

REPORT TO CONGRESSIONAL ARMED SERVICES COMMITTEES ON INITIATIVES FOR MITIGATING MILITARY PILOT SHORTFALLS

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EXECUTIVE SUMMARY

PURPOSE AND SCOPE: This report, prepared in consultation with the Secretaries of the Military Departments, provides information related to mitigating pilot shortfalls, as requested in Senate Report 115-125, page 250, accompanying S. 1519, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2018. This report covers the general nature of the pilot shortfall in the Armed Forces, commercial aviation factors that influence the current military pilot shortfall, and addresses the seven elements of interest specifically requested by Congress in the 2018 NDAA. The report also includes information from stakeholders such as flight training universities and commercial airlines, as well as government and private sector aviation organizations, to provide the Armed Services Committees a comprehensive view of this complex challenge. The seven core report elements include:

1. The viability of and resource requirements for increasing aviator production in each Military Service;
2. A comprehensive review of aviator manning requirements in each Military Service;
3. A comprehensive review of available aircraft fleet capacity for seasoning pilots to acceptable proficiency, currency, and experience levels;
4. Initiatives undertaken to improve the quality of service for aviators in the Armed Forces, to include the elimination of tertiary, non-flying training requirements; increased monthly flying time; and more effective training;
5. Initiatives undertaken to improve the quality of life of aviators in the Armed Forces, to include a review of disincentives to continued service caused by high rates of deployment, insufficient pay and allowances, family hardships, and other morale-based issues;
6. An assessment of the feasibility of developing a career track for Armed Forces aviators that would allow continuous flying duties, as opposed to tertiary assignments and duties required for promotion to senior officer ranks;
7. The potential for striking partnership agreements and memoranda of understanding with flight training universities, major airlines, or other entities to achieve synergies in satisfying national pilot demands.

FINDINGS: The Department of Defense (DoD) now faces a pilot shortfall in excess of 3,000 pilots, which has been several years in the making. While the severity and dynamic of the shortfall varies among the Military Services, all Services are experiencing pilot shortfalls due to several years of underproduction in pilot training and reduced aircraft readiness. These shortfalls have been exacerbated by higher than average attrition among experienced aviators. The internal challenges of underproduction and aircraft material readiness have resulted in extended time to train new aviators, a lack of sufficient flight time per pilot, extended and frequent deployments, and other quality of life concerns for aviators. In addition to these internal dynamics, the commercial aviation industry is experiencing a global supply and demand imbalance for commercial pilots. An unprecedented number of mandatory retirements at major airlines, additional Federal Aviation Administration (FAA) requirements, and industry growth are driving a significant increase in commercial aviation hiring, which is impacting retention among military pilots, who routinely accrue sufficient flight hours to compete for commercial jobs within their first military commitment (i.e., 1000 hours over 10-12 years).

A number of studies published by the Government Accountability Office (GAO) and RAND¹, as well as airline industry forecasts and data from the Federal Aviation Administration (FAA)² all point to the fact that the aviation industry as a whole will experience constraints on the supply of new pilots. In a Memorandum from Air Force Secretary Heather Wilson to then Defense Secretary Mattis, she explained that “as a nation, the [United States] is not producing enough pilots to meet the demand for the military and commercial industry, impacting both the economy and national security.”³ While the Military Services estimate that they will require upwards of 75,000 pilots over the next 20 years, Boeing’s 2018 Pilot Outlook indicates that North American companies will need to hire 206,000 new pilots over the same period. This pilot shortfall is not limited to the United States. Worldwide commercial aviation demand is projected to require 635,000 new pilots, while passenger demand is forecasted to nearly double from 4 billion to 7.8 billion.⁴

The supply of new pilots has not kept pace worldwide demand. FAA data reflecting original airman certificates issued has been in a steady decline over the last 10 years, from a high of 102,829 certificates issued in 2008 to just over 74,130 in 2017.⁵ Significant barriers to entry exist for new pilots. A bachelor’s degree from a University flight program with an FAA approved aviation program will cost on average \$120,000, after which graduates will still require an additional 12-14 months of flying to obtain the 1,000 hours of flight time necessary to obtain a restricted privileges Airline Transport Pilot (ATP) Certificate. A restricted privileges ATP is the minimum required for employment with an airline, and following the Colgan Air crash of 2009 and subsequent FAA regulations, the minimum flight time required to fly as an airline pilot increased from 250 hours to 1,000 hours. These increased FAA regulations alone have decreased the pool of available pilots that meet the minimum flight time requirements and have necessitated increased major airline hiring from regional airlines and the military. According to several studies by RAND, the Center for Naval Analysis (CNA), and others, increased commercial airline hiring has been shown to be highly correlated with decreased retention among military pilots, and recent Service retention data supports these findings.⁶

According to the GAO and other Military Service information, the Air Force, Navy, Marine Corps, and Army all had staffing shortfalls in some, but not all, fixed-wing and rotary-wing pilot communities for operational positions from fiscal years 2013 through 2018.⁷ The Air Force Active and Reserve Components, for example, ended FY18 short 2,000 pilots out of a total inventory of 18,400, for an overall gap of approximately 10 percent. An analysis of factors leading to this deficit reveals that since 2006, the Air Force had fewer pilots than authorized, and the supply-demand gap continued to grow. Varying degrees of pilot shortfalls across the Military Services are already affecting near-term readiness. Aircraft supply and maintenance

¹ GAO. *Aviation Workforce: Current and Future Availability of Airline Pilots* (GAO-14-232, 2014); GAO. *Military Personnel: Collecting Additional Data Could Enhance Pilot Retention Efforts* (GAO-18-439, 2018).; RAND. *Air Transport Pilot Supply and Demand* (2015); RAND. *Retaining U.S. Air Force Pilots When the Civilian Demand for Pilots is Growing* (2016).

² FAA. *FAA Aerospace Forecast 2018-2037* (2018).

³ U.S. Government. SECAF Memo to SECDEF on Pilot Shortages, dated September 20, 2017.

⁴ Boeing. *Pilot Outlook: 2018-2037* (2018).

⁵ FAA. *Active Civil Airmen Statistics* (2017).

⁶ RAND. *Modeling the Departure of Military Pilots from the Service* (2004); RAND. *Retaining Air Force Pilots when the Civilian Demand for Pilots is Growing* (2016); CNA. *The Effect of Compensation on Aviator Retention* (2006); Air Force Institute of Technology. *Predicting Pilot Retention* (2012).

⁷ GAO. *DOD Needs to Reevaluate Fighter Pilot Workforce Requirements* (GAO-18-113, 2018).

challenges are affecting aircraft availability. As a consequence, pilot production is reduced as well as available mission capable aircraft for deployment and seasoning⁸ at operational units.

Furthermore, the average shortfall numbers often mask the most acute challenges – fighter pilots and instructor pilots are two examples. A deeper analysis of the military pilot numbers supports recent GAO findings that the most immediate shortfall is among fighter pilots.⁹ Fighter pilots generally require more time and funding to reach appropriate experienced, mission-ready levels. Of the 2,000 pilot gap the Air Force reported, fighter pilots accounted for nearly 1,000, or 50 percent, which equates to a 20 percent shortfall in mission-ready requirements. Similarly, what the aggregate supply and demand pilot numbers do not immediately reveal is that retaining the most experienced and qualified operational and instructor pilots remains a significant near-term challenge across the Department. Without sufficient instructor pilots in advanced pilot training programs and especially in operational squadrons, efforts to increase initial pilot production create absorption problems in squadrons, where an insufficient number of instructor pilots exist to conduct the intensive training required of new pilots.

The Military Services are acutely focused on readiness recovery to ensure lethality necessary to fully support the National Defense Strategy. For aviation units across the Military Services, this means they must be fully funded to meet pilot production, aircraft maintenance, and overall aircraft readiness requirements. Equally important is the ability to retain experienced pilots and instructors. Replacing an experienced pilot at the end of his or her initial obligated service commitment (10-12 yrs of service) will take a minimum of 6-8 years of training and experience and millions of dollars for every pilot lost.¹⁰ In order to overcome pilot shortfalls, each Military Service examined a variety of solutions, focused on production, absorption/training, and retention lines of effort, in both the short-term and long-term. Initiatives include funding increased pilot production capacity and aircraft repairs, potential changes to compensation statute, the use of contract and civilian instructor pilots, Virtual Reality trainers to reduce pilot training time, time off under Career Intermission Programs, and “fly only” career paths, among others discussed in detail throughout the report.

In addition to Military Service-specific initiatives focused on greater utilization of the Reserve Component (RC) in pilot training pipelines and absorbing newly trained pilots, additional opportunities exist for pilot loss mitigation, such as an increased Reserve Component capacity. With a short-term limited supply of experienced pilots available, the Department anticipates further pressure on pilot retention. If the overall pool of pilots in the coming years proves insufficient to meet demand from the commercial aviation industry and the Department, the Military Services will need to continue examining the overall force mix between Active and Reserve Component aviation capacities and how they employ those capabilities. For example, pilots transitioning to the Reserve Component who are allowed to remain attached to their Active Component squadron, or other squadrons of a similar platform, can provide the experienced instructor cadre necessary to increase the ratio of experienced pilots to inexperienced pilots, potentially in a non-deployable capacity, while flying for a commercial airline. Increasing sufficient additional Reserve Component capacity for those military pilots transitioning to a non-military career will enable the Services to increase the return on the significant investments already made with respect to training and experience.

⁸ Refers to building experience and achieving required qualifications to be fully mission capable.

⁹ GAO. *DOD Needs to Reevaluate Fighter Pilot Workforce Requirements* (GAO-18-113, 2018).

¹⁰ *Ibid.*

Each Military Service employs its aviation communities in distinctly different ways, however aging airframes, parts support, major maintenance availability, and several years of underproduction are common themes affecting aircraft readiness/availability throughout the Department. These issues have had a direct impact on available flight time, which in turn further affects a squadron's ability to train its pilots and produce readiness. The Military Services are focused on rebuilding and maintaining aircraft readiness in both production and operational squadrons, resourcing the manpower necessary to produce future pilots, and pursuing quality of service/quality of life initiatives, in order to compete more effectively with the commercial sector for experienced military pilots. These ongoing lines of effort require full funding of manpower and readiness accounts to ensure that Military Service aviation communities can adequately support the National Defense Strategy. The Department cannot afford to continue losing experienced pilots at the current rate.

BACKGROUND

The Military Services

Producing pilots is a costly and time consuming endeavor, which varies by Military Service and type of aircraft, however producing a mission-ready fighter pilot can take up to 5 years and cost between \$3-11 million.¹¹ Advanced qualifications and instructor pilot designation can take years longer. Approaching the eight to ten year point of experience and proficiency is where the nation's preeminent military aviators reside. This is also the point when many aviators approach the end of their initial service commitment, at which point they are faced with a decision to continue with military service or pursue other opportunities. This is when the military lifestyle is measured against alternatives in the ever-changing civilian hiring market.

A robust, highly skilled, and experienced cadre of military pilots is vital to the readiness of our Armed Forces. Although each of the Military Services continues to meet operational requirements, pilot career fields across the Department are experiencing higher than average attrition rates. As a generation of commercial airline pilots reaches mandatory retirement age, GAO estimates that commercial airlines will need to hire between 1,900 and 4,500 pilots per year over the next decade.¹² Similarly, a University of North Dakota study estimates total major airline hiring, accounting for industry growth, attrition, and retirements, to exceed 5,000 pilots per year through 2030 (Figure 1). It further identified that commercial airlines will need to hire an average of 2,800 pilots per year over the next decade, just to replace retirees.¹³ This current airline hiring cycle represents a fundamentally different event than previous major airline hiring (1997-2001), which only saw five years of hiring above 3,000 pilots per year (Figure 2). This significant increase in airline hiring posture, generous compensation packages, and the promise of greater control of one's work schedule appear to be significant drivers of military pilot attrition.

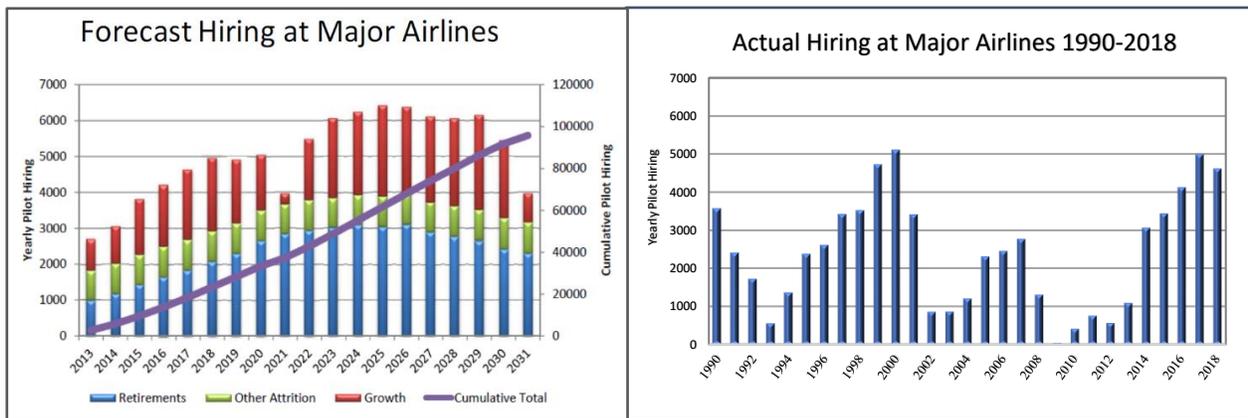


Figure 1: Forecast Major Airline Hiring 2013-2031 (Higgins, J. et al., University of North Dakota, 2013).

Figure 2: OSD analysis of Historical Major Airline Hiring, Future & Active Pilot Advisors (FAPA) data, 2018.

¹¹ GAO. *Military Personnel: DOD Needs to Reevaluate Fighter Pilot Workforce Requirements* (GAO-18-439, 2018).

¹² GAO. *Aviation Workforce: Current and Future Availability of Airline Pilots* (GAO-14-232, 2014).

¹³ Higgins, et al. (2013). University of North Dakota. *An Investigation of the United States Airline Pilot Labor Supply*.

Air Force

The Air Force is experiencing the most pressing pilot shortfall among the Military Services, which is impacting readiness. While the Air Force has historically experienced a cyclical ebb and flow of personnel, fiscal year 2017 was unlike any in recent memory. General David Goldfein, Air Force Chief of Staff, testified before Congress about a rare and significant shortage of qualified, experienced aviators, referring to the situation as a crisis. Air Force Secretary Heather Wilson noted in September of 2017 that the Air Force was approximately 2,000 pilots short in its total inventory, which included Remotely Piloted Aircraft (RPA) pilots.¹⁴ Accordingly, the Air Force established an Aircrew Crisis Task Force (ACTF) to address the growing shortage of experienced aircrew by considering seven lines of effort: *requirements, accessions, production, absorption, retention, sortie production, and industry collaboration.*

While sustained, increased production is the long-term solution to the pilot shortage, the Air Force's current size (personnel and aircraft) and operational requirements limit the rate at which it can build experience among new pilots. Near term production increases will likely yield positive results in some communities, such as the Mobility Air Forces, however, other communities are significantly more constrained in their ability to receive and season a substantial increase in new pilot production. Specifically, the Combat Air Forces are severely constrained by factors such as combat aircraft fleet size, sortie generation capacity, and instructor pilot manning, which will limit the number of new pilots that can be trained and seasoned in a sustainable and effective manner. RAND and Air Force absorption models show a typical fighter squadron should be comprised of 55 percent experienced pilots. As that percentage decreases, it lengthens the time it takes for junior pilots to gain the experience they need to be fully mission capable, as inexperienced pilots require experienced pilots to lead them in training. Without removing the constraints discussed, increasing pilot production would result in squadrons saturated with inexperienced pilots. The interdependent nature of the multi-phased production process highlights the need to balance increased production with retention efforts to chart a sustainable path to recovery. In regards to both production and retention, the Air Force is aggressively implementing the following initiatives to address the pilot shortage:

- Increasing production of pilots to 1,480 per year
- Executing expanded congressional authority to increase Aviation Retention Pay cap to \$35,000 per year, though analysis and initial take-rates suggest this amount may be insufficient to increase retention
- Maximizing use of increased experience in the Air National Guard and Air Force Reserve for absorption
- Assessing light attack aircraft for uncontested environments, to relieve the operations tempo for advanced fighter crews and increase the number of airframes capable of absorbing new pilots
- Modifying assignments system to increase individual choice in career decisions and add flexibility for professional development
- Examining a "fly only" career track
- Eliminating non-essential training, additional duties, and administrative burdens, serving as distractions
- Increasing contractor support to flying squadrons; utilizing relevant talent from companies with prior military instructors

¹⁴ U.S. Government. *SECAF Memo to SECDEF on Pilot Shortages*, dated September 20, 2017.

Navy

The Navy is experiencing shortfalls due to maintenance and training backlogs that are the result of a high operational tempo and low aircraft material condition, exacerbated by previous fiscal uncertainty. Navy attempts to restore stability and predictability to squadron deployment cycles have been challenged both by constrained funding levels and by operational demands. These readiness challenges go deeper than aircraft maintenance and deployment, and directly affect quality of service for the Navy's pilots.

Naval Aviation inventory and accessions including tactical, maritime, and rotary wing remain sufficient to meet operational requirements. However, declining retention in some communities, especially strike fighter and electronic attack pilots, present serious challenges to aviation health. Aviation retention challenges are a result of lower job satisfaction and a broadening pay gap compared to private industry. Navy specific challenge areas are a lack of flight hours, tactical training and progression of qualifications, quality of life and quality of service concerns, and a deficit in mid-grade and senior pilots (between 10-20 years of service) who are increasingly choosing the compensation and quality of life in the airline industry. The loss of mid-grade and senior officers directly impacts squadron readiness through a shortage of qualified and experienced pilots. As with the Air Force, increasing pilot accessions alone will not solve the problem, as a surplus of junior aviators in squadrons will further exacerbate challenges with low numbers of flight hours and instructor pilots.

Vice Admiral Robert Burke testified before the Congressional Subcommittee on Military Personnel that, "while mid-level officer retention represents our greatest challenge, resignations have also increased among junior and senior aviators due, in part, to intense competition from private industry. Post-command commander (O-5) losses have steadily increased since 2009, further diminishing essential talent and experience...It is absolutely vital that we retain mid-level and senior aviators, capitalize on their experience, leadership, and the multi-million dollar investment they represent to ensure maximum combat readiness and ability to execute the National Military Strategy."¹⁵ As Vice Admiral Burke illustrates, the strong correlation between increased airline hiring rates and post-command resignations, suggests competition for talent with private industry is an important factor impacting military pilot retention. The upward trend in airline hiring seems unlikely to abate soon due to the combined effects of industry demand, civilian pilot retirements, and FAA requirements, fostering a greater demand for military pilots, especially those with fixed-wing experience.

The Navy is heavily engaged in improvements to the underlying resource and planning challenges impacting retention, including a focus on personnel management. Fleet feedback indicates aviators want more career path flexibility and opportunities for personal and professional development. Surveys suggest pilots also desire monetary incentives that are more flexible (varying contract lengths), merit based, and competitive with civilian opportunities. Several initiatives, both monetary and non-monetary, are being developed to address retention shortfalls. Utilizing 2017 NDAA statutory changes to aviation bonus and career incentive programs, the Navy is significantly reshaping pilot department head and commanding officer bonuses, as well as Career Aviation Incentive Pay, to better target and retain talented officers. Non-monetary career enhancing opportunities (e.g., expanded options for graduate school and fellowships, increased opportunities in Tours with Industry, and the Career Intermission Program) are also being implemented to improve retention.

¹⁵ United States. Cong. House Subcommittee on Military Personnel. *Pilot Shortages*. March 29, 2017 (statement of VADM Robert Burke, Chief of Naval Personnel).

Marine Corps

The Marine Corps is experiencing a shortage of qualified fixed wing & tiltrotor aviators in the appropriate grades to fill all aviation billet requirements. While the aggregate number of aviators remains within historical norms, we do see risk due to aggressive airline hiring (at the same target grades) and recent decreases in historic retention (attributed to many factors). The Marine Corps problem can be broken down into two areas: production and retention. Production levels, especially within the Tactical Aircraft (TACAIR) communities, have fallen short of requirements. These shortfalls mainly resulted from readiness issues in the intermediate and advanced phases of undergraduate flight training and in the fleet replacement squadrons. Tiltrotor aviator shortfalls are a result of continued growth within the community, without adequate production capacity. Pilot underproduction also stems from under accessing aviators due to force shaping efforts during the FY12-FY15 drawdown. A constrained training pipeline eliminates flexibility and creates difficulties for the Marine Corps to adjust to changes in attrition rates and future growth requirements.

Job satisfaction and “quality of life” are the most influential factors in determining the retention of a Marine Corps aviator. Marine aviators chose to become pilots to fly; aircraft readiness challenges and low flight hours limit that opportunity. High operational tempo and increased daily workloads, due to reduced numbers of aviators with the same number of requirements, affect time at home with families and retention decisions. Insufficient fleet aircraft readiness rates limit qualifications and experience required for combat readiness. Current accession numbers are sufficient to build healthy pilot inventories in the future, but aging aircraft and reduced aircraft readiness in the TACAIR training squadrons significantly delay new pilots arriving at operational squadrons. Marine Corps aviation leadership is focused on improving readiness for combat. To confront these challenges, Marine aviation has prioritized current readiness initiatives and modernization efforts. Improving aircraft readiness across Marine aviation will have a two-fold effect - improving pilot production and quality of life/quality of service. The Marine Corps constantly addresses operational tempo and continues to look for ways to manage operational commitments to reduce the strain of deployments.

Army

The Army is addressing the shortage of pilots as a high priority readiness issue. The Army’s pilot shortage resides primarily within the Active Component, but these shortages have impacts throughout the Army National Guard and Army Reserve as well. For the Army, the issue resides within the Aviation Warrant Officer ranks as they perform the majority of pilot duties (approximately 70 percent of pilot positions are filled by Warrant Officers). Reduced budgets and sequestration led the Army to suppress Aviation Warrant Officer accessions between 2010 – 2017, resulting in a shortfall of pilots within those year groups. The current Active Component Warrant Officer shortfall is 330 pilots, the most critical of which are AH-64 Apache Pilots. As Aviation Warrant Officer accessions were being suppressed, reduced budgets and sequestration also necessitated a reduction in aviation force structure beginning in 2013. The reduction in force structure reinforced the decision to suppress Warrant Officer accessions. However, in 2016 the decision was made to retain six AH-64 battalions (two Regular and four Army National Guard) above what had been programmed, based on the recommendations of the National Commission on the Future of the Army, further exacerbating the shortfall. In November 2016, the Army G-1 projected a pilot shortfall of 731 AC Warrant Officers (WO1/CW2 ranks) in Year Groups 2010 – 2017 that would develop if no action was taken. This projected shortfall represents approximately 14 percent of the total active Aviation Warrant

Officer Force and continues to be partially masked by the retention of senior Aviation Warrant Officers serving in junior positions. Over 25 percent of this senior Warrant Officer population is retirement eligible.

In 2017, the Army identified an increase in attrition rates of Aviation Warrant Officers above forecasting models, possibly as the result of perceived quality of life concerns and new recruitment programs by commercial airlines and other government agencies targeting Army Rotary-Wing Aviators. In the aggregate, the Army's Aviation Warrant Officer manning remains below the required inventory, when accounting for officers not available to the operating force and increased attrition. In response to the projected shortfall, Army leaders quickly led efforts to develop solutions to resolve these shortages. The result was the publication of Headquarters Department of the Army (HQDA) Execution Order (EXORD) 139-17 on March 23, 2017, which focused on three critical components to address the Army's pilot shortages; increase recruitment, increase pilot training throughput, and increase retention. In implementing HQDA EXORD 139-17, the Army has executed the following initiatives:

- Increase the Active Component Aviation Warrant Officer accessions from 308 in FY17 to 475 per year through FY24.
- Offer graduated incentives and promotion opportunities that encourage pilots to continue their military aviation career and further reward pilots who advance their aviation qualifications.
- Actively recruit AH-64 and CH-47 qualified pilots who have recently left the Service.
- Leverage experience from pilots in the Reserve Component at the training base.
- Augment the training base with higher instructor pilot fill rates through Call to Active Duty, Retiree Recall, and Active Duty Operational Support.
- Augment the training base with AH-64E and CH-47F aircraft, simulation devices, and instructor pilots.
- Adjust the Program of Instruction to gain efficiencies where possible, without reducing quality of training.
- Establish a Mobile Training Team and conduct AH-64D Aircraft Qualification Courses at unit Home Station.

The Army is making progress, but estimates it will require two to five years to fully address this aviation readiness shortfall, if properly resourced. As part of the Army's pilot shortfall mitigation strategy, the U.S. Army Aviation Center of Excellence (USAACE) and the Department of the Army Military Operations-Aviation (DAMO-AV) led a monthly review with key stakeholders to monitor progress, synchronize activities, and evaluate future changes or new recommendations. These efforts identified by USAACE have shown that the Army currently lacks the required number of instructor pilots and aircraft (UH-72) to meet current training requirements. Without these resources, the Army assesses that it will be difficult to fully address the pilot shortage, which could create serious readiness concerns within the Active Component and cascading impacts throughout the Reserve Component.

The Commercial Aviation Industry

Aviation industry and business press publications have warned about a growing crisis in the airline industry—a shortage of qualified pilots. Their concerns are well-founded; Boeing’s 2018 Pilot Outlook indicates that North American companies will need to hire 206,000 pilots between now and 2037. The need for pilots is even greater internationally. This is especially true in the Asia-Pacific region, where rising standards of living and a growing middle-class will drive pilot requirements to exceed 261,000 for the same period. Boeing is forecasting worldwide demand for new commercial airline pilots to top 635,000 over the next 20 years, which is up sharply from their 2016 estimate (Figure 3).¹⁶ The worldwide pilot pipeline is simply proving insufficient to meet demand. Some projections indicate that the United States airline industry will have a shortage of as many as 35,000 pilots until 2031.¹⁷ While the pilot shortage is anticipated to endure well into the future, the commercial airline industry is already experiencing its effects. The shortage of pilots is being most acutely felt at major U.S. air carriers’ regional affiliates. Republic Airlines filed for bankruptcy protection in February 2016, citing a shortage of qualified pilots as one of the primary drivers of their filing, and many others have been forced to cut back on numbers of flights and routes.¹⁸



Figure 3: Boeing New Pilot Demand 2018-2037

There are several reasons behind the growing global pilot shortage. Part of the near-term shortage is a natural byproduct of industry growth. The global aviation marketplace is growing—the International Air Transport Association is forecasting that worldwide passenger demand will double within the next 20 years. However, FAA regulations have also contributed to limiting the supply of new pilots, in response to the 2009 Colgan Airlines Bombardier Dash 8 crash in Buffalo, New York. The National Transportation Safety Board determined the probable cause of this accident was pilot error. One of the contributing factors was thought to be the relatively low number of flight hours required for regional airline First Officer hiring. At the time of the Colgan Airlines’ accident, the only regulatory requirement for a new First Officer to be hired at an airline was that they hold a Federal Aviation Administration Commercial Pilot Certificate, which could be achieved with a minimum of 250 hours of total flight time. In response, Congress passed the *Airline Safety and Federal Aviation Administration (FAA) Extension Act of 2010* (Public Law 111-216). Part of the law directed the FAA to address pilot knowledge levels and experience in air carrier operations. In responding to this legislation, the

¹⁶ Boeing. *Pilot and Technician Outlook, 2018-2037* (2018).

¹⁷ Higgins, et al. (2013). *An Investigation of the United States Airline Pilot Labor Supply*.

¹⁸ Church, Steven, et al. (Feb 2016). *Republic Airlines Files for Bankruptcy After Shortage*. *Bloomberg Businessweek*.

FAA created rules that stipulated higher minimum requirements for new airline pilots. Under the revised regulations, First Officers would be required to possess at least an Airline Transport Pilot Certificate (ATP), essentially raising the minimum airline flight time hiring requirements from approximately 250 hours to 1,500 hours. The FAA later revised these rules, allowing graduates of approved collegiate flying programs to obtain a Restricted ATP and fly passengers at 1,000 hours and military pilots to do the same at 750 hours of total flight time.

The new regulation drastically reduced the supply of qualified pilot applicants, especially for the commercial airlines' non-military pilot pipeline. Instead of hiring recent college and flight school graduates as first officers, airlines now must wait an average of 13 months until their prospective applicants have accumulated a minimum of 1,000 hours of total flight time. With only a small number of flying jobs available outside of passenger and cargo airlines for new pilots, there are few avenues other than flight instructing for pilots to accrue the required hours. Congress also directed the FAA to study pilot fatigue and implement new rules to mitigate its effect on pilots. In January 2014, the FAA instituted revised flight and duty time requirements for airline pilots. While the rule did not have the same level of impact as the ones that increased the minimum hours of pilot experience, airlines still needed to add additional staff to ensure adequate schedule coverage. A 2014 Regional Airline Association study showed that pilot staffing levels at U.S. airlines would have to increase by 5 to 8 percent, to cover the schedule mandated by the new regulations.¹⁹

Unrelated to the Colgan event was a delayed pilot retirement bubble that would hit hardest starting in 2014, as the FAA increased the mandatory retirement age for airline pilots from age 60 to 65 in 2009. While that decision offered a reprieve by shifting the retirement bubble five years into the future, it did little to address the anticipation of U.S. airlines having to replace 30,000 retiring pilots by 2026.²⁰ The major airlines have already begun to increase hiring in preparation for the surge in retirements, which places more pressure on the lower paying regional airlines, who must become increasingly creative in their hiring practices. Pilots at regional airlines typically are eager to move on to better pay and improved schedules offered by major airlines.

SEVEN REPORTING ELEMENTS

ELEMENT 1: The Viability of and Resource Requirements for Increasing Aviator Production

Air Force

The Air Force pilot production pipeline consists of Undergraduate Pilot Training (UPT), graduate-level pilot training such as Formal Training Units (FTUs), and absorption into operational squadrons or duty as a first-assignment Instructor Pilot at UPT. A balanced pilot production, absorption and sustainment system is critical to meeting pilot requirements. For example, the number of new pilots produced at UPT has to be able to flow to the FTU and then to an operational unit where they are "absorbed." There is no benefit to producing more pilots than can flow through the entire pipeline. Delays or breaks in training can undermine student learning and proficiency, and frustrate the entire pipeline. The pipeline culminates in the production of an "Experienced Pilot," capable of full mission execution within each weapon system's requirements. With only 55 fighter squadrons across the Air Force (Active and

¹⁹ Regional Airline Association. *U.S. Regional Airlines are Facing Shortage of Qualified Pilots* (2014).

²⁰ Federal Aviation Administration. *U.S. Civil Airman Statistics 2015* (2016).

Reserve), simply ramping up undergraduate pilot production without also ramping up graduate pilot production and absorption would result in squadrons overrun with inexperienced pilots serving as wingmen.²¹

According to Air Education and Training Command’s standard model, maximum annual UPT capacity is 1,480 pilots, which is dependent on Instructor Pilot (IP) and Civilian Simulator (CSI) manning, no unexpected training delays, and required maintenance sortie generation. Current low IP manning Air Force-wide coupled with low CSI manning is expected to restrict training capacity through 2020. Additionally, unexpected training delays, like the recent fleet-wide stand-down of T-6 primary trainer aircraft due to unexplained physiological events, may further restrict UPT production. Due to flying constraints at graduate-level training and operational squadrons, the Air Force has only once programmed to train to the 1,400 pilot capacity since 2007 (Figure 4) and the Air Force is programming to exceed that in 2020.

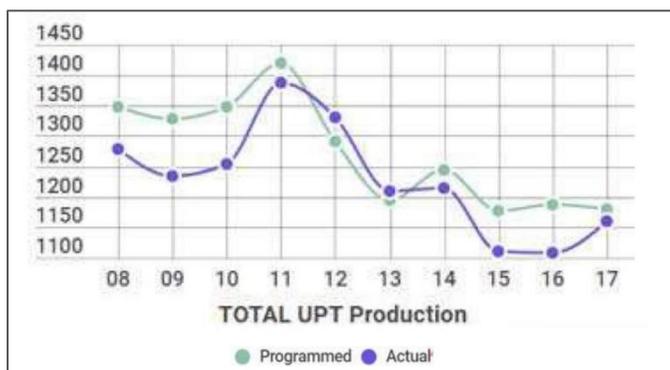


Figure 4: USAF UPT Production FY08-FY17

The Aircrew Crisis Task Force identified increasing UPT production at existing bases to 1,480 annually through optimized syllabus changes. Before implementing the UPT syllabus experiment, production was thought to be limited to 1,400, as it was based on runway and airspace constraints. During the stand-down, 80 Majors and Lieutenant Colonels innovatively redesigned the entire training syllabus to improve quality and better align with absorption into FTUs. The new UPT training will save an average of 5-9 training weeks per student pilot, thus resulting in increased organic capacity of up to 1,480 UPT graduates per year, once increased military and civilian simulator instructor pilot manning are secured.

Even that significant improvement won’t get the Air Force to its production requirements in the out years. To reach a sustainable and increased output level, the ACTF proposed increasing UPT capacity by 100 pilots per year. The Air Force is still awaiting the outcome of a business case analysis that will provide a variety of options with associated costs. However, even if the Air Force is able to increase UPT and FTU output, significant constraints exist in the ability to absorb and season pilots at higher production levels due to limited Instructor Pilot manning and decreased force structure in operational squadrons.

Navy

The Navy sets its aviator production requirements a bit differently, where production is based on first fleet seat junior officer tour billets. The Navy has fallen short of the 1,100 aviators required annually for several years, but is on track to accomplish this in FY19, due to additional readiness funding. If force structure (the fleet billet demand) increases in the future, the validated demand signal will be sent to the accession and training pipelines. However, it would

²¹ U.S. Government. *SECAF Memorandum to SECDEF on Pilot Shortages*, dated September 20, 2017.

normally take 3-4 years to realize this demand and additional time to get them experience/qualifications. Similar to the Air Force, significantly expanding the number of aviators produced annually today, without a concurrent increase in the fleet billet base, would result in overfilled billets in fleet squadrons. With no extra billets to send the excess officers to and no increase in resources to give them training in the Fleet, the effect would be to exacerbate experience and retention problems.

The Navy's challenges with pilot inventory today are largely associated with the strike fighter community and stem from under accessions from 2005 through 2012 and underproduction in the undergraduate training commands and graduate Fleet Replacement Squadron (FRS). Furthermore, aircraft maintenance challenges at both levels in recent years have exacerbated the problem. These combined factors contribute to the vast majority of production shortfalls in the Navy's strike fighter community. This underproduction is causing gaps in first-tour Fleet seats that are being mitigated with extensions and rotations to meet deployment requirements. Looking forward, this short-fall in first sea tour strike fighter pilots will result in a gap of instructor pilots on shore duty in the 2021-2023 timeframe.

The Navy is using three levers to address this pending instructor pilot gap at the training command. These include expanded use of Reserve Component instructor pilots, reintroduction of the Selective Retained Graduate (SERGRAD) Program, and creating an alternate career path under the Professional Flight Instructor Program. The Navy has increased utilization of Reserve Instructor Pilots by increasing the size of the augmentation units at the training squadrons, as well as funding additional Selective Reserve fly days. The SERGRAD Program keeps high performing newly winged pilots and uses them to instruct basic flight maneuvers to student pilots. The SERGRAD program has been used extensively in the past and is advantageous because the newly winged Naval Aviators are current in the training aircraft. Finally, the Navy has recently announced a Professional Flight Instructor Program for O-4 and O-5 aviators not on track for command, to provide additional career flexibility and make use of their extensive flight experience.

Ultimately, the correction for the Navy's shortage of strike fighter pilots will require approximately 5 years of continued funding for pilot production at the Fleet requirement level, which began in 2018. These efforts aim to increase the number of qualified first-tour Fleet pilots, which in turn, should increase the number of instructor pilots as the first-tour pilots rotate to shore duty in the training commands after an initial three year sea duty tour. The Navy does not see the need to produce first tour pilots above the Fleet seat requirement, as doing so would only exacerbate current readiness challenges. Producing too many inexperienced pilots at a given fleet squadron, without an adequate number of experienced pilots or flight time to provide for their seasoning, would decrease available flight time, increase the time it takes to qualify, and ultimately lead to a lower overall quality of service.

Marine Corps

The Marine Corps and Navy share the same production pipeline, so many of the pilot production challenges outlined by the Navy have had a similar impact on the Marine Corps, to include the strike fighter community. Several years of underproduction (8 out of the last 11 years) and aircraft maintenance challenges in recent years have exacerbated the problem.

Army

The Army has taken steps to increase production since 2017. Critical to the success of this effort is predictable resource levels by way of students, instructors, availability of training

aircraft and simulations, funding, and time. Currently, instructor pilot and aircraft (UH-72) shortages most impact the Army's ability to increase pilot throughput at the training base. In FY17, the Army approved a mitigation strategy for a deliberate surge in accessions and training throughput to gradually reduce junior pilot shortages in the WO1/CW2 ranks. As a result, the Army is expected to have enough applicants ready to meet increased flight training throughput during the remainder of FY19. The surge is expected to grow to approximately 12 percent above current force structure accession requirements and will continue for 5 years, while the Army continues to monitor aviation fill rates and attrition.

The U.S. Army Aviation Center of Excellence (USAACE) utilizes a mix of Warrant Officer, Department of the Army Civilian (DAC), and contract instructor pilots. Warrant Officer instructor pilots are currently under-resourced with 222 on-hand of the 292 authorized (76 percent). While the Army has an ongoing initiative to bring Reserve instructor pilots on active duty to augment Active Component Army instructor pilot strength; however, operational units compete for these instructor pilots in all airframes. Within USAACE, DAC instructor pilots are currently understaffed with only 191 on-hand of the 206 authorized (93 percent). The Army is continuing with efforts to recruit and hire the required number of civilian instructor pilots.

Contractor instructor pilots are utilized to mitigate the shortages in military and civilian instructor pilots with 40 currently on-hand. The prime vendor of this contract continues to recruit and hire the required number contract instructor pilots to fill gaps in the military and DAC populations. Collectively, the most significant obstacle to filling these positions remains the demand for pilots in the commercial aviation industry workforce. Over the last two years, the Army experienced a marked increase on the part of the commercial aviation industry to recruit Army aviators into the commercial airlines. In fact, the vast majority of the regional airlines have developed military rotary-wing pilot transition programs,²² as the vast majority of military pilots will leave the military with the total flight time requirements of 750hr to qualify for a restricted ATP certificate and only require an additional 250 hours of fixed-wing flight time.

Predictable, stable and sustainable funding is paramount to executing the current training mission and any potential future increases regarding training participants and additional contract and personnel costs. To mitigate the effects of the pilot shortfall, the Army must allocate sufficient funding to sustain the deliberate surge in accessions/training requirements. Increasing annual training throughput by 100 pilots requires a funding increase of approximately \$76M for training, additional contract, and personnel costs (using an average of the fully burdened training costs of between \$565,546 to \$1,041,609, depending on aircraft type). In addition to the costs associated with producing a basic Army pilot, the training pipeline takes a minimum of one year to complete. Therefore, any increase to aviator output will not manifest the intended output until the following year.

ELEMENTS 2 & 3. Manning Requirements and Aircraft Fleet Capacities Review

Air Force

Each Military Service possesses its own unique manning and aircraft fleet capacity requirements that are based on its funding and mission. The Air Force was short 2,000 pilots across the total force (Active and Reserve Component) by the end of 2018. This includes an approximately 800

²² Leading regional airlines including PSA, Piedmont, Trans States, GOJet, Commuteair, Compas, Envoy and SkyWest all have military rotary wing transition programs, most of which allow their pilots to flow to one of their major airline affiliates after spending a defined period of time at the regional carrier.

pilot shortfall in the Active Component (AC) and a Reserve Component (RC) shortfall of 1,150 pilots. Most of the solutions and initiatives presented by the Air Force primarily focus on the Active Component because the Air Force’s Reserve Component relies primarily on Active Component personnel affiliating with the Reserve Component as they leave active duty. As discussed earlier, the pilot shortfall is most acute in the fighter community, where the overall nearly 1,000 fighter pilot deficit includes 700 AC pilots. The Active Component pilot shortfall is forecasted to continue growing to 1,607 pilots by 2023, based on RAND modeling, unless corrective actions are taken (Figure 5).

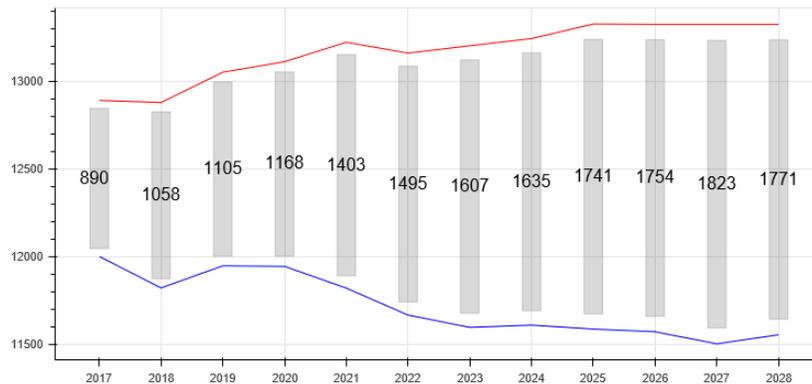


Figure 5: USAF Active Component Pilot Requirements vs. Inventory (shortfall listed)

Across the enterprise, the Air Force requires 12,842 AC, 3,843 Air National Guard, and 3,684 Air Force Reserve pilots (Lieutenant Colonel and below) in the steady state to accomplish the mission and perform management functions of the Military Service and its Components. The analysis does not include the 4,490 combat system officers (formerly navigators, systems officers, and electronic warfare officers), 2,017 air battle managers, 3,304 remotely piloted aircraft pilots, or 14,908 career enlisted airmen across the total force. Major Commands and the Components determine manning based on mission requirements. The Air Force then works to prioritize those requirements and allocates against the available inventory through the Rated Management process.

Formal Training Unit capacities differ from platform to platform, but the fighter enterprise as a whole currently has the capacity to produce 294 Total Force fighter pilots, with the Active Component receiving 259 of those positions. Under the ACTF proposed increased production plan, the annual production requirement would increase to 300 Active Component fighter pilot FTU graduates. To achieve the increased production, multiple issues will need to be addressed, to include: increased fighter instructor pilot staffing, increased funding for Weapons System Sustainment, and additional aircraft for both training and absorption in operational squadrons. Due to current imbalances in the production pipeline, delays throughout the training phase from commissioning through absorption at operational units are further restricting the Air Force’s ability to meet fighter pilot requirements. The Air Force is looking for ways to better balance training and absorption demands within the fighter community to improve the production pipeline.

Navy

The Navy reported 1,242 total aviator billet gaps (pilots and navigators) in FY18, and is experiencing higher than average pilot loss rates, though the extent varies by aircraft community. Of particular concern are adverse retention trends at the mid and senior officer levels in the

TACAIR communities (Strike Fighter and Electronic Attack). According to a survey of pilots who decide to leave active duty, they report leaving due to; increased commercial airline job opportunities, dissatisfaction with readiness challenges limiting aircraft availability/flight hours, quality of service issues including operational tempo, administrative burdens, low incentive pay (as compared to civilian opportunities), and quality of life issues for families.²³ The Navy is addressing these challenges through the judicious use of targeted incentives and non-monetary retention tools aimed at retaining required personnel and sustaining required readiness levels. Navy pilot retention through Department Head assignment, nominally the 10-12 year career point, has fallen below three-, five-, and ten-year average continuation rates (Figure 6). Resignation/retirement rates have also increased among junior and senior pilots. For example, Post-Command Commander (O-5) losses have increased since 2009, more than doubling from 2010 to 2018, as airline hiring rates have grown. Such trends are reducing the Navy's ability to fill critical billets requiring experienced aviators, and challenge the long-term ability to continue meeting mission requirements.

Active Component Navy Pilot Inventory	6,975
FY18 Combined Aviation Billet Gaps (Pilot/NFO)	1,242
FY18 Pilot Losses	611
Pilot Losses (10-Year Average)	465
FY18 Pilot Loss Comparison to 10 Year Average	131%
FY18 (O-4) Pilot Loss Comparison to 3-Year Average	122%
FY18 (O-3) Pilot Loss Comparison to 3-Year Average	125%

Figure 6: Active Duty Navy Pilot Losses and Billet Gaps (October 1, 2018)

These adverse retention trends are not being experienced to the same levels across all Naval Aviation communities. The most adverse retention trends are being driven by the TACAIR Community, accounting for 37 percent of Naval Aviation or about 3,723 pilots/NFOs. The Navy produces approximately 167 pilots and 88 NFOs for these communities annually, with three years required to train new pilots. Therefore, any delays in flight training further challenge Navy's ability to replenish Strike Fighter and Electronic Attack pilot manning. The Navy also continues to have challenges with maintenance and training backlogs that result from high operational tempo and aircraft material readiness challenges. The Navy is attempting to restore stability and predictability to squadron deployment cycles, which have been challenged by previously constrained funding levels and operational demand.

Marine Corps

The Marine Corps is experiencing aggregate inventory shortfalls, which stem from a shortage in the Company Grade (CoGrade), O1-O3, population as depicted in Figure 7. This shortfall reflects the total pilot requirement, which includes pilot participation in broadening tours and staff positions which do not require an aviator. The CoGrade shortfalls are attributable to the decreased accessions and production levels during the FY12-15 drawdown, as well as the current production deficits and protracted time-to-train in undergraduate aviation training. Production shortfalls contribute to the inventory shortfalls, as the pilot production pipeline fell short of the requirements by 44 in FY16, 46 in FY17 and 37 in FY18. The Marine Corps has

²³ U.S. Government. Statement of Vice Admiral Burke before the Subcommittee on Military Personnel of the House Armed Services Committee on Pilot Shortages, dated March 29, 2017.

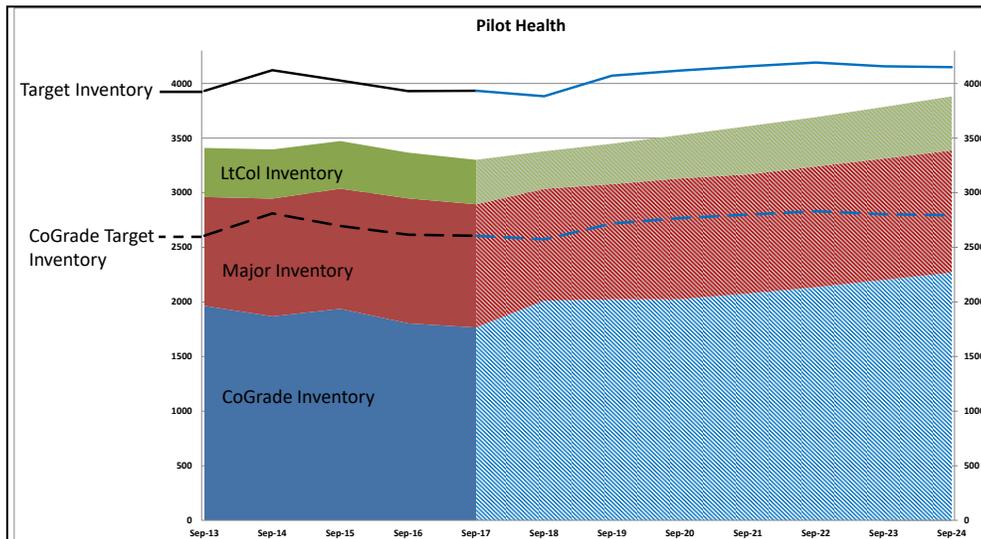


Figure 7: USMC Aggregate Pilot Health

mitigated inventory shortages by manning billets with individuals of higher grades if a surplus at the higher Grade could be leveraged. For example, the Marine Corps uses healthy O-4 overages to fill gaps in O-3 billets in the aviation community. Pilot communities with overages have been used to fill pilot billets that do not require platform-specific pilots (such as a primary flight school instructor). Marine Corps Attrition rates have yet to return to pre-drawdown era levels, as seen in Figure 8. The rotary-wing community’s rates are decreasing in the post-drawdown years, while the fixed-wing community attrition rates continue to rise, mainly driven by the jet community.

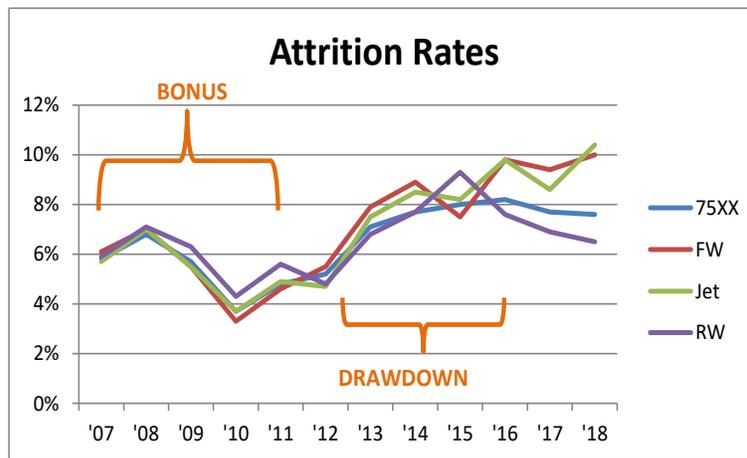


Figure 8: USMC Attrition Rates (2007-2018)

Like the other Services, the Marines Corps is experiencing aviator inventory shortages in multiple communities largely as a result of production shortfalls. Similarly, challenges exist within vulnerable mid-career experience pools within stressed communities, namely the MV-22, AV-8, and F-18 airframes. The Marine Corps’ challenges are evidenced by the fact that the retention rate for MV-22 pilots in the grade of Major (O-4) declined from 93.8 percent in FY17 to 86.3 percent in FY18, even though the Marine Corps offered a bonus of \$35,000 to MV-22 pilots for the first time since 2011. These challenges facing the Marine Corps are further exacerbated by planned growth of MV-22 and F-35 aircraft.

Army

The U. S. Army shortfall in the Active Component and aggregate surpluses in the Army National Guard (ARNG) and Army Reserve (USAR) do not fully capture many of the unique challenges these components have faced in recruiting, training, and maintaining pilots. As a whole, Army pilot manning is below total required for the Active and Reserve Components, when accounting for pilots not available to the operational force, due to training, transient, hold and student (TTHS) status. The Active Component Army shortfall of 330 Aviation Warrant Officers (AWO) reflects a required inventory of 5,282 and a current inventory of 4,952 (see figure 9).

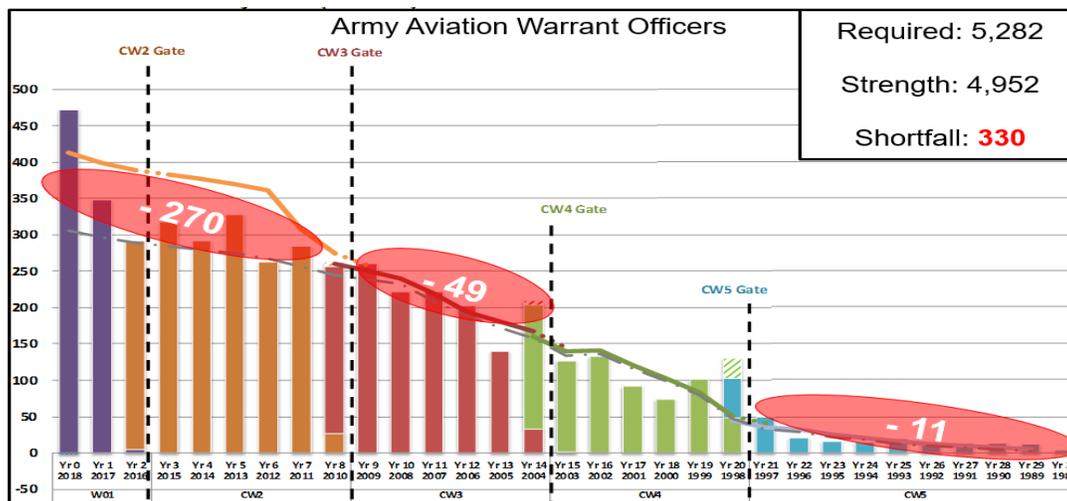


Figure 9: Active Component Aviation Warrant Officer Strength (as of 1 Oct 2018)

The Army National Guard and Army Reserve, have pilot surpluses of 161 and 83, respectfully, however this conceals the emerging issue of a personnel manning imbalance. A shortfall of junior-grade AWOs in the Army National Guard is being masked by retention of higher numbers of senior-grade AWOs. Currently, 22 percent of the reserve force is retirement eligible, which represents a risk if they choose to retire in substantial numbers. Summarily, the Army Reserve compensates for its initial under accession of AWOs with a relatively steady flow of Active Component AWOs transitioning to the Reserve Component. This produces a concentrated spike in pilots that are more senior, where 26 percent of the entire active and reserve component force is currently eligible to retire.

The Active and Reserve Component Army force currently have enough aircraft in the aggregate to train pilots to adequate proficiency. However, aircraft shortages exist within the AH-64, UH-72, and CH-47 aircraft fleets, with the greatest deficit residing in the AH-64 fleet. Active Component Army AH-64 units are currently equipped at 88 percent, while National Guard units are at 75 percent. The Army continues to build toward its Army Procurement Objective (APO) of 791 AH-64 aircraft and maintains approximately 10 percent in the remanufacture line (AH-64D to AH-64E conversions). At existing production rates, it is forecasted to take until 2028 to manufacture the approved AH-64E force structure, assuming adequate funding remains available. The Army continues to manage risk in the AH-64E force structure, while meeting current operational requirements. Total Army Analysis validates the current aviation force structure as sufficient to meet war plan requirements at an acceptable level of risk. Figure 10 reflects the current Total Army inventory.

AIRCRAFT	AUTHORIZED	FILLED
AH-64	791	737
CH-47	542	500
UH-60	2135	2159
UH-72	477	424
Fixed-Wing	285	285

Figure 10: Army Aircraft Inventory – All Components

Shortages of aircraft in operational formations increase the complexity for maintenance and training volume. Most of these shortages are temporary and do not impact a unit’s long-term capacity to season pilots to acceptable proficiency, currency, and experience levels.

The Army resources institutional training base aircraft and simulator requirements to support the student training mission. The number of training aircraft and simulators available are largely determined by a balance of training requirements, impacts to operational unit readiness, and cost. The lack of a dedicated training fleet of UH-72As at Fort Rucker prevents the Army from streamlining the flight school curriculum by requiring a variance of instructor pilots and qualifications to support training. With an adequate number of IPs, the current inventory of aircraft and simulators on hand at the institutional training base adequately supports a steady state training mission to produce 1,344 Initial Entry Rotary Wing aviators annually to meet Active and Reserve Component training requirements.

ELEMENTS 4 & 5: Quality of Service and Quality of Life Initiatives

One of the greatest challenges to adequate pilot manning is predicting retention rates and understanding the reasons for increased voluntary separations. Job dissatisfaction; career dissatisfaction; frequent and long deployments; poor quality of life; non-competitive pay; and lack of personal and professional development are among the reasons cited for why many experienced military pilots separate from military service. The Military Services have implemented a number of solutions and continue to explore initiatives to mitigate aviation shortfalls.

Air Force

The Air Force gathered data on what drives separations from an October 2015 Fighter Pilot Retention “Air Force Smart Operations for the 21st century” event, the 2015 Air Force Exit and Retention surveys, the August 2017 Dedicated Aircrew Retention Teaming Summit, and a series of three aircrew retention crowdsourcing surveys sent to 9,000 aircrew members that culminated in March 2018. These data points focused the ACTF on retention efforts that improve work/life balance, quality of service, and monetary compensation packages. One of the most important variables in meeting pilot requirements is the retention rate, as this is used to estimate what level of new pilot production is needed. Accuracy in predicting the retention rate has been challenging due to the number of both internal and external variables which influence individual pilot retention decisions, though historically there has been a strong correlation between major airline hiring and Air Force pilot losses.²⁴ Major airline hiring has steadily increased since 2012, and during that same timeframe the number of eligible Air Force pilots that took the Aviation Bonus steadily decreased from 67 to 44 percent.

²⁴ RAND. *Retaining U.S. Air Force Pilots When the Civilian Demand for Pilots Is Growing* (2016).

To mitigate the growing pilot shortage, the Air Force has implemented the following initiatives:

- Modifying the Air Force assignments system to increase individual choice in career decisions and add flexibility to officer professional development pathways. This will help improve the overall quality of life, which is essential for pilots and their families.
- Re-evaluating Air Force requirements for pilots in headquarters staff positions by exploring the potential to staff these positions with military personnel from other career fields, or civilians, to fill these positions. These measures will allow the Air Force to keep combat-seasoned aviators in operational units.
- Continuing aggressive reviews of airmen's requirements to eliminate non-essential training, additional duties that are unrelated to flight mission, and administrative burdens that have caused job and career dissatisfaction and reduced readiness for primary mission effectiveness.
- The Voluntary Retired Return to Active Duty program was designed to bring back military retirees to active duty who previously served in an aviation specialty in accordance with Title 10, U.S.C. § 688a. This program authorizes the return of up to 1,000 aviators between FY18 and December 31, 2022, and would allow those that return to active duty, under this program, to fill staff positions enabling current Active Duty pilots to remain in line-flying positions.

Furthermore, the Air Force has cut operational and administrative requirements for aircrew members by 25 percent, rebuilt squadron administrative support at operational flying wings, and is exploring ways to incentivize volunteers for 365-day deployments. Taking these steps will build trust and establish a proactive retention posture for the Air Force by providing pilots with the time to execute the shortage recovery and the ability to pursue excellence at their primary warfighting duties, while recapturing a sustainable work/life balance. The Air Force projects these initiatives will add 91 additional pilots by 2023, improving gap projections, and will provide long-term stability for experienced pilot retention to prevent future pilot shortfalls.

Navy

The Navy is focusing on improving quality of service and work-life balance and is already seeing progress through various initiatives. Navy leadership is heavily engaged in improvements to the underlying resource and planning challenges impacting retention, including a focus on personnel management. Fleet feedback indicates aviators want more career path flexibility and opportunities for personal and professional development. Non-monetary career enhancing opportunities (e.g., expanded options for graduate school and fellowships, increased opportunities in the Tours with Industry, and the Career Intermission Programs) are also being implemented to improve retention. Additionally, Navy leadership is attempting to mitigate gaps through targeted personnel distribution measures (e.g., extending personnel tour lengths for available officers to ensure deploying units remain 100 percent manned at all times). Navy leadership will continue to explore creative personnel management solutions to retain its best and brightest aviators, while working to address the issues that stem from unpredictable funding and increased operational demands.

Army

Army Aviation does not have a significant challenge with tertiary non-flying training requirements, due to the career model of the Aviation Warrant Officer. While the other Military Services train and employ commissioned officers as aviators, the Army predominantly utilizes

Warrant Officers to fill flying positions. Nearly 70 percent of all aviation positions within the US Army are filled by Warrant Officers. By design, Warrant Officers are technical experts who specialize in one skill until mastery. They do not typically fill non-flying positions until completing their career progression as an aviator and achieve the rank of CW5, typically around their 20th year of warrant officer service. At present, less than 1 percent of Aviation Warrant Officers fill roles outside of aviation, and of those, approximately 5 percent are non-flying.

The Army is currently working to implement a more comprehensive training strategy for aviation units. This strategy, aimed at improving overall training readiness at the battalion level, intends to gradually increase the total flight time for Army aircrews to approximately 14.5 hours/month. Currently, the Army is executing between 10–12 hours/month as Headquarters, Department of the Army evaluates the effectiveness of the training strategy. Army senior leaders recognize there are growing civilian opportunities for Army pilots. As a result, the US Army Aviation Center of Excellence initiated a survey to better inform future incentive and quality of life programs designed to increase retention. The survey found family stability, compensation, and job satisfaction are critical elements of a pilot’s decision to remain in service. The Army is evaluating changes to address these key factors.

Incentive Pay

In April 2017, the Department increased the maximum cap on Aviation Incentive Pay (AvIP) from \$840 per month to \$1,000 per month; and also increased the Aviation Bonus (AvB) pay cap from \$25,000 per year to \$35,000 per year. All of the Military Services have taken advantage of the AvB increase, though retention data has yet to show a meaningful decrease in attrition to date. RAND research indicates that the aviation bonus may need to be increased further to have a meaningful impact on military pilot retention, based on civilian airline pilot hiring salaries and major airline hiring.²⁵ As illustrated below, Figure 11 shows a strong negative correlation between major airline hiring and AvB take rates in the Air Force.

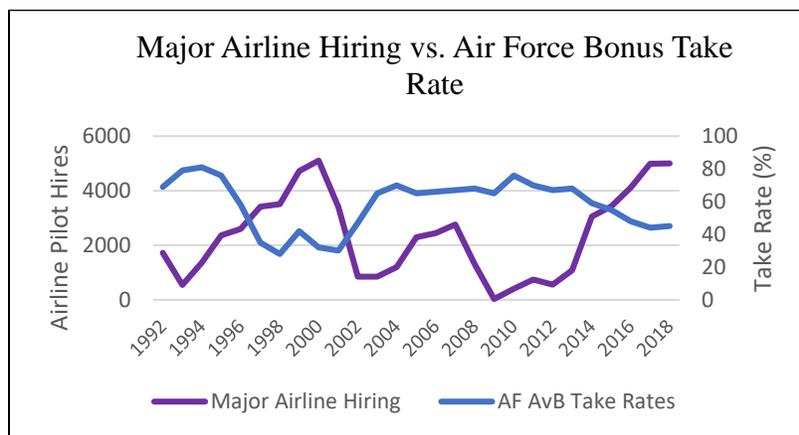


Figure 11: USAF Historical AvB Initial Take Rates

Air Force

The Air Force believes that under current economic conditions and legal authorities, the AvB and AvIP programs need to be improved to retain valuable experienced instructor pilots. The 44 percent overall pilot AvB take rate in FY17 suggests programmed amounts do not effectively incentivize pilots to stay in the Air Force because members continue to choose greater

²⁵ Mattock et. al., RAND. *Retaining U.S. Air Force Pilots When the Civilian Demand for Pilots is Growing* (2016). The Dynamic Retention Model used in their analysis suggests that major airline hiring in excess of 3,800 pilots per year could require a pilot bonus cap of between \$38,500-\$62,500 to increase retention.

compensation and family stability within the major airlines. While final take rates for FY18 averaged 45 percent, potentially indicating an arrestment of the downward trend of the previous four years, the take rate was still significantly lower than the Air Force target of 65 percent. Furthermore, given the underproduction of pilots in some sections of previous year groups, such as in fighter pilots, retention would have to exceed 100 percent of the entering cohort to ensure all requirements would be filled.

In one Air Force retention survey, 73 percent of pilots stated shorter AvB commitment contracts covering a single assignment extension would influence them to stay in the Air Force longer. Additionally, 1,942 aircrew members from the retention survey answered the following open-ended question: “What is one thing you would change about the compensation structure to increase the likelihood of your decision to stay in (the AF) and why?” The #1 response was to “offer monthly flight pay similar to what other [military] professionals (doctors/dentist/etc.) are paid to be competitive with other [civilian] flying options.” The Air Force is studying a number of compensation changes to address pilot retention issues, and believes that when measured against the capital investment loss when a pilot leaves Military Service, increased bonus structures remain a reasonable human capital investment.

Navy

The Navy assesses that its aviators desire monetary incentives that are more flexible, merit-based, and competitive with civilian aviation employment opportunities. Utilizing the 2017 NDAA statutory changes to Aviation bonus and career incentive programs, Naval Aviation is significantly reshaping aviator department head and commanding officer bonuses as well as Career Aviation Incentive Pay, to better target and retain talented officers. Primary monetary incentive tools supporting aviator retention are Aviation Incentive Pay (AvIP) and the Aviation Bonus (AvB). Fleet feedback indicates junior officers desire more flexible incentive options that are explicitly tied to merit, while senior officers want consistent, predictable growth of pay/incentives throughout a successful career. The Navy has implemented Congress' 2017 authorization of an increase in the statutory maximums for AvB from \$25,000 to \$35,000 per year, as well as, increased maximum pay scales for AvIP from \$850 to \$1,000 per month. Both were well-received, though it is too early to determine if these increases will be enough to have a meaningful impact on retention.

Marine Corps

The Marine Corps implemented an Aviation Incentive Pay increase effective March 2018, which increased this special pay to the maximum of \$1000 per month for Marines in the critical-retention and flight-intensive years (11-16 yrs of service). Additionally, the Marine Corps reestablished its Aviation Bonus program in FY18, which is the first Aviation Bonus offered since FY11 and is using the maximum allowable amount in FY19 of up to \$35,000, based on projected officer inventories. The intent of the program is to provide a proactive, short-term incentive for targeted aviation officers, aimed at combating inventory shortfalls and providing stable aviator inventory levels.

Army

The Army has historically been relatively unaffected by commercial airline hiring, but it is now experiencing unexpected competition from regional airlines. Faced with pressures from their major airline counterparts, a limited pilot supply and growing demand, major airlines are currently offering an unprecedented average \$75,000 annual starting salary.²⁶ Additionally, the

²⁶Glassdoor 2018 Salary Analysis; https://www.glassdoor.com/Salaries/pilot-salary-SRCH_K00,5.htm

regional airlines have established direct-path entryway programs granting experiential credit for military aviators wishing to transition between rotary and fixed-wing aircraft, which has become a threat for the Army's Warrant Officer aviator supply.

Beginning in the first quarter of FY18, the Army offered an Aviation Bonus to a targeted population of conventional Aviation Warrant Officers for the first time since FY11, resulting in 450 AWOs signing up as of the first quarter FY19. This bonus program provides up to \$35,000 per year based on airframes and qualifications in exchange for varying service commitments. Based on feedback received from the initial bonus, the Aviation Bonus was revised to include expanding eligibility and bonus amounts to retain more pilots. Additionally, the Army is also reevaluating a potential increase in the Army's Aviation Career Incentive Pay amount from the current maximum of \$850 per month to \$1,000 per month as a measure to match the other Military Services and account for inflation of a payment that has not changed in over a decade. To increase the predictability and stability for AWOs, the Army is exploring implementing duty station stability, increasing assignments from three years in length to four or more, while still meeting current operational demands.

ELEMENT 6: Dedicated Flying Career Track

The Military Services vary in the use of a dedicated flying only career track. While the Army is the only Military Service with an established dedicated flying career track, the Navy and Air Force are introducing initiatives that would offer aspects of a flying career track in specific areas.

Air Force

The Air Force is examining a "fly only" career track through the use of a limited line duty officer career option, modeled after the Navy's nuclear power officer career track. Additionally, Air Mobility Command is conducting a beta test of an Aviator Technical Track (ATT) to determine the feasibility of creating an overall program for the Air Force. The ATT beta test goals include creating a career path desired by pilots, while submitting findings, conclusions, and recommendations for changes to Air Force policy.

Navy

The Navy is considering a number of initiatives to enable its aviators to fly more within an aviation career. The most recent example is the Professional Flight Instructor (PFI) Program. PFI will allow qualified pilots who do not seek command opportunities to serve continuously as flight instructors beyond the Department Head milestone, as an alternative to a traditional sea/shore rotational career path. PFI program goals are to improve retention by offering career flexibility, greater assignment stability for selected officers/families, and rewarding experiences training our newest Naval Aviators. The program will also improve instructor manning levels, better leveraging the experience and instructional skillsets of officers who otherwise may have chosen to leave naval service for civilian opportunities.

Marine Corps

At this time the Marine Corps is not considering a "fly only" career track for its pilots. The Marine Corps feels that its officer development model instills the necessary skills and ethos demanded of a Marine officer to skillfully employ combined arms in a variety of complex and technical career fields. Experienced and well-rounded Marine Air-Ground Task Force officers are foundational to Marine Corps' ability to deliver expeditionary capabilities. While a continuous flying career track may have a short-term impact on retaining qualified and

experienced pilots in critical billets, the long term impact on the remaining pilot population that elects the typical career track would be negative.

Army

The Army Aviation Warrant Officer career track is a well-established pathway providing continuous flying duties with minimal tertiary assignments and additional duties. This program is the foundation of the Army rotary-wing aviation community and the Army has every intention of continuing this program going forward.

ELEMENT 7. Partnerships for Pilot Production Synergies

As the global aviation industry continues to grow and commercial airline interest in hiring military aviators continues to expand, the Department recognizes the importance of remaining engaged with commercial industry counterparts, aviation training and education institutions, and other related entities to seek innovative ways of addressing the impacts of a global pilot shortage.²⁷ As such, the Military Services participate in the National Pilot Sourcing Forum, which is a public-private partnership that includes the Services, major airlines, university aviation programs, youth aviation programs and others working to cultivate the next generation of pilots through public education and outreach, as well as training incentives and efficiencies. In addition to solving the immediate shortage, the Department is investing in fostering a future generation's propensity for aviation. By indirectly linking pathway opportunities to military service, such outreach has the potential to provide the next generation of potential pilots when life-shaping future career decisions are being formed. Many organizations, such as high school Junior Reserve Officers' Training Corps (JROTC) programs, the Civil Air Patrol, the Naval Sea Cadets, and the Experimental Aircraft Association, all have programs designed to promote the future and passion for aviation.

In FY18, the United States Air Force and Air Force JROTC (AFJROTC) established a Flight Academy to award aviation scholarships to competitive high school students. AFJROTC partnered with several universities to provide students the opportunity to earn a Private Pilot's License and college credit through an eight week intensive in-residence program. The inaugural summer of 2018 saw 120 students attend six university programs, producing 94 newly licensed pilots. Although there is no military service commitment nor obligation upon successful completion of the Academy, each cadet gains a positive college experience, earns college credit while still in high school, and earns their private pilot's license, potentially filling university and aviation pipelines early. This program is expected to indirectly benefit all Military Services. Currently, 20 of the 44 high school seniors who attended the Flight Academy are enrolled in Air Force ROTC, many at the same colleges where they attended flight training.

A number of universities across the United States have associated large-scale, well-established VA-approved flight training schools. These schools, such as Embry-Riddle Aeronautical University, Purdue University, and the University of North Dakota, to name a few, possess unique prospects in that they can provide a complete package for military aviator production augmentation. They provide graduates an accredited four-year degree, host multiple-Military Service Reserve Officer Training Corps (ROTC) Detachments, and their graduates frequently graduate with advanced FAA certificates. This model has the potential to afford the Military Services needed training capacity relief while providing constructive credit in the initial

²⁷ National Pilot Sourcing Forum, comments from major airline representatives, 22 May 2018.

stages of pilot production. Successfully-screened university flight training partnerships possess ample organic infrastructure to meet this expansion requirement as needed.

The Air Force has also created a conceptual “Alternate Path to Wings” program, which effectively “fast tracks” the approved flight university program graduates through additional pipeline training, utilizing a combination of civilian instructors and advanced simulators to place new officers into military aircraft in a more accelerated timeline. Initial candidates have already been identified and are scheduled to produce Air Force aviators as soon as Fiscal Year 2019.

CONCLUSION

The DoD is experiencing a significant pilot shortfall. While the shortfall reaches across each of the military departments, the Air Force is experiencing the largest shortfall. Military aviation capabilities have been in high demand over the last 17 years of combat operations. The challenges of operating at this sustained level of engagement, coupled with reduced budgets, has resulted in inadequate funding for pilot production and aircraft material readiness accounts. These shortfalls have been further exacerbated by high attrition among experienced pilots who have transitioned to opportunities within the commercial aviation industry. Commercial aviation hiring is at an all-time high, as major airlines are experiencing an unprecedented number of mandatory retirements, additional Federal Aviation Administration (FAA) requirements, and industry growth. The last time the airline industry experienced elevated levels of hiring (above 3,000 pilots/yr), it was limited to the five years between 1997 and 2001. By contrast, the major airlines have hired an average of 4,000 new pilots over the last five years and current industry forecasts estimate that they will require at least 4,000-5,000 pilots per year, for the next ten years. Several studies have shown a strong correlation between increased airline hiring and lower military pilot retention, suggesting that airline hiring is influencing retention and is likely a leading indicator of retention challenges going forward.

The DoD is focused on rebuilding aircraft readiness and pilot production capacity, but doing so will require sustained funding for those readiness accounts. While the Military Services believe that improving aircraft readiness and pilot production will have positive impacts on retention, they are also implementing a number of quality-of-service and quality-of-life initiatives focused on improving retention. These initiatives include: reducing administrative tasks and training, implementing “fly only” career tracks, providing career flexibility, leveraging Reserve Component pilot capacity, and structured compensation incentives.

While the Military Services continue to mitigate current shortfalls, the Department simply cannot afford to continue losing experienced pilots at the current rate. The commitment required to train and build requisite experience is a costly and time-intensive endeavor, so every effort should be made to retain this talent. To maintain a competitive edge, the Department will need to maintain a keen awareness of the commercial airline industry’s relative competitive practices and understand behavioral influences affecting military members. This particular military pilot shortfall is unlike previous shortfalls and will require comprehensive approaches that address personnel policies and adequate funding for readiness. In this way the Military Services can create an environment that continues to attract future talent, while retaining the experienced pilots that are currently serving.