

Figure 5.1. Sample Accession Requirement Table

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Tier	Target Accession Rate	CIP	Education Program Title	Requirement
1	> 50%	14.XXXX	Engineering	Mandatory
			or	
		40.XXXX	Physical Sciences	
2	> 30%	11.XXXX	Computer and Information Sciences and Support Services	Desired
		26.XXXX	Biological and Biomedical Sciences	
			or	
		27.XXXX	Mathematics and Statistics	
			or	
3	< 10%	52.XXXX (Excluding 52.04XX)	Business, Management, Marketing, and Related Support Services	Permitted
		15.XXXX	Engineering Technologies and Engineering-Related Fields	
			or	
2	< 10% (24 Semester Hours)	41.XXXX	Science Technologies/Technicians	Mandatory
		15.1501	Engineering/Industrial Management	
			or	
		22.00XX	General Legal Studies	
			or	
		22.0101	Law	
			or	
		22.02XX	Legal Research and Advanced Professional Studies	
			or	
		45.06XX	Economics	
			or	
		52.03XX	Accounting and Related Services.	
			or	
		52.06XX	Business/Managerial Economics	
			or	
		52.08XX	Finance and Financial Management Services	
			or	
		52.13XX	Management Sciences and Quantitative Methods	
			or	
		52.14XX	Marketing	

6. An Example to Illustrate the Analysis Process

By conducting the analysis described in this manual, a career field can achieve the following:

- 1) a description of the survey sample and how representative it is of an actual job cluster or career field
- 2) a set of capabilities that are a high priority to obtain via officer accessions into a cluster or career field because they meet the following conditions:
 - a. needed at advanced levels of proficiency
 - b. needed at the highest proficiency levels early in an officer's career
 - c. best learned or only learned through a degree program.
- 3) information about whether certain academic degrees are better at providing officers with sufficient proficiency in these accession-prioritized capabilities.

The following example illustrates step by step how a CFM can use these data to develop degree requirements for officer accessions. **Note that this represents an ideal case;** the final steps of the process may not be possible in the time frame for this pilot study.

Given that the calculation of summary statistics (Goal 1) is relatively straightforward, we start our example with Goal 2 (note: these goals are the ones outlined in Chapter Four).

Example: The Air Force Officer Classification Directory (AFOCD) lists a mandatory accession target of 35 percent for business, management, marketing, and related support services degree holders in a career field. The question is whether to keep this target, and if so, whether it should be increased, decreased, or kept the same.

Goal 2: What are the capabilities that are needed at an advanced level of proficiency within each cluster?

To address this question, CFM John Doe created pivot tables that display the mean proficiency level for each capability and the percentage reporting advanced or expert levels of proficiency are needed (Table 6.1). CFM Doe then decided to focus on the percent reporting advanced capability needs as the primary metric of identifying high-level capabilities and decided to set a threshold of 60 percent as indicative of “substantial need for advanced proficiency.” This exercise revealed that four different capabilities out of the ten included in the survey were needed at advanced levels. The rest of the capabilities thus took lower priority for CFM Doe’s remaining analysis.¹⁰

¹⁰ The one exception to this is if there is a capability that is needed at advanced level for a distinct but small group of the overall cluster. For example, maybe 10 percent of a cluster are termed *quantitative analysts* and require particularly high levels of quantitative skills that are not needed in the population. You may consider separating this

Table 6.1. Proficiency Levels by Capability

	Average of Proficiency Levels	Percent Reporting High Level of Proficiency Needed
Capability 1	4.10	73
Capability 2	3.54	64
Capability 3	2.13	15
Capability 4	2.43	22
Capability 5	4.32	83
Capability 6	3.78	62
Capability 7	3.21	53
Capability 8	3.54	48
Capability 9	2.75	37
Capability 10	1.22	5

NOTE: Yellow highlighting signifies the capabilities that CFM Doe has identified as being a priority for additional analysis.

Goal 3: What do the profiles of capability needs look like over careers?

Next, CFM Doe created the career profiles for these four capabilities using pivot tables that provide the percent reporting advanced proficiency needed by grade (Figure 6.1). CFM Doe found that three were needed at the highest levels immediately upon accession, while Capability 5 was not required at high levels of proficiency until mid-career. Accordingly, Capability 5 was no longer prioritized in CFM Doe's analysis because there may be other options for acquiring the capability besides accessions. CFM Doe then further examined the remaining three capabilities using the modes survey data.

Figure 6.1. Career Profiles for Capabilities with Advanced Proficiency Needs

group out for its own analysis and including this fifth capability in the remaining analysis. In future studies, this group may be considered for its own cluster given these unique capability needs.

Goal 4: What are the primary ways of gaining proficiency in capabilities?

The next important step is to determine which of the capabilities are *best learned* and/or *only learned* through a degree program. This analysis is done through a third set of pivot tables, where *percent learned* and *percent best learned* are examined for each of the remaining three capabilities. To continue the example, CFM Doe found the majority of people reported that Capabilities 1 and 6 are learned or best learned through a degree program, while Capability 2 was most often reported as learned through normal duty assignments (Table 6.2). CFM Doe thus prioritized the two capabilities best acquired through a degree program (Capability 1 and Capability 6) in setting education targets for accessions, because there are likely to be fewer viable options for developing these capabilities.

Table 6.2. Where Capabilities Were Best Learned

	Percent Reporting High Level of Proficiency Needed	O-1s Reporting High Level of Proficiency Needed	Percent Who Best Learned Through Bachelor's	Percent Who Best Learned on the Job
Capability 1	73	95	89	4
Capability 2	64	76	22	47
Capability 6	62	85	73	12

NOTE: Yellow highlighting signifies the capabilities that CFM Doe has identified as being a priority for additional analysis.

Another way to visualize the data and to prioritize capabilities is to develop a scatter plot of percentage reporting capabilities needed at an advanced level against the percentage reporting capabilities learned in a bachelor's degree (Figure 6.2). In the example below, from a survey including 18 capabilities, the capabilities are graphed and then assigned tiers based on quartiles. The top tier capabilities are capabilities that are both needed at a high level of proficiency and learned in a bachelor's degree.

Goal 5: How do officers with degrees in different areas of study vary in reporting that they learned a capability from their degree?

CFM Doe has identified the two capabilities that are most likely needing to be acquired through officer accessions. Given that CFM Doe would like to test the education targets for accession in the fields of business, management, marketing, and related support services, the important question CFM Doe considered next is whether business degrees provided these two capabilities in a way that degrees in other academic fields do not. The first step was to aggregate areas of study within the business, management, marketing, and related support services academic field (e.g., accounting and related services, international business) in order to examine all survey respondents with some type of business degree as a single group. Then, for each of these two capabilities, CFM Doe used pivot tables to examine the percentage of officers across academic fields who learned the capabilities in their bachelor's degree program (Table 6.3).

Figure 6.2. Where Capabilities Best Learned Versus Proficiency Required

For Capability 1, CFM Doe found substantial differences by academic field, with business, management, marketing, and related support services degree holders the most likely to report having learned the capability in a bachelor's degree program. For Capability 6, the differences were much less stark, with approximately 60 to 80 percent of respondents from each academic field reporting gaining the capability through their respective bachelor's degree programs, and business, management, marketing, and related support services degree holders falling somewhere in the middle.

Table 6.3: Individuals Who Learned Capability from Degree Program

	Capability 1 (%)	Capability 6 (%)
Business Administration	89	73
Biology	16	68
Chemistry	22	82
Engineering	35	75
Economics	None in cluster	None in cluster
History	4	62
Mathematics	43	80

NOTE: Yellow highlighting signifies the capabilities that CFM Doe has identified as being a priority for additional analysis.

Bringing in other evidence: What does other evidence say about the linkages between academic fields and capabilities?

Upon further examination of Capability 6, CFM Doe saw that it was *teamwork*, a capability that may or may not be related to particular academic fields. CFM Doe then searched CIP code descriptions and found that no degree program descriptions explicitly mention teamwork, and a search of the literature yielded no evidence that teamwork is a skill uniquely developed by business, management, marketing, and related support services degree programs. This evidence does not indicate that business, management, marketing, and related support services majors should be assessed on the basis on needing proficiency in teamwork. This is a capability learned through most degree programs, so while it suggests that a bachelor's degree in *some field* is important, a degree-specific accession requirement should not be put into place based primarily on this capability.

Capability 1, on the other hand, was identified through survey data as being potentially uniquely developed in business, management, marketing, and related support services degree programs. Assume that it is a capability such as *cost analysis*. Upon a search of CIP code descriptions, CFM Doe found that cost analysis is mentioned under economics, suggesting that it may not be uniquely obtained via business, management, marketing, and related support services degrees. However, because there were no economics degree holders who responded to the survey, this could not be identified through survey analysis. After having expert academic advisors create a crosswalk from capabilities to academic fields, CFM Doe found that they also list business, management, marketing, and related support services and economics as being the primary fields in which cost-analysis capabilities are developed. In addition, based on some specific descriptions of the cost-analysis activities that require these advanced proficiencies (provided to the experts by the CFM), the experts argue that a combination of several cost-analysis courses could probably develop sufficient proficiency for someone majoring in any field.

Now, this information can be used to inform degree targets for accessions. The analysis for Goal 2 indicated that 73 percent of individuals reported advanced proficiency in the cost analysis–related capability is needed, and knowing that a business, management, marketing, and related support services degree is related to particular capability development in this area, it may make sense to keep the accession target at 35 percent. The remaining 38 percent of individuals who need the advanced capability would need to complete the course hours that academic experts reported to be critical to developing sufficient abilities in cost analysis. So CFM Doe considered setting an additional accession target of “38 percent with at least 12 credit hours in cost analysis.” In addition, since CFM Doe found evidence of economics being equivalent to business in providing this capability, CFM Doe considered expanding the requirement to be “35 percent with degrees in business or economics.”

Alternatively, requirements for degrees in business or economics could be pushed up to something like 53 percent, with the remaining 20 percent required to have the 12 credit hours in

cost analysis. The evidence cannot speak directly to the best split between requirements for full degrees in business and economics versus requirements for course credits in the specific area, so this will need to be determined by the career field. It may be that CFM Doe decides to use people who report needing expert proficiency (5s) in cost analysis under Goal 2 should have the full degree, while those who report needing advanced proficiency (4s) only need the 12 hours of coursework. Assuming 38 percent report needing advanced proficiency and 35 percent report needing expert proficiency, the above-proposed breakdown of education targets for accessions seems appropriate.

In this basic example, only one capability was identified as being a priority for accessions, making the analysis and the translation of results to education targets for accessions relatively straightforward. When multiple capabilities are needed at advanced levels early in the career and are provided uniquely by certain degrees, these must all be taken into consideration. For example, if *statistical analysis* capabilities were also needed at advanced levels, economics graduates may become more attractive than business majors, because economics programs tend to include more statistics education, as well as cost analysis. In addition, it may be desirable to access individuals with degrees in mathematics, statistics, or other fields that develop advanced proficiency in *statistical analysis*. However, this must be considered in combination with the needs for *cost analysis* to ensure that each of these advanced proficiency needs are addressed through education targets for accessions.

Appendix A: Request for Survey Control Number

The document below is the common survey control number request form provided by the U.S. Air Force. We have left the content in its original form.

To apply for a Survey Control Number (SCN), please complete the template below and it send to af.surveys@us.af.mil. SCNs are required by AFI 38-501, *Air Force Survey Program*.

SURVEY

Title:

Purpose:

Justification (Identify governing directive, legislative requirement, etc., as applicable):

Projected use of results: ☐ Inform Leadership ☐ Policy Change ☐ POM/APOM ☐ Other

Who will receive results?

Does sponsor have authority to implement changes in all areas surveyed? ☐ Yes ☐ No

Is the survey confidential? ☐ Yes ☐ No

Is the survey voluntary? ☐ Yes ☐ No

Average time for respondent to complete survey:

SURVEY TARGET POPULATION

Is the Survey Target Population a "Sample"?

☐ Yes (Survey Target Population is a fraction of all individuals that could be surveyed)

☐ No (Survey Target Population includes all individuals that could be surveyed)

Total number of Survey Target Population (total of categories shown below):

Number of AF Officers:

Number of AF Enlisted:

Number of AF Civilians:

Number of other population (AF retirees and/or AF family members):

Career field of target population (if applicable):

NOTE: The AF Survey Office's purview is limited to surveys designed for members of the AF community (i.e., AF active duty, Air National Guard, AF Reserve, AF civilian employees, AF retirees, and AF family members). Surveys cannot be conducted for contractors. To obtain approval for surveys of non-AF personnel (i.e., members of other services, employees of other Federal agencies, etc.), contact the designated representative for DoD/OMB [Office of Management and Budget].

DATA COLLECTION METHOD (please check all that apply)

☐ Personal interview

☐ Telephone interview

☐ Focus group

☐ Paper survey

___ E-mail
___ On-line survey
Hosted on: ___ .mil ___ .org ___ .com ___ .edu ___ Other
Web link address:
___ Other:

Name of Contractor (if applicable) (NOTE: Unless necessary for development of the survey, DO NOT OBLIGATE MONEY FOR A SURVEY UNTIL THE SURVEY IS APPROVED):

Cost of contract:

ADMINISTRATION TIMELINE

Survey start date:

Survey end date:

Recurring survey: ___ No ___ Yes ___ Annual ___ Semi-annual ___ Quarterly ___ Other

Next survey date (for recurring surveys):

POINTS OF CONTACT

Rank and name of AF-level sponsor (must be SAF/HAF 3-letter or above):

AF sponsor office symbol:

AF sponsor e-mail:

AF sponsor phone:

Rank and name of action officer (A/O) (must be government employee):

A/O office symbol:

A/O e-mail:

A/O phone:

Please e-mail your Survey Control Number request to: af.surveys@us.af.mil **with a copy of your survey attached**. Requests are worked in order received. The AF Survey Office can be reached by phone at DSN 487-5332/4773. Please refer to AFI 38-501 for more information on the Air Force Survey Program.

**** ADVISORY ** Please ensure compliance with the following guidance, as applicable.**

Non .Mil Survey Administration: IAW AFI 33-129, all websites hosted in the commercial environment (i.e. .com, .org, etc.), require SAF/A6 approval. A SCN issued from our office is only valid if the survey is hosted on a .mil domain site OR SAF/A6 has approved a waiver. The SCN is null and void if approval from SAF/A6 is not obtained to host a survey on a non .mil domain. Survey requestors and administrators are not authorized to host an official AF survey on a .com system representing the survey as originating from or interconnected to a military network. Send this document with the survey to safscio.networkdivi@pentagon.af.mil to request a waiver from AFI 33-129 requirements.

Digital Certificates: For information regarding digital certification of e-mails, refer to

AFI 33-119, *Air Force Messaging*. The reference for PK enabling (PKE) information is <https://afpki.lackland.af.mil/html/pkenabling.cfm>. For information pertaining to “.mil” accounts, the reference is https://afpki.lackland.af.mil/html/help_desk.cfm. Information for systems that are not “.mil” can be found at <http://iase.disa.mil/pki/eca/>. For information on External Certificate Authority or to contact a representative, the reference is http://iase.disa.mil/pki/eca/contact_us.html.

Labor Relations and Union Notification: IAW AFI 64-106, surveys administered to bargaining unit civilians require Labor Relations approval. For surveys requiring a SCN, send the SCN request and survey to AFPC/DPIECC, Air Force Program Management and Evaluation Branch; DSN 665-5737.

Protection of Human Subjects in Research: Surveys that constitute research with human subjects require review in accordance with AFI 40-402, Title 32 Code of Federal Regulations (CFR), Sec 219; and, when applicable, 45 CFR 46, Subparts B-D, 21 CFR 50, 56, 312, and 812; DoDD 3216.02; and 10 USC 980.

Privacy Act of 1974: Title 5 United States Code (USC) Sec 552a; Title 10 USC; Sec 55 and 8013; Executive Order 9397 and AFI 33-332, *Privacy Act Program*.

Freedom of Information Act (FOIA): Title 5 United States Code (USC), Sec 552; DoD Regulation 5400.7/Air Force Supplement; Executive Order 13392; AFI 33-129; and AFI 33-324.

Operational Security: DoD Regulation 5200.1-R; AFRD 31-4; and AFI 10-701.

Appendix B: Survey Forms

Determining Education Requirements for Officers—Capabilities Survey

Air Force SCN [TBD]

BACKGROUND

Your CFM is developing education requirements for officer accessions. An initial step in defining those requirements is to determine what capabilities officers need for their current jobs and at what level of proficiency they are needed. Your participation in this voluntary survey is important to ensure the necessary capabilities are accurately identified and measured for this purpose. More generally, sharing your time and perspective will help ensure your career field has the right mix of officers to perform today's jobs effectively and to meet the USAF's needs as its mission evolves over time.

Individual survey responses will not be shared beyond the personnel tasked with administering and analyzing the survey. We will be collecting general demographic information but will not ask you to supply your name or any other personally identifiable information. Your survey responses will be combined with the responses of other officers in your career field to identify capabilities most commonly regarded as needed and to provide insights regarding what level of proficiency is necessary.

If you have questions about this survey, please contact [insert name and contact information for POC].

Thank you in advance for your time and support of this effort.

DIRECTIONS

This survey consists of two sections. In the first section, there is a list of *capabilities*, which you should think of as the set of knowledge, skills, abilities, and other characteristics that officers in your career field may need to possess at varying levels of proficiency, depending on their job. You will be asked whether a capability is needed to perform **your current job** effectively, and, if yes, what level of proficiency is required in that capability.

The second section of the survey asks for information about your background, including your entry on active duty date, grade, AFSC, time in your current position, and education.

- 1) Eighteen capabilities, separated into related categories, are listed below. For each capability, please consider the following questions:
- Is this capability needed to perform **my current job** effectively?
 - If yes, what level of proficiency is needed?

If you do not think a specific capability is needed for your current job, please select **0 – Not Required**. If you think a capability is needed, please rate the level of proficiency using the following scale:

0 – Not required for my current job

1 – Introductory level

2 –Basic level

3 – Proficient level

4 – Advanced level

5 – Expert level

Capability	0 Not required for my current job	1 Introductory level	2 Basic level	3 Proficient level	4 Advanced level	5 Expert level
Capability 1: Description						
Capability 2: Description						
Capability 3: Description						
Capability 4: Description						
Capability 5: Description						
And so forth, for remaining capabilities						

- 2) Are there any capabilities missing from this list that you consider **important** to performing your job effectively? If yes, please list them below and indicate the level of proficiency needed.

Capability	1 Introductory level	2 Basic level	3 Proficient level	4 Advanced level	5 Expert level

SECTION II

- 3) What is your entry on active duty date? Please select both a month and a year.

[Select] month [Select] year

- 4) What is your grade?

- a. O-1 / O-1E
- b. O-2 / O-2E
- c. O-3 / O-3E
- d. O-4
- e. O-5
- f. O-6

- 5) What is your primary AFSC?

- a. AFSC 1
- b. AFSC 2
- c. AFSC 3
- d. Other: _____

- 6) How much time have you spent in your primary AFSC? Please use numbers to indicate the number of years (1–20) and months (0–12).

0 year(s) 0 month(s)

- 7) What is your duty AFSC?

- a. AFSC 1
- b. AFSC 2
- c. AFSC 3
- d. Other: _____

- 8) How much time have you spent in your current position? Please use numbers to indicate the number of years (0–20) and months (0–12).

0 year(s) 0 month(s)

- 9) When did you obtain your bachelor's degree? If you have more than one bachelor's degree, please indicate the year (e.g., 2002) that you obtained your **first** degree.

N/A year

- 10) In what field was your bachelor's degree awarded? Using the field of study list at the end of this survey, please choose the code that **best** describes the field of study for this degree.

Code

- 11) If you have a second bachelor's degree, please indicate the year (e.g., 2002) that you obtained your **second** degree.

Year:

If you do not have a second bachelor's degree, please skip to question 13.

- 12) In what field was your second bachelor's degree awarded? Using the field of study list at the end of this survey, please choose the code that **best** describes the field of study for this degree.

Code

- 13) If you have a master's or other graduate degree, please indicate the year (e.g., 2002) that you obtained this degree. If you have more than one master's degree, please indicate the year (e.g., 2002) that you obtained the degree you consider most **relevant** to **your current job**.

Year:

If you do not have a master's or other graduate degree, please skip to question 15.

- 14) In what field was your master's or other graduate degree awarded? Using the field of study list at the end of this survey, please choose the code that **best** describes the field of study for this degree.

Code

- 15) Thank you for your time today. If you have any comments that you would like to share regarding officer accessions for your career field, the capabilities needed for your job, or this survey, please share them in the space provided below.

Submit Completed Survey

Determining Education Requirements for Officers—Modes Survey

Air Force SCN [TBD]

BACKGROUND

Your CFM is developing education requirements for officer accessions. One step in defining those requirements is to determine **where** or **how** officers obtain the capabilities needed for their current jobs. Your participation in this voluntary survey is important to ensure capabilities and learning opportunities are accurately measured for this purpose. More generally, sharing your time and perspective will help ensure your career field has the right mix of officers to perform today's jobs effectively and to meet the USAF's needs as its mission evolves over time.

Individual survey responses will not be shared beyond the personnel tasked with administering and analyzing the survey. We will be collecting general demographic information but will not ask you to supply your name or any other personally identifiable information. Your survey responses will be combined with the responses of other officers in your career field to identify where or how capabilities needed for jobs in your career field are most commonly obtained. This, in turn, will be used to determine requirements for officer accessions.

If you have questions about this survey, please contact [insert name and contact information for POC].

Thank you in advance for your time and support of this effort.

DIRECTIONS

This survey has two sections. In the first section, there is a list of *capabilities*, which you should think of as the set of knowledge, skills, abilities, and other characteristics that you may need to perform **your current job** effectively. You will be asked to identify where you learned and **BEST** learned each capability.

The second section of the survey asks for information about your background, including your entry on active duty date, grade, AFSC, time in your current position, and education.

1) Please consider the following places or ways to learn each of these capabilities when answering these questions with **your current job** in mind:

- My first bachelor's degree
- My second bachelor's degree
- My master's or other graduate degree (if you have more than one graduate degree, please consider the one most relevant to your current job)
- Training (commissioning/initial skills training/ mid-career technical training)
- Normal duty assignments
- Professional military education (PME)
- Exercises (home station/deployed) and deployments
- Outside the USAF (excluding any academic degree programs)

First, we would like you to tell us about all the places or ways you learned or developed a capability. If you do not possess a specific capability, please select **Not Acquired**.

Capability	My first bachelor's degree	My second bachelor's degree	My master's or graduate degree	Training	Normal duty assignments	PME	Exercises and deployments	Outside the USAF	Not acquired
Capability 1: Description									
Capability 2: Description									
Capability 3: Description									
Capability 4: Description									
Capability 5: Description									
And so forth, for remaining capabilities									

- 2) Next, for the capabilities listed below, you indicated that you learned or developed them in more than one place or way. Please select the one place or way that you BEST learned each capability.

If no capabilities are listed below, please skip to the next page.

Capability	My first bachelor's degree	My second bachelor's degree	My master's or graduate degree	Training	Normal duty assignments	PME	Deployments or Exercises	Outside the USAF

Are there any capabilities missing from this list that you consider important or very important to performing your current job effectively? If yes, please list them below, and indicate where you best learned them.

Capability	My first bachelor's degree	My second bachelor's degree	My master's or graduate degree	Training	Normal duty assignments	PME	Deployments or Exercises	Outside the USAF

SECTION II

- 3) What is your entry on active duty date? Please select both a month and a year.

[Select] Month [Select] Year

- 4) What is your grade?

a. O-1 / O-1E	d. O-4
b. O-2 / O-2E	e. O-5
c. O-3 / O-3E	f. O-6

- 5) What is your primary AFSC?

e. AFSC 1
f. AFSC 2
g. AFSC 3
h. Other: _____

- 6) How much time have you spent in your primary AFSC? Please use numbers to indicate the number of years (0–20) and months (0–12).

year(s) month(s)

- 7) What is your duty AFSC?

- a. AFSC 1
- b. AFSC 2
- c. AFSC 3
- d. Other: _____

- 8) How much time have you spent in your current position? Please use numbers to indicate the number of years (1–20) and months (0–12).

year(s) month(s)

- 9) When did you obtain your bachelor's degree? If you have more than one bachelor's degree, please indicate the year (e.g., 2002) that you obtained your **first** degree.

year

- 10) In what field was your bachelor's degree awarded? Using the field of study list at the end of this survey, please choose the code that best describes the field of study for this degree.

Code

- 11) If you have a second bachelor's degree, please indicate the year (e.g., 2002) that you obtained your **second** degree.

Year:

If you do not have a second bachelor's degree, please skip to question 14.

- 12) In what field was your second bachelor's degree awarded? Using the field of study list at the end of this survey, please choose the code that **best** describes the field of study for this degree.

Code

- 13) If you have a master's or other graduate degree, please indicate the year (e.g., 2002) that you obtained this degree. If you have more than one master's degree, please indicate the year (e.g., 2002) that you obtained the degree you consider **relevant to your current job**.

Year:

If you do not have a master's or other graduate degree, please skip to question 16.

14) In what field was your master's or other graduate degree awarded? Using the field of study list at the end of this survey, please choose the code that best describes the field of study for this degree.

Code

15) Thank you for your time today. If you have any comments that you would like to share regarding officer accessions for your career field, the capabilities needed for your job, or this survey, please share them in the space provided below.

Submit Completed Survey

FIELD OF STUDY

If you cannot find the code that best describes your field of study, use the “OTHER” code under the most appropriate broad category. If none of the codes fits your area of study, use code 9999.

● Agriculture, agriculture operations, and related sciences	0100	Agriculture, agriculture operations, and related sciences	
● Aircraft/airframe and computer/auto/equipment maintenance/repair technologies	4700	Aircraft/airframe and computer/auto/equipment maintenance/repair technologies	
● Architecture and community/regional planning and development	0400	Architecture and community/regional planning and development	
● Area, ethnic, cultural, gender and group studies	0500	Area, ethnic, cultural, gender and group studies	
● Biological and biomedical sciences, including zoology, genetics, pharmacology, biometry/biometrics and neuroscience	2600	Biological and biomedical sciences, including zoology, genetics, pharmacology, biometry/biometrics and neuroscience	
● Business, management, marketing, and related support services	5203	Accounting and related services	5211 International business
	5202	Business administration, management and operations	5212 Management information systems and services
	5205	Business/corporate communications	5213 Management sciences and quantitative methods
	5220	Construction management	5214 Marketing
	5208	Finance and financial management services	5215 Real estate, taxation, insurance
	5209	Hospitality administration/management	5221 Telecommunications management
	5210	Human resources management and services	5200 OTHER business, management, marketing, and related support services
● Communication, journalism, and related programs	0904	Journalism	0907 Radio, television, and digital communication
	0909	Public relations, advertising, and applied communication	0901 OTHER communication, journalism, and related programs
	0910	Publishing	
● Communications technologies including graphic/audiovisual communications and print management	1000	Communications technologies, including graphic/audiovisual communications and print management	
● Computer and information sciences and support services	1102	Computer programming	1110 Computer/information technology administration and management
	1107	Computer science	1106 Data entry/microcomputer applications
	1108	Computer software and media applications	1104 Information science/studies
	1105	Computer systems analysis	1101 OTHER computer and information sciences and support services
	1109	Computer systems networking and telecommunications	
● Education, including education administration, learning sciences and curriculum/instruction	1300	Education, including education administration, learning sciences and curriculum/instruction	

● Engineering and operations research	1402	Aerospace, aeronautical and astronautical engineering	1434	Forest engineering
	1403	Agricultural engineering	1439	Geological/geophysical and surveying engineering
	1404	Architectural engineering	1435	Industrial engineering
	1445	Biochemical/biological/biosystems engineering	1436	Manufacturing engineering
	1405	Biomedical/medical engineering	1418	Materials engineering
	1407	Chemical engineering	1419	Mechanical engineering
	1408	Civil engineering	1442	Mechatronics, robotics, and automation engineering
	1409	Computer engineering	1420	Metallurgical/mining and mineral engineering
	1433	Construction engineering	1422	Naval architecture and marine/ocean engineering
	1410	Electrical, electronics and communications engineering	1423	Nuclear engineering
	1441	Electromechanical engineering	1437	Operations research
	1444	Engineering chemistry	1425	Petroleum engineering
	1411	Engineering mechanics	1427	Systems engineering
	1412	Engineering physics	1428	Textile engineering, polymer/plastics engineering and paper engineering
	1413	Engineering science	1499	OTHER engineering and operations research
	1414	Environmental/environmental health engineering		
● English language and literature/letters (including creative/technical writing)	2300	English language and literature/letters (including creative/technical writing)		
● Family and consumer sciences/human sciences, including nutrition, child development, housing, and furnishings/apparel	1900	Family and consumer sciences/human sciences, including nutrition, child development, housing and furnishings/apparel		
● Foreign languages, literature, and linguistics	1600	Foreign languages, literature, and Linguistics		
● Health services/allied health/health sciences, general	3400	Health services/allied health/health sciences, general		
● History	5400	History		
● Homeland security, law enforcement, firefighting, and related protective services	4301	Criminal justice and corrections	4303	Homeland security
	4302	Fire protection	4399	OTHER homeland security, law enforcement, firefighting, and related protective services
● Legal professions and Studies	2200	Legal professions and studies		
● Liberal arts and sciences, general studies, and humanities	2400	Liberal arts and sciences, general studies, and humanities		
● Library science	2500	Library science		
● Mathematics and statistics	2700	Mathematics and statistics		

● Military science, leadership and operational art (including security, policy and strategy military economics/management)	2800	Military science, leadership and operational art (including security, policy and strategy military economics/management)		
● Multi/interdisciplinary studies	3017	Behavioral sciences	3018	Natural sciences
	3030	Computational science	3025	Neuroscience/cognitive science
	3023	Intercultural/multicultural and diversity studies	3019	Nutrition sciences
	3020	International/global studies	3099	OTHER multi-interdisciplinary studies
	3014	Museology/museum studies and historic preservation and conservation		
● Natural resources and conservation (including forestry, environmental and wildlife areas)	0300	Natural resources and conservation (including forestry, environmental and wildlife areas)		
● Parks, recreation, leisure, and fitness studies	3100	Parks, recreation, leisure, and fitness studies		
● Personal and culinary services (including funeral science)	1200	Personal and culinary services (including funeral science)		
● Philosophy and religious studies	3800	Philosophy and religious studies		
● Physical sciences	4002	Astronomy and astrophysics	4010	Materials sciences
	4004	Atmospheric sciences and meteorology	4008	Physics
	4005	Chemistry	4099	OTHER physical sciences
	4006	Geological and earth sciences/geosciences		
● Psychology	4200	Psychology		
● Public administration and social service professions	4400	Human services	4407	Social work
	4404	Public administration	4499	OTHER public administration and social service professions
	4405	Public policy analysis		
● Social sciences	4502	Anthropology	4509	International relations and national security studies
	4503	Archeology	4510	Political science and government
	4504	Criminology	4511	Sociology, including urban/rural sociology
	4506	Economics	4599	OTHER social sciences
	4507	Geography and cartography		
● Science technologies/technicians	4101	Biology technician/biotechnology laboratory technician	4103	Physical science technologies/technicians
	4102	Nuclear and Industrial radiologic technologies/technicians	4199	OTHER science technologies/technicians
● Theology and religious vocations	3900	Theology and religious vocations		
● Transportation and materials moving	4901	Air transportation	4903	Marine transportation
	4902	Ground transportation	4999	OTHER transportation and materials moving
● Visual and performing arts	5010	Arts, entertainment, and media management	5007	Fine and studio arts
	5004	Design and applied arts	5009	Music
	5005	Drama/theater arts and stagecraft	5099	OTHER visual and performing arts

• OTHER

9999 Other

Appendix C: Sample Survey Invitation Emails

This appendix contains survey invitation emails that you may wish to use verbatim or simply as a starting point for an email that you or your designee sends to intended survey respondents. The emails provide not only general information about the survey's purpose and participation, but also elements required by the Air Force Survey Office, such as the survey title, Survey Control Number (SCN), and confidentiality statement. Three versions of the letter are provided, which vary, depending on which survey or surveys the officer is being asked to complete.

Version One: Capabilities Survey Only

Determining Education Requirements for Officers—Capabilities/Modes Surveys

Air Force SCN AF##-#####

Dear [Salutation],

Your career field manager, [NAME], is working to refine education requirements for officer accessions. An initial step in defining those requirements is to determine what capabilities officers need for their current jobs and at what level of proficiency. By sharing your time and perspective, you will help to ensure your career field has the right mix of officers to perform today's jobs effectively and to meet the Air Force's needs as its mission evolves over time.

Attached to this email is the survey form for you to complete. You will need Adobe Reader to view and complete the survey (available for free at <http://get.adobe.com/reader/>). We know you have many demands on your time; we estimate this survey should only take you 10–15 minutes to complete. Once you have answered the questions on the form, please click the "Submit" box at the end of the survey to submit your responses. You may also want to print a copy for your records.

While I encourage you to give this survey your careful consideration, please note that your participation in the survey is voluntary. The information you provide on this survey will be kept confidential, and the individual survey responses will not be shared beyond the personnel tasked with administering and analyzing the survey. The responses will be reported in aggregate, so your individual responses will not be attributable to you.

Thank you for your participation. If you have any questions, please call [CFM or staff] at (XXX) XXX-XXXX, or send an email to [email].

V/r,

General John Doe
Other signature info

Please note: We cannot provide confidentiality to a participant regarding comments involving criminal activity/behavior or statements that pose a threat to yourself or others. Do NOT discuss or comment on classified or operationally sensitive information.

To see a list of Air Force approved surveys, please visit <https://www.my.af.mil/gcss-af/USAF/ep/browse.do?programId=t2D8EB9D6297405FA012980243147010A&channelPageId=s5FDEA9F02134FFA70121351677C80048>.

Version Two: Modes Survey Only

Determining Education Requirements for Officers—Capabilities/Modes Surveys
Air Force SCN AF##-#####

Dear [Salutation],

Your career field manager, [NAME], is working to refine education requirements for officer accessions. An initial step in defining those requirements is to determine how officers acquired the capabilities that they need to perform their current job well. By sharing your time and perspective, you will help to ensure your career field has the right mix of officers to perform today's jobs effectively and to meet the Air Force's needs as its mission evolves over time.

Attached to this email is the survey form for you to complete. You will need Adobe Reader to view and complete the survey (available for free at <http://get.adobe.com/reader/>). We know you have many demands on your time, and estimate this survey should only take you 10–15 minutes to complete. Once you have answered the questions on the form, please click the "Submit" box at the end of the survey to submit your responses. You may also want to print a copy for your records.

While I encourage you to give this survey your careful consideration, please note that your participation in the survey is voluntary. The information you provide on this survey will be kept confidential, and the individual survey responses will not be shared beyond the personnel tasked with administering and analyzing the survey. The responses will be reported in aggregate, so your individual responses will not be attributable to you.

Thank you for your participation. If you have any questions, please call [CFM or staff] at (XXX) XXX-XXXX, or send an email to [email].

V/r,
General John Doe

Other signature info

Please note: We cannot provide confidentiality to a participant regarding comments involving criminal activity/behavior or statements that pose a threat to yourself or others. Do NOT discuss or comment on classified or operationally sensitive information.

To see a list of Air Force approved surveys, please visit: <https://www.my.af.mil/gcss-af/USAF/ep/browse.do?programId=t2D8EB9D6297405FA012980243147010A&channelPageId=s5FDEA9F02134FFA70121351677C80048>.

Version Three: Both Surveys

Determining Education Requirements for Officers—Capabilities/Modes Surveys

Air Force SCN AF13-185A1PT

Dear [Salutation],

Your career field manager, [NAME], is working to refine education requirements for officer accessions. By sharing your time and perspective, you will help to ensure your career field has the right mix of officers to perform today's jobs effectively and to meet the Air Force's needs as its mission evolves over time.

There are two important parts of this effort: identifying the capabilities officers need for their current jobs, and identifying the ways in which these capabilities are learned. There is a separate survey for each of these purposes; we ask that you please complete both surveys attached to this email, starting with the "Capabilities" survey. You will need Adobe Reader to view and complete the survey (available for free at <http://get.adobe.com/reader/>).

We know you have many demands on your time, and estimate each survey should only take you 10–15 minutes to complete. Once you have answered the questions on the form, please click the "Submit" box at the end of the survey to submit your responses. You may also want to print a copy of each survey for your records.

While I encourage you to give this survey your careful consideration, please note that your participation in the survey is voluntary. The information you provide on this survey will be kept confidential, and the individual survey responses will not be shared beyond the personnel tasked with administering and analyzing the survey. The responses will be reported in aggregate, so your individual responses will not be attributable to you.

Thank you for your participation. If you have any questions, please call [CFM or staff] at (XXX) XXX-XXXX, or send an email to [email].

V/r,

General John Doe

Other signature info

Please note: We cannot provide confidentiality to a participant regarding comments involving criminal activity/ behavior or statements that pose a threat to yourself or others. Do NOT discuss or comment on classified or operationally sensitive information.

To see a list of Air Force approved surveys, please visit: <https://www.my.af.mil/gcss-af/USAF/ep/browse.do?programId=t2D8EB9D6297405FA012980243147010A&channelPageId=s5FDEA9F02134FFA70121351677C80048>.

Appendix D: Using Adobe Acrobat to Field Surveys

Overview

This appendix describes how to modify the PDF survey designed by RAND to suit your needs, how to distribute it, and how to collect response data into a single file. To follow these instructions you will need copies of Microsoft Outlook 2010, Adobe Acrobat X, and the electronic survey instrument itself (available through PAF).

Designing the Survey with Adobe Acrobat

The Adobe Acrobat X survey form consists of three kinds of elements: art objects (lines), text, and editable form fields. This section describes the process for designing and editing various components of the survey form.

Editing an Art Object

To edit an art object (in this survey, these are just the boxes or lines used to define tables), you will need to use the `Edit Object` function. It is unlikely that you will need to work with art objects other than to delete them—for example, you might need to delete an unused row. To delete an unused row, follow these steps:

Step 1. Click the `Tools` option on the ribbon. The tools sidebar is displayed to the right.

Step 2. Click the `Content Editing` section to expand it, and then click `Edit Text & Images`. When you hover over the document, your cursor shows a small box next to the arrow.

Step 3. Click to select a single art object, and then press the `Delete` key to delete it (Figure AD.1).

Figure AD.1. Editing an Art Object

NOTE: A single line making up part of a table is selected.

Tips for editing art objects:

- Clicking to select art objects can be hard to select individually. Two things will help while working with lines and boxes.
 - Zoom in: Press and hold CTRL while using your scroll wheel to zoom in on the document. This makes thin lines easier to select.
 - Select multiple items at once: Click and drag with the **Edit Object** tool to select a whole group of items at once. Be careful, as this will sometimes select more items than you intend.

Editing a Form Field

To prepare the survey for distribution, you will need to enter the capabilities that are determined as important for the survey population. To do so, you edit the text that appears in the Capabilities fields (which are text fields), and then mark them **Read Only**. The process of doing so is as follows:

Step 1. Open either the Modes or Capabilities survey. Scroll to page two, and then click the text/pointer icon on the ribbon (the multiple cursor button to the left of the Hand button).

Step 2. Now, click a field, and enter text. Both the text that appears at the top of the form and any individual Capability lines can be edited (Figure AD.2).

Figure AD.2. Editing a Form Field

1) Please consider the following places or ways to learn each of these capabilities when answering these questions with **your current job** in mind:

- My first bachelor's degree
- My second bachelor's degree
- My master's or other graduate degree (if you have more than one graduate degree, please consider the one most relevant to your current job)
- Training (Commissioning/Initial skills training/ Mid-career technical training)
- Normal duty assignments
- PME (SOS/IDE/SDE) This is also a form field.
- Exercises (Home Station Deployed) and Deployments
- Outside the AF (including any academic degree programs)

First, we would like you to tell us about all the places or ways you learned or developed a capability. If you do not possess a specific capability, please select Not Acquired.

Capability	Not Acquired	My first bachelor's degree	My second bachelor's degree	My master's or graduate degree	Training	Normal duty assignments	PME	Exercises	Outside the AF
This is a form field, and has two lines for editing by default.	☐	☐	☐	☐	☐	☐	☐	☐	☐
Two	☐	☐	☐	☐	☐	☐	☐	☐	☐
Three	☐	☐	☐	☐	☐	☐	☐	☐	☐

NOTE: Both the text above the table and the text in each row are displayed using text form fields.

Tips for editing form fields:

- These fields accept rich text (text with formatting) and are sized to use 8 pt Arial by default. This means that you should not paste into these fields from Microsoft Word. Doing so will preserve the formatting from Word—the text you enter will use a different font and will probably be much bigger than 8 pt.
- To copy text from Word into the survey, you can either paste the text into a text editor (such as Notepad), which will scrub it of formatting, or change the text you have in Word to 8pt Arial.
- Each Capability field accepts 200 characters in the listed font. To fit more than 200 characters, you will have to use an editor such as Word to make your text smaller than 8 pt and then paste it into the survey. We would caution against using less than 8 pt, as survey respondents may have to use the zoom function to read the text you enter in this manner.

Marking Fields “Read Only”

Once you have made your changes to the Capabilities lines, you will need to mark these fields Read Only to prevent an ambitious survey respondent from writing in their own values. Use the following steps to mark form fields Read Only:

Step 1. Once you have made your changes to the Capabilities lines, you will need to mark these fields Read Only to prevent an ambitious survey respondent from writing in his or her own values. Click the Tools option on the ribbon to reveal the tools sidebar.

Step 2. Click the Forms item on the Tools sidebar, then click Edit. Form fields on the survey will be highlighted in black.

Step 3. Double click a field. Its Properties window is displayed which, on the General tab, includes an option to mark an item Read Only (Figure AD.3).

Step 4. Close the Properties window. Instead of doing this one by one, you are going to mark many fields Read Only at once.

Step 5. Zoom out by pressing CTRL and moving your mouse's scroll wheel until you can see the entire page on your screen.

Step 6. Starting in the upper left corner, click and drag to select all of the form fields on the left side of the page. Do not select any of the checkboxes (also form fields)—you want people to edit those.

Step 7. Right click one of the selected fields, and select Properties. A properties window is displayed that applies to all of the fields on the page.

Step 8. Click the Read Only box on the General tab, and then click Close. Click the Close Form Editing option in the upper right corner of the window.

Step 9. If, when filling out the capabilities, you have fewer than 25 values, use the click-and-drag selector in Edit Form mode to delete unused fields. Then, use the Edit Object tool (described above in the Edit Art Object section) to delete unused lines and boxes.

Figure AD.3. Marking an Object as “Read Only”

NOTE: Click and drag in Edit Form mode to select multiple fields at once.

Note: If, when filling out the capabilities, you have fewer than 18 or 25 values and end up with extra boxes, use the click-and-drag selector in Edit Form mode to delete unused fields. Then, use the **Edit Object** tool (described above in the **Edit Art Object** section) to delete unused lines and boxes.

Editing Document Text

Some of the labels and wording on the survey is plain text rather than a form field. While harder to edit, using text greatly simplifies the returned results of the survey. To change values that appear on the survey as plain text:

*Step 1. Click the **Tools** option on the ribbon to reveal the tools sidebar.*

*Step 2. Click the **Content Editing** item to reveal its options, and then click **Edit Text** and **Images**.*

*Step 3. To add new text, click **Add Text** and select the place on the document where you would like to add text. To delete text, delete the highlighted box in the same way you would delete art objects. If a message displays to say that an original font is not installed, you can*

disregard this message (it is for this reason that the document uses Arial—a multiplatform font).

Tips for editing text:

- Editing text in Adobe Acrobat is counterintuitive and not at all like editing text in a word-processing application. Please consider the following tips:
 - Do not press the `Return` key. Doing so will not always give you a new line as you would expect, but will instead move text around in unexpected ways.
 - In general, use the text-editing tool to replace existing text with new entries that are approximately the same length. For example, to change a AFSC value for a question:
 - Click once in the middle of the existing value.
 - Add your new value. Notice that other text on the page moves as a result.
 - Carefully delete the remnants of the original value.
 - Potentially, add or delete a space to keep other values on the page in line.

It is likely that the only text you will have to modify on this survey is included in the Grade and AFSC fields in Section II of the two surveys. For the Modes survey, more than half of this text uses Form fields instead. This text can be edited as described in `Editing Form Fields`, above; remember to use the `Edit Forms` tool to lock the values after editing.

Preparing the Survey for Administration

To prepare the survey form for administration, you will use the *Distribute Form* function in Acrobat. Before you follow the steps below, you should check the following:

- Have you marked all of the form fields that are for your editing only as `Read Only` as described in the previous section?
- Does the first page of the survey have the correct contact information?

After ensuring that the form is read only and has the correct contact information embedded, you are ready to distribute the form.

Step 1. First, you'll need to set your copy of Acrobat to store the email address to which you'll want the surveys to be returned. By default, this value will match your network login or the name of the person who registered the Adobe software; the address to which you want responses to be sent might be different. To change this address:

- Launch the `Preferences` window in Acrobat from `Edit | Preferences`.
- Click `Identity` on the left pane. A window similar to the one below is displayed.
- The value that appears in the `Email Address` field is the one that will receive returned responses. Enter the appropriate address.
- Click `OK` to save your changes and close the window (Figure AD.4).

Figure AD.4. Setting Preferences to Return Surveys to an Email Address

NOTE: The Edit | Preferences window with the Identity section selected.

Step 2. Click the Tools menu in the upper right corner of Acrobat, then click the Forms menu. Click Distribute under the Forms menu. A message similar to the one pictured below is displayed. Select Email to distribute, and collect data using email and Acrobat, and click Continue (Figure AD.5).

Figure AD.5. Set Distribute Form by Email

*Step 3. The next box that will appear asks if you would like to clear values. Click **No** (Figure AD.6). **This is a very important step**—clicking **Yes** will clear some of the changes you made in the beginning sections of these instructions. The **Distribute Form** wizard will be displayed.*

Figure AD.6. Marking an Object “Read Only”

*Step 4. Select **Save a local copy and send it later** from the **How do you want to distribute your forms...** field, and specify the folder in which you would like to save the file. This should be somewhere on your local drive (or a network share) that you can easily access. Click **Next**.*

*Step 5. Remove the check next to **Collect name & email from recipients** (Figure AD.7). Click **Finish**.*

Figure AD.7. Uncheck the Box That Refers to Collection of Identifying Information

After you have completed these steps, navigate to the directory specified in the process above. You should see two files: One that ends in “_distributed” and another that ends in “_responses” (pictured below). You should send the file that ends in “_distributed” to potential respondents. The other file is used to process the returned responses, as described in the next section. If you would like to rename the “_distributed” file, you can do so. This can be sent to your pool of potential respondents without further action.

Processing Returned Surveys

This section describes how to receive, store, and combine responses to the Career Field survey. Survey respondents click the **Submit Completed Survey** or **Submit Response** button in Adobe Reader, and send an email to a predetermined address with a response data file. These response emails need to be grouped into one folder in the recipient’s inbox using Microsoft Outlook rules. Then, the recipient uses a macro to copy out all of the attachments and save them to a local folder. Finally, the survey responses are combined into a single file using Adobe Acrobat.

Testing the Survey Return Email Address

Before you begin, test the email receipt by opening the copy of the survey that you will be sending out (the “distributed” copy), scrolling to the end, and clicking the **Submit Completed survey** button. A message is displayed showing the email address where the survey will be delivered. Please verify that this is the correct address and if not, return to Acrobat Preferences to edit the email address.

Next, you will be asked “How would you like to send this e-mail” Please select “Default email application (Microsoft Outlook).”

Creating a Rule in Microsoft Outlook

Unless responses to the survey are sent to an email inbox that has been set aside just for this purpose, you will want to separate Survey responses from your other email. This is accomplished using an Outlook rule that moves items to their own folder, according to the following steps:

Step 1. Open Microsoft Outlook, and navigate to your Inbox.

*Step 2. Right click your Inbox icon in the folder browser pane and select **New Folder**.*

Step 3. Type a name for the new folder. Do not use a name that has spaces (though you can use the underscore “_” character), and make a note of the name of this folder for future reference.

Step 4. Click the File menu, and then click Manage Rules and Alerts.

Step 5. Click the New Rule button in the upper left corner of the window. The Rules Wizard is displayed (see Figure AD.8).

Figure AD.8. Setting a Rule to Transfer All Surveys to a Single Folder

Step 6. Click the second option in the list—“Move messages with specific words in the subject to a folder.” The text in the Step 2 field changes to include new options.

Step 7. Click the phrase “specific words” in the Step 2 box (part of the phrase “with specific words in the subject”). A Search Text window is displayed.

Step 8. Enter Submitting Completed Form (see Figure AD.9). Please note this is case sensitive, and the words should be entered without quotes.

Figure AD.9. Entering the Words for the New Outlook Rule

*Step 9. Click **Add**. The text you entered appears in the **Search list** at the bottom of the window. Click **OK**.*

*Step 10. Click the word “specified” (in blue) in the phrase “move it to the specified folder.” A folder picker window is displayed. Select the folder you created in step 3, above, and click **OK**. Then click the **Finish** button.*

After following these steps, your rule is created. To test the rule, send yourself an email with a subject line that includes the text you entered in Step 8. The email will appear as a new item in the folder you created in Step 3.

Creating a Macro in Microsoft Outlook

By the end of the above section, you created a rule that moves all incoming survey responses to a specified folder. After you send out the survey, this folder could potentially be filled with hundreds of emails—each with an attachment. Since you only need the attachments, and don’t want to open each message individually to save them, you can create a macro to copy out the attachments for you.

Step 1. Before you create the macro, you’ll need to create a new folder on your local drive to store its output. To do so, open a Windows Explorer window, navigate to your local (C:\) drive, and create a new folder. Name the new folder the same as the name you used for the Outlook folder in Step 3 (again, using no spaces). This example will use the name “SurveyResponses” for both.

*Step 2. Open Outlook, navigate to your inbox, and check to see whether you have the Developer tab enabled—it will be an option on the Outlook ribbon to the right of the **View** menu (see Figure AD.10).*

Figure AD.10. The “Developer” Tab

Step 3. If you do not have the developer tab, follow the steps below. If you do, skip to Step 4.

- To enable the Developer tab, click the **File** menu, and then click on **Options**.
- Click **Customize Ribbon** from the list on the left. A window with two columns is displayed.
- In the right column, scroll through the list until you see **Developer** listed as an option, and put a check next to it.
- Click **OK**. The Developer tab is displayed after the View tab.

Step 4. Click the Developer tab, and then click the Macros option. Click again, or click the Macros option in the drop-down to reveal a Macros window similar to the one in Figure AD.11.

Figure AD.11. The Macros Window

*Step 5. Enter “SaveAttachments” (no quotes, case sensitive) as the name for the macro, then click **Create**. The Microsoft Visual Basic for Application window is displayed.*

Step 6. The system will have created two lines for you—one that says “Sub SaveAttachments()” and another that says “End Sub.” Delete both of these lines.

Step 7. Open the “save_macro.txt” document that came packaged with these instructions. Copy all of the text it contains, and paste it into the Visual Basic editor window. After this step, you should see something similar to Figure AD.12.

Figure AD.12. The Macros in the Editor Window

Step 8. This file contains two editable components—both are contained on the line after the green (comments) section that begins `GetAttachments`. Edit these two items to tell the macro the name of your Outlook folder (set in Step 3 of “Creating an Outlook Rule”), and the name of the folder on your C: drive (set in Step 1, above). See Box AD.1 below.

Box AD.1. Editing the Microsoft Outlook Macro

`GetAttachments "SurveyResponses", "", "C:\SurveyResponses"`

- **SurveyResponses**: The value between the first set of quotes in the `GetAttachments` line tells the macro what Outlook folder to look in for attachments. This was the folder created in Step 4.X.
- **C:\SurveyResponses**: The value between the third set of quotes in the `GetAttachments` line tells the macro the folder on your computer within which it should save the attachments. Enter the name of the folder you created in Step 4.X.

Aggregating Responses into a Data Set

You will have two files for each survey; one of these is the survey that you will send to potential respondents (the file with no suffix, e.g., “Career_Field_Survey_(Modes).pdf”), and a file with the suffix “_responses” (e.g., “Career_Field_Survey_(Modes)_responses.pdf”) (Figure AD.13).

Figure AD.13. The Survey Files

You'll use the “_responses” file to combine returned surveys into one file. To do so, take the following steps:

Step 1. Double click the Responses file to open it. If this is your first time editing a survey responses file, a splash screen is displayed. Click Don't Show Again in the lower right corner, and then click Get Started. A page similar to the one in Figure AD.14 will be displayed.

Figure AD.14. A Blank Responses File

Step 2. Click the Add button on the left panel toolbar. The Add Forms window is displayed. Click Add File. A Browse window will be displayed.

Step 3. Navigate to the directory where you have saved the returned responses. This will be the directory on your local (C:) drive (example: “C:\SurveyResponses”) that you entered into the macro in step 8 of “Creating an Outlook Macro.”

Step 4. Click the heading of the Name column in the Add Returned Forms window to sort the contents of the folder by name. If your view looks different from the one pictured in Figure

AD.15, click the Change Your View button in the upper right corner, and select Details. If you are collecting results from multiple surveys in a single folder, make sure to select only the data on the relevant survey.

Figure AD.15. Changing Your View in the Response File

NOTE: All of the files in the responses folder will begin with the name of the survey file you sent to potential respondents.

After this step, the files in the folder will be sorted by name—each file in the directory will begin with the name of the survey file you sent by email to potential respondents.

Step 5. Scroll until you see the first survey that has the same name as the “_responses” file you have open. Click once to select it.

Step 6. Hold your SHIFT key, and press the down arrow key to select more records. As you select more records, the names of the files are added to the Filename field at the bottom of the window. Select all of the responses to the survey in this manner.

Step 7. Click Open. The system processes each file from the responses folder, and adds the response data to the _responses file. This can take a while if you are importing many files. Your window will look something like the one in Figure AD.16.

Figure AD.16. A Response File with Imported Surveys

	t1_q1_csp1_1	t1_q1_csp1_2	t1_q1_csp1_3	t1_q1_csp1_4	t1_q1_csp1_5	t1_q1_csp1_6	t1_q1_csp1_7	t1_q1_csp1_8	t1_q1_csp1_9	t1_q1_csp1_10
	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
1	Off	Off	1	Off	Off	Off	Off	Off	Off	Off
	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

NOTE: Four responses have been imported into the sample response file.

Step 8. Once there is information in the “_responses” file, you can export this information to Excel. Follow these steps to export:

- Click the **Export** drop-down on the left toolbar,
- Select **Export All**. The **Select Folder to Save File** window is displayed.
- Enter a name and a save location for the file. The **save as type** field should be set to “CSV (comma delimited)” by default.
- Click **save**.

Appendix E: Getting Familiar with the Data

Eliminating Unnecessary Variables

There are a number of data elements that are not needed in the analysis described in this manual. For the purposes of this analysis, it may help to clean up the data file to more easily focus on the variables of interest. A codebook for both surveys (see Table AE.1 and Table AE.2) is available at the end of this Appendix with variable name (found in row 1 of the data files), variable description, and variable values. Variables shaded in blue are the only required variables for the analysis described in this manual. Variables in green are ones that are not analyzed in the primary analysis, but may be of interest to CFMs for secondary analysis. Variables in light red are purely descriptive variables. They contain data that either the CFM or respondent entered into a text box in the Adobe form. Variables that are not found in the codebook (Tables AE.1 and AE.2) have no use in analysis and should be deleted.

For the first round of analysis, we recommend that only the variables shaded in blue be retained. All other variables/columns should be deleted. Note that it is very important that the other data not be permanently deleted in case you want to go back and analyze additional variables in follow-up analyses. Before deleting any columns, re-save the spreadsheet with a different name (e.g., “Analysis Round 1”).

Recoding Variables

There are a number of variables that you may want to regroup for analysis. For example, you may want to aggregate academic degree fields into larger groups (e.g., “mechanical engineering,” “aeronautical engineering,” recategorized to “engineering”). Or you may want to recategorize O-1 and O-2s as “early career,” O-3s and O-4s as “mid-career,” and O-5s and O-6s as “late career.” Or you may simply want to fill in the actual-duty AFSCs, rather than the “a” through “z” values that are currently found in the duty AFSC column. This appendix includes two methods for recoding variables.

Using “Find and Replace” to Recode Variables

The Find and Replace option in Excel can be used to recode variables according the following steps:

Step 1: Enter a new column next to the column you want to recode with the same data. To do so, highlight the column you want to recode, click Copy (Ctrl-C), right click on your mouse at the top of the highlighted column, and click on Insert Copied Cells (Figure AE.1).

Rename the variable a different name in row 1.

Figure AE.1. Inserting a Duplicate Data Column

Step 2: Highlight only the new column of duplicate data and click on Replace under Find and Select under the Home tab (Figure AE.2). Note: Do not highlight the variable name in row 1. Only highlight the values in rows 2 on.

Figure AE.2. Choosing the “Find and Replace” Option for a Single Column

Step 3: A box will pop up (Figure AE.3). Click on the Replace tab. Enter the value you want to change from in the Find what box (e.g., 3), and enter the value you want to change to in the Replace with box (e.g., “Mid-Career”). Repeat this step for all values.

Figure AE.3. Choosing the Values to Change From and Change To

Using “IF” Statements to Recode Variables

Replacing values can be time consuming, particularly if there are a large number of values. It may save time to recode the variable using an Excel formula with an “IF” statement to recode values simultaneously. To do so, follow these steps:

Step 1: Insert a blank column next to the one you would like to recode. To do so, highlight the column you want to recode, right click on your mouse, and click on Insert (Figure AE.4). Add a variable name in row 1 of the empty column.

Figure AE.4. Inserting a Blank Column

Step 2: In row 2 of the new empty column, enter the following formula:

=IF(Cell2=Value1, NewValue1, IF(Cell2=Value2, NewValue2, IF(Cell2=ValueN, NewValueN)))

*Where **Cell** should be replaced with the actual cell for the data that you want to recode, **Value1** should be replaced with the first value you want to recode from and **NewValue1** should be replaced with the first value you want to recode to (Figure AE.5).*

Figure AE.5. Using a Formula with an IF Statement to Recode Values

	A	B	C	D	E	F	G
1		From	Received	s2_q5_grade	s2_q5_grade2	LABEL_S2	LABEL_S2
2	Space_Sta	anonymou	#####	5	O-5	O-1 / O-1E	O-4
3	Space_Sta	anonymou	#####	3	O-3	O-1 / O-1E	O-4
4	Space_Sta	anonymou	#####	5	O-5	O-1 / O-1E	O-4
5	Space_Sta	anonymou	#####	5	O-5	O-1 / O-1E	O-4
6	Space_Sta	anonymou	#####	5	O-5	O-1 / O-1E	O-4
7	Space_Sta	anonymou	#####	4	O-4	O-1 / O-1E	O-4
8	Space_Sta	anonymou	#####	4		O-1 / O-1E	O-4
9	Space_Sta	anonymou	#####	5		O-1 / O-1E	O-4
10	Space_Sta	anonymou	#####	4		O-1 / O-1E	O-4
11	Space_Sta	anonymou	#####	5		O-1 / O-1E	O-4
12	Space_Sta	anonymou	#####	5		O-1 / O-1E	O-4
13	Space_Sta	anonymou	#####	5		O-1 / O-1E	O-4

Step 3: Drag down or copy and paste this formula into all cells in the new column.

Creating New Variables

There are three sets of variables that need to be created for the purposes of analysis—one in the Capabilities Survey data and two in the Modes Survey data. This section describes how to create these variables.

Variable Indicating Whether a Capability Is Required at an Advanced Proficiency

Under Goal 2 of the survey analysis, we recommended looking at two different variables: average proficiency level rating and the percentage of respondents who reported a level four or five (advanced) proficiency is needed. The variable you will create can be used to calculate this second measure, the percentage of respondents who reported advanced proficiency is needed.

Step 1: Find the columns with the ranking levels in the Capabilities Survey data (e.g., s1_q1_cap1_ranking). Insert a blank column next to each ranking level column. Label these blank columns with new variable names.

Step 2: Insert the following formula into the second row of the blank column:

=IF(Cell2>3, 1,0)

Where **Cell** should be replaced with the actual cell in the column where the ranking level data is located. This should recode rows with 4 or 5 rankings as 1s, and recode rows with 1–3 as 0s (Figure AE.6).

Figure AE.6. Using a Formula with an IF Statement to Create a New Variable in Capabilities Survey Data

The screenshot shows an Excel spreadsheet titled "CAPABILITIES SURVEY". The formula bar at the top displays the formula `=IF(B2>3,1,0)` for cell C2. The spreadsheet data includes columns for various capabilities and their proficiency levels. Below the spreadsheet, a legend for the proficiency scale is provided:

Proficiency Level	0 - Not Required for my Current Job	1 - Introductory Level	2 - Basic Level	3 - Proficient Level	4 - Advanced Level	5 - Expert Level
Attention to Detail: Thoroughness in accomplishing a task through concern for all the areas involved, no matter how small; accurately checks processes and tasks; watchful and conscientious over a period of time.	☐	☐	☐	☐	☐	☐
Problem Solving: Generates creative approaches to solving problems; determines accuracy and relevancy of information; identifies and weighs options; considers the implications or impact of potential solutions.	☐	☐	☐	☐	☐	☐

Step 3: Drag or copy and paste this formula into all cells in the new column. Now, when you use a pivot table to calculate the average of this column, the average will be the percent who reported a 4 or 5 was needed. Repeat for all capabilities.

Variable Indicating Where a Capability Is Learned, and Where It Is Best Learned

Under Goal 4 of the analysis, you must calculate the percentage of respondents that best learned a capability from a bachelor's program. However, you need to recode the values into a variable that is equal to 1 if a person best learned a capability in a bachelor's program and equal to 0 if a

person did not best learn the capability in a bachelor's program. To do so, follow Steps 1 through 3 in the section *Using "IF" Statements to Recode Variables* to recode the variables that identify where capabilities are best learned (e.g. s1_q3_cap1_best_learned). Use the following formula in Step 2:

=IF(**Cell**<3, 1,0)

Where **Cell** should be replaced with the actual cell in the column where the ranking level data is located. This should recode rows with rankings of 3–8 as 0s, and recode rows with 1 or 2 as 1s.

Under Goal 5 of the analysis, you must calculate the percentage of respondents that learned a capability from a bachelor's program (by academic field). To do so, follow these steps:

Step 1: Identify the columns for "learned Capability in first bachelor's degree" and "learned Capability in second bachelor's degree." Insert a blank column in front of these variables.

Step 2: In the blank column, enter the following formula below in row 2.

=IF(OR(**Column1stBA**=1, **Column2ndBA**=1), 1,0)

Where **Column1stBA** is the column that indicates whether a skill was learned in a person's first bachelor's degree, and **Column2ndBA** indicates whether a skill was learned in a second bachelor's degree (Figure AE.7).

Figure AE.7. Combining Both “Learned in Bachelor’s” Columns into a Single 0/1 Variable in Modes Survey Data

MODES SURVEY

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Condition Formatting

K2	=IF(OR(C2=1,D2=1),1,0)
----	------------------------

	A	B	C	D	E	F	G	H	I	J	K
1	page2_cap_s1_q1_cap1_1	s1_q1_cap1_2	s1_q1_cap1_3	s1_q1_cap1_4	s1_q1_cap1_5	s1_q1_cap1_6	s1_q1_cap1_7	s1_q1_cap1_8	s1_q1_cap1_9	s1_q1_cap1_10	cap1_learn
2	Attention Off	Off	Off	Off	1 Off	1 Off	1 Off	Off	Off	Off	0 F
3	Attention Off		1 Off	Off	1	1	1 Off	Off	Off	Off	1 F
4	Attention Off		1 Off	Off		1 Off	Off	Off	Off	Off	1 F
5	Attention Off	Off	Off	Off		1 Off	Off	Off	Off	Off	0 F

6	Atte	1) Please consider the following places or ways to learn each of these capabilities when answering these questions with your current job in mind:									
7	Atte	<ul style="list-style-type: none"> My first bachelor's degree My second bachelor's degree My master's or other graduate degree (if you have more than one graduate degree, please consider the one most relevant to your current job) Training (Initial skills training, APDP classes, etc.) Normal duty assignments Professional Military Education (PME) Deployments and exercises Outside the AF (excluding any academic degree programs) 									
8	Atte										
9	Atte										
10	Atte	First, we would like you to tell us about all the places or ways you learned or developed a capability. If you do not possess a specific capability, please select Not Acquired .									

Attention to Detail: Thoroughness in accomplishing a task through concern for all the areas involved, no matter how small; accurately checks processes and tasks; watchful and conscientious over a period of time.											
Problem Solving: Generates creative approaches to solving problems; determines accuracy and relevancy of information; identifies and weighs options; considers the implications or impact of potential solutions.											

Step 3: Drag or copy and paste this formula into all cells in the new column. Now, when you use a pivot table to calculate the average of this column, the average will be the percent who reported learning a capability in their first or second bachelor’s program. Repeat for all capabilities.

Codebooks for Data Sets

Given that the number of capabilities for a survey will vary, not all the variables that exist for all capabilities are included here. Instead, the variables for the first three capabilities are shown, and the “N” is used to represent “all other capabilities.”

Table AE.1. Codebook for the Capabilities Survey

Variable Name (found in row 1)	Variable Description	Values
s1_q1_cap1_ranking	Ranking for Capability 1	1-5, OFF=no response
s1_q1_cap2_ranking	Ranking for Capability 2	1-5, OFF=no response
s1_q1_cap3_ranking	Ranking for Capability 3	1-5, OFF=no response
s1_q1_capN_ranking	Ranking for Capability N	1-5, OFF=no response
s2_q4_grade	Pay Grade	1=O-1, 2=O-2, etc.
s2_q7_duty_AFSC	Duty AFSC	a=top left AFSC; b=AFSC in first column, row 2; c=AFSC in first column, row 3; etc.
s2_q7_other	Duty AFSC (other)	respondent-provided AFSC
s1_q2_capability1	Ranking for Write-In Capability 1	1-5, OFF=no response
s1_q2_capability2	Ranking for Write-In Capability 2	1-5, OFF=no response
s1_q2_capability3	Ranking for Write-In Capability 3	1-5, OFF=no response
s1_q2_capabilityN	Ranking for Write-In Capability N	1-5, OFF=no response
s2_q3_month	Entry Active Duty Month	1-12
s2_q3_year	Entry Active Duty Year	1983-2013
s2_q8_years	Years in Current Duty AFSC	1-20
s2_q8_months	Months in Current Duty AFSC	1-11
s2_q9_year	Year Earned 1st Bachelor Degree	1973-2013
s2_q10_code	CIP Code for 1st Bachelor Degree	see table in survey
s2_q10_year	Year Earned 2nd Bachelor Degree	1973-2013
s2_q12_code	CIP Code for 2nd Bachelor Degree	see table in survey
s2_q13_year	Year Earned Graduate Degree	1973-2013
s2_q14_code	CIP Code for Graduate Degree	see table in survey
s2_q15_comments	Open-ended comments	provided by respondent
capability_text_1_page_two	Description of Capability 1	provided by career field
capability_text_2_page_two	Description of Capability 2	provided by career field
capability_text_3_page_two	Description of Capability 3	provided by career field
capability_text_N_page_two	Description of Capability N	provided by career field
s1_capability_1	Description of Write-In Capability 1	provided by respondent
s1_capability_2	Description of Write-In Capability 2	provided by respondent
s1_capability_3	Description of Write-In Capability 3	provided by respondent
s1_capability_N	Description of Write-In Capability N	provided by respondent

Key - How Variable Used

	Used for primary analysis
	Could be useful to analyze
	Descriptive, not used in analysis

Table AE.2. Codebook for the Modes Survey

Variable Name (found in row 1)	Variable Description	Values
s1_q1_cap1_1	Capability 1 Not Acquired	1=YES, Off=No
s1_q1_cap1_2	Capability 1 Learned in 1st Bachelors	1=YES, Off=No
s1_q1_cap1_3	Capability 1 Learned in 2nd Bachelors	1=YES, Off=No
s1_q1_cap2_2	Capability 2 Learned in 1st Bachelors	1=YES, Off=No
s1_q1_cap2_3	Capability 2 Learned in 2nd Bachelors	1=YES, Off=No
s1_q1_cap3_2	Capability 3 Learned in 1st Bachelors	1=YES, Off=No
s1_q1_cap3_3	Capability 3 Learned in 2nd Bachelors	1=YES, Off=No
s1_q1_capN_2	Capability N Learned in 1st Bachelors	1=YES, Off=No
s1_q1_capN_3	Capability N Learned in 2nd Bachelors	1=YES, Off=No
s1_q2_cap1_best_learned	Where Capability 1 Best Learned	1=1st Bachelors, 2=2nd Bachelors, 3=Grad Degree, 4=Training, 5=Normal Duty, 6=PME, 7=Exercises, 8=Outside USAF
s1_q2_cap2_best_learned	Where Capability 2 Best Learned	1=1st Bachelors, 2=2nd Bachelors, 3=Grad Degree, 4=Training, 5=Normal Duty, 6=PME, 7=Exercises, 8=Outside USAF
s1_q2_cap3_best_learned	Where Capability 3 Best Learned	1=1st Bachelors, 2=2nd Bachelors, 3=Grad Degree, 4=Training, 5=Normal Duty, 6=PME, 7=Exercises, 8=Outside USAF
s1_q2_capN_best_learned	Where Capability N Best Learned	1=1st Bachelors, 2=2nd Bachelors, 3=Grad Degree, 4=Training, 5=Normal Duty, 6=PME, 7=Exercises, 8=Outside USAF
s2_q5_grade	Pay Grade	1=O-1, 2=O-2, etc.
s2_q8_duty_AFSC	Duty AFSC	a=top left AFSC; b=AFSC in first column, row 2; c=AFSC in first column, row 3; etc.
s2_q8_other	Duty AFSC (other)	respondent-provided AFSC
s2_q10_year	Year Earned 1st Bachelor Degree	1973-2013
s2_q11_code	CIP Code for 1st Bachelor Degree	see table in survey
s2_q12_year	Year Earned 2nd Bachelor Degree	1973-2013
s2_q13_code	CIP Code for 2nd Bachelor Degree	see table in survey
s2_q14_year	Year Earned Graduate Degree	1973-2013
s2_q15_code	CIP Code for Graduate Degree	see table in survey
s1_q1_cap1_4	Capability 1 Learned in Graduate Program	1=YES, Off=No
s1_q1_cap1_5	Capability 1 Learned in Training	1=YES, Off=No
s1_q1_cap1_6	Capability 1 Learned in Normal Duty	1=YES, Off=No
s1_q1_cap1_7	Capability 1 Learned in PME	1=YES, Off=No
s1_q1_cap1_8	Capability 1 Learned in Exercises	1=YES, Off=No
s1_q1_cap1_9	Capability 1 Learned Outside the USAF	1=YES, Off=No
s1_q1_cap2_1	Capability 2 Not Acquired	1=YES, Off=No
s1_q1_cap2_4	Capability 2 Learned in Graduate Program	1=YES, Off=No
s1_q1_cap2_5	Capability 2 Learned in Training	1=YES, Off=No
s1_q1_cap2_6	Capability 2 Learned in Normal Duty	1=YES, Off=No
s1_q1_cap2_7	Capability 2 Learned in PME	1=YES, Off=No
s1_q1_cap2_8	Capability 2 Learned in Exercises	1=YES, Off=No
s1_q1_cap2_9	Capability 2 Learned Outside the USAF	1=YES, Off=No

Key - How Variable Used

	Used for primary analysis
	Could be useful to analyze
	Descriptive, not used in analysis

Appendix F: Sampling and Analysis in Microsoft Excel

Choosing a Sample

To ensure that the results of the survey are representative of the entire job cluster, it is important to choose a random sample. If the individuals chosen for the survey are systematically different from those who are not chosen, then the results may not provide accurate information about the full career field, and educational requirements for accessions may be set in the wrong places.

There are many different ways of choosing a random sample. Some methods that appear to be random might not be. For example, sorting names alphabetically and choosing every other person might seem random, but if names are associated with race, ethnicity, or some other underlying characteristic, then using this process will not generate a random sample. If you do not already have a method for generating random sample, the following strategy is recommended:

Step 1. Compile names and contact information for the cluster into an Excel spreadsheet in whatever order they naturally exist (e.g., alphabetically, by ID number). Clusters should each have a separate worksheet within the spreadsheet.

Step 2. Generate a random number in the column to the right of every entry of the data by entering =RAND() into the cells (see Figure AF.1). Copy and repaste these random numbers in as a value to ensure that new random numbers aren't created when you sort the file.

Figure AF.1. Generating Random Numbers in Microsoft Excel

Step 3. Sort the data by the random number column (see Figure AF.2). Choose the individuals at the top of the list for the survey. A sample targeting 102 individuals would be sent to the first 102 individuals in the spreadsheet. For two surveys, the first 102 individuals will be given the first survey, while the last 102 individuals will be given the second survey. For an occupational group with 200 members, four individuals would receive both surveys.

Figure AF.2. Sorting by the Random Number to Select a Sample

Creating a Pivot Table

This section gives steps for creating a pivot table. The next section will provide examples of how to modify pivot tables to meet the needs of survey analysis.

Step 1. Highlight the full data set. Click on Insert in the Excel toolbar and then click on Pivot Table (Figure AF.3).

Figure AF.3. Highlighting the Data Set to Create a Pivot Table

Step 2. A box will pop up with options to reselect data and to determine whether the pivot table should go on the same worksheet or a different worksheet (Figure AF.4). For this example, you will use the full data set and develop the pivot table on a separate worksheet.

Figure AF.4. Options for Creating a Pivot Table

Step 3. Click on OK and a template for the pivot table will appear (Figure AF.5). The pivot table has four components: sections for column labels and row labels to identify which subgroups will be compared in the table, a section for values to determine which variable(s) will be analyzed, and a section for filtering that can be used to focus analysis only on portions of the data. Variables can be dragged from the field list at the top down to each of these four pivot table component areas.

Figure AF.5. Pivot Table Template

Calculating Mean Levels of Proficiency

In this example, assume you want to measure average-reported proficiency levels for capabilities Q1 and Q2 by an individual's grade. Cross tabs could similarly be done by degree type and other subgroups of interest.

Step 1. The variable identifying our subgroups of interest (varying grades) must be pulled down into the Row Labels section or Column Labels section. For this example, pull Q3 in to act as Column Labels (Figure AF.6).

Step 2. Next, the variables for which values need to be calculated should be pulled into the Values section. Assume you want to calculate averages for Q1 and Q2, so you pull both in.

Step 3. The default is for Values to be placed into the Column Labels section. If you want to look at values for different variables in different rows, the Values identifier should be dragged into the Row Labels section.

Figure AF.6. Pulling Variables into Pivot Table Fields

Note: This same pivot table can be created for the entire sample of respondents, without breaking the averages down by grade. To see statistics for “all respondents” only, simply pull Q3 out of the “Column Labels” area.

Step 4. The default calculation for a pivot table is to sum all values or count all entries, depending on whether fields are numeric or non-numeric. Instead, for this example you want means. To change, click on the arrow next to those calculations listed in the Values section, and then click on Value Field Settings (Figure AF.7).

Figure AF.7. Changing the Value from a Sum to an Average

Step 5. A box will pop up with the options for Value Field Settings. Scroll down, select Average, and select OK (Figure AF.8). The values in row 1 should now be the average of values for Q1. Repeat the same process to switch values for Q2 to be averages.

Figure AF.8. Choosing a Value Setting

Calculating Percentage of Officers Reporting High Levels of Proficiency Required

In this example, assume you want to measure the percentage of officers reporting proficiency levels of 4 or 5 for capabilities Q1 and Q2 by grade (Q3). One way to do this is to create a new indicator variable that is equal to 1 if a person chooses 4 or 5 and is equal to 0 if a person chooses 1, 2, or 3, and then calculate the average according to the instructions above. This section provides an additional method for calculating this.

Step 1. Create a new pivot table template according to the steps to Create a Pivot Table. Pull Q3 into the Column Labels section and Q1 into the Values section (Figure AF.9).

Step 2. In addition, pull Q1 from the Field List into the Row Labels section. This will produce counts of responses to Q1 by the values respondents were able to choose (in this example, proficiency levels 1 through 5).

Figure AF.9. Pulling Variables for a Pivot Table That Calculates Percentages

Step 3. The default value will be the sum of Q1. What you want for this example is the percentage of respondents by grade reporting that a level 4 or 5 proficiency is required. To get this, you will again need to click on the arrow to the right of sum of Q1 to open the Value Field Settings box.

Step 4. The box opens up to the tab Summarize Values By. You are looking for the count of responses for each proficiency level, so you will want to choose Count.

Step 5. Click on the Show Values As tab to get to different ways of presenting the values. Click on % of Column total to get the percentage of respondents by grade who chose each proficiency level (Figure AF.10).

Figure AF.10. Showing Values as Percentages of a Column

In the following example (Figure AF.11), notice that, overall, respondents were evenly spread across required proficiency levels in Capability 1, and 40 percent of respondents reported that a level 4 or 5 proficiency is needed in Capability 1. However, there were differences by grade. Approximately 40 percent of O-1 respondents reported the capability was needed at an advanced level, and 70 percent of O-2s reported this, while only 20–25 percent of respondents who were O-3 or higher responded the capability is needed at an advanced level.

Figure AF.11. Showing Values as Percentages of a Column

Appendix G: Additional Resources for Use in Analysis

O*NET

The Occupational Information Network (O*NET) is a national database of standardized occupational descriptors sponsored by the U.S. Department of Labor/Employment and Training Administration. Among its various resources are “work activities” that may be the building blocks for career field and job cluster–specific capabilities. All information about and produced for O*NET can be found at www.onetonline.org. See in particular www.onetonline.org/find/descriptor/browse/Work_Activities (O*NET OnLine, undated [b]).

Classification of Instructional Programs (CIP) Descriptions

According to a Department of Education website for CIP, the purpose is to create a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions activity. CIP was originally developed by the U.S. Department of Education's National Center for Education Statistics (NCES) in 1980, with revisions occurring in 1985, 1990, and 2000. The current version was revised in 2010. All information related to CIP can be found at nces.ed.gov/ipeds/cipcode/default.aspx?y=55 (see U.S. Department of Education, undated).

A sample of a CIP code description is provided before for general physics majors. The descriptions provide a relatively high-level description with limited information on the capabilities developed in the program.

Detail for CIP Code 40.0801

Title: Physics, general

Definition: A general program that focuses on the scientific study of matter and energy, and the formulation and testing of the laws governing the behavior of the matter-energy continuum. Includes instruction in classical and modern physics, electricity and magnetism, thermodynamics, mechanics, wave properties, nuclear processes, relativity and quantum theory, quantitative methods, and laboratory methods.

Curriculum Handbook for the U.S. Air Force Academy

The Curriculum Handbook for the U.S. Air Force Academy provides a more detailed picture of what is accomplished under various academic programs (see U.S. Air Force Academy, 2015). It may not be representative of what would be taught under the same degree programs in other institutions. However, it provides a strong picture of what an ideal feeder program should include to prepare future USAF officers. The Curriculum Handbook can be found at

www.usafa.edu/df/dfr/curriculum/CHB.pdf. The following is an example of a program description in the handbook for physics:

PHYSICS

THE PHYSICS MAJOR AT A GLANCE: Physics involves the study of the small and very small (atoms, molecules, nuclei, and elementary particles), the large and very large (the Earth, Moon, solar system, stars, galaxies, and the universe), the strange (black holes, anti-matter, and superconductivity), the common (swings on playgrounds, springs, and wheels), the relevant (space systems sensors and the motions of aircraft and satellites), and just about anything else! In other words, the scope of physics is limited only by the imagination of the physicist. Because the scope of physics is so broad, a physicist must be a generalist who can see the underlying connections between diverse topics. As a result, the Physics major concentrates on the basic physical and mathematical principles that help us understand the world. This is also why the Physics major is so flexible; your vision can help you design a Physics sequence that fits your role as an Air Force officer. The Physics curriculum blends traditional academic instruction, practical laboratory work and independent research projects to develop your ability to think creatively and analytically.

The Physics major has a reputation for being challenging, but its rewards are great. It will prepare you for a successful career in the increasingly technical Air Force, and reward you with satisfaction in mastering a rigorous, demanding discipline. Physics is never obsolete; it forms the foundation upon which new technologies rest. Whether operational or scientific in nature, the technical innovations in today's Air Force have physics as their fundamental element.

COURSE REQUIREMENTS: 146 Semester Hours

A. 96 Semester hours of Dean's academic core courses to include the following core substitutes:

Required Core Substitute Substitutes for

Physics 421 Thermal and Statistical Physics Systems Option

ECE 231 Differential Equations with Circuit Applications I ECE 315

Math 356 Probability and Statistics for Engineers and Scientists Math 300

B. 5 Semester hours of Director of Athletics core courses.

C. 3 Semester hours of Academy Option.

D. 9 Semester hours in Applied Mathematics as follows:

1. Math 243 (or Math 253) Calculus III (or Advanced Placed Calculus III)

2. Math 245 Differential Equations

3. Math 346 Engineering Mathematics

E. 24 Semester hours in Physics:

1. Physics 264 Modern Physics

2. Physics 341 Laboratory Techniques

3. Physics 355 Classical Mechanics

4. Physics 356 Computational Physics

5. Physics 361 Electromagnetic Theory I
6. Physics 362 Electromagnetic Theory II
7. Physics 405* Physics Seminar
8. Physics 465 Quantum Mechanic
9. Physics 490 Capstone Physics Research

* Physics 405 must be taken concurrently with Physics 490

F. 9 Semester hours in one of the following options. Most of our Physics majors align themselves with one of the following options:

Astronomy:

1. Physics 371 Astronomy
2. Physics 486 Astrophysics
3. One of the following: Physics 370/Physics 375/Physics 391/Physics 499/Math 469

Laser Physics/Optics:

1. Physics 391 Introduction to Optics and Lasers
2. Physics 482 Laser Physics and Modern Optics
3. One of the following: Physics 375/Physics 393/Physics 468/Physics 499/Math 469

Space Physics:

1. Physics 370 Upper Atmospheric and Geo-Space Physics
2. Physics 451 Plasma Physics
3. One of the following: Physics 375/Astro Engr 436/Physics 499/Math 469

Applied Physics Option:

You may also propose a sequence of your own by selecting at least three courses (9 semester hours) from the Department of Physics or other Academy academic departments. It is *your* responsibility to identify and justify a coherent three-course sequence in an area related to basic sciences or engineering. You may take more than three courses if your schedule permits in order to delve more deeply into a subject of interest. Normally, at least two of the selected courses must be 300-level or higher and one must be a 400-level course. All applied physics option sequences must be approved by the Department of Physics AIC and the department's Director of Advanced Programs.

Some possible sequences are shown below:

Aircraft Propulsion Design: Aero Engr 241/Aero Engr 361/Aero Engr 466

Atmospheric Physics: Meteor 330/Meteor 331/Meteor 430

Materials Physics: Physics 393/Engr Mech 340/Engr Mech 440

Mathematical Physics: three of Math 344/Math 451/Math 468/Math 469/Math 470

Medical Physics (pre-med):* Chem 233/Chem 234/Chem 243/Biology 431

Space Vehicle Design: Physics 370 or Astro Engr 331/Astro Engr 436/Astro Engr 437

Other Capability Definitions and Descriptions

The following definitions compiled by RAND may assist in your efforts.

Capability	Description/Additional Information
Ability to make arguments	Stating a position, providing valid reasons to support the writer's position, and demonstrating an understanding of the complexity of the issue by considering and possibly refuting alternative viewpoints
Accountability	Takes responsibility for all work activities and personal actions; follows through on commitments; implements decisions that have been agreed upon; maintains confidentiality with sensitive information; acknowledges and learns from mistakes without blaming others; recognizes the impact of one's behavior on others
Accurate self-assessment	Knowing one's strengths and limits
Achievement	Striving to improve or meeting a standard of excellence
Acquiring knowledge	Learning how to learn
Adaptability/ flexibility	<p>Responds to changing circumstances by being innovative and altering behavior to better fit different situations; consistently exhibits optimism and energy; learns new skills, performs work in different ways; successfully works with new colleagues; professionally deals with personal discomfort in a changing work environment; willing to be flexible; remains calm in stressful situations</p> <p>Changes behavioral style or method of approach when necessary to achieve a goal; adjusts style as appropriate to the needs of the situation. Responds to change with a positive attitude and a willingness to learn new ways to accomplish work activities and objectives</p> <p>Is open to change and new information; adapts behavior or work methods in response to new information, changing conditions, or unexpected obstacles; effectively deals with ambiguity</p>
Advising/mentoring	Works collaboratively with subordinates; help subordinates understand how to value diversity, problem solve, and be accountable to one another
Analytic reasoning and evaluation	Interpreting, analyzing, and evaluating the quality of information. This entails identifying information that is relevant to a problem, highlighting connections, logic, and questionable assumptions, and explaining why information is credible, unreliable, or limited
Analytical thinking	<p>Uses a logical and systematic approach to accurately analyze data, problems, and situations</p> <ul style="list-style-type: none"> • compares data from a variety of sources • notices discrepancies and inconsistencies in information and materials • breaks down concepts, issues, and problems into their component parts • identifies and evaluates many possible causes for a problem • proactively identifies the root causes of problems • uses logical, systematic approaches to solve problems • analyzes costs, benefits, risks, and chances for success of decisions • breaks down complex concepts, issues, and problems into their fundamental units.

Capability	Description/Additional Information
Arithmetic	Performs computations such as addition, subtraction, multiplication, and division correctly using whole numbers, fractions, decimals, and percentages
Attention to detail	<p>Thoroughness in accomplishing a task through concern for all the areas involved, no matter how small. Monitors and checks work or information and plans and organizes time and resources efficiently</p> <p>Accomplishing tasks by considering all areas involved, no matter how small; showing concern for all aspects of the job; accurately checking processes and tasks; being watchful over a period of time</p> <p>Is thorough when performing work and conscientious about attention to detail</p>
Balancing work and life	Maintaining a balance among the different parts of your life
Building organizational commitment	<p>Acts to support the organization toward the achievement of its mission and objectives</p> <ul style="list-style-type: none"> • aligns oneself and encourages others to align with company decisions and objectives • ensures that company policy, practices, and procedures are followed • expresses support for the organization's welfare • sets personal goals and objectives to help the organization achieve its objectives • identifies and corrects problems affecting employee loyalty and commitment • takes responsibility for building loyalty and commitment throughout the organization • develops and implements programs to create unity and build commitment • defends the organization and its leaders against actions that undermine the company vision and mission.
Building partnerships/ positive working relationships	<p>Identifying opportunities and taking action to build strategic relationships between one's area and other areas, teams, departments, units, or organizations to help achieve goals</p> <p>Developing and using collaborative relationships to facilitate the accomplishment of work goals</p>
Building teamwork	<p>Provides direction and leadership to help teams achieve goals and operate cooperatively and cohesively</p> <ul style="list-style-type: none"> • encourages others to work as a team • establishes direction for projects and assignments for team members • assists group members in understanding roles and responsibilities • provides input without taking over • assists the group in effectively using individuals' talents and contributions • provides guidance when the team is off track • helps remove organizational barriers and identifies resources to assist the team • champions the team within the organization.

Capability	Description/Additional Information
Business acumen	<p>Understands the business and uses good judgment to guide it</p> <ul style="list-style-type: none"> • negotiates well on behalf of the business • understands the business, the market, and the industry • uses good judgment in guiding the business • develops effective tactics based on knowledge of the business and the marketplace • maintains up-to-date knowledge of industry-wide business issues • articulates critical business issues • applies industry knowledge to business decisions • makes good business decisions in stressful, complex, and ambiguous situations.
Caring	<p>Demonstrates responsibility for the image and effectiveness of the organization</p>
Change management/ change leadership	<p>Initiates and/or manages the change process and energizes it on an ongoing basis, taking steps to remove barriers or accelerate its pace</p> <p>Takes responsibility for leading, directing, and managing organizational change</p> <ul style="list-style-type: none"> • understands and supports the need for change • accurately assesses the potential barriers and resources for change initiatives • envisions and articulates the intended result of the change process • enrolls others in the change process • develops a change strategy that includes milestones and timelines • provides direction and focus during the change process • identifies and enlists allies who support the change process • provides resources, removes barriers, and acts as an advocate for those initiating change.
Coaching/mentoring	<p>Works to improve and reinforce performance of others. Facilitates their skill development by providing clear, behaviorally specific performance feedback, and making or eliciting specific suggestions for improvement in a manner that builds confidence and maintains self-esteem</p> <p>Providing timely guidance and feedback to help others strengthen specific knowledge/skill areas needed to accomplish a task or solve a problem</p>
Collaborative leadership	<p>Promotes and generates cooperation among one's peers in leadership to achieve a collective outcome; fosters the development of a common vision and fully participates in creating a unified leadership team that get results</p>

Capability	Description/Additional Information
Communication/ communicating effectively	<p>Expresses oneself clearly and effectively when speaking and/or writing to individuals or groups; listens attentively; ensures that information is understood by all parties; shares information in a timely manner using the most appropriate method; presents well-organized information in a group setting</p> <p>Listening, interpreting, and speaking skills</p> <p>Creates an atmosphere in which timely and high-quality information flows smoothly up and down, inside and outside of the unit/organization; encourages open expression of ideas and opinions</p> <p>Effectively transfers thoughts and expresses ideas orally or verbally in individual or group situations</p> <p>Delivers clear, effective communication and takes responsibility for understanding others</p> <ul style="list-style-type: none"> • organizes and expresses ideas clearly orally and in writing • keeps manager and others informed of the status of projects and activities • ensures that regular communication occurs based on the needs of the project or the individual • clarifies the meaning and intent of others' communication when it is unclear • tailors communication to the level and experience of the audience • uses strong listening skills to formulate direct, responsive answers to questions • effectively communicates complex ideas using analogies, visuals, and other techniques • creatively identifies and utilizes effective communication channels and methods.
Conceptual thinking	<p>Uses concepts and theories to find similarities and put ideas together in new ways</p> <ul style="list-style-type: none"> • keeps the big picture in mind when creating solutions • identifies the central or underlying issues in a situation • integrates information from multiple sources to create a solution • takes unconnected concepts, finds similarities, and ties them together to create new ideas • uses abstract concepts to solve problems • applies a theoretical framework to understand situations • creates and uses examples or analogies to help others understand the concepts • develops a conceptual framework to provide a new perspective.

Capability	Description/Additional Information
Concern for quality/ quality orientation	<p>Monitors work, systems, and processes and takes action to ensure that they meet or exceed standards</p> <ul style="list-style-type: none"> • checks accuracy of own work • carefully prepares materials, approaches, and resources • follows procedures to ensure quality output • uses a system to organize and track quality • does not accept anything but the highest quality work • encourages people to maintain high standards of quality and thoroughness. • monitors accuracy and quality of others' work and takes action to correct mistakes • creates standards of quality for the organization.
Configuration management/ process management	<p>Knowledge and understanding of a process for establishing and maintaining the consistency of a product's performance, functional, and physical attributes and baselines with its requirements, design, and life</p>
Conflict management/ conflict resolution	<p>Brings substantial conflicts and disagreements into the open and attempts to manage them collaboratively, building consensus, keeping the best interests of the organization in mind, not only one's own interest</p> <p>Ability to negotiate and resolve disagreements</p> <p>Uses a variety of approaches to manage and resolve concerns, disagreement, and conflict</p> <ul style="list-style-type: none"> • invites others to express their points of view • expresses disagreements in a way that does not attack or disparage others • helps uncover underlying and unstated issues causing the conflict • brings disagreements into the open and addresses them • expands areas of agreement and narrows areas of disagreement • facilitates the development of creative solutions to conflict • acknowledges the truth in criticisms • knows when to compromise and when to take stands.

Capability	Description/Additional Information
Continuous development/ continuous learning (individual)	<p>Builds professional skills and competencies and improves work processes</p> <ul style="list-style-type: none"> • identifies personal skill areas to be developed • looks for ways to improve performance and efficiency on the job • looks for opportunities to learn from mistakes • uses a variety of resources to generate potential ideas for improvement • invests time and resources to learn, grow, and develop • regularly analyzes systems, processes, and performance trends to identify • opportunities for improvement • consistently seeks out business opportunities that will create growth and development • provides others with tools and approaches to solve problems and improve processes. <p>Regularly reaches out to supervisor(s) for support and feedback on how to grow within their position. Is always working to advance their professional skill set. Recognizes additional work and/or job duties as an opportunity to grow professionally</p> <p>Demonstrates eagerness to acquire necessary technical knowledge, skills, and judgment to accomplish a result or to serve a customer's needs effectively. Has desire and drive to acquire knowledge and skills necessary to perform job more effectively</p>
Continuous improvement (process)	<p>Identifies and implements ways to make job tasks or processes more efficient</p> <ul style="list-style-type: none"> • looks for ways to improve performance and efficiency on the job • identifies a variety of potential causes to explain problems or variances • uses a variety of resources to generate potential ideas for improvement • analyzes the potential impact of solutions • regularly analyzes systems, processes, and performance trends to identify opportunities for improvement • enlists others to take on process improvements • provides others with tools and approaches to solve problems and improve processes • tests and gathers feedback on process or system improvements.
Contracting/procurement	<p>Knowledge of the procurement process to include; development of acquisition strategies; documentation, awarding contracts, and monitoring contractor performance, and support contract administrative activities.</p>
Contributing to a team	<p>The ability to work collaboratively with others; including identifying individual strengths (yours and others) and harnessing them for the group, building consensus, knowing when to lead and when to follow, and appreciating group dynamics</p>
Cost estimating	<p>Knowledge of policies and practices used in developing resource requirements and associated costs (e.g., funds, personnel, material, and facilities) for systems, structures, or facilities</p>

Capability	Description/Additional Information
Cost, schedule, and performance metrics	Knowledge of the metrics used to measure contract progress (i.e., cost, schedule, and performance) and knowledge of integrated program management and control (e.g., earned-value management, system metric and reporting tools)
Innovation/ creative thinking/ original thinking	<p>Uses imagination to develop new insights into situations and applies innovative solutions to problems; designs new methods where established methods and procedures are inapplicable or are unavailable</p> <p>Applies original thinking in approach to job responsibilities and to improve processes, methods, systems, or services</p>
Crisis management	Performs jobs in a manner that minimizes hazards to oneself, others, and the environment. Maintains a physical work environment that contributes to the well-being of others
Critical thinking	<p>Ability to examine issues and ideas and to identify good and bad reasoning in a variety of fields with differing assumptions, contents, and methods</p> <p>Able to handle autonomy, make sound decisions, and find opportunities</p> <p>Interpreting, analyzing, and evaluating the quality of information. This entails highlighting conflicting information, detecting flaws in logic and questionable assumptions, and explaining why information is credible, unreliable, or limited</p> <p>The ability to evaluate an argument for how well reasoned it is</p>
Cross-cultural sensitivity/ cultural acumen	<p>Uses an understanding of cultural differences to communicate, influence, and manage</p> <ul style="list-style-type: none"> • treats all individuals with respect regardless of their ethnicity, gender, ethnicity, or background • develops a knowledge and understanding of different cultures and backgrounds • builds collaborative and mutually beneficial working relationships with people of different cultural backgrounds • modifies communication and behavior based on an understanding of cultural differences • uses an understanding of cultural differences to communicate, influence, and manage across cultures • uses cultural awareness to resolve conflict • helps others increase their awareness and acceptance of cultural differences • develops policies, procedures, and values that encourage cultural awareness and acceptance. <p>Recognizes and understands the similarities and differences in shared values, practices, and beliefs of individuals from various countries; appreciates the impact of different values and beliefs, recognizes the implications of alternative courses of action, and responds in a culturally appropriate manner</p> <p>Supports and promotes an environment that holds opportunities for all, regardless of ethnicity, gender, culture, and age</p>

Capability	Description/Additional Information
Customer service	Works with clients and customers (individuals who use or receive the service or products that the work unit produces, including the general public, individuals who work in the agency, other agencies, or organizations outside the government) to assess their needs, provide information or assistance, resolve their problems, or satisfy their expectations; knows about available products and services; is committed to providing quality products and services
Data management	Knowledge of the principles, policies, procedures, structures, designs, and tools of data management for the purposes of identifying, acquiring, and controlling data and data requirements
Dealing with ambiguity	<p>Deals effectively in uncertain situations</p> <ul style="list-style-type: none"> • avoids jumping to conclusions too quickly or postponing decisions too long in the face of uncertainty • identifies and articulates what information is unknown that is important to determine a decision or course of action • can change directions and reorient quickly when necessary • remains calm in the face of uncertainty • can decide and act when the complete picture is unclear • accurately assesses risks and options when important data is unavailable • is comfortable when things are up in the air and the situation and outcome are unclear • helps others operate effectively in pressure-filled, uncertain situations.

Capability	Description/Additional Information
Decisionmaking	<p>Makes sound decisions in a timely manner</p> <ul style="list-style-type: none"> • bases decisions on an analysis of short-range consequences or simple options, including people's reactions and potential problems • makes decisions in a timely manner when the options are clear and there is little pressure or risk • solicits the input of the appropriate people to improve the quality and timing of a decision • gathers sufficient information to identify gaps and variances before making a decision • focuses on objectives and results when considering the various alternatives to a decision • foresees the long-range consequences or implications of different options • takes charge of a group when it is necessary to facilitate either an action or a decision • makes decisions at the right time when there is ambiguity or considerable personal or organizational risk. <p>Makes sound, well-informed, and objective decisions; perceives the impact and implications of decisions; commits to action, even in uncertain situations, to accomplish organizational goals; causes change</p> <p>Makes decisions in a timely manner</p> <ul style="list-style-type: none"> • makes decisions in a timely manner when the options and consequences are clear • considers consequences and risks in order to assess the timing for a decision • uses clear criteria for timing of a decision • includes others in the decisionmaking process • recognizes issues, problems, or opportunities and determines whether action is needed to advance the decision making process • takes charge of a group when it is necessary to facilitate either action or a decision • makes decisions in a timely manner under ambiguous circumstances • makes decisions when there exists considerable personal and/or organizational risk.

Capability	Description/Additional Information
Decision quality	<p>Makes sound decisions that take into account objectives, risks, implications, and values</p> <ul style="list-style-type: none"> • bases decisions on an analysis of short-range consequences or simple options, including people's reactions and potential problems • gathers sufficient information to identify gaps and variances before making a decision. • solicits the input of the appropriate people to improve the quality of a decision • weighs the costs, benefits, risks, and chances for success in a decision. • focuses on objectives and results when considering the various alternatives to a decision • foresees the long-range consequences or implications of different options • bases decisions on higher principles and values, even when the consequences • may result in personal cost, loss, or pain • makes decisions based on available opportunity and potential risk in the marketplace.
Delegating responsibility	<p>Effectively delegates responsibility as appropriate</p> <ul style="list-style-type: none"> • breaks overall project into components and determines what can be delegated. • clearly defines and communicates objectives and tasks • communicates context, purpose and long-term benefits to empower others to take greater responsibility • communicates expectations regarding outcomes or deliverables, timelines and quality of work • delegates responsibility to others based on their ability and potential • expresses appreciation for taking on tasks • gives others the freedom to have control of their tasks and duties • provides others with opportunities that challenge them and develop their capabilities.
Developing others	<p>Uses a variety of approaches to help others develop their capabilities</p> <ul style="list-style-type: none"> • provides accurate feedback on individual strengths and weaknesses • assists others in acquiring the skills needed for their job • looks for and creates situations that foster others' development • helps others set goals and create development plans • helps others identify resources for achieving their development goals • helps other examine the barriers to their growth and development • sets up systems to monitor others' growth and development • takes responsibility for creating a culture that fosters development.
Discernment/judgment	<p>Sensing others' development needs and bolstering their abilities</p> <p>Makes decisions authoritatively and wisely, after adequately contemplating various available courses of action</p>

Capability	Description/Additional Information
Results oriented	Demonstrates concern for achieving or surpassing results against an internal or external standard of excellence. Shows a passion for improving the delivery of services with a commitment to continuous improvement
Efficiency orientation	Focusing on objectives, tasks and achievements. Setting challenging goals and supporting appropriate planning. Facilitating overcoming of obstacles. Encouraging people to act in this way
Emotional awareness/ emotional self-control	Recognizing one's emotions and their effects Keeping disruptive emotions and impulses in check
Empathy	Sensing others' feelings and perspectives, and taking an active interest in their concerns
Entrepreneurship	Identifies opportunities to develop and market new products and services within or outside of the organization. Willing to take risks; initiates actions that involve a deliberate risk to achieve a recognized benefit or advantage
External awareness	Identifies and keeps up to date on key international policies and economic, political, and social trends that affect the organization. Understands near-term and long-range plans and determines how to best be positioned to achieve a competitive business advantage in a global economy
Financial management	Prepares, justifies, and/or administers the budget for program areas; plans, administers and monitors expenditures to ensure cost-effective support of programs and policies; assesses financial condition of an organization
Resourcefulness	Efficient use of time, money, materials, and people to produce the required goods and services; models resourcefulness in all areas without sacrificing timeliness or quality
Honesty and integrity	Takes personal responsibility for correcting problems or issues. Holds themselves to the highest ethical standard Contributes to maintaining the integrity of the organization; displays high standards of ethical conduct and understands the impact of violating these standards on an organization, self, and others; is trustworthy
Influence/negotiation	Asserts own ideas and persuades others, gaining support and commitment from others; mobilizes people to take action, using creative approaches to motivate others to meet organization's goals Wielding effective tactics for persuasion Persuades others to accept recommendations, cooperate, or change their behavior; works with others toward an agreement; negotiates to find mutually acceptable solutions
Information assurance	Knowledge of the concepts, theories, principles, policies, processes, procedures, and methods related to the designing, processing, transmitting, storing, authenticating, using, and protecting data, information, and information systems

Capability	Description/Additional Information
Initiative	<p>Takes action to improve a situation without waiting for explicit instructions; understands how one's own actions relate to the organization's strategic goals; recognizes and responds to opportunities in order to reach a goal; seeks new and improved techniques, solutions, and approaches to completing assignments</p> <p>Does more than is required or expected in the job; does things that no one has requested that will improve or enhance products and services, avoid problems, or develop entrepreneurial opportunities. Plans ahead for upcoming problems or opportunities and takes appropriate action</p> <p>Readiness to act on opportunities</p>
Inspirational leadership	Inspiring and guiding individuals and groups
Integrated logistics support planning (ILSP)	Knowledge of ILSP elements for the planning and implementation of a comprehensive, affordable, and effective life-cycle logistics plan
Interpersonal skills	Shows understanding, friendliness, courtesy, tact, empathy, concern, and politeness to others; develops and maintains effective relationships with others; may include effectively dealing with individuals who are difficult, hostile, or distressed; relates well to people from varied backgrounds and different situations; is sensitive to cultural diversity
Leadership	<p>Creates a vision or goal for one's work unit and communicates it in a way that motivates others to implement it; understands and leverages the organization's structure and relationships; pursues organization support and resources; develops strategies to include divergent opinions and overcome adversity; moves plans forward toward a specific course of action</p> <p>Influences, motivates, and challenges others; adapts leadership styles to a variety of situations</p>
Mission oriented	Keeping the organization's mission at the forefront of decisionmaking and action. Has a solid understanding of the core goals of the unit and organization and actively endorses those goals
Learning	Uses efficient learning techniques to acquire and apply new knowledge and skills; uses training, feedback, or other opportunities for self-learning and development
Legal, government, and policy	Knowledge of applicable laws, legal codes, government regulations, executive orders, agency rules, and policies
Leveraging diversity	Fosters an inclusive workplace where diversity and individual differences are valued and leveraged to achieve the vision and mission of the organization. Seeks out diverse ideas, opinions, and insights, respecting the values and perceptions of others. Examines biases and seeks insights to avoid stereotypical responses and behavior
Make an argument	The ability to take and justify a position on an issue
Managing conflict	Ensures productive resolution of conflict; recognizes different viewpoints; brings conflict into the open, and encourages those involved to find appropriate solutions
Managing performance	Sets clear goals and expectations for staff; follows progress against goals; provides regular feedback; addresses performance issues promptly; fosters learning and development; provides public recognition of staff accomplishments

Capability	Description/Additional Information
Managing resources	Allocates time and resources efficiently and effectively; prioritizes work and delegates as appropriate; works to minimize institutional risk by acting as a responsible steward for the organization
Managing time and priorities	Managing how time is spent and on what; sorting priorities
Mathematical reasoning	Solves practical problems by choosing appropriately from a variety of mathematical and statistical techniques
Navigating across boundaries	Discovering how to avoid the boundaries that become barriers so as not to hamper the ability to collaborate with other people
Negotiation	Explores positions and alternatives to reach outcomes that gain acceptance of all parties
Operational safety, suitability, and effectiveness	Knowledge of the principles, methods, and tools used to evaluate and ensure systems management and related disciplines are used to ensure that systems and end-items provide safe, sustainable, and acceptable performance during operational use
Optimism	Persistence in pursuing goals despite obstacles and setbacks
Oral communication	Expresses information (e.g., ideas or facts) to individuals or groups effectively, taking into account the audience and nature of the information (e.g., technical, sensitive, controversial); makes clear and convincing oral presentations; listens to others, attends to nonverbal cues, and responds appropriately
Organization management	Organizes large amounts of information by creating and maintaining well organized systems; follows logical approaches to completing work; brings a project from inception to successful completion; translates strategies into step-by-step plans for action; monitors work progress to completion; effectively prioritizes; pays close attention to detail
Organizational awareness	Reading a group's emotional currents and power relationships Knows the organization's mission and functions and how its social, political, and technological systems work and operates effectively within them; this includes the programs, policies, procedures, rules and regulations of the organization
Organizational understanding	Understands agendas and perspectives of others, recognizing and effectively balancing the interests and needs of one's own group with those of the broader organization
Performing with integrity	Develop a code of ethics and principles to guide your life
Planning and organizing/time management	Establishes a systematic course of action for self or others to ensure accomplishment of a specific objective. Sets priorities, goals, and timetables to achieve maximum productivity
Planning and evaluating	Organizes work, sets priorities, and determines resource requirements; determines short- or long-term goals and strategies to achieve them; coordinates with other organizations or parts of the organization to accomplish goals; monitors progress and evaluates outcomes.
Political savvy	Identifies the internal and external policies that impact the work of the organization. Approaches each problem situation with a clear perception of organizational and political reality, recognizes the impact of alternative courses of action

Capability	Description/Additional Information
Problem solving	<p>Generates creative approaches to addressing problems and opportunities; identifies and weighs options, makes sound decisions after reviewing all relevant information; anticipates and plans for potential problems; takes calculated risks; recognizes impact of solutions</p> <p>Considering and weighing information from discrete sources to make decisions (draw a conclusion and/or propose a course of action) that logically follow from valid arguments, evidence, and examples. Considering the implications of decisions and suggesting additional research when appropriate</p> <p>Identifies problems; determines accuracy and relevance of information; uses sound judgment to generate and evaluate alternatives and to make recommendations</p> <p>Understanding the process and mindset of successful problem solving to more easily handle challenges</p>
Professionalism	Thinks carefully about the likely effects on others of one's words, actions, appearance, and mode of behavior. Selects the words or actions most likely to have the desired effect on the individual or group in question
Project management	Demonstrates the principles, methods, and tools for planning, scheduling, coordinating, and managing projects and resources, including monitoring and inspecting costs, work, and contractor performance
Quality	Produces results or provides service that meets or exceeds organization's standards
Reading	Understands and interprets written material, including technical material, rules, regulations, instructions, reports, charts, graphs, or tables; applies what is learned from written material to specific situations
Reasoning	Identifies rules, principles, or relationships that explain facts, data, or other information; analyzes information and makes correct inferences or draws accurate conclusions
Reliability	Demonstrates a high level of dependability in all aspects of the job
Requirements management	Knowledge of the principles and methods to identify, analyze, specify, design, and manage functional and infrastructure requirements; knowledge of the processes for translating functional requirements into technical requirements used for logical design or presenting alternative technologies or approaches
Resilience	<p>The capability to recover from and adjust quickly to stressful challenges, misfortune, or change. Capable of withstanding shock without permanent negative effects; better prepared for future opportunities</p> <p>Deals calmly and effectively with high-stress situations (e.g., tight deadlines, hostility, emergency situations, dangerous situations)</p>
Risk management	Knowledge of the principles, methods, and tools used for risk identification, assessment, and mitigation, including assessing the probability and consequences of potential problems
Self-confidence	A strong sense of one's self-worth and capabilities
Self-management	Sets well-defined and realistic personal goals; displays a high level of initiative, effort, and commitment toward completing assignments in a timely manner; works with minimal supervision; is motivated to achieve; demonstrates responsible behavior

Capability	Description/Additional Information
Service/ service orientation	<p>Demonstrates strong commitment to meeting the needs of coworkers, subordinates, superiors, community members, and the general public, striving to ensure their full satisfaction</p> <p>Acts professionally and calmly at all times when interacting with others; consistently demonstrates concern and courtesy toward colleagues and customers; treats all people respectfully; takes personal responsibility for correcting problems; follows up with individuals to ensure satisfaction with the level of service they have received</p>
Systems engineering	<p>Anticipating, recognizing, and meeting customers' needs</p> <p>Knowledge of the life-cycle systems engineering processes (e.g., reliability, quality, maintainability) necessary to design and develop methodologies, paradigms, tools, and metrics to sustain systems over the lifecycle and to satisfy customer capability needs within imposed constraints</p>
Systems life-cycle management	<p>Knowledge of systems life-cycle management processes and procedures needed to acquire, test, operate, and sustain products, services, and systems</p>
Systems test and evaluation	<p>Knowledge of the principles, methods, and tools for analyzing and developing systems test and evaluation procedures, performing test execution, conducting data analysis, preparing reports, and analyzing technical characteristics of systems based on requirements, including identifying critical technical and operational issues</p>
Teamwork and collaboration	<p>Encourages and facilitates cooperation, pride, trust, and group identity; fosters commitment and team spirit; works with others to achieve goals</p> <p>Working with others toward shared goals. Creating group synergy in pursuing collective goals</p> <p>Willingly cooperates and works collaboratively toward solutions that generally benefit all involved parties; works cooperatively with others to accomplish company objectives</p> <p>Actively participating as a member of a team to move the team toward the completion of goals</p> <p>Develops cooperation and teamwork while participating in a group, working toward solutions that generally benefit all involved parties</p> <p>Works collegially with others, cooperating in both interpersonal and team relationships; fosters enthusiasm and maintains mutual trust, candor, and respect. If applicable, manages groups effectively and builds partnerships with others</p>
Technical competence	<p>Uses knowledge that is acquired through formal training or extensive on-the-job experience to perform one's job; works with, understands, and evaluates technical information related to the job; advises others on technical issues</p> <p>Demonstrates ability to use technology effectively and productively; continually updates skills and knowledge; addresses problems as they arise or seeks help as appropriate</p>
Technical expertise	<p>Applies and improves extensive or in-depth specialized knowledge, skills, and judgment to accomplish a result or to accomplish one's job effectively</p>

Capability	Description/Additional Information
Technology application	Uses machines, tools, instruments, or equipment effectively; uses computers and computer applications to analyze and communicate information accurately and in the appropriate format
Transparency	Maintaining integrity and acting congruently with one's values
Valuing diversity	Treats all individuals fairly and respectfully, works effectively with others, regardless of their background, position, or status; ensures that opportunities are equally available to all; respects different values and viewpoints
Vision	Understands where the organization is headed and how to make a contribution; takes a long-term view and recognizes opportunities to help the organization accomplish its objectives or move toward the vision
Working in a diverse environment	Learning from people who are different from you and recognizing your commonalities
Writing effectiveness	Recognizes or uses correct English grammar, punctuation, and spelling; communicates information (e.g., facts, ideas, messages) in a succinct and organized manner; produces written information, which may include technical material that is appropriate for the intended audience
	Constructing organized and logically cohesive arguments. Strengthening the writer's position by providing elaboration on facts or ideas (e.g., explaining how evidence bears on the problem, providing examples, and emphasizing especially convincing evidence).
Writing mechanics	Facility with the conventions of standard written English (agreement, tense, capitalization, punctuation, and spelling) and control of the English language, including syntax (sentence structure) and diction (word choice and usage)

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