Manning the Next Unmanned Air Force
Developing RPA Pilots of the Future

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The successes of Operations Enduring Freedom and Iraqi Freedom have resulted in Unmanned Aircraft Systems (UAS), or Remotely Piloted Aircraft (RPA), providing more strategic level effects than any other weapon system in the Air Force (AF) inventory. Besides regular use on the battlefield, these intelligence, surveillance, reconnaissance (ISR) and strike aircraft are used as the weapon of choice for the White House to prosecute targets that are a risk to our national security (primarily the Al Qaeda network). As a result, the AF has aggressively enhanced its RPA capabilities over the last few years, and is currently supporting 61 combat air patrols (CAP) that operate 24-hours per day, predominantly in Afghanistan, Yemen and the North Africa coast. This capability will continue to grow over the next few years due to a Secretary of Defense-directed requirement 65 daily patrols by mid-2014.

On the operator front, the RPA pilot career field hovered around the 50-person level in the late 1990s but now exceeds 1,300 and is growing to approximately 1,650 by fiscal year (FY)17. However, as the CAP requirement grows at a faster pace than the AF can train personnel to operate these systems, it is apparent that the RPA career field is not properly identifying and professionally developing these pilots. Mental health and post-traumatic stress disorder factors aside, there are significant issues that confront the RPA community, and these problems are not receiving the level of attention they deserve. First, the RPA career field is failing to accurately prescreen and assess the most appropriate pilots to fly RPA, which is resulting in an attrition rate during RPA Flight Screening (RFS) three times higher than traditional pilots. Second, RPA pilots are unable to meet promotion education, and training opportunities commensurate with other officers, resulting in a 13 percent lower promotion rate to the rank of Major over the last five years.

In order for the AF to stay innovative and relevant in the furtherance of unparalleled RPA operations, it must take a new approach and re-evaluate the personnel programs that most effectively contribute to this vital mission. First, the AF must standardize the Pilot Candidate Scoring Method across all commissioning sources and incorporate psychological prescreening tools for the selection process for pilots. Second, the assignment process must ensure there are enough rated qualified candidates to meet AF-wide requirements for manned and unmanned aircraft, and that a volunteer for one pilot specialty is a volunteer for all pilot specialties. In addition, the USAF Academy should mandate participation and successful completion of the Soaring and UAS Airmanship programs prior to the commencement of Initial Flight Screening (IFS), and the Board Order of Merit should not be finalized until after IFS. Third, the AF needs to expand their collaboration with industry and academia in order to glean

lessons learned and best practices for unmanned systems, and then incorporate them into curricula at USAFA and ROTC units. Fourth, the AF should establish a rated force developmental plan that cross-flows rated officers into RPA (similar to Air Mobility Command's Phoenix Reach program), and continue to track these high potential officers for future education, training, and Command opportunities. Fifth, an aggressive enterprise-wide recruiting strategy and strategic communication plan is needed. This should focus on placing RPA mentors at all commissioning sources, and include a grass-roots message in the training and operational communities that highlights the growing commercialization and strategic importance of unmanned systems, and the high tech and savvy personnel that are required to fly these systems.

The recommendations above are pragmatic changes that should be implemented to more effectively identify and develop future RPA pilots (a career field that now produces more pilots than traditional fighter and bomber pilots combined). They are based on a continuum of education and learning from day one at one of the various commissioning sources all the way until promotion into the senior leadership ranks within the AF. The sooner the AF fully integrates these aviators into its professional developmental plans, the more effective the RPA community will be in recruiting, training, and retaining high potential officers. With more RPA-experienced senior officers, the USAF will also remain on the cutting edge of this new technology and its employment. In summary, the AF mission is to "fly, fight and win"…and the personnel that support this mission must be assigned at the right place and the right time to more effectively fight our Nation's wars. The new generation of UAS pilots is here, and the AF must redefine its "airmindedness" culture in order to lead the country into the next decade of aviation innovation and greatness.

CHAPTER ONE
Introduction

"RPAs, unmanned aerial systems, unmanned air vehicles…we're in the second stage here. We're just past the Wright Flyer stage of these things. In the next 20-30 years these things are going to explode. It's going to be exciting to watch, and our Air Force has to be in the lead because we'll know the best way to use them. Innovation is what we're all about." [1] *-- General Mark Welsh, Chief of Staff of the Air Force*

We, as a Nation, are in the middle of many discussions and debates regarding the current and future use of unmanned systems. Whether it's the ethical or legal debates regarding "drone" strikes in the Middle East and Northern Africa, or the safety, security and privacy concerns with the use of domestic drones (or unmanned systems) in the Federal Aviation Administration (FAA) airspace, the debate will continue. However, leading drone experts inside and outside of government all agree that drones are here to stay, and the proliferation of these systems will continue to explode over the next decade. To put things in perspective, the US military entered Operation Iraqi Freedom with only a handful of remotely piloted aircraft (RPA) and zero unmanned systems on the ground. Today, there are over 8,000 unmanned aircraft systems (UAS) and over 12,000 ground systems, with UAS/RPA now conducting over 500 strike missions per year (a rise of approximately 96 percent since 2009).[2] From an international commercial market perspective, the Teal Group Study of 2012 forecasts that the UAS industry will double over the next decade to approximately $12 billion, with more countries (currently at 87) deciding to develop and operate these systems.[3]

More specifically for the military, the successes of Operations Enduring Freedom and Iraqi Freedom have resulted in RPA providing more strategic level effects than any other weapons system in the United States Air Force (AF) inventory. Besides regular use on the battlefield, these intelligence, surveillance, reconnaissance (ISR) and strike aircraft are used as the weapon of choice for the White House to prosecute targets that are a risk to our national security (primarily the Al Qaeda network). As a result, the AF has aggressively enhanced its RPA capabilities over the last few years and is currently supporting 61 combat air patrols (CAP) that operate 24-hours per day, predominantly in Afghanistan, Yemen and North Africa. This capability will continue to grow over the next few years due to a Secretary of Defense-directed requirement of 65 daily patrols by mid-2014.[4]

On the operator front, the RPA pilot career field hovered around the 50-person level in the late 1990s but now exceeds 1,300 and is growing to approximately 1,650 by FY17.[5] As the CAP requirement grows at a faster pace than the AF can train personnel to operate these systems, it is apparent that the RPA career field is not properly identifying and professionally developing these pilots. Mental health and post-traumatic stress disorder factors aside, there are still significant institutional issues that confront the RPA community, and these problems are not receiving the level of attention they deserve. First, the RPA career field is failing to accurately prescreen and access the most appropriate pilots to fly RPA, which is resulting in an attrition rate during RPA Flight Screening (RFS) that is three times higher than traditional pilots. Second, RPA pilots are unable to meet promotion education, and training opportunities commensurate with other officers, resulting in a 13 percent lower promotion rate to the rank of Major over the last five years.

In order for the AF to stay innovative and relevant in the furtherance of unparalleled RPA operations, it must take a new approach and reevaluate the personnel programs that most effectively contribute to this vital mission. A robust RPA community begins with a more deliberate accessions process and carries through to a continuum of education and training opportunities later in an officer's career. The AF cannot wait another decade to ensure the RPA community gets professionally developed, recognized, and promoted on par with other officers in the AF. In an AF that now produces more RPA pilots than traditional fighter and bomber pilots combined, the sooner the AF fully integrates this innovative and technically savvy culture of aviators, the more effective the RPA community will be in recruiting, training, and retaining high potential officers that will be future senior leaders in the AF.[6]

Notes

[1] Mark Welsh, Speech given at Air Force Association's Air and Space Conference, Washington, DC, September 18, 2012.

[2] Aaron Church, "RPA Strikes Still Rising," *Air Force Magazine,* Vol. 96, No. 3 (March 2013): 21.

[3] Teal Group Corporation, "2012 World Unmanned Aerial Vehicle Systems," (2012).

[4] HQ Air Force, "RPA Enterprise: Growth to Normalization," briefing given at Intelligence, Surveillance and Reconnaissance Directorate, March 27, 2012.

[5] Ibid.

[6] HQ Air Force, "Public Affairs talking points on RPA Operations," January 2013.

CHAPTER TWO
Background

As stated earlier, the AF is currently providing 61 combat air patrols (CAP) across the globe. As the AF continues to grow this requirement to 65 CAPs by 2014, there is another story behind this. The AF is going through a time where unmanned aircraft are produced and delivered to the Combatant Commanders faster than it can identify, select, train and professionally develop the pilots that fly these systems.

Based on manning data provided by the Air Staff, each CAP is supported by eight aircrews. By 2017, the AF wants to have ten crews per patrol (or nearly 1,650 RPA pilots), which will drive down the high operations tempo and allow the aircrew to meet staffing, schooling, training and other professional development requirements.[1] Currently, there are approximately 1,300 RPA pilots (or 8.5 percent of total AF pilots, up from 3.3 percent in 2008).[2]

Figure 1: Forecast RPA Pilot Manning
(HQ Air Force)
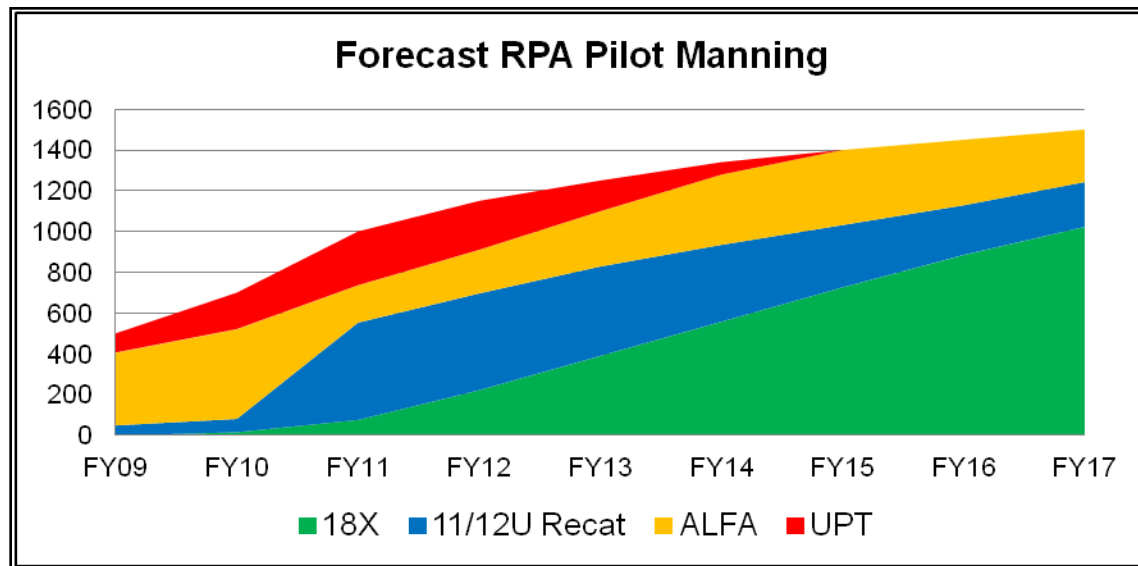
Then Air Combat Command Commander General William Fraser, speaking at the 2011 Air Force Association's Air Warfare Symposium and Technology Exposition, emphasized the predicament the RPA community is in due to warfighter requirements, and acknowledges the AF must normalize the RPA career field:

…training is harder when we are putting everything forward as fast as we can. And, even with new sensors and platforms coming on at a good rate, we cannot operate on a continued surge pace indefinitely. The only factor that will help in this regard is building to 65 combat air patrols as fast as possible, and then increasing the crew ratios.[3]

Per discussion with officials from the Air Force's Air Education and Training Command (AETC), this shortage of RPA pilots will be filled by producing 168 pilots per year through FY16, then will stabilize at 140 thereafter.[4] To help attract more RPA pilots and, more significantly, formally recognize the importance of those that operate unmanned aircraft, the AF created the 18X AF specialty code (AFSC) in 2010, with the long-term goal of building a cradle-to-grave training pipeline for RPA pilots. This will end the system that has forced a large number of Undergraduate Pilot Training (UPT) graduates (or traditional pilots) to cross-flow to RPA for one "alpha tour" (approximately three years) before heading back to their original weapon system.

Rated Accessions

Let's take a look at how the AF currently identifies and selects candidates for formal training In order to meet this growing requirement of RPA pilots. First, officers join the AF in one of three ways: 1) through the USAF Academy (USAFA); 2) through the Reserve Officer Training Corps (ROTC); and 3) through the Officer Training School (OTS). A tool commonly used to assist in screening for the rated selection board is the Pilot Candidate Scoring Method (PCSM), which is an index that "quantifies the candidate's aptitude for success at undergraduate pilot training."[5] In summary, the PCSM score is determined by weighted values of the following:

- Air Force Officer Qualifying Test (AFOQT): a 12-section, 3.5-hour test similar to the Standardized Assessment Test that assesses aptitudes needed for various officer specialties;
-Test of Basic Aviation Skills (TBAS): a 1-hour computer based test that measures certain cognitive, multi-tasking, and psychomotor attributes for aviation; and
- Civilian flying time.

A downside to this tool is that use of PCSM isn't standardized across commissioning sources. For example, PCSM historically has only been used for cross-flow boards from a non-rated specialty to a rated specialty, although there are recent indications from AETC officials that the AF may start using the PCSM for ROTC cadets. On the other hand, USAFA still has no intention of using PCSM or other predictive tools since they have academic and airmanship programs that theoretically negate this need.[6]

Prescreening

According to current AF policy, commissioning sources do not incorporate psychological or emotional testing into the rated prescreening or selection board processes for UPT or Undergraduate RPA Training (URT).[7] Rather, this psychological testing is only conducted as part of a baseline medical screening process that only determines whether or not the person is rated (or pilot) qualified. Contrary to this "traditional" means of selecting pilot candidates, the 711th Human Performance Wing (711 HPW) at Wright Patterson Air Force Base has conducted human factors integration research and reported that there are cognitive and multi-tasking differences between traditional and RPA pilots. The study concluded by stating that "advances in automation are decreasing the need for RPA pilots to have traditional pilot skills and instead emphasize monitoring and collaborative decision making skills."[8] A similar report from the AF Chief Scientist in May 2010 also acknowledged the need for better integration of autonomous systems. In particular, human performance augmentation is essential since "natural human capacities are becoming mismatched to the enormous data volumes, processing capabilities, and decision speeds that technologies offer or demand, which may improve screening of specialty codes based on brainwave patterns or genetic correlators."[9]

Another study performed by a former AF Aerospace Medicine Squadron Commander acknowledges that since 1994, all student pilots complete a battery of neuropsychological tests, called Medical Flight Screening-Neuropsychiatric, prior to the beginning of UPT. Though not used as part of the pre-selection or screening criteria, the tests "are a rich source of information on the attributes of the candidate and have been used to construct a composite neuropsychological picture of a successful AF aviator."[10] Similarly, studies by Professor Henry Jenkins of the Massachusetts Institute of Technology (MIT) and his colleagues argue that students require new learning skills in the 21st century.   He stated that we need students "for 21st century job skills. In some cases, this means instruction for the jobs of tomorrow which may not even exist today. We should encourage instruction in data analytics, data visualization, mapping, video game design, computer science, programming, math, engineering, artificial intelligence, and machine-to-machine communications since these are in short supply currently and likely to be vital for the future."[11] A similar example of the new reliance and use of technologies is substantiated in a recent Kaiser Foundation Study. Basically, Kaiser took a look at the new generation of kids and how they use technology systems on a daily basis, and more importantly, how they learn. The study determined that eight to 18 year olds currently spend 7.5 hours per day using entertainment media, and also concluded that "there exists different cognitive and multi-tasking skill sets for youth these days."[12]

Finally, a comparison can be made to the Special Forces (SF) community within the U.S. Army.   Key traits of a sniper, for example, are very similar to an RPA pilot,

which include experiencing long periods of droning or waiting followed by extremely high levels of quick decision making and precise action. During the initial SF evaluation period, the Special Forces Assessment and Selection (SFAS) process historically used three main standardized tests to evaluate a candidate's mental capacity and psychological makeup: the Myers-Briggs test, the Wonderlic, and the Defense Language Aptitude Battery. According to Major Brian Decker, commander of the SFAS, the SF community is now incorporating the Minnesota Multiphasic Personality Inventory (MMPI) into their screening process, the most frequently used test for personality traits in mental health (and typically used for Secret and Top Secret clearances).[13] Not only do they deem it important to assess the physical and cognitive attributes of potential candidates, but it is also critical to account for the psychological traits in order to get the most optimal candidate that can succeed in this demanding career field.

Pilot Assignment Process

Once these candidates have been deemed "pilot qualified" for traditionally manned or unmanned aircraft duties, the AF commissioning sources use a board order of merit (BOM) to select the rated assignment track, with the UPT requirement (66 percent of the total rated requirement) filled first and RPA requirement filled last. At USAFA, for example, the BOM is based on 60 percent grade point average, 30 percent military point average, and 10 percent physical education average.[14] According to the Air Staff, this has resulted in the *Class of 2011 sending 54.3 percent of RPA candidates from the bottom quarter of the class and the Class of 2012 sending 63.3 percent from the bottom quarter of the class*. In addition to these USAFA cadets, the AF also permits those "washing-out" or not finishing UPT to volunteer for the Undergraduate RPA Training (URT) track. Historically the AF has reclassified approximately ten personnel per year to RPA, but due to the higher attrition rate during RFS and the resultant shortage of RPA pilots, is evaluating the effectiveness of increasing this rate to ten percent of approximately 200 UPT wash-outs per year.[15] Once again, this contributes to an RPA culture that is comprised of pilots in the bottom of their class and/or perceived as "not good enough" for UPT.

Flight Training

With the advent of this new RPA career field also came a new training pipeline to certify these aviators as pilots of unmanned aircraft. Similar to the traditional pipeline of training pilots for manned aircraft at UPT, those candidates in the RPA track now attend URT. However, prior to attending UPT or URT, all pilot candidates must graduate from a flight screening course in Pueblo, Colorado. Those candidates selected for UPT attend a month-long flight training program called Initial Flight Screening (IFS). They train for approximately 18-flight hours in the Diamond DA20 aircraft, which culminates when students successfully complete a solo flight in the air traffic

control tower pattern. They then proceed to a one-year UPT program, followed by an additional three to six months of formal training for the major weapon system that the pilot will fly in a combat unit (e.g. fighter, bomber, airlift, tanker, reconnaissance). On the other hand, those selected for URT attend a more extensive RPA Flight Screening (RFS) program that entails 39-flight hours of training over a seven-week period (also in the DA20). Since this is the only time these pilots will ever fly traditionally manned aircraft, the USAF built a Pilot Fundamental Skills curriculum that includes more cross country flying, both with an instructor and solo. The goal of this extra flight training is to build better airmanship and operational situational awareness for flying within controlled airspace.[16]

In regard to pilot accession quotas, the AF requirement in FY12 was to train 1,129 traditional pilots and 150 RPA pilots). However, the AF was not able to meet its RPA training requirements since there were not enough volunteers (and the AF policy states that rated accessions are still an all-volunteer process). Per Table 1 below, only 82 percent of the URT slots were filled AF-wide in FY12 while 100 percent of UPT slots were filled.[17] As the AF looks into FY13 requirements, it appears a similar anomaly exists. As of January 2013, the USAFA only had 12 volunteers for 40 URT slots after round one of their assignment process.[18]

Table 1: FY 12 AF Pilot Accession
(HQ Air Force)

FY 12 Accessions	AFA		ROTC		OTS		TOTAL	
	Target	EAD	Target	EAD	Target	EAD	Target	EAD
Operator Type								
Manned Acft (Pilot)	505	499	505	517	119	112	1129	1128
Unmanned Acft (RPA)	40	32	80	65	30	26	150	123

Professional Development

As with any career field in the AF, it typically takes up to 20 years to grow senior leaders from the time they are commissioned as Second Lieutenants until they get promoted up through the ranks to Colonel. However, the RPA career field is experiencing a unique phenomenon due to the influx of 1,000 RPA pilots from UPT and those forced to cross-flow in order to meet the surging warfighter requirements. This high operations tempo has also resulted in the inability of RPA pilots to participate in educational, training, and staff officer opportunities on par with their peers, even though the AF realizes it must still deliberately identify and professionally develop these aviators that have unique RPA backgrounds and skill sets.

With the evolution of the RPA community since the late 1990s, this coming summer will actually be the first time the USAF will see "home-grown" RPA pilots as squadron commanders. In a few more years the USAF will undoubtedly see these officers promoted to Colonel. Up to this point, however, the RPA squadron, group, and wing commanders were all experienced aviators from other weapon systems that were directly injected into RPA community at the Command level. As a point of reference, *only 41 of approximately 4,314 USAF Colonels have experience (i.e. flying hours) in the MQ-1 Predator, MQ-9 Reaper, or RQ-4 Global Hawk.* Of these Colonels, 3,187 are Active Duty Line-of-the-Air Force (2,871 are "pinned" Colonels and 316 are Colonel-selects), and the remaining 1,127 are in the Air Reserve Component. Additionally, of these 3,187 officers, only 1,481 are rated officers.[19]

However, of the 41 RPA operators currently in the rank of Colonel, 15 have been promoted below-the-zone to Lieutenant Colonel or Colonel, which is very high in comparison to the typical below-the-zone promotion rate to Lieutenant Colonel and Colonel of approximately four percent.[20] This data is slightly skewed due to the importance AF general officers put on ensuring high potential officers are leading the future of the RPA career field, and was further validated with the January 2013 Brigadier General release that selected two of 31 selectees with RPA experience (although that experience did not come until the rank of Colonel), and now there will be a total of three general officers with RPA experience in the AF.[21]

Research with the US Army has shown that their special operations community has gone through something similar. Major General Nagata, former commandant of the US Army Special Operations Qualification School, stated that you know a career field is relevant and succeeded at a cultural change by the number of general officers it makes each year.[22] As an example, the SOF community would usually have one promotee on the Brigadier General list prior to 9/11. Most recently, however, those numbers have significantly changed. The December 2012 release of the Army Brigadier General list had nine percent (three of 34 promotees) from the SOF community, well above the Army average of three percent (and well above the SOF percentage of the rest of the force, which is only two percent). Obviously this is a sign of the new and enduring importance this community has to the overall mission of the Army and the Department of Defense.

Notes

[1] HQ Air Force, "RPA Enterprise: Growth to Normalization," briefing given at Intelligence, Surveillance and Reconnaissance Directorate, March 27, 2012.

[2] HQ Air Force, "Public Affairs talking points on RPA Operations," January 2013.

[3] William Fraser, Speech given at Air Force Association's Air Warfare Symposium and Technology Exposition, Orlando, FL, February 17, 2011.

[4] Tom Englehart, Interview by author, RPA Training Branch, HQ Air Education and Training Command, US Air Force, January 7, 2013.

[5] "Pilot Candidate Selection Method Program," HQ Air Education and Training Command, US Air Force, http://pcsminfo.net/index.html, accessed February 11, 2013.

[6] Tom Englehart, Interview by author, RPA Training Branch, HQ Air Education and Training Command, US Air Force, January 7, 2013.

[7] Dr. Anthony Tvaryanas, Interview by author, 711 Human Performance Wing, Wright-Patterson AFB, OH, January 22, 2013.

[8] Anthony Tvaryanas, "Human Systems Integration in Remotely Piloted Aircraft Operations," *Aviation, Space, and Environmental Medicine*, Vol. 77, No. 12 (December 2006).

[9] Werner Dahm, "Report on Technology Horizons: A Vision for Air Force Science and Technology During 2010-2030," Vol. 1, AF/ST-TR-10-01-PR, May 15, 2010.

[10] William A. Thomas, Jr., "Minimizing the Loss of Student Pilots from Voluntary Attrition," *Air and Space Power Journal*, December 1, 2009.

[11] Darrel West, Allan Friedman, and Walter Valdivia, "Smart Policy: Building an Innovation-Based Economy," Center for Technology and Innovation, The Brookings Institution, January 15, 2013.

[12] "Reduce Screen Time," Kaiser Foundation, December 19, 2012, www.nhlbi.nih.gov/health/public/heart/obesity/wecan/reduce-screen-time/index.htm, accessed December 21, 2012.

[13] Brian Decker, Interview with author, January 24, 2013.

[14] Jeff Butler, Interview by author, January 14, 2013.

[15] Kurt Konopatzke, Interview by author, HQ AF, Directorate of Manpower, Personnel and Services, February 26, 2013.

[16] HQ Air Force, "RPA Attrition Factors," Briefing given at Directorate of Manpower, Personnel and Services, December 7, 2012.

[17] Ibid.

[18] Tom Englehart, Interview by author, RPA Training Branch, HQ Air Education and Training Command, US Air Force, January 7, 2013.

[19] Ryan Richardson, Interview by author, HQ Air Force, Directorate of Manpower, Personnel and Services, January 22, 2013.

[20] Ibid.

[21] Ibid.

[22] Michael Nagata, discussion at Center for Strategic and International Studies, Washington, DC, December 21, 2012.

CHAPTER THREE
Issues

Issue 1: RPA Flight Screening Attrition Rates Three Times Higher

As we take a deeper look into the RPA accessions and training pipeline, an opportunity to improve still exists. In particular, RPA students are currently attriting or "washing out" of RFS at approximately three times the rate of traditional pilots. Per the Air Staff, the average attrition rate in FY11 and FY12 was 33 percent (which far surpassed the AETC training goal of only 15 percent, and was well above the traditional pilot attrition rate from IFS of 10 percent). Additionally, of those RPA candidates attriting out at IFS, 15 percent were due to self-initiated elimination from the program (termed Drop on Request, or DOR), while 85 percent were due to flight deficiencies (e.g. airsickness, academics, manifestation of apprehension/lack of adaptability). Of note, *73 percent of the attritions occurred prior to the pre-solo ride, while 13 percent were post-solo* (see Figure 2 below). During July 2011, two extra sorties were added prior to the pre-solo flight, which helped drive down the attrition rate (i.e. five classes prior to the syllabus change had a 48 percent attrition rate; 11 classes after it were down to 32 percent).[1] However, AETC decided to adjust the FY13 attrition rate to 25 percent in order to meet output requirements (i.e. 224 students will start RFS, with the requirement of graduating 168 pilots).[2]

Figure 2: Causes of RFS Attrition

(HQ Air Force)
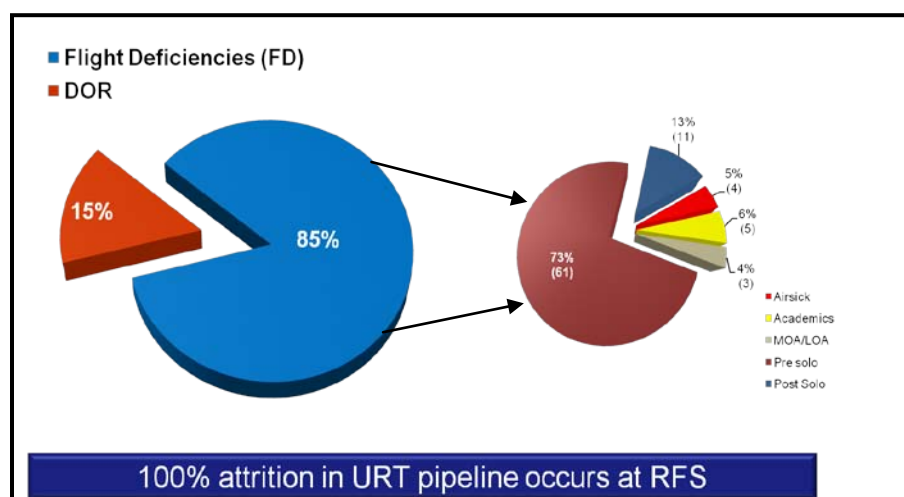
On a positive note, it should be highlighted that once the RPA candidates graduate from RFS, there is a 100 percent graduation rate from follow-on training at

URT (3.5 months at Randolph AFB) and the Formal Training Unit (two to six months at Holloman or Beale AFBs). Obviously this indicates that the RFS program is adequately training these pilots for follow-on training in the RPA pipeline, but it is still inefficient and unacceptable for attrition rates at RFS to exceed IFS at three times the rate. Therefore, let's take a closer look at the tools used to assist selection board members for future RPA candidates and what should be done to improve the quantity and quality of volunteers that access into this strategically critical career field.

Through discussions with former RPA Commanders and a faculty/admissions officer at USAFA, one explanation for the lack of RPA volunteers appears to be a higher level of interest in non-rated specialties upon graduation from USAFA or ROTC units. Of note is the acquisition career field, which trains officers to be certified in weapon system development and procurement (and only comes with a five-year active duty service commitment, compared to traditional pilots who incur a ten-year commitment and RPA pilots who incur a six-year commitment).[3] Another reason is the lack of credible mentors in the operational units and at the commissioning sources that have RPA experience, which is mainly due to the inability to release current and qualified RPA pilots for non-flying assignments as a result of the high operations tempo within the RPA community. A third reason is the lack of an AF-wide strategic communication plan that educates, encourages, and motivates the next generation of RPA pilots.

USAFA, for example, has a robust Airmanship program that allows cadets to build aviation experience and expertise during their 4-year college degree. John Tomjack, from the Plans and Programs Directorate at USAFA, stated that there are now three major Airmanship programs for the cadets, which include training in soaring (gliders), parachuting, and operating small UAS. However, these programs are all-volunteer, meaning that not everyone has to take one of these courses prior to graduation, or even as a prerequisite for RFS or IFS.[4] Many years ago cadets had to take one of the flying Airmanship programs as a prerequisite for UPT (I can attest to this since I had to take glider training and T-41 flight screening prior to earning a UPT slot). Nowadays, the second order effect of an all-volunteer Airmanship program is that not all rated-qualified cadets are participating in any Airmanship programs at all. As detailed in Table 2 below, 12-18 percent of all rated-qualified cadets in Classes 2011-2013 did not take part in any Airmanship program during their four-year bachelor's degree. As a matter of fact, a downward trend is also being realized is the total number of cadets per graduating class that are even rated qualified to begin with. In particular, the percentage of rated qualified cadets has declined from 54 percent to 45 percent respectively for Classes 2011-2013.[5] As a result of the current admissions process, an immediate bathtub of USAFA pilot candidates is created since only 479 cadets are even qualified for rated duties in the operational AF and the annual USAFA quota is 505 for UPT and 40 for URT.

Table 2: USAF Academy Rated Qualification/Airmanship Program Participation
(USAFA)

Class 2013		
Graduates	**Rated**	**Non-Rated**
1059	479	569
No Airmanship	62	237
Class 2012		
Graduates	**Rated**	**Non-Rated**
1082	535	526
No Airmanship	95	267
Class 2011		
Graduates	**Rated**	**Non-Rated**
1035	558	456
No Airmanship	69	186

Specific to the future of unmanned systems, Colonel John McCurdy, USAFA's UAS RPA Program Manager, stated that only a quarter to a third of the cadets actually volunteer for the UAS Airmanship program.[6] Col McCurdy has been trying to increase enrollment, but it is extremely challenging based on all the academic and military requirements imposed on the cadets. Another initiative also underway is to stand up a small UAS cadet club, similar to the aero club that currently exists at USAFA (and many other USAF bases). Within this club, cadets would receive initial training at Hurlburt Field, Florida, on the Raven and Wasp "small" UAS, then would upgrade to instructor and eventually conduct the hands-on initial training at USAFA. However, the problem is that resources and funding are getting more difficult to obtain in this fiscally austere environment.[7]

Issue 2: RPA Pilot Promotion Rates 13 Percent Below Peers

The professional developmental plan to grow and sustain any career field is critical after initial training and upgrades. Specific to the RPA community, the key to success is directly related to identifying high potential officers early in their careers and providing them the professional opportunities to excel. However, the current RPA program has not achieved this goal to date, so much so that Congress has directed the AF to provide updates on education and promotion statistics since the *RPA pilot promotion rate to the rank of Major is thirteen percent below that of their peers.*

Senate Majority Leader Harry Reid (D-NV) and Senate Armed Services Committee Chairman Carl Levin (D-MI) said in a September 2012 letter to the Government Accountability Office that an in-depth analysis is necessary due to the

importance of unmanned aircraft in current conflicts and the heightened demand for Airmen in the career field. "Given the extent to which we increasingly depend upon RPA personnel to conduct military missions of strategic importance to our nation, we believe that we must take rapid and proactive steps to ensure that these personnel are rewarded, rather than disadvantaged for their choice in career path."[8]

Moreover, the National Defense Authorization Act (NDAA) for FY2013 recognizes a consistently downward trend in promotion rates of RPA operators over the last five years. Specifically, the promotion percentages from Majors Promotion Boards have declined from "96 percent to 78 percent, compared to a consistent range of 96 and 91 percent for their peers." Education rates also lag behind those for manned aircraft, and "it is simply unacceptable for service as an RPA operator to be relegated to substandard status in terms of personnel qualifications and treatment."[9]

The AF is trying to correct this "recruitment" problem, but it will take many more years to achieve parity for its RPA pilots. According to Colonel Bill Tart, a former commander at Creech AFB, the current AF promotion board guidance from the Secretary of the AF is to promote not less than the Board average for RPA operators.[10] However, this guidance is not being met once a quality review is performed. On merit and based on a thorough records review, the current group of young RPA pilots do not compete as well for promotion. This is a primary result of the RPA surge in the 2008-2009 timeframe during which pilots were cross-flowed into the RPA career field from almost every other major weapon system in the AF. Squadron commanders at the time (to include myself) were provided very little guidance or selection criteria for these RPA pilots. Basically, the commanders were given a requirement to meet, and had approximately two weeks to provide names to the AF Personnel Center in San Antonio, Texas.

Since very few, if any, traditional pilots actually volunteered for the RPA community, most commanders generally sent Captains that were in the bottom half of the pool of eligible pilots. Some of these pilots had multiple downgrades or failures on their annual checkrides; some were unable to upgrade from copilot to aircraft commander due to below average airmanship; others did not have had the "right" attitude or personality that fit into the weapon system climate; and others had discipline or quality of force issues. It should not be surprising that a few years later the promotion rates to Major were below that of the rest of the AF, especially given the fact that these aviators weren't high potential officers to begin with as a result of flying or discipline discrepancies.

Another area where RPA pilots are lacking is in their opportunities for in-residence professional military education. According to Colonel Tart, RPA pilots received less in-residence Squadron Officer School (SOS) slots by percentage than other specialty codes in the AF. This was mainly due to high operations tempo for the pilots

that precluded them from being released from the training and operational missions, as well as programmatic quotas that were based on previous fiscal year manpower numbers.[11] Regarding SOS, this is the first opportunity to excel and set oneself above peers. Receiving "distinguished graduate" (historically the top ten percent of the graduation class) or "top third" accolades has been used as a discriminator for future leadership opportunities in the AF.

Along the lines of education, RPA pilots must also be afforded the time to complete their master's degree program prior to their Major's promotion board. A decade of high operations tempo that typically included six days per week of flying also precluded some officers from completing their advanced degree in time for the promotion board.[12] Basically, the rapid growth of this career field has prevented some of the RPA pilots from being professionally developed when compared with the rest of their peers in the AF, and waiting another three to four years to increase the RPA crew ratio from an 8.0 to 10.0 is not soon enough for some of these officers.

Lastly, lack of adequate or appropriate recognition is a factor for lower promotion rates. One of the controversies surrounding their historical lack of high level recognition is the viewpoint that RPA pilots were not risking their lives while operating their aircraft 7,000 miles away in Nevada. According to Dr. Peter Singer from the Brookings Institution,

> Let's use the case of the mission that got the leader of al-Qaida in Iraq, Zarqawi. So there was a team of unmanned aerial systems, drone operators, that tracked him down. It was over 600 hours of mission operational work that finally pinpointed him. They put the laser target on the compound that he was in, this terrorist leader, and then an F-16 pilot flew six minutes, facing no enemy fire, and dropped a bomb - a computer-guided bomb - on that laser. Now, who do you think got the Distinguished Flying Cross? The people who spent 600 hours, or the six-minute pilot? And so that's really what we're getting at. Actually, the drone operators, in that case, they didn't get the medal, but they did get a nice thank-you note from a general. So, essentially, you know, what we're hitting at is, one, you have this growing portion of the military that's engaged in these kind of operations. It's important to the future of the military. But at the same time, the system wasn't set up to recognize some of their accomplishments.[13]

In an attempt to properly recognize personnel like RPA operators that are performing extraordinary strategic level action while working outside of the combat zone, Secretary of Defense Leon Panetta approved in February 2013 the Distinguished Warfare Medal (DWM). He stated that it "recognizes distinct, department-wide recognition for the extraordinary achievements that directly impact on combat operations, but that do not involve acts of valor or physical risk that combat entails. Having seen the great work that they do, I've always felt that day in and day out those who performed in an outstanding manner should be recognized. Unfortunately, medals that they otherwise might be eligible for simply did not recognize that kind of contribution."[14] This appeared to be a step in the right direction for these operators of

cyber and unmanned systems, but most recently the current Secretary of Defense Chuck Hagel provided new DWM guidance. Due to order of precedence concerns primarily raised by veterans' organizations and members of Congress, Secretary Hagel overturned the establishment of the DWM and "recommended the creation of a new distinguishing device that can be affixed to existing medals to recognize the extraordinary actions of this small number of men and women."[15] Regardless of how the details play out, the bottom line is that these operators justly deserve separate and distinguishable recognition for their extraordinary acts, acts that achieve strategic effects for our Nation.

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CHAPTER FOUR
Recommendations

Based on analysis of the two major issues facing the future of RPA pilots in the AF, detailed below are five areas of improvement to more appropriately identify, screen, train, educate and promote these future AF leaders.

Prescreening

In practice, the Israelis are the first country to use prescreening psychological testing for future drone pilots. According to SIMLAT, a high-end ISR and UAS mission training systems and simulators company, they assess pilot candidates through Screening by Performance Oriented Testing (SPOT).[1] This simulation system is designed to evaluate UAS operation candidates by testing the skills most relevant for this demanding position. Most recently, the Israeli AF (IAF) used the performance evaluation services of SIMLAT to begin analyzing the usefulness and predictable accuracy of this methodology. Although results have not been released on the effectiveness of this program, it is critical that the US Air Force collaborate with the IAF to glean the lessons learned.

With respect to rated AF accessions, the Air Force Personnel Center is preparing to propose changes to the Pilot Candidate Scoring Method (PCSM). It is expected that the new PCSM will greatly increase the weight of civilian flying time while slightly decreasing the weight of the Test for Basic Aviation Skills. However, this new approach still does not account for the MIT or 711 Human Performance Wing recommendations for psychological testing as a formal prescreening tool and factor for accessions, and equally important, it still does not differentiate between prescreening for manned and unmanned career paths. Now is the appropriate time for selection boards to look at other criteria that provide a better indicator for the aptitude to learn and operate unmanned systems, especially since the next generation of aviators is extremely tech savvy and more reliant on mobile devices and gaming (play) stations. Models and studies are proving this, yet the AF is hesitant to embrace this new pilot prescreening methodology. As stated by Dr. Tvaryanas, the AF is a "massive consumer of technology, but very conservative and risk averse when it needs to integrate human machine interfaces."[2]

Assignment Process

First, a change should be made to the rated volunteer policy which currently allows individuals to volunteer for one or all of the rated tracks (e.g. traditional pilots,

unmanned pilots, combat systems operators, or air battle managers). As stated earlier, not all commissioning sources are meeting their rated requirements (e.g USAFA), and therefore a policy change is necessary to ensure this negative trend is mitigated. The common concern of among cadets and/or candidates is that a policy change may discourage some candidates from applying for a rated career in the first place since the risk of getting assigned to a non-traditional pilot slot may outweigh the benefit of getting a traditional slot.[3] However, the mission of the AF is to fly, fight and win our Nation's wars, and the Airmen who join the AF make a commitment to this. One of the core values of the AF is "Service before Self," and the AF must apply it's mantra of the *Right Person* at the *Right Place* and the *Right Time* for unmanned systems. Basically, if a rated officer is more qualified to fly unmanned aircraft versus manned aircraft, then the AF should place them there. The aviation culture in the AF is changing, and now is the time to test the waters on this policy change.

A recent AF survey of RPA pilots supports this change, and proves that traditional pilots that made the jump to RPA end up being very content and satisfied with the RPA community. In particular, 487 Airmen who started out as traditional pilots (but had been shifted to RPA for three years) were asked if they would like to stay on in the unmanned aircraft field. There were *412 volunteers (87 percent) that requested to stay in RPA*, which was much higher than anticipated by the AF Personnel Center and Air Staff. In addition, *25 percent of 244 pilots from FY09-11 that were sent directly to RPA from Undergraduate Pilot Training are voluntarily choosing to stay in RPA.*[4]

Second, a change should be made to the USAFA Airmanship Program. No longer should rated-qualified cadets have the "volunteer" option for the Soaring and UAS programs. These programs are too vital in the building of aviation situational awareness and experience, and the current trend of up 18 percent of the rated cadets missing this tremendous training opportunity must be addressed. These programs should also be offered to ROTC cadets on a space available basis during the summer in order to assist the AF in better identifying and preparing all pilot candidates for manned or unmanned flight.

Third, the AF must add Initial Flight Screening (IFS) as a key performance indicator to the Board Order of Merit process out of the commissioning sources. The current process at USAFA of only using grade point average, military point average, and physical fitness misses out on the key aspect of airmanship (and identifying those with the aptitude to be more successful at manned or unmanned systems). Adding competition and a performance based order of merit at IFS will increase the motivation of candidates to work harder during this phase of training as compared to the current system which is based on a pass-fail criteria.

Collaboration with Industry and Academia

Another more advanced program in development at USAFA is the Irregular Warfare Laboratory that Col McCurdy oversees. The goal is to leverage UAS technology and provide a combat laboratory in which "cadets receive knowledge, experimental learning, and familiarization with how the AF employs air power within the joint, combined environment."[5] Additionally, this program will cross-talk and integrate with the AF Research Laboratory (AFRL) at Wright-Patterson AFB, Ohio, as well as other universities where they are currently partnered (e.g. the US Naval Academy and the US Military Academy). Opportunities for future partnerships should also be pursued with key industry partners in the Dayton region. Led by AFRL's then Acting Director, Jack Blackhurst, the Dayton Development Coalition's Executive Vice President and Chief Strategic Officer, Joe Zeiss, and Sinclair Community College's Vice President of the Workforce Development, Deb Norris, the region is trying to stand up an aeronautical center of excellence that will collaborate and integrate RPA strategies among industry, government, and academia. USAFA can leverage these innovative programs and funding strategies, especially the lessons learned from Sinclair's recently built Emergency Management/First Responders course, as well as from the region's first UAV training program as part of a National UAV Education, Training and Certification Center.[6] USAFA can also learn from dozens of other colleges which now offer aviation course in unmanned aerial systems, to include several universities that have recently added master's degree programs. The University of North Dakota, for example, operates a fleet of seven different types of unmanned aircraft and in 2009 became the first college in the country to offer a four-year degree in unmanned aircraft piloting. It now has 23 graduates and another 84 students working towards a bachelor's of science in Aeronautics with a major in Unmanned Aircraft Systems Operations.[7] Last May, Kansas State University graduated its first student with a Bachelor of Science in unmanned aircraft systems, and Embry-Riddle Aeronautical University started offering the degree in 2011 at its Daytona Beach, Florida, campus, and now has 89 UAS students.[8]

The 2012 RAND Corporation study on the RPA career field also acknowledged the advantages that civilian education programs have over the AF. Specifically, "the civilian programs may offer education and training on different types of RPA than those used in the Air Force. Taken together, civilian UAS education programs could give graduates certain advantages that typical military UAS education and training programs do not provide."[9] The USAFA and other ROTC units must reach out to these industry and academia partners in order to capture the lessons learned, and more realistically train and educate our future Airmen that have the aptitude to fly RPA.

Deliberate Force Development

A force development initiative that could benefit the RPA community is a program similar to Air Mobility Command's (AMC) Phoenix Reach program. This program consists of a formal board process where Captains and young Majors compete for crossflow opportunities from one major weapon system within AMC to another. For example, airlift or tanker pilots (and navigators) are competitively selected to crossflow into the other airlift or tanker aircraft. Over the last decade, these young officers were promoted to Major through Colonel at higher rates than the USAF board average, and now many of these officers are senior leaders within the AF.[10] More specifically, the CY12 breakout for promotion to Major, Lieutenant Colonel, and Colonel for Phoenix Reach graduates is:

- 100 percent promote rate to Major (AF average at 91 percent)

- 95 percent promote rate to Lieutenant Colonel (AF average at 75 percent)

- 52 percent promote rate to Colonel (AF average at 45 percent)

Similarly, the RPA community should create a crossflow program that focus on building breadth of aviation experience for future senior officers. This program would select fliers from all communities, mobility and combat air forces alike, and would then formally track these high potential officers in order to validate that they truly have a competitive advantage for formal education, training, Command, and promotion.

Strategic Communication Plan

Proactive strategic messaging is needed that educates, encourages, and motivates the next generation of RPA pilots. This includes deliberately identifying and placing high potential officers in and around cadets at all the commissioning sources (e.g. on faculty and in the Cadet Wing), as well as going out to other units via Spread the Word briefs. The purpose is to clearly articulate the role and impact RPA and unmanned systems are having for the AF, and emphasize that this weapon system is achieving more strategic level effects in the fight against terrorism than any manned aircraft. From a recruiting point, it is also critical to reach out to this generation of millennials that have a better aptitude to fly unmanned aircraft based on their tech savvy and diverse skill sets, and they can also answer their Nation's call without putting themselves in harm's way.

The strategic messaging must also include the timelines for what the FAA and industry are doing to integrate UAS into the National Airspace System (NAS) by September 2015, and the second order effects of commercialization of UAS. It is important to highlight that employment options outside the military will be realized

soon, which is finding validated by a 2012 RAND study that acknowledges incentives and post-military employment options are important things to consider for retention, especially the since the "private contracting of RPA services could provide the first growth area for commercial RPA applications."[11] Another study in March 2013 by the Association for Unmanned Vehicle Systems International reveals that "the unmanned aircraft industry is poised to create more than 70,000 new American jobs in the first three years following the integration of UAS into the NAS," and more than "100,000 total jobs by 2025."[12] Therefore, it is critical to ensure all RPA recruiting, accession and retention discussions include the prediction that this career field is on the cusp of expansion and global proliferation, and that post-military employment opportunities will be extremely viable once this occurs. It should also be noted that AF will probably have a retention issue once this business opportunity is realized, very similar to what has historically happened within the airline industry.

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CHAPTER FIVE
Conclusion

It generally takes a decade or more to identify and professionally develop promising Lieutenants and Captains that have the attributes to be high potential officers and future senior leaders in the AF. However, the AF can't sit idly by and wait for this decade of change. The unmanned aircraft system (UAS) industry and associated rated career fields are changing too fast, and it is a challenge to keep the AF personnel programs up to standards with the tremendous technology advances being witnessed over the past few years. Specific to the AF, it is irresponsible to continue a RPA pipeline that accepts an attrition or "washout rate" from RPA Flight Screening of three times that of traditional pilots. Additionally, an RPA promotion rate 13 percent lower than other officers is unacceptable as well. This career field has been stressed over the last few years due to our Nation's 24/7 requirement for Intelligence, Surveillance, Reconnaissance and Strike missions. The operations tempo is not anticipated to decrease in the foreseeable future, especially since the AF will continue to populate the skies with up to 65 combat air patrols by mid-2014. Therefore, the AF needs to re-evaluate how it identifies, screens, trains, educates, and promotes its future RPA operators, and it should not wait until 2017 when the RPA manning catches up with the aircraft program of record.

First, the AF must standardize the Pilot Candidate Scoring Method across all commissioning sources and incorporate psychological prescreening tools for the selection process for pilots. Second, the assignment process must ensure there are enough rated qualified candidates to meet AF-wide requirements for manned and unmanned aircraft, and that a volunteer for one pilot specialty is a volunteer for all pilot specialties. In addition, the USAF Academy should mandate participation and successful completion of the Soaring and UAS Airmanship programs prior to the commencement of Initial Flight Screening, and the Board Order of Merit should not be finalized until after IFS. Third, the AF needs to expand their collaboration with industry and academia in order to glean lessons learned and best practices for unmanned systems, and then incorporate into curricula at USAFA and ROTC units. Fourth, the AF should establish a rated force developmental plan that cross-flows rated officers into RPA (similar to Air Mobility Command's Phoenix Reach program), and continue to track these high potential officers for future education, training, and Command opportunities. Fifth, an aggressive enterprise-wide recruiting strategy and strategic communication plan is needed. This should focus on placing RPA mentors at all commissioning sources, and include a grass-roots message in the training and operational communities that highlights the growing commercialization and strategic

importance of unmanned systems, and the high tech and savvy personnel that are required to fly these systems.

The recommendations presented here are pragmatic changes that should be implemented to more effectively identify and develop future RPA pilots. They are based on a continuum of education and learning from day one at one of the various commissioning sources all the way until promotion into the senior leadership ranks within the AF. The sooner the AF fully integrates these aviators into its professional developmental plans, the more effective the RPA community will be in recruiting, training, and retaining high potential officers. With more RPA-experienced senior officers, the USAF will also remain on the cutting edge of this new technology and its employment. In summary, the AF mission is to "fly, fight and win"…and the personnel that support this mission must be assigned at the right place and the right time to more effectively fight our Nation's wars. The new generation of UAS pilots is here, and the AF must redefine its "airmindedness" culture in order to lead the country into the next decade of aviation innovation and greatness.

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