Barrier Analysis of the Aviation Safety Inspector (1825) Hiring Process

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Contents

Tables

ACRONYMS

AAM	Office of Aerospace Medicine
ACO	Aircraft Certification Office
ACR	Office of Civil Rights
AFS	Flight Standards
AI	Adverse Impact Ratio
AIR	Aircraft Certification Services
AOV	Air Traffic Safety Oversight Service
AQS	Office of Quality Integration and Executive Services
ARM	Office of Rulemaking
ASI	Aviation Safety Inspector
AVP	Office of Accident Investigation and Prevention
AVS	Aviation Safety
CMO	Certificate Management Office
EEO	Equal Employment Opportunity
EEOC	Equal Employment Opportunity Commission
FAA	Federal Aviation Administration
FSDO	Flight Standards District Office
HR	Human Resources
KSA	Knowledge, Skills and Abilities
MIDO	Manufacturing Inspection District Office
MIO	Manufacturing Inspection Office
MISO	Manufacturing Inspection Satellite Office
OPM	Office of Personnel Management
RNO	Race and National Origin
UGESP	Uniform Guidelines on Employee Selection Procedures

EXECUTIVE SUMMARY

The Federal Aviation Administration's (FAA) Office of Civil Rights commissioned Outtz and Associates to conduct a barrier analysis of the hiring process for the Aviation Safety Inspector (ASI) 1825 position. The process was guided by United States Equal Employment Opportunity Commission (EEOC) Management Directive (MD) 715 and the Uniform Guidelines on Employee Selection Procedures (UGESP). This report was commissioned in part due to the legal requirements contained in the EEOC MD-715, which requires federal agencies to ensure that the workplace is free of barriers that impede full opportunities to all persons in the workplace. Management Directive 715 provides policy guidance and standards for establishing and maintaining effective equal employment opportunity programs under Section 717 of Title VII (Part A) and effective affirmative action programs under Section 501 of the Rehabilitation Act (Part B).

Management Directive 715 outlines a comprehensive workforce analysis process to identify triggers for barrier analysis. The objective of a barrier analysis is the identification of specific barriers to employment by Race/National Origin (RNO), sex, and disability. If the barriers identified are sufficiently detailed, effective actions must be taken by specific organizations to remove the barriers and improve the diversity of their workforces. The barriers must be specific, clear, and sufficiently detailed or else the barriers identified will be too general to yield appropriate actions to improve the diversity status of any particular class or group. More importantly, agencies are required to file annual reports with EEOC that detail how well they are doing with identifying and addressing adverse effects from barriers to employment.

The FAA's mission is to provide the safest, most efficient aerospace system in the world. The line of business within the FAA primarily responsible for accomplishing this mission is Aviation Safety (AVS). Aviation Safety establishes, oversees, and enforces safety standards for persons or products that operate in the National Airspace System (NAS), including pilots, airlines, manufacturers, repair stations, mechanics and Air Traffic Controllers[1]. The resources necessary for AVS to carry out its mission are dictated by industry characteristics including number of aircraft, types of aircraft (e.g., fixed-wing, helicopter, turbine engine, reciprocating engine), scheduled and on-demand operations, domestic and foreign operations, number of company employees, experience of employees, and the location of operations and manufacturing facilities. The configuration of aviation industry operators as well as their complexity are primary drivers of demand for flight standards service. Aircraft and manufacturing are the primary demand drivers for the Aircraft Certification Service. The Flight Standards Service and the Aircraft Certification Service are the principal components of the FAA's Aviation Safety line of business. The FAA faces a constant and continued need to recruit, hire and train highly qualified safety employees, including Aviation Safety Inspectors (ASIs). In staffing these positions, the FAA must combat attrition. The FAA forecasts an annual attrition rate of approximately seven percent for the foreseeable future.[2] A particular problem for AVS is the need to build and maintain a pipeline of

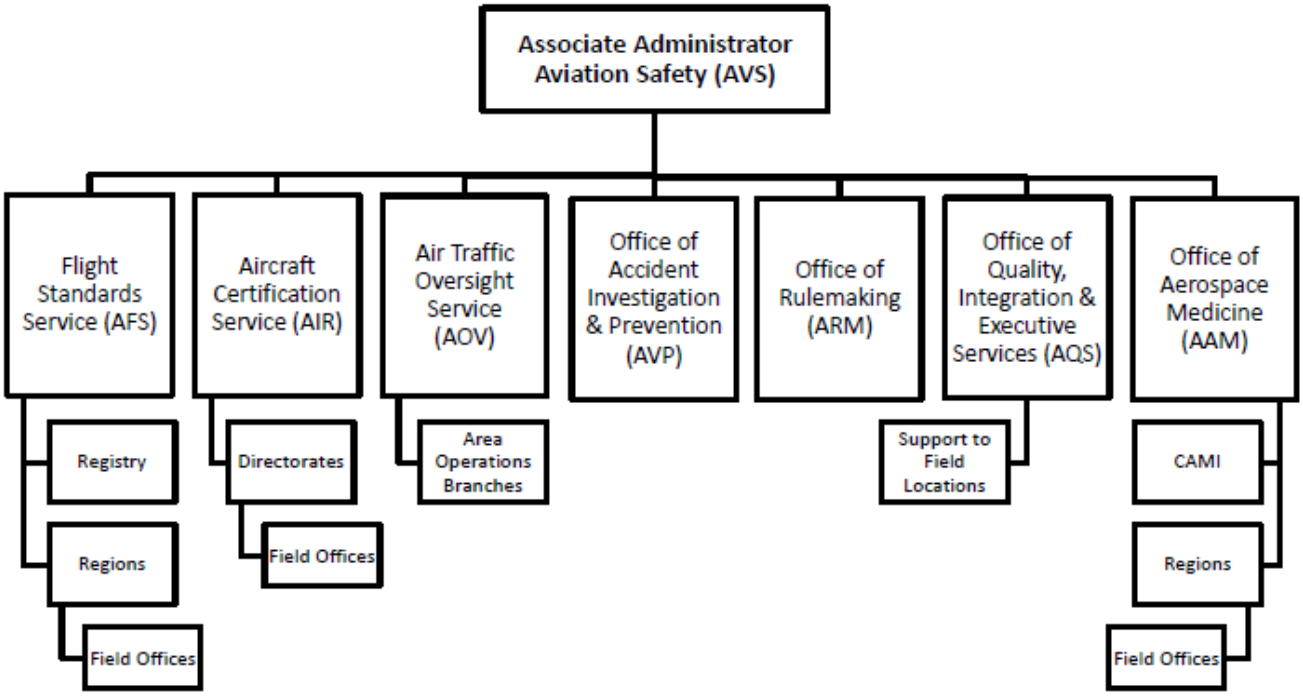
[1] Federal Aviation Administration Aviation Safety 2013 Workforce Plan
[2] Ibid, Page 1, Executive Summary

skilled employees. Although the barrier analysis reported here focuses on the Flight Standards and Aircraft Certification Services, AVS is composed of five additional services and offices as listed below:

- Office of Aerospace Medicine (AAM)
- Air Traffic Safety Oversight Service (AOV)
- Office of Accident Investigation and Prevention (AVP)
- Office of Rulemaking (ARM)
- Office of Quality, Integration, and Executive Services (AQS)

Figure 1 shows the basic organizational structure of AVS.

Figure 1: FAA Aviation Safety Organization



There are two position types or categories of ASIs. Flight Standards ASIs specialize in areas such as operations, maintenance and avionics. Their role is to be the frontline regulatory contact with the aviation industry. They are responsible for ensuring that the aviation industry complies with Title 14 requirements of the Code of Federal Regulations (14 CFR). Aircraft Certification (Manufacturing) ASIs administer and enforce safety regulations and standards for the production and/or modification, as well as continued operational safety of aircraft, aircraft engines and parts. Manufacturing ASIs make original airworthiness determinations and issue airworthiness certificates for all civil aircraft.

Figure 2 provides examples of the specialized experience, training, and certification requirements for specific ASI positions. Note that Figure 2 is presented for purposes of illustration and does not show all of the requirements for the various ASI positions at the FAA.

Figure 2

Examples of the Requirements of the ASI Positions[3] ASI-

Operations

- At least one year of pilot experience
- Professional flying skill as demonstrated in a simulator check
- A minimum of 100 flight hours during the last three years
- A minimum of 1,500 total flight hours ASI-

Airworthiness

- Aircraft Avionics experience involving maintenance, repair and troubleshooting of installed avionics systems on aircraft
- Aircraft avionics work experience in a repair station
- Experience involving the maintenance and repair of airframe, power plants, and aircraft systems

Figure 2 illustrates the highly technical nature of the ASI 1825 position. As a result, AVS hires many middle and late career professionals who have considerable employment experience. The

[3] U.S. Office of Personnel Management, Aviation Classifications and Qualifications General Schedule of Qualification Standards, Aviation Safety Series, 1825, http://www.opm.gov/policy-data-oversight/classification-qualifications/general-schedule-qualification-standards/1800/aviation-safety-series-1825/

average age of ASIs is 55[4]. These facts make it difficult for the FAA, using its current recruitment practices, to find qualified applicants to fill the position and find enough of those applicants to make up for attrition. Aviation Safety must compete with private industry to recruit the best candidates from a very limited pool. Despite these challenges, the FAA has set a goal for 2025 of creating a workforce of choice marked by integrity, fairness, diversity and accountabilities, safety, and innovation. A significant external impetus for this goal is the EEOC Management Directive (MD) 715.

Figure 3 shows the applicant flow process for hiring 1825 Aviation Safety Inspectors. Decision points that could be barriers to hiring were identified based on an examination of the applicant flow process. Note that decision points are distinguished from administrative steps in which there are no evaluation of applicants. The following decision points were identified and designated as potential barriers to racial, ethnic, and gender employment opportunities with regard to the hiring of ASIs.

Decision Point 1 – Qualifications Determination: The first decision point in the hiring process is the Qualifications Determination. This step involves verifying whether the qualifications of the applicants match the minimum qualifications specified in the job announcement. The determination of whether the applicant has the basic qualifications for the position is a system determination (e.g. carried out via a software system). A decision is then made by a Human Resource (HR) specialist as to whether the applicant's documentation supports the information provided on the application[5].

Decision Point 2 – Referral for Interview: At the second decision point, the quality of the applicant's credentials is evaluated by an HR specialist to determine whether his or her application/resume is consistent with the needed qualifications, knowledge, skills and abilities. This decision process results in each applicant being given a numerical score to which veterans points are added as appropriate. Applicants are ranked by score and referred for an interview if they are among those ranked highest.

Decision Point 3 – Selection Based on Interview Results: Once applicants are referred for an interview, the interview is used to determine if they will get the job.

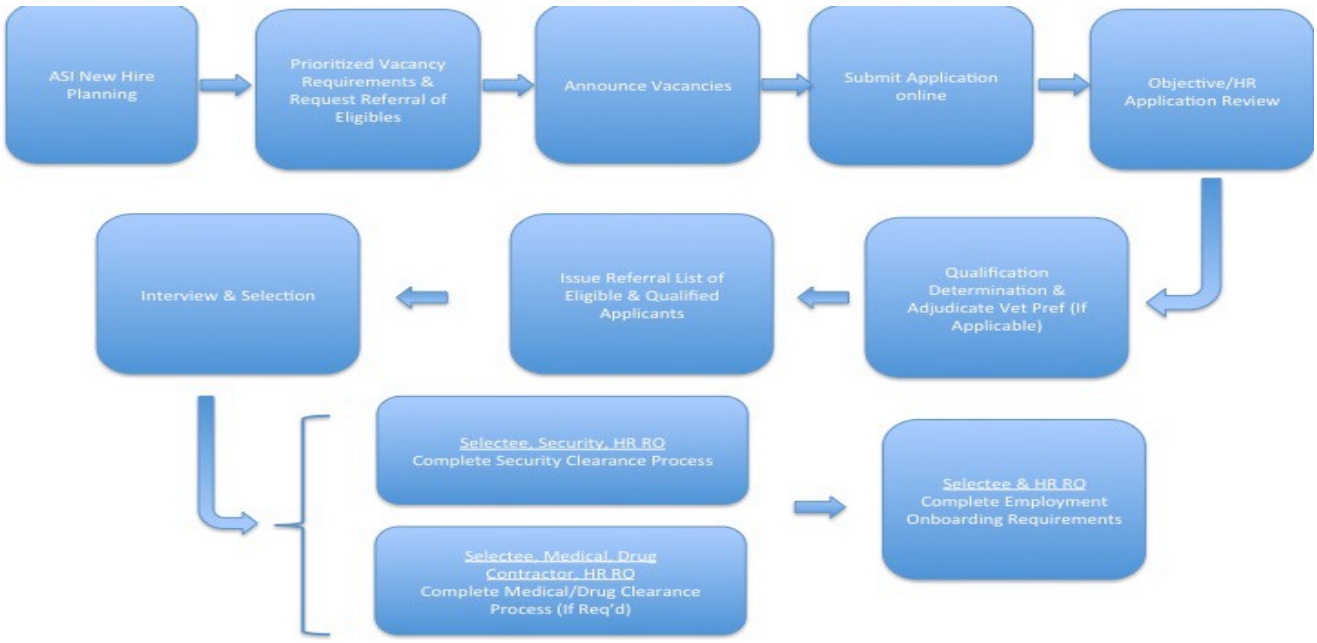
Decision Point 4 – Medical Clearance: Note that this decision point was not analyzed because of lack of variance. That is, applicants for operations ASIs are screened for medical clearance; however, the vast majority of the applicants pass the medical clearance because they must have a medical clearance to obtain the requisite certifications to even be minimally qualified. Therefore very few fail the FAA medical screen. This virtually eliminates the likelihood that the medical screen could be a barrier. In addition, manufacturing, maintenance, and avionics ASIs are not formally evaluated for medical clearance.

[4] Federal Aviation Administration Aviation Safety 2013 Workforce Plan

[5] The FAA does not maintain a database regarding technical requirements requested for a position. Thus, we could not conduct analyses at the position level or determine whether particular technical requirements could be barriers. Also, there is no database regarding how the decision points were administered (e.g., interview conducted in-person or over the phone). Thus, we could not analyze whether different administration of decision points created barriers.

Decision Point 5 – Security Clearance: As with the medical clearance, this decision point was not analyzed because a similar security background check is used for ASIs, as is used for Air Traffic Controllers. In the Barrier Analysis of the ATCS Centralized Hiring Process, no barriers associated with security processing were found. Additionally, unlike Air Traffic Controllers, in order to obtain the basic qualifications necessary to become an ASI, applicants have previously undergone screening similar to the FAA security screening. This screening regularly includes criminal background investigations and FBI fingerprint checks. The vast majority of ASI applicants have passed these types of checks administered by previous employers, airport authorities, or both. Therefore very few fail the FAA security clearance. This minimizes the possibility that the security clearance could be a barrier.

Figure 3: Decision Points in the ASI Hiring Process



OVERVIEW

BACKGROUND

Aviation Safety (AVS) projects an average loss of 247 ASIs per year between 2014 and 2022[6] from attrition. In addition to these vacancies, AVS must be able to fill the demand for ASIs based on the stakeholders in the U.S. aviation system. Given that AVS is competing with private industry to recruit and hire the best candidates from a limited pipeline of talent, this places a significant responsibility on the agency to ensure that the hiring process does not contain unnecessary barriers.

[6] Federal Aviation Administration Aviation Safety 2013 Workforce Plan, p. 18

METHODOLOGY

The methodology we used to conduct the barrier analysis involved an in-depth, root-cause analysis approach incorporating the Uniform Guidelines on Employee Selection Procedures (UGESP). The federal government's need for a uniform set of principles on the question of the use of personnel policies, practices, and procedures has long been recognized. The EEOC, the Civil Service Commission, the Department of Labor, and the Department of Justice jointly adopted the UGESP to meet that need. The UGESP apply a consistent set of principles to the federal government as are applied to non-governmental employers. These guidelines incorporate a single set of principles that are designed to assist employers, labor organizations, employment agencies, and licensing and certification boards to comply with requirements of federal law prohibiting employment practices that discriminate on grounds of race, color, religion, sex, and national origin. They are designed to provide a framework for determining the proper use of tests and other selection procedures. The guidelines do not require a user to conduct validity studies of selection procedures where no adverse impact results have been shown. However, all users are encouraged to use selection procedures that are valid, especially users operating under the federal government's merit principles.

Our methodology for identifying barriers included reviewing FAA documents regarding the ASI position (see Appendix A for a list of the reviewed documents) and conducting multiple interviews in Oklahoma City with HR specialists, Flight Standards District Office (FSDO) managers, Certificate Management Office (CMO) managers, regional Flight Standards (AFS) personnel managers, Aircraft Certification (AIR) personnel, as well as actual ASI employees[7]. In addition to these sources, we also collected AVIATOR[8] data and conducted quantitative analysis of this data. Thus, our barrier analysis combined quantitative and qualitative information to identify the root causes of any identified barriers.

With regard to the AVIATOR data, for each year from 2009 to 2012, we analyzed the qualification decisions made as a function of the RNO and gender subgroups, provided that a particular subgroup comprised more than two percent of the population of applicants. We determined from this analysis that Native American, Alaskan Native and Native Hawaiian/Other Pacific Islander subgroups would be excluded from all subsequent analyses in this report because they constituted less than two percent of the applicant population. The decision to exclude these subgroups is consistent with the recommendations of the UGESP issued by the EEOC, Civil Service Commission, Department of Labor, and the Department of Justice in 1978. In addition, a barrier analysis for disability could not be performed due to insufficient sample size.[9]

[7] Interviews did not include HR specialists outside of Oklahoma City due to their small numbers and the wide variations in how they handled the application screening process.

[8] AVIATOR stands for Automated Vacancy Information Access Tool for Online Referral. This tool generates vacancy announcements and automatically posts them to the FAA and USAJOBS websites.

[9] See Appendix H for a discussion of applicants with a disability.

We relied on several criteria to determine the presence of a barrier. Specifically, one criterion was computing a statistic referred to as *effect size* or *d-ratio*. This is a common statistic used in the scientific literature to understand the magnitude of the difference in selection rates between two groups. One benefit of using a *d-ratio* is that it allows researchers and practitioners to interpret the magnitude of subgroup differences. In particular, *d-ratios* are considered small if they are less than .30, moderate if close to .50, and large if close to or above .80 (Cohen, 1988). Smaller *d-ratios* may be considered trivial whereas larger *d*-values are more problematic. This, however, is not always the case. There are conditions when even small *d-ratios* indicate significant, practical effects. As an example, this can occur in situations in which the overall selection ratio (i.e., number of vacancies divided by the number of applicants) is very low. Very low selection ratios occur when there are typically very few openings and many applicants. In this situation, even small differences in the selection rates for various applicant groups can have meaningful negative consequences and constitute a barrier. For this reason we used three criteria to identify barriers. Our criteria are based on the weighted average of statistical values across years. Our specific criteria are:

- a statistically significant difference between a minority or gender group and the majority group (in this instance Whites and males),
- an effect size of .20 or higher, or
- an adverse impact ratio below .80.

If a selection step or decision point in the hiring process meets at least two of the three criteria, we consider it a barrier.

In the technical report that follows, there is a complete description of the scope and methodology of the barrier analysis and our approach using the data that we received from the agency.

General Items to Note

Before discussing our specific findings, we note that the percentage of applicants self-reporting RNO and gender status is relatively high, ranging from 72.6 and 93.0 percent. This supports the premise that the samples reporting RNO and gender data are sufficiently large in relation to the total sample to indicate that there is little, if any, difference between the statistics from the self-report sample and what would be expected from the total sample. This is true even though more applicants self-reported RNO status than gender status. In addition, we computed weighted averages to provide an aggregate picture of the RNO and gender diversity composition in the various applicant sources across the fiscal years.

FINDINGS

Table 1A provides a summary of the barrier analysis results for the Flight Standards Service. Table 1A shows that there are barriers at the Qualifications Determination decision point for Avionics, Maintenance and Operations. Asian and African-American applicants experience barriers at the Qualification Determination decision point in Avionics, Maintenance, and Operations. There is a barrier for Hispanic and Multi-Racial applicants at this decision point in Operations. Females experience a barrier at this decision point as well in Avionics and Maintenance. The Referral for Interview decision point is a barrier for Asian, African-American and Hispanic applicants in Operations. The Final Selection decision point was not a barrier for any RNO or gender subgroups. Overall, the Qualifications Determination decision point is the principal source of barriers that exist in the hiring process for Aviation Safety Inspectors in Flight Standards. Once passed this decision point there are relatively few barriers to any subgroup.

Analysis of the data from Aircraft Certification indicates that the applicant pool is much smaller (2,404) than that for Flight Standards. Assessment of subgroup differences in Table 1B indicated that there was a barrier for African-Americans in the Qualification Determination decision point, a barrier for Asians in the Referral decision point and a barrier for females for the Final Selection decision point. No other barriers were found. With regard to the Qualification Determination barrier, an examination of the relevance of the qualifications requirements indicated that they are derived from the duties of the position and thus are job related.

Recommendations to address the barriers include developing better recruitment and outreach efforts to increase diversity within applicant pools, a more user-friendly application process, standardization of the Qualifications Determination process and improving the technical expertise of those responsible for evaluation of applicants' background and experience.

Table 1A
Summary of Barrier Analysis Results
Flight Standards

Avionics		
Hiring Process Decision Point	**Race/Ethnicity/Gender**	**Barrier(Yes/No)**
Qualifications Determination	Asian	Yes
	African-American	Yes
	Hispanic	No
	Multi-Racial	No
	Female	Yes
Referral for Interview	Asian	No
	African-American	No
	Hispanic	No
	Multi-Racial	No
	Female	No
Final Selection	Asian	No
	African-American	No
	Hispanic	No
	Multi-Racial	No
	Female	No
Maintenance		
	Asian	Yes

Qualifications Determination	African-American	Yes
	Hispanic	No
	Multi-Racial	No
	Female	Yes
Referral for Interview	Asian	No
	African-American	No
	Hispanic	No
	Multi-Racial	No
	Female	No
Final Selection	Asian	No
	African-American	No
	Hispanic	No
	Multi-Racial	No
	Female	No
Operations		
Qualifications Determination	Asian	Yes
	African-American	Yes
	Hispanic	Yes
	Multi-Racial	Yes
	Female	No
Referral for Interview	Asian	Yes
	African-American	Yes
	Hispanic	Yes
	Multi-Racial	No
	Female	No
Final Selection	Asian	No
	African-American	No
	Hispanic	No
	Multi-Racial	No
	Female	No

Table 1B
Summary of Results for Aircraft Certification

Hiring Process Decision Point	**Race/Ethnicity/Gender**	**Barrier (Yes/No)**
Qualifications Determination	Asian	NA
	African-American	YES
	Hispanic	NO
	Multi-Racial	NO
	Female	NO
Referral for Interview	Asian	YES
	African-American	NO
	Hispanic	NO
	Multi-Racial	NO
	Female	NO
Final Selection	Asian	NA
	African-American	NO
	Hispanic	NO
	Multi-Racial	NO
	Female	YES

SUMMARY RECOMMENDATIONS

The executive recommendations that follow are the result of our conclusions. Each of the decision points was examined using root cause analysis. As such, the barriers described in the analysis and our methodology is detailed in the relevant sections under the decision point. We present here a summary of the recommendations in the Technical Report. We make the following recommendations:

Summary Recommendations

- Both the AIR and AFS application process should be revised to make them less tedious and more user-friendly. Applicants typically find the process burdensome, particularly for those less familiar with the process that federal agencies use to screen applications.
- Feedback to all applicants as to where their application is in the process should be more consistent and timely.
- There should be greater oversight and tracking of the process for both AFS and AIR to ensure applications are processed in a similar manner for all 1825 positions.
- Recruitment and outreach efforts should be significantly increased for all groups to ensure that they are aware of the kinds of vacancies that exist and the specific qualifications required.

Qualifications Determination[10,11]

- HR specialists involved in the review of applicant qualifications should be given training to better understand the technical qualifications required for a given 1825 position and how to better address the degree to which the training and experience information provided by each applicant satisfies the requirements of the job.
- Applicants should be provided aids (e.g., an orientation video or completed sample application/resume) for each vacancy announcement. The aids should be designed to ensure that every applicant is aware of the proper terminology and level of detail required in their application information.
- Access to information regarding locations where vacancies exist should be provided to all applicants.
- Applicants should be made aware of the implications of indicating that they are only willing to work in certain locations.

[10] Our analyses indicate that the Qualification Determination Barrier derives from two factors. First, HR specialists in both Oklahoma City and in regional offices do not have sufficient technical knowledge to properly interpret applicants' qualifications and job requirements. Thus, HR specialists are currently using a rote/mechanical approach when qualifying applicants (i.e., did applicants check the right boxes). Second, both managers and current ASIs report that applicants have difficultly properly completing the application so their skills/knowledge are properly reflected.

[11] It is important to note that these recommendations should be followed by both AIR and AFS. The current AFS process may need more change to incorporate these recommendations than the AIR process.

Referral for Interview

- The HR specialists should be better trained in terms of matching the applicants' background information with the job (e.g. knowledge, skill and ability [KSA]) requirements from a technical standpoint.
- Employees (managers) should be designated to provide technical assistance to HR specialists, as necessary, with regard to assessing the technical expertise, experience and training of applicants.

Selection Based on the Interview

- The interview process should be made more consistent across AFS and AIR.
- Interviewers should be provided detailed training on how to conduct interviews prior to being involved in the interview process.

TECHNICAL REPORT

INTRODUCTION

This report provides results of a barrier analysis of the hiring process for the position of Aviation Safety Inspector at the Federal Aviation Administration (FAA).

THE ORIGIN OF BARRIER ANALYSIS REQUIREMENTS

"MANAGEMENT DIRECTIVE 715 AND THE INSTRUCTIONS:

The Equal Employment Opportunity Commission (EEOC) issued MD-715 to provide guidance and establish standards for developing and maintaining effective programs of equal employment opportunity (EEO) under Section 717 of Title VII of the 1964 Civil Rights Act. This directive provides policy guidance and standards for establishing and maintaining effective affirmative programs of EEO under Section 717 of Title VII (PART A) and effective affirmative action programs under Section 501 of the Rehabilitation Act (PART B). The intent of this directive is to ensure that federal employees and applicants have equality of opportunity regardless of race, sex, national origin, color, religion, disability, or reprisal for engaging in a prior protected activity. Part A of MD-715 clarifies the concept of a barrier analysis and provides a set of instructions that guides and set standards to help maintain effective EEO affirmative programs.

SECTION II: BARRIER IDENTIFICATION AND ELIMINATION

Management Directive 715 contains operational guidance on how to identify barriers that tend to inhibit free and open workplace competition, and how to develop a meaningful plan to eliminate those barriers.

To develop a competitive and highly qualified workforce, federal agencies must fully use all workers' talents, without regard to race, color, religion, national origin, sex, disability, or reprisal for prior EEO activity. This goal cannot be accomplished when barriers to EEO persist in an agency's management/personnel policies, procedures, or practices.

The barrier analysis process requires much more of agencies than has been asked in the past. The barrier analysis process cannot be guided solely by examining workforce statistics. While snapshot statistics can be useful as a starting point, statistics alone do not enable an agency to effectively identify workplace barriers.

Workforce statistics can serve to reveal symptoms of barriers to equal opportunity. It must be understood, however, that the statistics themselves are not the barriers. Therefore, when there is an indication through statistical analyses or other means, that potential barriers exist in the workplace, an agency is responsible for undertaking a thorough examination of all related policies, procedures, and practices to uncover whether a barrier to EEO exists. When an agency uncovers and understands the barrier then appropriate objectives can be implemented to eliminate it.

> Lastly, in addition to analyzing workforce statistics, Section II of the MD-715 requires agencies to explore a variety of sources to identify potential barriers to equal employment opportunity."[12,13]

Before drawing conclusions from the data, one point should be noted. The percentage of applicants self-reporting RNO and gender status is high (between 72.6 percent and 93.0 percent). This supports the premise that the samples reporting RNO and gender data are sufficiently high, in relation to the total sample, to indicate that there is little, if any, difference between the statistics from the self-report sample and what would be expected from the total sample. Finally, we computed weighted averages, as shown for example in Table 2, to provide an aggregate picture of the RNO and gender diversity composition in the various applicant sources across the fiscal years. This weighted average is computed using the following formula:

$$\bar{p}_i = \frac{\sum_{t=1}^{k} (p_{ik}\, f_{ik})}{\sum_{i=1}^{k} f_{ik}} \qquad \text{(Formula I)}$$

where p_i is the weighted average percentage of applicants in RNO subgroup (i) across the fiscal time periods FY 2009 to FY 2012, p_{ik} represents the percentage of applicants in RNO subgroup(i) in fiscal year$_{(k)}$, and f_{ik} represents the frequency of applicants in the RNO subgroup(i) in fiscal year$_{(k)}$. The weighted average is a commonly used statistic found in other statistical analyses such as meta-analytic research (e.g., Rosenthal, 1991; Schmidt & Hunter, 1990) as well as in random coefficient modeling (Raudenbush and Bryk, 2002). It is often used to provide an accurate estimate of an effect when there are multiple samples estimating of the effect. The weighted average places more weight on those samples that have the most stability (i.e., the largest samples).

Based upon our review of the ASI hiring process, we identified three critical decision points at which barriers to racial and gender employment opportunities could occur. These three decision points are:

1. Qualifications Determination
2. Referral for Interview
3. Selection Based on the Interview

We will consider each decision point separately and provide the root-cause analysis that led to our conclusions and recommendations for each of the identified barriers.

[12] Equal Employment Opportunity Commission (2003), Equal Employment Opportunity Management Directive EEO MD-715

[13] The U.S. Equal Employment Opportunity Commission Instructions to Federal Agencies for EEO MD-715

ROOT CAUSE ANALYSIS OF THE DECISION POINTS IN THE ASI (1825) HIRING PROCESS

FLIGHT STANDARDS

The first critical decision point in the ASI Hiring Process is the Qualifications Determination. This step involves verifying whether the qualifications of the applicant meet the minimum qualifications specified in the job announcement. The second decision point is a determination of whether the applicant ranks high enough to be Referred for an Interview. The determination of whether someone meets the minimum qualifications for the position is a combination of computer-generated evaluation of the application (i.e., is the applicant missing an objective qualification) and a decision made by HR personnel (i.e., a subjective decision) regarding which elements of the applicant's qualifications meet the qualification requirements specified on the vacancy announcement. This HR determination is based on the application and supporting information (e.g. resume, documentation of the required certification etc.) The third decision point occurs when a determination is made as to which applicant will be selected based on the interview.

Race/Ethnicity: We analyzed the qualification decision rates made as a function of the RNO subgroups that composed more than two percent of the population of applicants for 1825 ASI positions from 2009 through 2012. Analysis was done for each of the major job groups in Flight Standards (Avionics, Maintenance and Operations) and for Aircraft Certification. After reviewing the data, it was determined that Native American, Alaskan Native and Native Hawaiian/Other Pacific Islander subgroups would be excluded from all subsequent analyses in this report due to their small (i.e., less than two percent) representation in the applicant population for all of the job groups. The decision to exclude these two subgroups is consistent with the analysis recommendations of the UGESP issued by the EEOC, Civil Service Commission, Department of Labor, and the Department of Justice in 1978. Data for these two groups will be presented but not discussed.

There is a traditional adverse impact ratio (AI) (or 80% Rule) used in fair employment practices cases. The 80% Rule is used as a rough guide by Title VII enforcement agencies as to whether there is a meaningful underrepresentation of those groups protected under Title VII. The adverse impact ratio is computed by dividing the proportion deemed qualified for a minority subgroup (e.g., one of the Table 3 qualification rates for a particular RNO minority subgroup) by the proportion for the majority subgroup. For this analysis, we choose the White subgroup as the majority group due to its percentage representation in the sample. Specifically, the adverse impact ratio is computed as follows:

$$AI = \frac{p_{\min}}{p_{majority}} \qquad \text{(Formula 2)}$$

In the formula above, p_{min} represents the percentage of a particular minority subgroup rated as qualified and $p_{majority}$ represents the percentage of the majority subgroup rated as qualified. Adverse Impact ratios lower than 80 percent are considered indicative of underrepresentation or barriers in this instance (Hanges, Salmon, & Aiken)[14].

Another statistic used to understand the magnitude of the difference between two groups is to compute what is known as the effect size or *d-ratio*. This is a common statistic used in the scientific literature to measure the effect or impact of a phenomenon. The *d-ratio* is computed by using the following formula:

$$d = \frac{\left(p_{min} - p_{majority}\right)}{\sqrt{\frac{\left[p_{min}\left(1-p_{min}\right)\left(n_{min}-1\right)+p_{maj}\left(1-p_{majority}\right)\left(n_{majority}-1\right)\right]}{n_{min}+n_{majority}-2}}}$$ (Formula 3)

Similar to Formula 2, p_{min} and $p_{majority}$ represent the percentage of minority subgroup and percentage of majority subgroup rated as qualified, respectively. Finally, n_{min} and $n_{majority}$ are the number rated as qualified. The *d* statistic is computed by dividing the difference in proportions by the pooled standard deviation for the two compared ethnicities. Table 4 shows these *d*-values as a function of RNO subgroups.

The benefit of using *d-ratios* is that there are standards that have been proposed to help researchers and practitioners interpret their magnitude. In particular, *d*-values are considered small if they are less than .30; they are considered moderate if they are close to .50; and they are generally considered large if they are close to .80 or above (Cohen, 1988). Smaller *d-ratio* values may be considered trivial whereas larger *d*-values are more problematic. This, however, is not always the case. Even small differences can have significant practical effects. As an example, consider the situation of a very low overall selection rate (i.e., number of vacancies divided by the number of applicants). In other words, the organization has very few openings but lots of applicants. In this situation even small differences in the selection rates for various applicant subgroups can have meaningful negative consequences and constitute a barrier. For this reason we used three criteria to determine what constitutes a barrier. Those criteria are based on the weighted averages:

- A statistically significant difference between a minority or gender group and the majority group (in this instance Whites and males)[15]
- An effect size of .20 or higher
- An adverse impact ratio below .80

[14] Hanges, P. J., *Salmon, E. D., & Aiken, J. R.* (2013). Legal issues in industrial testing and assessment. (pp. 693-711). In K.F. Geisinger (Ed.-in-Chief), B. A. Bracken, J. F. Carlson, J. C. Hansen, N. R. Kuncel, S. P. Reise, & M. C. Rodriguez (Assoc. Eds.), *APA handbooks in psychology: APA handbook of testing and assessment in psychology*: *Vol. 1. Test theory and testing and assessment in industrial and organizational psychology*. Washington, DC: American Psychological Association.

[15] The chi-square test for a contingency table was used to determine if the subgroup differences were statistically significant.

If a decision point in the hiring process meets at least two of the three criteria above, we consider it a barrier.

In the next sections of this report, we provide the results of the quantitative analyses. We first provide RNO analysis for Avionics, Maintenance, and Operations. Next, we present the results of the gender analysis for Avionics, Maintenance, and Operations, respectively.

RNO Analysis for Avionics

Table 2 shows the Applicant Pool for Avionics positions by RNO subgroup for each fiscal year and the weighted average for all four years. As shown in Table 2, a total of 7,784 persons applied for 1825 ASI positions in Avionics from 2009 to 2012. The applicant pool for analysis consideration included 9.1 percent African-Americans, 4.7 percent Hispanics and 2.6 percent Asians.

Table 2
Applicant Pool for Avionics

Race/Ethnic Origin	2009	2010	2011	2012	Total 09 to 12
Asian	61 (2.7)	61 (2.7)	36 (2.5)	42 (2.3)	200 (2.6)
African-American	174 (7.8)	187 (8.2)	148 (10.3)	196 (10.8)	705 (9.1)
Hawaiian	8 (0.4)	17 (0.7)	9 (0.6)	9 (0.5)	43 (0.6)
Hispanic	105 (4.7)	113 (4.9)	73 (5.1)	77 (4.3)	368 (4.7)
Multi-Racial	109 (4.9)	120 (5.2)	126 (8.7)	147 (8.1)	502 (6.5)
Native American	29 (1.3)	17 (0.7)	7 (0.5)	11 (0.6)	64 (0.8)
Unanswered	141 (6.3)	130 (5.7)	84 (5.8)	320 (17.7)	675 (8.7)
White	1609 (72.0)	1649 (71.9)	958 (66.5)	1011 (55.8)	5227 (67.2)
Total	**2236**	**2294**	**1441**	**1813**	**7784**

Note: Applicants who applied multiple times for the same division in a particular year were included only once. Specifically, their best outcome in that division was retained for analyses at each decision point.

Tables 3 and 4 show the magnitude of a statistical comparison in terms of adverse impact ratios and effect sizes for the racial and ethnic subgroups at the Qualifications Decision Point. Table 3 shows that there was a violation of the 80% Rule only for African-Americans. However, Table 4 shows that there was a statistically significant difference in success rates at the Qualifications Determination Decision Point for both African-Americans and Asians and the effect sizes are greater than .20. Therefore we conclude that the Qualifications Decision Point is a barrier for both African-American and Asian applicants for ASI positions in Avionics.

Table 3
Qualifications Determination Decision Point for Avionics

Race/ Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	35	0.57	0.82	37	0.61	0.85	28	0.78	1.10	19	0.45	0.62	200	0.60	0.84
African-American	100	0.57	0.82	107	0.57	0.80	73	0.49	0.70	108	0.55	0.75	705	0.55	0.77
Hispanic	68	0.65	0.93	67	0.59	0.83	46	0.63	0.89	60	0.78	1.06	368	0.65	0.92
Multi-Racial	76	0.70	1.00	88	0.73	1.03	85	0.67	0.96	94	0.64	0.87	502	0.68	0.96
Unanswered	86	0.61	0.87	87	0.67	0.94	57	0.68	0.96	163	0.51	0.70	675	0.58	0.82
White	1122	0.70		1176	0.71		675	0.70		740	0.73		5227	0.71	

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 4
Effect Size (d) Estimates for Qualifications Determination Decision Point for Avionics

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.27*	0.24	-0.16	0.63**	0.25**
African-American	0.26**	0.31**	0.46**	0.40**	0.34**
Hispanic	0.11	0.26**	0.16	-0.11	0.13*
Multi-Racial	0.00	-0.04	0.07	0.21*	0.04
Unanswered	0.19*	0.10	0.06	0.49**	0. 21**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 3.

Tables 5 and 6 show the adverse impact ratios and effect sizes for the Referral Decision Point. These tables indicate that none of the RNO subgroups met the requirements for a barrier at the Referral Decision Point.

Table 5
Referral Decision Point for Avionics

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	6	0.17	1.28	2	0.05	0.36	2	0.07	0.48	0	0.00	0.00	119	0.08	0.66
African-American	22	0.22	1.65	8	0.07	0.49	7	0.10	0.64	1	0.01	0.16	388	0.10	0.77
Hispanic	12	0.18	1.32	10	0.15	0.99	9	0.20	1.31	5	0.08	1.43	241	0.15	1.18
Multi-Racial	10	0.13	0.98	18	0.20	1.35	14	0.16	1.10	1	0.01	0.18	343	0.13	0. 99
Unanswered	10	0.12	0.87	9	0.10	0.68	9	0.16	1.06	12	0.07	1.27	393	0.10	0.80
White	150	0.13		178	0.15		101	0.15		43	0.06		3713	0.13	

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 6
Effect Size (d) Estimates for Referral Decision Point for Avionics

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	-0.11	0.27	0.22	0.25	0.14
African-American	-0.25*	0.22*	0.15	0.22*	0.07
Hispanic	-0.12	0.01	-0.13	-0.11	-0.08
Multi-Racial	0.01	-0.15	-0.04	0.21	-0.01
Unanswered	0.05	0.13	-0.02	-0.06	0.04

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 5.

Tables 7 and 8 show the adverse ratios and effect sizes for the Final Selection Decision Point for Avionics positions based on the interview. The data in these tables shows that the Final Selection Decision Point was not a barrier for any of the RNO subgroups.

Table 7
Selection Decision Point for Avionics

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	1	0.17	1.14	0	NA	NA	1	NA	NA	0	NA	NA	10	0.20	1.02
African-American	3	0.14	0.93	0	0.00	0.00	2	0.29	0.87	1	NA	NA	38	0.16	0.80
Hispanic	2	0.17	1.14	1	0.10	0.60	4	0.44	1.36	0	0.00	0.00	36	0.19	0.99
Multi-Racial	2	0.20	1.36	3	0.17	0.99	2	0.14	0.44	0	NA	NA	43	0.16	0.83
Unanswered	2	0.20	1.36	0	0.00	0.00	4	0.44	1.36	2	0.17	0.90	40	0.20	1.02
White	22	0.15		30	0.17		33	0.33		8	0.19		473	0.20	

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 8
Effect Size (d) Estimates for Selection Decision Point for Avionics

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	-0.06	NA	NA	NA	-0.06
African-American	0.03	0.46	0.09	NA	0.21
Hispanic	-0.06	0.18	-0.25	0.50	0.04
Multi-Racial	-0.15	0.00	0.40	NA	0.05
Unanswered	-0.15	0.46	-0.25	0.05	0.07

Note: *p≤.05; **p≤.01.
The effect size (d) entry for a particular year is NA if the number eligible for a particular category is less than 5. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 7.

RNO Analysis for Maintenance

Table 9 shows the Applicant Pool for Maintenance positions in Flight Standards. As shown in Table 9, African-Americans, Hispanics, and Asians made up 8.1 percent, 5.3 percent, and 2.5 percent of the applicants respectively.

Table 9
Applicant Pool for Maintenance

Race/Ethnic Origin	2009	2010	2011	2012	Total (09 to 12)
Asian	148 (2.6%)	145 (2.2%)	100 (2.9%)	92 (2.8%)	485 (2.5%)
African-American	436 (7.6%)	545 (8.3%)	297 (8.5%)	264 (8.0%)	1542 (8.1%)
Hawaiian	22 (0.4%)	32 (0.5%)	19 (0.5%)	16 (0.5%)	89 (0.5%)
Hispanic	299 (5.2%)	374 (5.7%)	162 (4.7%)	171 (5.2%)	1006 (5.3%)
Multi-Racial	237 (4.1%)	307 (4.7%)	215 (6.2%)	227 (6.9%)	986 (5.2%)
Native American	62 (1.1%)	475 (0.7%)	19 (0.5%)	14 (0.4%)	142 (0.7%)
Unanswered	324 (5.6%)	397 (6.1%)	211 (6.1%)	511 (15.6%)	1443 (7.6%)
White	4248 (73.6%)	4687 (71.7%)	2459 (70.6%)	1990 (60.6%)	13384 (70.2%)
Total	**5776**	**6534**	**3482**	**3285**	**19077**

Note: Applicants who applied multiple times for the same division in a particular year were included only once for that job. Specifically, their best outcome in that division was retained for analyses at each decision point.

Tables 10 and 11 show the adverse impact ratios and effect sizes for subgroup differences at the Qualifications Determination Decision Point for maintenance. Based on the fact that the effect sizes for African-Americans and Asians are statistically significant and above .20, we conclude that the Qualifications Decision Point is a barrier for these groups with regard to Maintenance positions.

Table 10
Qualifications Determination Decision Point for Maintenance

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	84	0.57	0.83	87	0.60	0.87	56	0.56	0.79	56	0.61	0.88	485	0.58	0.84
African-American	173	0.40	0.58	223	0.41	0.59	154	0.52	0.73	133	0.50	0.72	1542	0.44	0.64
Hispanic	172	0.58	0.84	227	0.61	0.88	106	0.65	0.93	128	0.75	1.08	1006	0.63	0.91
Multi-Racial	149	0.63	0.92	190	0.62	0.90	133	0.62	0.88	130	0.57	0.82	986	0.61	0.88
Unanswered	219	0.68	0.99	245	0.62	0.89	151	0.72	1.01	339	0.66	0.95	1443	0.66	0.95
White	2905	0.68		3237	0.69		1738	0.71		1384	0.70		13384	0.69	

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 11
Effect Size (d) Estimates for Qualifications Determination Decision Point for Maintenance

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.25**	0.20*	0.32**	0.19	0.23**
African-American	0.61**	0.60**	0.41**	0.41**	0.54**
Hispanic	0.23**	0.18**	0.11	-0.12	0.14**
Multi-Racial	0.12	0.15**	0.19**	0.26**	0.17**
Unanswered	0.02	0.16**	-0.02	0.07	0.07*

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 10.

Tables 12 and 13 show the adverse impact ratios and effect sizes for subgroup differences at the Referral Decision Point. Given that none of the adverse impact ratios are below 80 percent and none of the effect sizes are greater than .20, we conclude that the Referral Decision Point is not a barrier for any subgroup.

Table 12
Referral Decision Point for Maintenance

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	12	0.14	1.29	8	0.09	0.91	7	0.13	0.75	4	0.07	1.10	31	0.11	1.03
African-American	24	0.14	1.26	25	0.11	1.11	27	0.18	1.05	11	0.08	1.27	87	0.13	1.17
Hispanic	14	0.08	0.74	19	0.08	0.83	20	0.19	1.13	6	0.05	0.72	59	0.09	0.83
Multi-Racial	13	0.09	0.79	27	0.14	1.41	33	0.25	1.49	11	0.08	1.30	84	0.14	1.25
Unanswered	27	0.12	1.12	24	0.10	0.97	32	0.21	1.27	18	0.05	0.82	101	0.11	1.00
White	321	0.11	1.00	327	0.10		289	0.17		90	0.07		1027	0.11	

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 13
Effect Size (d) Estimates for Referral Decision Point for Maintenance

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	-0.10	0.03	0.11	-0.03	0.00
African-American	-0.09	-0.04	-0.02	-0.07	-0.06
Hispanic	0.09	0.06	-0.06	0.07	0.05
Multi-Racial	0.07	-0.14	-0.22*	-0.08	-0.08*
Unanswered	-0.04	0.01	-0.12	0.05	-0.02

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 12.

Tables 14 and 15 show the adverse impact ratios and the effect sizes for the Selection Decision Point for applicants seeking maintenance positions. None of the selection ratios are below 80 percent and none of the effect sizes are statistically significant. Therefore we conclude that the Selection Decision Point is not a barrier to any subgroup.

Table 14
Selection Decision Point for Maintenance

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	2	0.17	0.99	1	0.13	0.76	1	0.14	0.67	1	0.25	1.18	31	0.16	0.87
African-American	2	0.08	0.50	9	0.36	2.18	3	0.11	0.52	1	0.09	0.43	87	0.17	0.93
Hispanic	2	0.14	0.85	2	0.11	0.64	6	0.30	1.40	1	0.17	0.79	59	0.19	1.01
Multi-Racial	1	0.08	0.46	5	0.19	1.12	9	0.27	1.27	2	0.18	0.86	84	0.20	1.10
Unanswered	4	0.15	0.88	3	0.13	0.76	6	0.19	0.87	2	0.11	0.53	404	0.13	0.88
White	54	0.17		54	0.17		62	0.21		19	0.21		1131	0.18	

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 15
Effect Size (d) Estimates for Selection Decision Point for Maintenance

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.00	0.11	0.18	0.10	0.11
African-American	0.23	-0.52**	0.26	0.30	0.01
Hispanic	0.07	0.16	-0.21	0.11	0.02
Multi-Racial	0.25	-0.05	-0.14	0.07	0.02
Unanswered	0.05	0.11	0.07	0.25	0.09

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table

RNO Analysis for Operations

Table 16 shows the Applicant Pool for operations positions from 2009 to 2012. There was a total of 22,499 applicants of whom 5.3 percent and 3.4 percent were African-American and Hispanic respectively. Note that Asians did not constitute two percent of the applicant pool. However, because the Asian subgroup is greater than two percent of the applicant pool for the other job categories, we present the information for this subgroup in Operations for comparison purposes.

Table 16
Applicant Pool for Operations

Race/Ethnic Origin	2009	2010	2011	2012	Total 09 to 12
Asian	123 (1.9%)	114 (1.7%)	61 (1.7%)	90 (1.6%)	388 (1.7%)
African-American	281 (4.3%)	312 (4.6%)	233 (6.4%)	371 (6.8%)	1197 (5.3%)
Hawaiian	14 (0.2%)	22 (0.03%)	11 (0.3%)	16 (0.3%)	63 (0.3%)
Hispanic	237 (3.6%)	241 (3.6%)	144 (3.9%)	134 (2.4%)	756 (3.4%)
Multi-Racial	223 (3.4%)	237 (3.5%)	194 (5.3%)	346 (6.3%)	1000 (4.4%)
Native American	52 (0.8%)	55 (0.8%)	26 (0.7%)	27 (0.5%)	160 (0.7%)
Unanswered	608 (9.2%)	609 (9.0%)	300 (8.2%)	1795 (32.7%)	3312 (14.7%)
White	5064 (76.7%)	5161 (76.4%)	2694 (73.5%)	2704 (49.3%)	15623 (69.4%)
Total	**6602**	**6751**	**3663**	**5483**	**22499**

Note: Applicants who applied multiple times forr the same division in a particular year were included onlyy once for that job. Specifically, their best outcome in that division was retained for analyses at each decision point.

Tables 17 and 18 show the adverse impact ratios and effect sizes for subgroup differences. Adverse impact ratios failed to reach the 80 percent level for African-American, Hispanic, and Multi-Racial applicants. The effect sizes for these groups were statistically significant and greater than .20. Therefore, we conclude that the Qualifications Decision Point is a barrier for three of these groups.

Table 17
Qualifications Determination Decision Point for Operations

Race/ Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	50	0.41	0.73	48	0.42	0.74	25	0.41	0.78	25	0.28	0.53	388	0.38	0.69
African-American	60	0.21	0.38	62	0.20	0.35	38	0.16	0.31	36	0.10	0.18	1197	0.16	0.30
Hispanic	98	0.41	0.74	90	0.37	0.65	52	0.36	0.68	24	0.18	0.34	756	0.35	0.63
Multi-Racial	107	0.48	0.86	109	0.46	0.81	64	0.33	0.62	80	0.23	0.44	1000	0.36	0.65
Unanswered	370	0.61	1.09	360	0.59	1.03	182	0.61	1.15	691	0.38	0.73	3312	0.48	0.88
White	2833	0.56		2948	0.57		1422	0.53		1425	0.53		15623	0.55	

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 18
Effect Size (d) Estimates for Qualifications Determination Decision Point for Operations

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.31**	0.30**	0.24	0.50**	0.33**
African-American	0.70**	0.76**	0.74**	0.90**	0.76**
Hispanic	0.29**	0.40**	0.33**	0.70**	0.41**
Multi-Racial	0.16*	0.22**	0.40**	0.60**	0.30**
Unanswered	-0.10*	-0.04	-0.16**	0.29**	0.00

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 17.

Tables 19 and 20 show the adverse impact ratios and effect sizes for subgroup differences at the Referral Decision Point. The adverse impact ratio failed to reach 80 percent for African-Americans and Hispanics. Table 20 shows that the effect size for both groups is statistically significant and/or above .20. Therefore we conclude that the Referral Decision Point is a barrier for African-American and Hispanic applicants seeking 1825 positions in Operations.

Table 19
Referral Decision Point for Operations

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	3	0.06	0.37	7	0.15	0.76	3	0.12	0.42	4	0.16	0.75	148	0.11	0.57
African-American	3	0.05	0.31	7	0.11	0.59	8	0.21	0.73	10	0.28	1.29	196	0.14	0.71
Hispanic	6	0.06	0.38	8	0.09	0.46	9	0.17	0.60	4	0.17	0.78	264	0.10	0.51
Multi-Racial	15	0.14	0.87	23	0.21	1.10	12	0.19	0.65	16	0.20	0.93	360	0.18	0.91
Unanswered	60	0.16	1.01	73	0.20	1.06	57	0.31	1.09	129	0.19	0.87	1603	0.20	0.99
White	455	0.16		566	0.19		409	0.29		306	0.21		8628	0.20	

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 20
Effect Size (d) Estimates for Referral Decision Point for Operations

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.28*	0.12	0.37	0.13	0.21**
African-American	0.30*	0.20	0.17	-0.15	0.17*
Hispanic	0.27**	0.26**	0.25	0.12	0.24**
Multi-Racial	0.06	-0.05	0.22	0.04	0.04
Unanswered	0.00	-0.03	-0.06	0.07	0.00

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 19.

Tables 21 and 22 show the adverse impact ratios and effect sizes for subgroup differences at the Selection Decision Point for Operations positions. None of the adverse impact ratios are below 80 percent and none of the effect sizes are statistically significant. Therefore we conclude that the Selection Decision Point for Operations is not a barrier for any RNO subgroup.

Table 21
Selection Decision Point for Operations

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	1	NA	NA	2	0.29	1.35	0	NA	NA	0	0.00	0.00	17	0.18	0.87
African-American	1	NA	NA	1	0.14	0.67	0	0.00	0.00	3	0.30	1.19	28	0.18	0.88
Hispanic	1	0.17	1.07	4	0.50	2.36	1	0.11	0.53	0	0.00	0.00	27	0.22	1.09
Multi-Racial	1	0.07	0.43	8	0.35	1.64	2	0.17	0.80	5	0.31	1.24	66	0.24	1.19
Unanswered	12	0.20	1.28	12	0.16	0.78	12	0.21	1.01	36	0.28	1.11	319	0.23	1.11
White	71	0.16		120	0.21		85	0.21		77	0.25		1737	0.20	

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 22
Effect Size (d) Estimates for Selection Decision Point for Operations

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	NA	-0.18	NA	0.58	0.09
African-American	NA	0.17	0.52	-0.11	0.21
Hispanic	-0.03	-0.70	0.24	0.58	-0.08
Multi-Racial	0.25	-0.33	0.10	-0.14	-0.04
Unanswered	-0.12	0.12	-0.01	-0.06	-0.01

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 21.

Gender Analysis for Avionics

Table 23 shows the Applicant Pool for Avionics positions by gender. Table 23 shows that women made up a very small percentage (3.5 percent) of the applicants. This data shows the recruiting challenge that the FAA has in trying to find qualified women for Avionics positions.

Table 23
Applicant Pool for Avionics

Gender	2009	2010	2011	2012	Total 09 to 12
Female	64 (2.9%)	75 (3.3%)	56 (3.9%)	76 (4.2%)	271 (3.5%)
Male	1823 (81.5%)	1871 (81.6%)	1231 (85.4%)	1350 (74.5%)	6275 (80.6%)
Unanswered	349 (15.6%)	348 (15.2%)	154 (10.7%)	387 (21.3%)	1238 (15.9%)
Total	**2236**	**2294**	**1441**	**1813**	**7784**

Note: Applicants who applied multiple times for the same division in a particular year were included only once for that job. Specifically, their best outcome in that was retained for analyses at each decision point.

Tables 24 and 25 show the adverse impact ratio and effect size for differences between men and women in meeting the qualifications for positions in Avionics. The adverse impact ratio is below 80 percent and the effect size is statistically significant and greater than 0.20. Therefore, we conclude that the Qualifications Decision Point for Avionics is a barrier to women in Avionics.

Table 24
Qualifications Determination Decision Point for Avionics

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	32	0.50	0.73	34	0.45	0.65	19	0.34	0.49	33	0.43	0.62	271	0.44	0.63
Male	1250	0.69		1311	0.70		855	0.69		951	0.70		6275	0.70	
Unanswered	230	0.66	0.96	239	0.69	0.98	102	0.66	0.95	212	0.55	0.78	1238	0.63	0.91

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 25
Effect Size (d) Estimates for Qualifications Determination Decision Point for Avionics

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.40**	0.54**	0.77**	0.59**	0.55**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 24.

Tables 26 and 27 show the adverse impact ratio and effect size for the Referral Decision Point. The adverse impact ratio is above 1.0. This indicates that women have a slightly higher probability of being referred for an interview than men although the effect size is not statistically significant. Therefore we conclude that the Referral Decision Point is not a barrier to women.

Table 26
Referral Decision Point for Avionics

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	3	0.09	0.62	7	0.21	1.40	4	0.21	1.43	2	0.06	1.18	118	0.14	1.06
Male	188	0.15		193	0.15		126	0.15		49	0.05		4367	0.13	
Unanswered	23	0.10	0.66	29	0.12	0.82	15	0.15	1.00	12	0.06	1.10	783	0.10	0.79

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 27
Effect Size (d) Estimates for Referral Decision Point for Avionics

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.16	-0.16	-0.18	-0.04	-0.05

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 26.

Tables 28 and 29 show the adverse impact ratio and effect size for subgroup differences at the Selection Decision Point by gender. The adverse impact ratio is above 1.0 and the effect size is not statistically significant. Therefore we conclude that the Selection Decision Point is not a barrier to women.

Table 28
Selection Decision Point for Avionics

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	0	NA	NA	2	0.29	1.85	2	0.50	1.80	0	NA	NA	16	0.25	1.35
Male	29	0.15		30	0.15		35	0.28		9	0.18		557	0.18	
Unanswered	4	0.17	1.13	2	0.07	0.45	9	0.60	2.16	2	0.17	0.91	79	0.22	1.16

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 29
Effect Size (d) Estimates for Selection Decision Point for Avionics

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	NA	-0.36	-0.49	NA	-0.41

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 28.

Gender Analysis for Maintenance

Table 30 shows the Applicant Pool for persons seeking positions in Maintenance. Here again women make up a very small percentage of the applicants.

Table 30
Applicant Pool for Maintenance

Gender	2009	2010	2011	2012	Total (09 to 12)
Female	183 (3.2%)	262 (4.0%)	108 (3.1%)	120 (3.7%)	673 (3.5%)
Male	4767 (82.5%)	5327 (81.5%)	2960 (85.0%)	2553 (77.7%)	15607 (81.8%)
Unanswered	826 (14.3%)	945 (14.5%)	414 (11.9%)	612 (18.6%)	2797 (14.7%)
Total	**5776**	**6534**	**3482**	**3285**	**19077**

Note: Applicants who applied multiple times for the same division in a particular year were included only once for that job. Specifically, their best outcome in that division was retained for analyses at each decision point.

Tables 31 and 32 show the adverse impact ratio and effect size for subgroup differences at the Qualifications Decision Point. The adverse impact ratio is below 80 percent and the effect size is statistically significant as well as above .20. Therefore we conclude that the Qualifications Determination Decision Point is a barrier for women seeking ASI positions in Maintenance.

Table 31
Qualifications Determination Decision Point for Maintenance

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	59	0.32	0.49	117	0.45	0.67	55	0.51	0.75	54	0.45	0.66	673	0.42	0.63
Male	3158	0.66		3572	0.67		2020	0.68		1728	0.68		15607	0.67	
Unanswered	539	0.65	0.99	568	0.60	0.90	285	0.69	1.01	404	0.66	0.98	2797	0.64	0.96

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 32
Effect Size (d) Estimates for Qualifications Determination Decision Point for Maintenance

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.72**	0.48**	0.37**	0.48**	0.53**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 31.

Tables 33 and 34 show the adverse impact ratio and effect size for male/female differences at the Referral Decision Point. Since the adverse impact ratio shows that women are slightly more successful at this decision point than men, this decision point is not a barrier.

Table 33
Referral Decision Point for Maintenance

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	4	0.07	0.63	15	0.13	1.27	10	0.18	1.05	3	0.06	0.85	285	0.11	1.01
Male	338	0.11		360	0.10		350	0.17		113	0.07		10478	0.11	
Unanswered	74	0.14	1.28	56	0.10	0.98	53	0.19	1.07	24	0.06	0.91	1796	0.12	1.04

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 34
Effect Size (d) Estimates for Referral Decision Point for Maintenance

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.13	-0.09	-0.02	0.04	0.01

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 33.

Tables 35 and 36 show the adverse impact ratio and effect size for male/female differences at the Selection Decision Point. These tables show that women are more successful at this decision point than men, so it is not a barrier.

Table 35
Selection Decision Point for Maintenance

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	1	0.25	1.72	4	0.27	1.52	1	0.10	0.45	1	NA	NA	32	0.22	1.20
Male	49	0.14		63	0.18		77	0.22		22	0.19		1161	0.18	
Unanswered	15	0.20	1.40	7	0.13	0.71	10	0.19	0.86	3	0.13	0.64	207	0.17	0.93

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 36
Effect Size (d) Estimates for Selection Decision Point for Maintenance

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	-0.30	-0.24	0.29	NA	-0.08

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 35.

Gender Analysis for Operations

Table 37 shows that the Applicant Pool for persons seeking ASI Operations positions by gender. The representation of women in this job category is somewhat higher than that for Avionics or Maintenance. Tables 37 through 43 show the adverse impact ratios and effect sizes for male/female differences at the Qualifications Determination, Referral and Selection Decision Points. In each comparison, our criterion for establishing a barrier is not met. Therefore, none of these decision points are barriers to women in Operations.

Table 37
Applicant Pool for Operations

Gender	2009	2010	2011	2012	Total 09 to 12
Female	331 (5.0%)	353 (5.2%)	241 (6.6%)	320 (5.8%)	1245 (5.5%)
Male	5160 (78.2%)	5213 (77.2%)	2914 (79.6%)	3273 (59.7%)	16560 (73.6%)
Unanswered	1111 (16.8%)	1185 (17.6%)	508 (13.9%)	1890 (34.5%)	4694 (20.9%)
Total	**6602**	**6751**	**3663**	**5483**	**22499**

Note: Applicants who applied multiple times for the same division in a particular year were included only once for that job. Specifically, their best outcome in that division was retained for analyses at each decision point.

Table 38
Qualifications Determination Decision Point for Operations

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Sample	PR	AI
Female	166	0.50	0.93	195	0.55	1.02	101	0.42	0.85	89	0.28	0.61	1245	0.44	0.86
Male	2775	0.54		2816	0.54		1432	0.49		1487	0.45		16560	0.51	
Unanswered	607	0.55	1.02	635	0.54	0.99	272	0.54	1.09	722	0.38	0.84	4694	0.48	0.93

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 39
Effect Size (d) Estimates for Qualifications Determination Decision Point for Operations

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.07	-0.02	0.14*	0.36**	0.11**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 38.

Table 40
Referral Decision Point for Operations

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	22	0.13	0.86	39	0.20	1.07	26	0.26	0.94	18	0.20	0.95	551	0.19	0.97
Male	428	0.15		525	0.19		394	0.28		318	0.21		8510	0.20	
Unanswered	101	0.17	1.08	127	0.20	1.07	85	0.31	1.14	137	0.19	0.89	2236	0.20	1.03

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 41
Effect Size (d) Estimates for Referral Decision Point for Operations

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.06	-0.03	0.04	0.03	0.02

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 40.

Table 42
Selection Decision Point for Operations

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	6	0.27	1.80	9	0.23	1.04	7	0.27	1.41	4	0.22	0.88	105	0.25	1.22
Male	65	0.15		117	0.22		75	0.19		80	0.25		1666	0.20	
Unanswered	17	0.17	1.11	23	0.18	0.81	18	0.21	1.11	37	0.27	1.07	450	0.21	1.04

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 43
Effect Size (d) Estimates for Selection Decision Point for Operations

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	-0.33	-0.02	0.20	0.07	-0.13

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 42.

SUMMARY OF RESULTS OF AVIONICS, MAINTENANCE, AND OPERATIONS

The RNO and gender analysis for Avionics, Maintenance, and Operations shows that the Qualifications Decision Point is a barrier in all three job-groups for Asians and African-Americans. This decision point is a barrier for females in Avionics and Maintenance but not in Operations. Finally, this decision point is a barrier for Hispanics and Multi-Racial applicants in Operations only. The Referral Decision Point is a barrier for Asians, African-Americans and Hispanics for Operations only. The Selection Decision Point is not a barrier for any RNO group or gender applicants in all three job-groups.

In the next section, we present the results from the quantitative RNO analyses for Air Carrier and then General Aviation. Following this, we present the results from the quantitative gender analysis for Air Carrier and General Aviation, respectively.

RNO Analysis for Air Carrier

We analyzed Flight Standards results based upon the type of aircraft involved, Air Carrier or General Aviation. Tables 44 through 56 present these results. Table 44 shows the Applicant Pool for Air Carrier positions by RNO. Table 44 shows that African-Americans, Hispanics and Asians made up 7.6, 4.6 and 2.4 percent of the applicant pool respectively.

Table 44
Applicant Pool for Air Carrier

Race/Ethnic Origin	2009	2010	2011	2012	Total 09 to 12
Asian	207 (2.5%)	198 (2.2%)	130 (2.6%)	128 (2.4%)	663 (2.4%)
African-American	568 (6.8%)	689 (7.7%)	417 (8.5%)	437 (8.1%)	2111 (7.6%)
Hawaiian	28 (0.3%)	36 (0.4%)	27 (0.5%)	23 (0.4%)	114 (0.4%)
Hispanic	396 (4.7%)	438 (4.9%)	231 (4.7%)	201 (3.7%)	1266 (4.6%)
Multi-Racial	330 (3.9%)	385 (4.3%)	300 (6.1%)	359 (6.6%)	1374 (5.0%)
Native American	78 (0.9%)	61 (0.7%)	29 (0.6%)	22 (0.4%)	190 (0.7%)
Unanswered	620 (7.4%)	637 (7.2%)	334 (6.8%)	1314 (24.3%)	2905 (10.5%)
White	6164 (73.5%)	6454 (72.5%)	3455 (70.2%)	2927 (54.1%)	19000 (68.8%)
Total	**8391**	**8898**	**4923**	**5411**	**27623**

Note: Applicants who applied multiple times for the same job in a particular year were included only once for that job. Specifically, their best outcome for a particular job was retained for analyses at each decision point.

Tables 45 and 46 show the adverse impact ratios and effect sizes for comparisons between RNO subgroups at the Qualification Determination Decision Point. The results show that the adverse impact ratios for Asians and African-Americans are below 80 percent. The effect sizes are statistically significant and above .20 for Asians, African-Americans, and Hispanics. Therefore, we conclude that the Qualifications Determination Decision Point is a barrier for these three groups.

Table 45
Qualifications Determination Decision Point for Air Carrier

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	108	0.52	0.78	108	0.55	0.81	66	0.51	0.78	64	0.50	0.74	663	0.52	0.78
African-American	214	0.38	0.56	240	0.35	0.52	170	0.41	0.63	179	0.41	0.61	2111	0.38	0.57
Hispanic	215	0.54	0.81	232	0.53	0.79	131	0.57	0.87	125	0.62	0.92	1266	0.56	0.83
Multi-Racial	204	0.62	0.92	227	0.59	0.88	170	0.57	0.87	181	0.50	0.75	1374	0.57	0.85
Unanswered	428	0.69	1.03	408	0.64	0.95	231	0.69	1.06	673	0.51	0.76	2905	0.60	0.90
White	4134	0.67		4338	0.67		2245	0.65		1980	0.68		19000	0.67	

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 46
Effect Size (d) Estimates for Qualifications Determination Decision Point for Air Carrier

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.32**	0.27**	0.30**	0.38**	0.31**
African-American	0.62**	0.69**	0.51**	0.57**	0.62**
Hispanic	0.27**	0.30**	0.17**	0.12	0.24**
Multi-Racial	0.11*	0.18**	0.17**	0.37**	0.19**
Unanswered	-0.04	0.07	-0.09	0.34**	0.06**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 45.

Tables 47 and 48 show the adverse impact ratios and effect sizes for the differences between RNO subgroups at the Referral Decision Point. Although the adverse impact ratio is below 80 percent for Asians and Hispanics, only the effect size for Hispanics is statistically significant. Therefore, we conclude that the Referral Decision Point is a barrier for Hispanics with regard to RNO applicants seeking positions in the Air Carrier job group.

Table 47
Referral Decision Point for Air Carrier

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	10	0.09	0.85	10	0.09	0.76	6	0.09	0.51	6	0.09	0.84	346	0.09	0.73
African-American	27	0.13	1.16	21	0.09	0.71	23	0.14	0.75	14	0.08	0.70	803	0.11	0.84
Hispanic	17	0.08	0.73	17	0.07	0.60	16	0.12	0.68	6	0.05	0.43	703	0.08	0.63
Multi-Racial	16	0.08	0.72	34	0.15	1.22	37	0.22	1.21	16	0.09	0.80	782	0.13	1.04
Unanswered	55	0.13	1.18	53	0.13	1.06	49	0.21	1.18	68	0.10	0.91	1740	0.13	1.02
White	449	0.11		531	0.12		403	0.18		220	0.11		12697	0.13	

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 48
Effect Size (d) Estimates for Referral Decision Point for Air Carrier

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.05	0.09	0.23	0.06	0.10
African-American	-0.06	0.11	0.12	0.11	0.06
Hispanic	0.10	0.15	0.15	0.20*	0.14**
Multi-Racial	0.10	-0.08	-0.10	0.07	0.00
Unanswered	-0.06	-0.02	-0.08	0.03	-0.04

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 47.

Tables 49 and 50 show the adverse impact ratios and effect sizes for differences by RNO for the Selection Decision Point. This table shows that the adverse impact ratios are above 80 percent for all subgroups and none of the effect sizes are statistically significant or above 0.20. Therefore, this decision point is not a barrier when considering RNO applicants for Air Carrier positions as a whole.

Table 49
Selection Decision Point for Air Carrier

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	1	0.10	0.61	2	0.20	1.03	2	0.33	1.82	0	0.00	0.00	32	0.16	0.83
African-American	3	0.11	0.67	6	0.29	1.47	3	0.13	0.71	3	0.21	0.96	85	0.18	0.94
Hispanic	4	0.24	1.43	1	0.06	0.30	3	0.19	1.02	0	0.00	0.00	56	0.14	0.76
Multi-Racial	1	0.06	0.38	9	0.26	1.36	6	0.16	0.88	3	0.19	0.84	103	0.18	0.99
Unanswered	9	0.16	0.99	6	0.11	0.58	8	0.16	0.89	20	0.29	1.32	225	0.19	1.02
White	74	0.16		103	0.19		74	0.18		49	0.22		1603	0.19	

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 50
Effect Size (d) Estimates for Selection Decision Point for Air Carrier

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.18	-0.02	-0.39	0.54	0.02
African-American	0.15	-0.23	0.14	0.02	0.00
Hispanic	-0.19	0.35	-0.01	0.54	0.13
Multi-Racial	0.28	-0.18	0.06	0.08	0.04
Unanswered	0.00	0.21	0.05	-0.17	0.05

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 49.

RNO Analysis for General Aviation

Table 51 shows the Applicant Pool for General Aviation positions by RNO. Table 51 shows that Asians did not make up two percent of the applicants in this job group. However, because the Asian subgroup is greater than two percent of the applicant pool for the other job categories, we present the information for this subgroup in General Aviation for comparison purposes. African-Americans, Hispanics and Multi-Racial made up 6.1, 4.0 and 5.1 percent of the applicant pool respectively.

Table 51
Applicant Pool for General Aviation

Race/Ethnic Origin	2009	2010	2011	2012	Total 09 to 12
Asian	125 (2.0%)	122 (1.8%)	67 (1.8%)	96 (1.9%)	410 (1.9%)
African-American	323 (5.2%)	355 (5.3%)	261 (7.1%)	394 (7.6%)	1333 (6.1%)
Hawaiian	16 (0.3%)	35 (0.5%)	12 (0.3%)	18 (0.3%)	81 (0.4%)
Hispanic	245 (3.9%)	290 (4.3%)	148 (4.0%)	181 (3.5%)	864 (4.0%)
Multi-Racial	239 (3.8%)	279 (4.2%)	235 (6.4%)	361 (7.0%)	1114 (5.1%)
Native American	65 (1.0%)	58 (0.9%)	23 (0.6%)	30 (0.6%)	176 (0.8%)
Unanswered	453 (7.3%)	499 (7.5%)	261 (7.1%)	1312 (25.4%)	2525 (11.6%)
White	4757 (76.4%)	5043 (75.5%)	2656 (72.5%)	2778 (53.7%)	15234 (70.1%)
Total	**6223**	**6681**	**3663**	**5170**	**21737**

Note: Applicants who applied multiple times for the same job in a particular year were included only once for that job. Specifically, their best outcome for a particular job was retained for analyses at each decision point.

Tables 52 and 53 show the adverse impact ratios and effect sizes for the differences in between RNO subgroups at the Qualifications Determination Decision Point for General Aviation. African-American applicants had an adverse impact ratio less than 80 percent and a statically significant effect size that was greater than 0.20. Therefore, the Qualifications Determination Decision Point was a barrier for only African-Americans.

Table 52
Qualifications Determination Decision Point for General Aviation

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	61	0.49	0.85	64	0.52	0.88	43	0.64	1.07	36	0.38	0.66	410	0.50	0.85
African-American	119	0.37	0.64	152	0.43	0.71	95	0.36	0.61	98	0.25	0.44	1333	0.35	0.60
Hispanic	123	0.50	0.88	152	0.52	0.87	73	0.49	0.82	87	0.48	0.85	864	0.50	0.86
Multi-Racial	128	0.54	0.93	160	0.57	0.96	112	0.48	0.80	123	0.34	0.60	1114	0.47	0.80
Unanswered	247	0.55	0.95	284	0.57	0.95	159	0.61	1.02	520	0.40	0.70	2525	0.48	0.82
White	2726	0.57		3023	0.60		1590	0.60		1569	0.56		15234	0.58	

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 53
Effect Size (d) Estimates for Qualifications Determination Decision Point for General Aviation

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.17	0.15	-0.09	0.38**	0.16**
African-American	0.41**	0.35**	0.48**	0.65**	0.45**
Hispanic	0.14*	0.15**	0.21**	0.17**	0.16**
Multi-Racial	0.08	0.05	0.25**	0.45**	0.17**
Unanswered	0.06	0.06	-0.02	0.34**	0.11**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 52.

Tables 54 and 55 show the adverse impact ratios and effect sizes for the Referral Decision Point by RNO.

Table 54
Referral Decision Point for General Aviation

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	11	0.18	1.03	7	0.11	0.61	6	0.14	0.56	2	0.06	0.40	204	0.13	0.70
African-American	22	0.18	1.06	19	0.13	0.70	19	0.20	0.80	8	0.08	0.58	464	0.15	0.80
Hispanic	15	0.12	0.70	20	0.13	0.74	22	0.30	1.21	9	0.10	0.74	435	0.15	0.83
Multi-Racial	22	0.17	0.98	34	0.21	1.19	22	0.20	0.79	12	0.10	0.70	523	0.17	0.94
Unanswered	42	0.17	0.97	53	0.19	1.04	49	0.31	1.24	91	0.18	1.25	1210	0.19	1.06
White	477	0.17		540	0.18		396	0.25		219	0.14		8908	0.18	

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 55
Effect Size (d) Estimates for Referral Decision Point for General Aviation

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	-0.01	0.18	0.25	0.24	0.15*
African-American	-0.03	0.14	0.11	0.17	0.09*
Hispanic	0.14	0.12	-0.12	0.10	0.08
Multi-Racial	0.01	-0.09	0.12	0.12	0.02
Unanswered	0.01	-0.02	-0.14	-0.10*	-0.05

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 54.

Tables 56 and 57 show the adverse impact ratios and effect sizes for the Selection Decision Point by RNO. Only the adverse ratio for African-Americans was below 80 percent. However, none of the effect sizes were statistically significant or greater than 0.20. Therefore, we conclude that the Selection Decision Point is not a barrier for any subgroup when considering General Aviation as a whole.

Table 56
Selection Decision Point for General Aviation

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	3	0.27	1.79	1	0.14	0.77	0	0.00	0.00	1	NA	NA	26	0.19	0.94
African-American	3	0.14	0.89	4	0.21	1.13	2	0.11	0.39	2	0.25	1.00	68	0.16	0.79
Hispanic	1	0.07	0.44	6	0.30	1.61	8	0.36	1.36	1	0.11	0.44	66	0.24	1.18
Multi-Racial	3	0.14	0.89	7	0.21	1.10	7	0.32	1.19	4	0.33	1.33	90	0.23	1.14
Unanswered	9	0.21	1.40	9	0.17	0.91	14	0.29	1.07	20	0.22	0.88	235	0.22	1.08
White	73	0.15		101	0.19		106	0.27		55	0.25		1634	0.21	

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 57
Effect Size (d) Estimates for Selection Decision Point for General Aviation

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	-0.33	0.11	0.61	NA	0.10
African-American	0.05	-0.06	0.37	0.00	0.08
Hispanic	0.24	-0.29	-0.22	0.33	-0.03
Multi-Racial	0.05	-0.05	-0.11	-0.19	-0.06
Unanswered	-0.17	0.04	-0.04	0.07	-0.03

Note: *p<.05; **p<.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 56.

Gender Analysis for Air Carrier

Table 58 shows the demographic makeup of the Applicant Pool for Air Carrier ASI positions by gender. Table 58 shows that women constituted a mere 4.4 percent of the applicants.

Table 58
Applicant Pool for Air Carrier

Gender	2009	2010	2011	2012	Total 09 to 12
Female	333 (4.0%)	398 (4.5%)	231 (4.7%)	249 (4.6%)	1211 (4.4%)
Male	6729 (80.2%)	7094 (79.7%)	4084 (83.0%)	3704 (68.5%)	21611 (78.2%)
Unanswered	1329 (15.8%)	1406 (15.8%)	608 (12.4%)	1458 (26.9%)	4801 (17.4%)
Total	**8391**	**8898**	**4923**	**5411**	**27623**

Note: Applicants who applied multiple times for the same job in a particular year were included only once for that job. Specifically, their best outcome for a particular job was retained for analyses at each decision point.

Tables 59 and 60 show the adverse impact ratio and effect size for gender differences at the Qualifications Decision Point. The adverse impact ratio is below 80 percent, and the effect size is statically significant in addition to being greater than .20. Therefore, we conclude that the Qualifications Decision Point is a barrier for women seeking Air Carrier ASI positions.

Table 59
Qualifications Determination Decision Point for Air Carrier

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	147	0.44	0.68	181	0.45	0.71	103	0.45	0.71	93	0.37	0.58	1211	0.43	0.67
Male	4367	0.65		4561	0.64		2556	0.63		2372	0.64		21611	0.64	
Unanswered	853	0.64	0.99	861	0.61	0.95	390	0.64	1.02	762	0.52	0.82	4801	0.60	0.93

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 60
Effect Size (d) Estimates for Qualifications Determination Decision Point for Air Carrier

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.43**	0.39**	0.37**	0.56**	0.43**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 59.

Tables 61 through 64 show the adverse impact ratios and effect sizes for gender differences at the Referral and Selection Decision Points. The data in these tables indicates that neither the Referral nor the Selection Decision Point is a barrier to women seeking Air Carrier ASI positions.

Table 61
Referral Decision Point for Air Carrier

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	11	0.07	0.70	20	0.11	0.93	18	0.17	1.01	9	0.10	0.94	524	0.11	0.90
Male	464	0.11		542	0.12		444	0.17		245	0.10		13856	0.12	
Unanswered	107	0.13	1.18	107	0.12	1.05	80	0.21	1.18	78	0.10	0.99	2866	0.13	1.06

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 62
Effect Size (d) Estimates for Referral Decision Point for Air Carrier

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.10	0.03	0.00	0.02	0.04

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 61.

Table 63
Selection Decision Point for Air Carrier

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	2	0.18	1.17	7	0.35	1.79	3	0.17	0.94	1	0.11	0.50	58	0.22	1.22
Male	72	0.16		106	0.20		79	0.18		54	0.22		1695	0.18	
Unanswered	19	0.18	1.14	14	0.13	0.67	15	0.58	1.14	20	0.58	1.14	372	0.18	1.00

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 64
Effect Size (d) Estimates for Selection Decision Point for Air Carrier

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	-0.07	-0.39	0.03	0.27	-0.10

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 63.

Gender Analysis for General Aviation

Table 65 shows the demographic makeup for the General Aviation Applicant pool with respect to gender. Table 65 shows that here again, the proportion of female applicants is very small.

Table 65
Applicant Pool for General Aviation

Gender	2009	2010	2011	2012	Total 09 to 12
Female	245 (3.9%)	292 (4.4%)	72 (3.4%)	267 (5.1%)	876 (4.3%)
Male	5021 (80.7%)	5317 (79.6%)	1751 (83.7%)	3472 (66.8%)	15561 (77.0%)
Unanswered	957 (15.4%)	1072 (16.0%)	269 (12.9%)	1461 (28.1%)	3759 (18.6%)
Total	**6223**	**6681**	**2092**	**5200**	**20196**

Note: Applicants who applied multiple times for the same job in a particular year were included only once for that job. Specifically, their best outcome for a particular job was retained for analyses at each decision point.

Tables 66 through 71 show the adverse impact ratios and effect sizes for gender differences in General Aviation. The data in these tables shows that the Qualifications Determination Decision Point is a barrier for females in General Aviation but the Referral and Selection Decision Points are not.

Table 66
Qualifications Determination Decision Point for General Aviation

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	110	0.45	0.80	165	0.57	0.96	72	0.41	0.71	83	0.31	0.60	876	0.44	0.78
Male	2816	0.56		3138	0.59		1751	0.58		1794	0.52		15561	0.56	
Unanswered	523	0.55	0.97	581	0.54	0.92	269	0.57	0.99	576	0.39	0.76	3759	0.49	0.87

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 67
Effect Size (d) Estimates for Qualifications Determination Decision Point for General Aviation

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.23**	0.05	0.34**	0.41**	0.24**

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 66.

Table 68
Referral Decision Point for General Aviation

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	18	0.16	0.94	41	0.25	1.45	22	0.31	1.26	14	0.17	1.29	430	0.22	1.24
Male	490	0.17		536	0.17		426	0.24		235	0.13		9499	0.18	
Unanswered	91	0.17	1.00	105	0.18	1.06	73	0.27	1.12	95	0.16	1.26	1949	0.19	1.05

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 69
Effect Size (d) Estimates for Referral Decision Point for General Aviation

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.03	-0.20**	-0.14	-0.11	-0.12*

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 68.

Table 70
Selection Decision Point for General Aviation

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	5	0.28	1.92	8	0.20	1.01	7	0.32	1.26	4	0.29	1.18	95	0.25	1.25
Male	71	0.14		104	0.19		108	0.25		57	0.24		1689	0.20	
Unanswered	17	0.19	1.29	18	0.17	0.89	22	0.58	1.14	22	0.58	1.14	364	0.36	1.08

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 71
Effect Size (d) Estimates for Selection Decision Point for General Aviation

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	-0.37	0.00	-0.15	-0.10	-0.12

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 70.

SUMMARY OF RESULTS FOR AIR CARRIER AND GENERAL AVIATION

Quantitative analyses were conducted for RNO and gender differences when job categories were identified as Air Carrier or General Aviation. The results show that the Qualifications Determination Decision Point is the main barrier. Specifically, it is a barrier to Air Carrier Positions for Asians, African-Americans, Hispanics, and women. It is also a barrier to African-American applicants and women in General Aviation. The Referral Decision Point is a barrier for only Hispanics in Air Carrier and only Asians in General Aviation. No other barriers were found.

RNO Analysis for Aircraft Certification

Table 72 shows the Applicant Pool for Aircraft Certification ASI positions by RNO. The table shows that there were far fewer applicants for positions in Aircraft Certification than Flight Standards. African-Americans, Hispanics, and Asians made up 7.7, 4.6, and 3.0 percent of the applicant pool respectively.

Table 72
Applicant Pool for Aircraft Certification

Race/Ethnic Origin	200 9	2010	2011	2012	Total 09 to 12
Asian	27 (3.8%)	21 (2.4%)	18 (3.2%)	6 (2.6%)	72 (3.0%)
African-American	46 (6.4%)	63 (7.1%)	55 (9.7%)	20 (8.6%)	184 (7.7%)
Hawaiian	1 (0.1%)	3 (0.3%)	1 (0.2%)	0 (0.0%)	5 (0.2%)
Hispanic	29 (4.0%)	40 (4.5%)	24 (4.2%)	17 (7.3%)	110 (4.6%)
Multi-Racial	25 (3.5%)	41 (4.6%)	28 (4.9%)	22 (9.4%)	116 (4.8%)
Native American	8 (1.1%)	6 (0.7%)	5 (0.9%)	0 (0.0%)	19 (0.8%)
Unanswered	41 (5.7%)	54 (6.1%)	38 (6.7%)	48 (20.5%)	181 (7.5%)
White	540 (75.3%	656 (74.2%)	400 (70.3%)	121 (51.7%)	1717 (71.4%)
Total	**717**	**884**	**569**	**234**	**2404**

Note: Applicants who applied multiple times for the same job in a particular year were included only once for job. Specifically, their best outcome for a particular job was retained for analyses at each decision point.

Tables 73 and 74 show the adverse impact ratios and effect sizes for comparisons between racial and ethnic groups at the Qualifications Determination Decision Point. The adverse impact ratio is below 80 percent for African-Americans. The effect size for this group is statically significant and greater than 0.20. We conclude the Qualifications Determination Decision Point is a barrier for African-Americans seeking positions in Aircraft Certification.

Table 73
Qualifications Determination Decision Point for Aircraft Certification

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	2	.07	0.43	9	.43	1.03	3	.17	0.79	4	.67	2.37	72	0.25	0.89
African-American	0	.00	0.00	19	.30	0.72	7	.13	0.61	1	.05	0.18	184	0.15	0.52
Hispanic	5	.17	0.99	16	.40	0.96	3	.13	0.60	5	.29	1.05	110	0.26	0.93
Multi-Racial	4	.16	0.92	18	.44	1.05	8	.29	1.36	6	.27	0.97	116	0.31	1.10
Unanswered	7	.17	0.98	25	.46	1.11	4	.11	0.50	6	.13	0.44	181	0.23	0.82
White	94	.17		273	.42		84	.21		34	.28		1717	0.28	

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column, total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 74
Effect Size (d) Estimates for Qualifications Determination Decision Point for Aircraft Certification

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	0.27**	-0.03	0.11	-0.86*	-0.13
African-American	0.48**	0.23**	0.21**	0.54*	0.36**
Hispanic	0.00	0.03	0.21**	-0.03	0.06
Multi-Racial	0.04	-0.05	-0.18**	0.02	-0.04
Unanswered	0.01	-0.09**	0.26**	0.37*	0.13

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 73.

Tables 75 and 76 show the adverse impact ratios and effect sizes for comparisons at the Referral Decision Point by RNO. The adverse impact ratio is below 80 percent for Asians. The effect size for Asians is statistically significant and above 0.20. Therefore, the Referral Decision Point is a barrier for Asians.

Table 75

Referral Decision Point for Aircraft Certification

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	0	NA	NA	1	.11	0.27	0	NA	NA	1	0.25	0.35	18	0.11	0.23
African-American	0	NA	NA	9	.47	1.15	2	.29	0.50	1	NA	NA	27	0.44	0.91
Hispanic	1	0.20	0.35	6	.38	0.91	3	NA	NA	4	0.80	1.13	29	0.48	0.99
Multi-Racial	2	0.50	0.89	7	.39	0.95	5	.63	1.09	4	0.67	0.94	36	0.50	1.02
Unanswered	5	0.71	1.27	9	.36	0.88	1	.25	0.44	2	0.33	0.47	42	0.40	0.83
White	53	0.56		112	.41		48	.57		24	0.71		485	0.49	

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. PR and AI were not calculated when the number of eligible minority subgroup members for a particular year was less than 4. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 76

Effect Size (d) Estimates for Referral Decision Point for Aircraft Certification

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	NA	0.61**	NA	1.00	0.82**
African-American	NA	-0.13**	0.58**	NA	0.17
Hispanic	0.74**	0.07	NA	-0.21	0.20
Multi-Racial	0.13	0.04	-0.11	0.09	0.04
Unanswered	-0.30*	0.10**	0.65**	0.81	0.29

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 75.

Tables 77 and 78 show the adverse impact ratios and effect sizes for comparisons at the Final Selection Point by RNO. It can be seen from Table 77 that by the time applicants reach this

decision point their numbers are very low. The data show that the adverse impact ratios for the African-Americans, Hispanics, and Multi-Racial subgroups are below 0.80. However, none of the effect sizes were significant or above 0.20. Thus, the Selection Decision Point did not meet the definition of a barrier for any subgroup.

Table 77

Selection Decision Point for Aircraft Certification

Race/Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	0	NA	NA	0	NA	NA	0	NA	NA	0	NA	NA	2	NA	NA
African-American	0	NA	NA	1	0.11	1.13	0	NA	NA	0	NA	NA	12	0.08	0.66
Hispanic	0	NA	NA	0	0.00	0.00	0	NA	NA	1	0.25	6.00	14	0.07	0.56
Multi-Racial	0	NA	NA	0	0.00	0.00	1	0.13	0.46	1	0.25	6.00	21	0.10	0.75
Unanswered	1	0.20	2.12	0	0.00	0.00	0	NA	NA	1	NA	NA	17	0.12	0.93
White	5	0.09		11	0.10		13	0.27		1	0.04		237	0.13	

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. PR and AI were not calculated when the number of eligible minority subgroup members for a particular year was less than 4. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 78

Effect Size (d) Estimates for Selection Decision Point for Aircraft Certification

Race/Ethnic Origin	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Asian	NA	NA	NA	NA	NA
African-American	NA	-0.04	NA	NA	-0.04
Hispanic	NA	0.34**	NA	-0.87	-0.24
Multi-Racial	NA	0.34**	0.34**	-0.87	-0.07
Unanswered	-0.35	0.34**	NA	NA	0.02

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 77.

Gender Analysis for Aircraft Certification

Table 79 shows the Applicant Pool for Aircraft Certification by gender. This table shows that women made up only 5.4 percent of the applicants. The total number of applicants (2,404) is much smaller than the number of applicants for positions in Flight Standards.

Table 79
Applicant Pool for Aircraft Certification

Gender	2009	2010	2011	2012	Total (09 to 12)
Female	38 (5.3%)	47 (5.3%)	31 (5.4%)	14 (6.0%)	130 (5.4%)
Male	578 (80.6%)	707 (80.0%)	461 (81.0%)	167 (71.4%)	1913 (79.6%)
Unanswered	101 (14.1%)	130 (14.7%)	77 (13.5%)	53 (22.6%)	361 (15.0%)
Total	**717**	**884**	**569**	**234**	**2404**

Note: Applicants who applied multiple times for the same job in a particular year were included only once for that job. Specifically, their best outcome for a particular job was retained for analyses at each decision point.

Tables 80 through 85 show the adverse impact ratios and effect sizes for the Qualifications Determination, Referral and Selection Decision Points by gender. The tables show that only the Selection Decision Point was a barrier for women.

Table 80
Qualifications Determination Decision Point for Aircraft Certification

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	7	0.18	1.22	20	0.43	1.02	9	0.29	1.52	6	0.43	1.63	130	0.32	1.20
Male	87	0.15		294	0.42		88	0.19		44	0.26		1913	0.27	
Unanswered	19	0.19	1.25	51	0.39	0.94	13	0.17	0.88	6	0.11	0.43	361	0.25	0.92

Note: Freq=number of people in each category that passed the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be qualified. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be qualified. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 81
Effect Size (d) Estimates for Qualifications Determination Decision Point for Aircraft Certification

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	-0.09	-0.02	-0.25	-0.37	-0.13

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 80.

Table 82
Referral Decision Point for Aircraft Certification

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	6	.86	1.69	8	.40	1.01	7	.78	1.43	3	.50	0.71	42	0.57	1.22
Male	44	.51		117	.40		48	.55		31	.70		513	0.47	
Unanswered	11	.58	1.14	22	.43	1.08	5	.38	0.71	2	.33	0.47	89	0.45	0.96

Note: Freq=number of people in each category that passed the Referral Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be referred. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be referred. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 83
Effect Size (d) Estimates for Referral Decision Point for Aircraft Certification

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	-0.71	0.00	-0.47	0.44	0.04

Note: *p≤.05; **p≤.01 In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 82.

Table 84
Selection Decision Point for Aircraft Certification

Gender	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Female	0	0.00	0.00	0	0.00	0.00	2	0.18	1.24	0	NA	NA	28	0.07	0.64
Male	4	0.09		12	0.10		11	0.15		3	0.10		267	0.11	
Unanswered	2	0.18	2.00	0	0.00	0.00	1	0.58	1.14	1	0.58	1.14	48	0.22	1.98

Note: Freq=number of people in each category that passed the Selection Decision Point; PR=pass rate; AI=adverse impact ratio. In the shaded column labeled Average (09 to 12), total eligible represents the sum of the number of people in each category eligible to be selected. The PR in this shaded column is the total number of people passing in each category over the years (i.e., sum of Freqs across 2009 to 2012) by the total number of people eligible to be selected. The average AI was computed by dividing the computed average PR for a particular category by the average PR for the White group.

Table 85
Effect Size (d) Estimates for Selection Decision Point for Aircraft Certification

Gender	2009	2010	2011	2012	Weighted Average (09 to 12)
	d	d	d	d	d
Female	0.33	0.35	-0.10	NA	0.20

Note: *p≤.05; **p≤.01. In the last column, the effect size *(d)* is a weighted average. The statistical significance of this weighted average is based on the total sample size for each category in Table 84.

Table 86
Summary of Results for Aircraft Certification

Hiring Process Decision Point	Race/Ethnicity/Gender	Barrier (Yes/No)
Qualifications Determination	Asian	NA
	African-American	YES
	Hispanic	NO
	Multi-Racial	NO
	Female	NO
Referral for Interview	Asian	YES
	African-American	NO
	Hispanic	NO
	Multi-Racial	NO
	Female	NO
Final Selection	Asian	NA
	African-American	NO
	Hispanic	NO
	Multi-Racial	NO
	Female	YES

SUMMARY OF RESULTS: AIRCRAFT CERTIFICATION

The quantitative analysis for Aircraft Certification shows that there are almost no barriers. African-Americans had a barrier at the Qualifications Determination Decision Point and Asians had a barrier at the Referral Decision Point. It should be noted that the minority and female applicant pools for Aircraft Certification positions are very small, as is the case for all applicants for these positions. This indicates that the pipeline of applicants to be screened is quite narrow, which diminishes the likelihood that proportionate selection rates can be achieved.

Root Cause Analysis of Decision Points

In this section, we discuss our analyses of the root causes for any potential barriers. This analysis was informed by the previously discussed quantitative analysis, but also by a review of ASI documents (see appendix A), interviews with Oklahoma City HR specialists, FSDO and CMO supervisors/managers, regional AFS personnel managers, AIR personnel, and ASIs.

DECISION POINT 1: QUALIFICATIONS DETERMINATION[15]

The results of the barrier analysis indicate that the Qualifications Determination Decision Point is the primary barrier to minorities and women gaining entry into jobs in Avionics, Maintenance, and Operations. The Qualifications Determination Decision Point was determined to be a barrier for entry into Aircraft Certification positions, but it was only a barrier for African-Americans. We identified several factors at the root of this barrier. First, there is a low proportion of minority applicants from the various RNO subgroups. Table 87 shows the proportion of the total applicant pool that consisted of minority or female applicants. As shown in Table 87, not only is the RNO and gender representation low, it can fluctuate considerably within and across subgroups by job category. As an example, within the African-American subgroup, representation fluctuates from a low of 5.3 percent in Operations to a high of 9.1 percent in Avionics. Female representation on the other hand, is consistently very low, ranging from 3.5 percent in Avionics and Maintenance to only 5.5 percent in Operations. These low proportions of applicants place tremendous importance on the FAA's recruitment and outreach efforts. These low proportions are due in part to the paucity of some subgroups in the relevant labor market. As an example, the U.S. Census Bureau reports that in 2010 African-Americans were only one percent of pilots and flight engineers and only seven percent of aircraft mechanics and service technicians. Similarly, women made up only 2.3 percent of aircraft mechanics and service technicians.[16] The relatively high requirements for specific training and technical experience make it very difficult to achieve workforce diversity.

A second factor that lies at the root of the barriers identified in the qualitative analysis are the substantial differences in the knowledge applicants have about how to negotiate their way through the application process. Interviews with ASIs indicate that they find the computerized application process extremely cumbersome. They expressed significant displeasure with the fact that they were unsure of what information about their training and experience was most relevant and how to express that information using terms and "key words" so that their qualifications would be picked up by the computer-based application screening process. They expressed particular concern about how to match their training and experience to the knowledge, skills and abilities (KSA's) listed on the application or in the

[15] It is important to note that the root cause analysis findings apply to both AIR and AFS. The current AFS process may need more changes to incorporate these recommendations than the AIR process.

[16] 2010 United States Census, U.S. Census Bureau, Employed Civilians by Occupation, Sex, Race, and Hispanic Origin.

announcement. Minority applicants may have particular difficulty with these aspects of the application process.

A third factor that underlies the barriers posed by the Qualifications Determination Decision Point is differential exposure or access to key information about what qualifications the agency is seeking. Some applicants acquire an advantage in this regard by calling or actually visiting field offices and finding out from personnel at those offices how to best fill out their application or otherwise provide the best picture of their qualifications.

Table 87

Proportion of the Applicant Pools Made Up of Minorities and Women

Applicant Pool	Race/Ethnicity/Gender	Percentage of Applicant Pool
Avionics	Asian	2.6
	African-American	9.1
	Hispanic	4.7
	Multi-Racial	6.5
	Female	3.5
Maintenance	Asian	2.5
	African-American	8.1
	Hispanic	5.3
	Multi-Racial	5.2
	Female	3.5
Operations	Asian	1.7
	African-American	5.3
	Hispanic	3.4
	Multi-Racial	4.4
	Female	5.5
Aircraft Certification	Asian	3.0
	African-American	7.7
	Hispanic	4.6
	Multi-Racial	4.8
	Female	5.4
Air Carrier	Asian	2.4
	African-American	7.6
	Hispanic	4.6
	Multi-Racial	5.0
	Female	4.4
General Aviation	Asian	1.9
	African-American	6.1
	Hispanic	4.0
	Multi-Racial	5.1
	Female	4.3

Other applicants are simply referred to the online application website and not provided with any further information.

The final factor at the root of the barriers presented at the Qualifications Determination Decision Point is the lack of technical expertise on the part of the HR specialists responsible for examining applications and determining if the information matches the qualifications called for on the vacancy announcement. This problem is particularly acute with regard to examination of the applicants' attempts to address the KSAs. This lack of expertise may prevent the HR specialists from being able to make the subtle distinctions in qualifications that separate better qualified applicants from those who are less qualified.

DECISION POINT 2: REFERRAL FOR INTERVIEW

The referral of the best qualified applicants for an interview appears to be a barrier to the extent that the problems noted above are present. That is, if applicants differ in their ability to understand how their training and experience is to be presented and some applicants have more information as to how to overcome this problem than others, those with this information will obtain a higher application score and are more likely to be referred. The root causes noted with regard to Decision Point 1 above also carry over to the Referral Decision Point. If the HR specialists have difficulty properly analyzing and crediting the more detailed technical aspects of the applicants' background and experience, they are more likely not to fully credit some applicants with relevant credentials.

DECISION POINT 3: SELECTION BASED ON THE INTERVIEW

Here again our analyses show that for minority and female applicants who reach the interview decision point, there is no barrier in terms of getting hired. However, interviews with ASIs, as well as hiring managers, indicate a number of problems that do not comport with best practices. Those problems include the following:

- Significant differences in how interviews are conducted across offices and regions. For example, even though it is officially part of the ASI selection process, some of the ASI personnel that we spoke to indicated that they did not have a final interview with the selection manager.
- Lack of consistent oversight regarding whether and how interviews are to be conducted.
- Lack of consistency in the protocols used to conduct the interview.
- Lack of training for interviewers.

Recommended Root Cause Corrective Actions to Eliminate Barriers

Evidence of barriers was found for racial/ethnic minorities at the first two decision points.

1. Qualifications Determination of applications
2. Referral for Interview

No evidence of barriers were found for the other decision points.

3. Selection Based on the Interview
4. Medical Clearance
5. Security Clearance

Decision Point 1: Qualifications Determination

- Greater efforts should be taken to recruit qualified minorities and women for the ASI position. These should include near term efforts such as coordinating with minority colleges, universities and training schools that have programs in aviation-related fields.
- There should be long-term efforts to partner with the Department of Defense and the armed services to gain access to personnel in the aviation field who are retiring or have completed their service.
- Detailed information should be disseminated to all applicants as to how to best complete the online application process. If possible, applicants should be provided examples of properly completed applications.
- There should be greater oversight of information provided to potential applicants by personnel in field offices.
- Applicants should be made aware of the locations where vacancies exist and/or encouraged to apply for positions wherever they exist, so long as they are actually willing to work in those locations for an extended period of time.

Decision Point 2: Referral for Interview

HR specialists should be given technical training or be provided access to technical experts who can provide assistance in assessing technical information provided by applicants.

Decision Point 3: Selection Based on the Interview (for comportment with best practices)

- Efforts should be taken to standardize the interview process.
- Interviewers should be given training before being allowed to interview.
- There should be greater oversight of the interview process across offices and regions.

Measuring Competencies via the Interview

- Specification of the competencies being assessed by the interview
- For each competency, several questions should be provided.
- Each interview should consist of at least one question tapping each competency to be assessed.
- All interviews conducted for a particular job opening should consist of the same questions.
- Interview questions need to be changed/updated periodically.
- Either situational or historical behavioral evidence questions should be used.

Rating Scales and Process

- Rating scales should be defined with specific behaviors (anchors) that explain the points along the scale.
- Interview panel members should review their notes before providing ratings.
- Interview panel members should independently rate each interviewee. No consensus discussion (which is susceptible to power differentials, and personality differences among the raters) should take place prior independent ratings.
- An overall score should be obtained via mathematical averaging.

Note-taking

- Interview panel members should make detailed notes during the interview that describe the responses provided by the interviewee (no general impressions or evaluations recorded).
- All notes should be retained in computer files. This will help to document the process and justify the evaluations, if called upon to do so.

Appendix A
Documents Examined

1. Announcements for Aviation Safety Inspector 2006, 2007, 2008, 2009, 2010, 2011
2. Cancelled Aviation Safety Inspector Announcements
3. Background Documents 2011 AVS Forum Tiger Team--Power Point Diversity and Inclusion Best Practices & Next Practices 050311
4. Background Documents 2011 AVS Forum Tiger Team--Power Point Diversity and Inclusion Tiger Team Briefing Draft Version 2
5. Background Documents 2011 AVS Forum Tiger Team--Power Point Diversity and Inclusion Tiger Team Briefing Draft Version 3
6. Background Documents 2011 AVS Forum Tiger Team--Power Point Diversity and Inclusion Tiger Team Briefing Draft Version 4
7. Background Documents 2011 AVS Forum Tiger Team--Power Point Diversity and Inclusion Tiger Team Briefing Draft Version 5
8. Background Documents 2011 AVS Forum Tiger Team--Talking Points for 11 8 Brief
9. Background Documents 2011 AVS Forum Tiger Team--Talking Points
10. Background Documents 2011 AVS Forum Tiger Team--Images
11. Background Documents 2011 AVS Forum Tiger Team--Meeting Minutes June 18_DRAFT v SPA
12. Background Documents 2011 AVS Forum Tiger Team--Meeting Minutes December 6 v2 spa
13. Background Documents 2011 AVS Forum Tiger Team--Meeting Minutes November 23 minutes draft v2 spa
14. Background Documents 2011 AVS Forum Tiger Team--Meeting Minutes October 26 minutes draft v2 SA
15. Background Documents 2011 AVS Forum Tiger Team--Meeting Minutes October 26 minutes draft vf
16. Background Documents 2011 AVS Forum Tiger Team--Telecon November 23
17. Background Documents 2011 AVS Forum Tiger Team--AVS-DAI-TeleconMinutesSept29
18. Background Documents 2011 AVS Forum Tiger Team--Sharepoint Info AVS Diversity and Inclusion Work Plan Sharepoint Info v1 spa
19. Background Documents 2011 AVS Forum Tiger Team--Sharepoint Info Web ID
20. Background Documents 2011 AVS Forum Tiger Team--Workplan Tiger Team Draft Work Plan final draft spa
21. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Diversity and Inclusion Work Plan Tracker
22. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Draft Diversity and Inclusion Plan v08-23-12 spa
23. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Draft Diversity and Inclusion Plan v08-23-12 v2S&L
24. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Tiger Team Draft Work Plan final draft spa
25. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Tiger Team Draft Work Plan final draft
26. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Tiger Team Draft Work Plan Revised by JR

27. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Tiger Team Draft Work Plan v3-with Kim's edits
28. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Tiger Team Workplan
29. Background Documents 2011 AVS Forum Tiger Team--Workplan CAT 4 - Outreach & Partnerships v1
30. Background Documents 2011 AVS Forum Tiger Team--Workplan CAT 4 - Outreach & Partnerships v2
31. Background Documents 2011 AVS Forum Tiger Team--Workplan AVS Inclusion and Diversity Workplan Chart
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Appendix B
Protocol for Interviews with Managers

Aviation Safety Inspector (1825)
Executive Management Official Questionnaire

Date: _____

Name: _____

Current Position & Location: _____

Years with the FAA: _____

Prior Employer: _____

1. Which Aviation Safety Inspector positions have you played a role in hiring while in your current position and at what locations?

2. Please describe your vision of how the selection process should work or be implemented

3. What kind of characteristics, skills, or abilities do you think the FAA should be looking for in an Aviation Safety Inspector? Do these characteristics differ as a function of the role of the Aviation Safety Inspector?

4. What responsibilities, if any, do you have regarding the following aspects of the hiring process for Aviation Safety Inspectors?

a) Determining the minimum qualifications:

How do you determine what the minimum qualifications will be? What factors do you consider?

b) Determining the Selective Placement Factors, if any:

c) Determining the content of announcements or job postings:

d) Screening of applications (on what bases do you think they should be screened?):

- Do you think references should always be called or contacted?

e) How many of the applicants on the list of referrals do you think should be interviewed, if any? How should this be determined?

f) When interviews are conducted, who should develop the interview questions?

- Should all the applicants be asked the same questions?

- How should the applicants' answers be evaluated?

- Should the same set of interview questions be used from year to year?

- To what extent have members of interview panels received training in interviewing?

g) How should final selection decisions be made?

Appendix C
Protocol for Interviews with 1825 Aviation Safety Inspectors

Aviation Safety Inspector (1825)
Selecting Official Questionnaire

Date: _____

Name: _____

Current Position & Location: _____

Years with the FAA: _____

Prior Employer: _____

1. Which Aviation Safety Inspector positions have you played a role in hiring while in your current position and at what locations?

2. Please describe how you learned to conduct this selection process (formal training? OTJ?).

3. What kind of characteristics, skills, or abilities are you looking for in an Aviation Safety Inspector? Do these characteristics differ as a function of the role of the Aviation Safety Inspector?

4. What responsibilities, if any, do you have regarding the following aspects of the hiring process for Aviation Safety Inspectors?

a) Determining the minimum qualifications:

How do you determine what the minimum qualifications will be? What factors do you consider?

b) Determining the Selective Placement Factors, if any:

c) Determining the content of the vacancy announcement or job posting:

d) Screening of applications (on what basis do you screen them?):

- Do you call references? What do you ask them? Do you call references for all applicants? If not, how do you determine whether or not to call a reference?

e) The number of applicants to be interviewed, if any. How is this determined?

f) Interviewing applicants:

- Do you develop the interview questions and, if so, how?

- Do you ask each applicant the same questions?

- How do you evaluate the applicants' answers?

- Do you have a set of interview questions that you use from year to year?

- Did you receive any training about conducting the interview? If so, please discuss what the training entailed

g) Making the final selection: how do you do this? What is your thought process?

Appendix D
Illustration of Adverse Impact and Effect Size Calculations

The values in the "Total Sample" column are the total number of applicants from each RNO category eligible to be classified as qualified over the years 2009 to 2012. The average pass rates for each RNO category was computed by taking the total number of people passing over the years 2009 to 2012 and dividing it by the total number of applicants over the years 2009 to 2012 for each subgroup. For example, the average pass rate for African-Americans shown in Table 3 was calculated in the following manner. First, the total number of African-American applicants eligible to be qualified over the years 2009 to 2012 is determined (see Total column for African-Americans in Table D.1). Next, the total number of African-Americans classified as qualified over the years 2009 to 2012 is computed. Using Table D.2, it is determined that there are 388 African-American applicants that were qualified over the years in question. The average pass rate was then determined by dividing the total number of qualified African-Americans by the total number of African-Americans eligible to be qualified. The average pass rate was determined to be 0.55.

The average adverse impact ratios were computed by dividing the average pass rate for a particular RNO group by the average pass rate for the White subgroup. In other words, the adverse impact ratio shown in Table D.2 for African-Americans was computed by dividing the pass rate for African-Americans (i.e., 0.55) by the average pass rate for Whites (i.e., 0.71). This yields the average adverse impact ratio shown in Table D.2 of 0.77.

However, the average *d*-statistic presented in the tables is actually a sample size weighted estimate. That is, for each year, the effect size (*d*) was multiplied by the total number of eligible subgroup members being compared for that year. For example, the effect size for African-Americans in 2009 was multiplied by the number of eligible Whites and African-Americans in that year. This multiplication of effect size by the total eligible subgroup members was repeated for 2010 to 2012. These were then added together and then divided by the total number of eligible subgroup members across the four years. For example, if we consider the Avionics job, the effect size for African-Americans in 2009 was 0.26. This effect size is multiplied by the number of eligible Whites and African-Americans in this year (i.e., 1783). This multiplication is continued for all the years. The sum of the multiplication is taken and divided by the total eligible for this comparison (i.e., 5932).

This same process was used to compute the averages for the referral stage (e.g., Table 5 on page 25 of this report), except the sample size for each RNO group per year was the total number of people eligible to be referred (Table 3 on page 24 of this report). The average for the selected stage (Table 7 on page 26 of this report) was based on the sample size for each RNO group per year based on the total number of people eligible to be selected (Table 5 on page 25 of this report).

Table D.1.

Applicant Pool for Avionics

Race/Ethnic Origin	2009	2010	2011	2012	Total 09 to 12
Asian	61 (2.7%)	61 (2.7%)	36 (2.5%)	42 (2.3%)	200 (2.6%)
African-American	174 (7.8%)	187 (8.2%)	148 (10.3%)	196 (10.8%)	705 (9.1%)
Hawaiian	8 (0.4%)	17 (0.7%)	9 (0.6%)	9 (0.5%)	43 (0.6%)
Hispanic	105 (4.7%)	113 (4.9%)	73 (5.1%)	77 (4.3%)	368 (4.7%)
Multi-Racial	109 (4.9%)	120 (5.2%)	126 (8.7%)	147 (8.1%)	502 (6.5%)
Native American	29 (1.3%)	17 (0.7%)	7 (0.5%)	11 (0.6%)	64 (0.8%)
Unanswered	141 (6.3%)	130 (5.7%)	84 (5.8%)	320 (17.7%)	675 (8.7%)
White	1609 (72.0%)	1649 (71.9%)	958 (66.5%)	1011 (55.8%)	5227 (67.2%)
Total	2236	2294	1441	1813	7784

Note: Applicants who applied more than once in a particular year were only included once in this analysis. Specifically, their best outcome at each decision point was retained for analyses.

Table D.2
Qualifications Determination Decision Point for Avionics

Race/ Ethnic Origin	2009			2010			2011			2012			Average (09 to 12)		
	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Freq	PR	AI	Total Eligible	PR	AI
Asian	35	0.57	0.82	37	0.61	0.85	28	0.78	1.10	19	0.45	0.62	200	0.60	0.84
African-American	100	0.57	0.82	107	0.57	0.80	73	0.49	0.70	108	0.55	0.75	705	0.55	0.77
Hawaiian	5	0.63	0.90	7	0.41	0.58	7	0.78	1.10	3	0.33	0.46	43	0.51	0.72
Hispanic	68	0.65	0.93	67	0.59	0.83	46	0.63	0.89	60	0.78	1.06	368	0.65	0.92
Multi-Racial	76	0.70	1.00	88	0.73	1.03	85	0.67	0.96	94	0.64	0.87	502	0.68	0.96
Native American	20	0.69	0.99	15	0.88	1.24	5	0.71	1.01	9	0.82	1.12	64	0.77	1.08
Unanswered	86	0.61	0.87	87	0.67	0.94	57	0.68	0.96	163	0.51	0.70	675	0.58	0.81
White	1122	0.70		1176	0.71		675	0.70		740	0.73		5227	0.71	

Note: Freq=number of people in each category that entered the Qualifications Determination Decision Point; PR=passing rate; AI=adverse impact ratio. In the shaded column, total sample the sum of the number of people in each category that were eligible to be qualified and the weighted averages of the passing rate and adverse impact ratio over the four years.

Appendix E

GLOSSARY OF TERMS

Adverse Impact – A substantially different rate of selection in hiring, promotion, or other employment decision that works to the disadvantage of members of a race, sex, or ethnic group.

Analysis – The process of identifying a question or issue to be addressed and examining the issue, investigating the results, interpreting the results, and possibly making a recommendation. Analysis typically involves using scientific or mathematical methods for evaluation.

Applicant – Any individual who is a candidate for initial employment into an ASI position.

Applicant Flow Data – Information reflecting characteristics of the pool of individuals applying for an employment opportunity.

Assessment – Process of measuring or judging the value or level of something.

AVIATOR – Automated Vacancy Information Access Tool for Online Referral – generates vacancy announcements and automatically posts them to the FAA and USAJOBS websites.

Barrier – A policy, practice, or procedure that limits, or tends to limit, employment opportunities for members of a particular race, gender, ethnic background, or because of a disability.

Barrier Analysis – A process that examines relevant data, trends and benchmarks to identify a policy, practice or procedure that limits, or tends to limit, employment opportunities.

Civilian Labor Force (CLF) – Data collected and compiled by the U.S. Census Bureau for persons 16 years of age and over, except those in the armed forces, who are employed or are unemployed and seeking work. This information is to be used as the benchmark to compare and analyze the command/activity workforce as part of the barrier analysis process.

Hire Source – Announcement hiring source.

Hires – Number of hires from source.

Human Factors – A multidisciplinary effort to generate and compile information about human capabilities and limitations and apply that information to equipment, systems, facilities, procedures, jobs, operations, environments, training, staffing, and personnel management for safe, comfortable, efficient, and effective human performance.

Major Occupations – Agency occupations that are mission related and heavily populated relative to other populations within the agency.

Medical Examination – Any and all examinations performed by an Aviation Medical Examiner for an Operations ASI (pilots only).

Qualitative Data – Subjective data that is expressed as a measure of quality; nominal data.

Quantitative Data – Objective data expressed as a quantity, number, or amount; allows for rational analysis and substantiation of findings.

Relevant Civilian Labor Force (RCLF) – The source from which an agency draws or recruits applicants for employment or an internal selection, such as a promotion, will determine a more precise benchmark to use to compare the command/activity workforce.

Stakeholder – A group or individual who is affected by, or is in some way accountable for the outcome of an undertaking; an interested party having a right, share, or claim in a product or service, or in its success in possessing qualities that meet that party's needs and/or expectations.

Validation – The process of proving that the right system is being built, i.e., that the system requirements are unambiguous, correct, complete, and verifiable.

Verification – The process that ensures that the system requirements have been met by the design solution and the system is ready to be used in the operational environment for which it is intended.

Appendix F

Interview Results from Interviews with Managers

Aviation Safety Inspector (1825)
Executive Management Official Questionnaire

1. Which Aviation Safety Inspector positions have you played a role in hiring while in your current position and at what locations?

- Do not hire them personally, [but] this ensures standardized use of hiring process
- Seattle, Fort Worth, Kansas, Boston

2. Please describe your vision of how the selection process should work or be implemented.

Process

- Have a short process of standardized hiring
- Schedule 5/7/9/11/12/13 as there is a need to fill lots of jobs
- Put out individual announcements that use the same basic skill set
- Qualification changes have to go through OPM
- Be able to find out if a marginally qualified veteran is blocking the list
- Brand new contracts = prof Aviation specialist **PASS Contract**

Recruitment

- Cast a large net and work on diversity inclusion process. Look at recruitment system
- Use employee associations, recruitment bonuses, and hire from the outside

Develop a climate to grow talent internally

- Bring them on early and encourage growth and development. Perhaps hire from college
- Hard to know where a job is (except in your locale). Locals could have conflict of interest

3. What kind of characteristics, skills, or abilities do you think the FAA should be looking for in an Aviation Safety Inspector? Do these characteristics differ as a function of the role of the Aviation Safety Inspector?

- Supervisory experience needed
- Applicants must understand how the industry works. ASI jobs are second careers for these applicants.

4. What responsibilities, if any, do you have regarding the following aspects of the hiring process for Aviation Safety Inspectors?

a) Determining the minimum qualifications:

How do you determine what the minimum qualifications will be? What factors do you consider?

- Certification of eligibles, usually veterans
- Pilot mechanic = certificate holder
- Certification list = evaluate panel = trained to do that
- Military X18 Qualification
- The industry

Comments

- AVIATOR may not be the better mechanism
- Certification list = slow in implementation

b) Determining the Selective Placement Factors if any:

- Are, or should be rare
- Not applicable

c) Determining the content of the vacancy announcement of job posting:

- HR
- Announcement sent out from staff in the directorates = managers
- Quasi human resource people do 60-65 percent of HR: Drafting of announcement, put in the aviator system, Fed HR, USA Jobs website, Online AVIATOR System, reviewed by HR, referral list (internal), Human Capital Focal Point (external).

d) Screening of applications (On what bases do they think they should be screened?): Not applicable

- **Do you think references should always be called or contacted?** Not applicable

e) How many of the applicants on the list of referrals do you think should be interviewed, if any? (How should this be determined?)

- Casting a large net
- Quality assurance program to the airline manufacturer
- Manufacturer production certificate

f) When interviews are conducted, who should develop the interview questions?

- **How should the applicants' answers be evaluated?**

Potential applicants => Applicants => HR Screen => Interview Panel => Selecting Official

Appendix G

Interview Results with 1825 Selecting Officials

Aviation Safety Inspector (1825)
Selecting Official Questionnaire

1. Which Aviation Safety Inspector positions have you played a role in hiring while in your current position and at what locations?

- New hire administrative, new hire A Safety 1825 Operations Maintenance, 1825 Operation Airworthiness (In-house), ASI, Safety Inspector Positions (Ops, Avionics, electronics)
- Grades: 9/11/12, 12/13/14
- Southwest, Oklahoma City, Greensboro, DC
- Internal hiring, hire remotely, central hiring

2. Please describe how you learned to conduct this selection process. (Formal training? OTJ?).

Formal Methods

- Formal training
- Manager Guide, 2009
- Courses at OPM = writing PDs, use of selective placement factor => for all jobs not 1825 Manager Training = course
- Web-based on hiring vets or persons with disability
- Hiring manual
- Revised Select guide

Unstructured Methods

- OTJ:
    - I was a frontline manager and then office manager. I am self-taught, I follow the standard protocol for in-person interview
    - Started out being a member on a panel
    - Used to be a chair of the TAC
    - Learning from other managers/prior employee/regional HR managers or region
    - No formal training

Originally seen stages in the selection process

3. What kind of characteristics, skills, or abilities are you looking for in an Aviation Safety Inspector? <u>Do these characteristics differ as a function of the role of the Aviation Safety Inspector</u>?

Personal Characteristics

- Minimum qualifications
- Oral communication
- Mannerism
- Info management and computer literacy
- Work as member of a team
- Whatever is in the announcement (KSAs)

Experiences

- Airworthiness side experience in maintenance plane 12,500 lbs or more
- Some direct T's or military service (come usually toward the end of their careers) and some downfall
- General aviation
- Women in military maintenance background worked for five years before working with another female mechanic
- Operations side = ASI needs a type of plane rating e.g. planes Fedex
- Type of flight experience, particularly aircraft
- Experience training people
- Operating control of an airline
- Director of maintenance for a company
- Folks who have a long background in the Fed Aviation Regulations that ASI's deal with
- People who have a system safety background
- ASI = comm title
- OPS = require pilots
- Maintenance = mechanics
- Avionics = electronics and navigations system
- Cabin safety
- Headquarters hiring: ability to do field work, write, and program management (12/13/14)
- Try to get local pilots to get employees

General Comments

- No cookie cutter mold
- Yes it is job dependent – try to find the most experienced person for the job to be filled
- Managers are responsible for technical hiring (get approval from them)
- Some issues with HR qualifying applicants because they are so technical

4. What responsibilities, if any, do you have regarding the following aspects of the hiring process for Aviation Safety Inspector?

a) Determining the minimum qualifications: Yes

How do you determine what the minimum qualifications will be? What factors do you consider?

Already specified or preferred

- Pull out the list of selective factors
- Maintenance—have some level of experience
- Pilots-need certification, pilots rating
- Used OPM Standard Qualification
- Now FS has set them
- There is a strong veterans preference
- Type of plane
- Aircraft Cert = puts out job vacancy announcement
- Production certificate = must have quality systems to produce to the specifications

Personally Specifies for Position

- Make a request to fill a vacancy --region
- Write up justification
  - Request a registry = guided by the details of the certificate
- With minimum qualifications
- Authorize to hire
- Operations—selective factors

b) Determining the Selection Placement Factors if any:

Already Specified

- Military hiring
- HR writes up the bid = announcement
- Steps in hiring 11 or 12 positions
- Once we determined that we will fill an entry level position
- Go through HR and the registry will come back to them
- Determined by the hiring managers

Personally Specifies for Position

- Rated and ranked = start at the top and work their way down
- If hire 9/11/12 = hired from outside
- For headquarters = always use selective placement factors
  - SPF is a discussion between the manager and the HR specialist. They will develop a draft bid and the manager will work with the HR specialist to work on

the draft bid. Her specialist may get involved if they want comments on the draft bid. She has two specialists who give advice on these drafts.

Her HR specialists will give advice such as: Too specific information (when we bid these jobs before, the specificity is not acceptable for HR… to save time and reduce level of specificity). They may tell them that the information is too generic. They will use their knowledge to modify their announcement. Sometimes we can run interference with the manager because her specialist has experience and can help the specialist interpret what the manager wants.

- For the 13 and 14 positions, each division does the interview.

c) Determining the content of the vacancy announcement of job posting: AUB-wide

- Is it targeted to the Portland Office-- applicants can choose when they want to work and receive calls about vacancies
- Requests a list of eligibles (interview ratings to rank panel of randomly chosen managers)
- Has a standard verbiage that goes into the announcement
- They review it for specialized experience block and may add specialized experience
- Expertise of regional HR

d) Screening of applications (On what basis do you screen them?)

Already Specified

From the registry

- HR produces a selection list with vet preference
  - Usually a list of 3-5 ranked and vets preference
  - 3-4 out of 5 at least one vet at top of the list
  - Can skip a vet if he/she does not meet the qualifications

Personally Specifies for Position

- Look at the person's application = look at military
- Review applications
- Give applicants the notice of qualification
- Look for key words or phrases
- Particularly written

e) The number of applicants to be interviewed, if any (How is this determined?)

Looking for key factors

- By vet preference

- Location preferences
- Yes/no responses = looks for yes's + resume

Assessing Individual Capabilities

- Use a check list to screen the folks on the list (AS-1)Panel interview = usually by phone due to travel or video conferences
- Reviews the application packet = OK
- WE = a two people = manager = goes over eligibles by rank = if eliminated must justify passing over that person = vets are usually at the top
- If hired = goes through FedEx school = done on the phone to reduce travel expense for the applicant

f) Interviewing applicants:

Pre-set Questions

- HR website that has a re-used list of questions and your expectation for the answer

Create Questions

- Panels make up their own questions
- Consider specialty when making the panel

Interview Comments

- General interviews with open-ended questions
- Each interviewer grades answers independently (scale 1-5)
- At least three members (with one selection delegate, who also checks references)
- Done on the phone to reduce travel expenses for the applicant
- Start at top of eligibles and work down

Do you develop the interview questions and if so how?

- Panel = all managers that have a handbook are managing panel looks at the job treasures = exit question from the interview guide
- Sometimes but goes to an HR website that has a re-used list of questions and your expectation for the answer
- They have a bank of questions from the personnel management group

Do you ask each applicant the same questions?

- Yes

How do you evaluate the applicant's answers?

- Frontline manager = 1012
  Use a 1-5 rating of the answer to each question
  - 1 = poor-- defined by example => alt done something
  - 3 = adequate

    - 5 = outstanding
- Maintains bullets to question as to what is looked for

Do you have a set of interview questions that you use from year to year?

- Developed by the frontline manager
- The panel writes them or draws from question used in the past
- Similar but may adapt the questions based on what they are looking for
- Is at the discretion of the hiring manager
- Recommend they change the question based on the needs for the position
- Ask applicants not to share questions

Did you receive any training about conducting the interview? If so, please tell me about what the training entailed

Formal Training

- Briefly covered in general manager training when promoted to the frontline manager position
- How vets get 10pts-5pts, etc.
- Usually not totally but by ON THE JOB from their managers and overall manager training

Informal Training

- Mostly ON THE JOB = trail & error
- Yes = briefing by the panel chair and have done it before and OTJ just prior to process implementation

Lack of Training

- No training

g) Making the final selection: How do you do this? What is your thought process?

Office Manager Decides

- Ranking goes to office manager with recommendation of the top two
    - Needs their memo => was the process followed = why were certain person rated higher and reads each packet
    - Every new hire = veterans
    - Internal hire = choice of internal/external
    - What properties of vacancies are filled in house vs outside
    - Look at packets, resume, interview performance

Panel Decides

- After the interviews, panel makes recommendation to selecting office
    - For multiple vacancies, review panel makes a recommendation of the first person to hire the second person. If simple vacancy = recommend one person
    - Must have some experience, except for mechanics = basic mechanics knowledge
  - Operations – military airline industry
  - Maintenance, Avionics => mechanics schools
  - Hiring manager usually hires the top person on the list or justifies why not
  - Panel writes down strengths/weaknesses

General Comments

- The more critical the function, or specific the workload, the more narrow the applicant pool
- Location preference = use your office as a stepping stone to go to another office after hire
- Lower the grade = more likely to be external (entry level positions)

Appendix H

Barrier Analysis for Applicant Disability

In this appendix we describe the issues that arose in our attempt to analyze the applicant disability information contained in AVIATOR. We start our analysis by examining the composition of the applicant pool across the four fiscal years under investigation for the various disability subgroups. A breakdown of the number and percentage of applicants in each subgroup, for each fiscal year, as well as collapsed across all years, is provided in Table H.1.

Table H.1

Applicant Pool as a Function of Disability Subgroup

Disability	2009	2010	2011	2012	Total 09 to 12
NA	9117 (94.4%)	16629 (93.2%)	5488 (91.9%)	6597 (91.0%)	37831 (92.9%)
Blind/Uncorrectable Visual	2 (0.0%)	17 (0.1%)	6 (0.1%)	15 (0.2%)	40 (0.1%)
Choose not to Identify	178 (1.8%)	307 (1.7%)	173 (2.9%)	228 (3.1%)	886 (2.2%)
Complete Paralysis	0 (0.0%)	2 (0.0%)	1 (0.0%)	2 (0.0%)	5 (0.0%)
Convulsive Disorder	1 (0.0%)	8 (0.0%)	5 (0.1%)	4 (0.1%)	18 (0.0%)
Mental or Emotional Illness	5 (0.1%)	1 (0.0%)	7 (0.1%)	8 (0.1%)	21 (0.1%)
Mental Retardation	0 (0.0%)	0 (0.0%)	2 (0.0%)	2 (0.0%)	4 (0.0%)
Missing Extremety(ies)	16 (0.2%)	23 (0.1%)	13 (0.2%)	13 (0.2%)	65 (0.2%)
My Disability is not listed	327 (3.4%)	846 (4.7%)	260 (4.4%)	354 (4.9%)	1787 (4.4%)
Partial Paralysis	9 (0.1%)	13 (0.1%)	13 (0.2%)	13 (0.2%)	48 (0.1%)
Severe Distortion of Limbs or Spine	1 (0.0%)	2 (0.0%)	0 (0.0%)	3 (0.0%)	6 (0.0%)
Total Deafness	1 (0.0%)	1 (0.0%)	5 (0.1%)	10 (0.1%)	17 (0.0%)
Total	9657	17849	5973	7249	40728

Note: Applicants who applied more than once in a particular year were only included once in this analysis. Specifically, their best outcome at each decision point was retained for analyses.

As can be seen in this table, the vast majority of the applicants (from 91 percent to 94.4 percent) did not respond to this question (i.e., NA in Table H.1). This implies that these individuals did not have a disability. The next highest subgroup was the "My Disability is not Listed" (from 3.4 percent to 4.9 percent). After this group, the next highest subgroup was "Choose not to Identify" (from 1.7 percent to 3.1 percent). The percentages for the subgroups with a particular disability were less than two percent for each of the fiscal years investigated. As indicated previously, we only performed statistical analyses for subgroups that comprise more than two percent of the population of applicants.

We next considered whether the various disability subgroups could be combined to conduct our analyses. Specifically, we created a new subgroup, hereafter referred to as "Disabled," in each fiscal year by collapsing the information from all subgroups that identified the nature of their disability in that year. It should be noted that we decided to not add information from the "Choose Not to Identify" and the "My Disability is Not Listed" subgroups into this "Disabled" subgroup. That is because both the "Choose Not to Identify" and "My Disability is Not Listed" are ambiguous classifications regarding what the nature of the person's disability is or whether they actually have a disability that would fall under the Americans with Disabilities Act. The percentage of applicants in this newly constructed "Disabled" subgroup category was examined, and there was less than the two percent representation in this combined classification. Therefore, we could not conduct a barrier analysis for disability.

It is very important that the accuracy of the disability information be improved in the future. The ambiguity of the "Choose Not to Identify" and "My Disability is Not Listed" categories needs to be clarified before this information can be included into meaningful barrier analyses. Further, the fact that almost all applicants (over 90 percent) did not respond to this question is very problematic. A major improvement would be to require some response from the applicant to indicate that or she has no relevant disability, or exactly what disability they have.