

BACKGROUND

No. 3208 | APRIL 17, 2017

Independent Capability Assessment of U.S. Air Force Reveals Readiness Level Below Carter Administration Hollow Force

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Abstract

After 26 years of continuous combat deployments, major combat operations, and surges, the United States Air Force's level of readiness is below the hollow force levels of the late 1970s. The effect has been to reduce an Air Force once capable of two simultaneous major regional conflicts to one that could effectively muster a win in one region at the cost of its remaining global combat capability. High-end, fourth-generation fighters, coupled with healthy sortie rates, flying time, and realistic training scenarios, made the latter half of the 1980s a model for readiness. An assessment of today's Air Force in each of those three areas reveals a marked decline in capability. Senior Air Force leaders need to convey the real level of readiness to Congress and the Trump Administration in a way that will get this service the funding and support that it needs to regain absolute air dominance.

Readiness: A Rare Window of Transparency

All of America's military services are suffering the consequences of substantial cuts in defense spending imposed over the past half-decade. During testimony before the House Armed Services Committee on February 7, 2017, the Vice Chief of Staff for the Army stated that only three of the Army's 56 Brigade Combat Teams (Active, Reserve, and Guard) are ready for full-spectrum combat; the Vice Chief of Naval Operations stated that only one-third of the Navy's fighters and half of all Navy aircraft are flyable; and the Assistant Commandant of the Marine Corps testified that 80 percent of his aviation units lacked the aircraft required to give their pilots the minimum required flying time. During the last week of March 2017,

KEY POINTS

- Air Force readiness is lower than the Carter Administration's hollow force of the late 1970s. Readiness, fighter pilot proficiency, mindsets, and manning have fallen with successive years of underfunding and high operational tempo.
- Current capacity will allow the Air Force to muster the force required to win a single major regional conflict against a near-peer competitor, but the costs in lives and resources would be significant.
- Standards and overall foundation for quality have changed in the flying community, and flight school graduation rates have risen from below 80 percent to over 90 percent since the 1990s.
- The success of precision guided munitions (PGM) has made them indispensable but has also caused the Air Force to neglect non-PGM-centric skills. Planned major combat operation (MCO) expenditure rates, coupled with relatively low stockpiles of PGMs and lack of aircrew training to deliver unguided munitions, elevate risk considerably.

This paper, in its entirety, can be found at <http://report.heritage.org/bg3208>

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TABLE 1

Air Force Readiness: Only Four of 36 Units Fully Mission Capable

SORTS Score	Resource/ Training Level	Mission Capability	Active Duty Units Meeting Capability Threshold
C1	90%–100%	Can execute all wartime missions	4 of 36
C2	70%–89%	Can execute most wartime missions	Less than 18 of 36
C3	55%–69%	Can execute portions of wartime mission	Up to 32 of 36
C4	0%–54%	Needs more resources before it can execute its mission	Up to 32 of 36

SOURCE: R. Derek Trunkey, “Implications of the Department of Defense Readiness Reporting System,” Congressional Budget Office *Working Paper* No. 2013-03, May 2013, http://www.cbo.gov/sites/default/files/cbofiles/attachments/44127_DefenseReadiness.pdf (accessed April 11, 2017).

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the Marine Corps Deputy Commandant for Aviation said that his pilots were getting less than 10 hours of flying time a month.¹

However, little information was provided with respect to Air Force readiness.²

An effective assessment of Air Force readiness can be made based on the collective testimony of Air Force senior leaders, historical readiness levels, current threats, funding levels, and operational insights gleaned through surveys and interviews with Air Force line fighter pilots. Forty-six fighter pilots have weighed in on this argument about what it will take to win a single major regional conflict (MRC) in the European theater and just how ready the U.S. military is to win that battle.

During his confirmation hearing in 2016, Air Force Chief of Staff (CSAF) General David Goldfein

stated that his service could not surge enough combat-ready forces to execute a single MRC and still meet the remaining demand for global combat-ready forces.³ He went on to say that less than 50 percent of combat units are ready for “full-spectrum” (high-threat, high-intensity) combat.⁴

The Air Force could move forces to meet a combatant commander’s requirement, but their lack of readiness would hamper the execution of mission-essential tasks and put his aircrews at greater risk. During testimony before the Senate Armed Service Committee on March 29, 2017, Lieutenant General Mark Nowland, Air Force Deputy Chief of Staff for Operations, told the lawmakers that only four of the Air Force’s 55 total (Active, Reserve, and Guard) fighter squadrons are at the very highest levels of readiness. Fewer than half are in the top two readiness tiers.⁵

1. See “Services Outline Readiness Crisis,” Committee on Armed Services, U.S. Senate, February 7, 2017, <https://armedservices.house.gov/news/defense-drumbeat/services-outline-readiness-crisis> (accessed April 14, 2017).
2. The challenges associated with services being transparent with regard to readiness are threefold. The service chiefs serve at the pleasure of the President, and some Administrations do not value or highly prioritize a strong, viable Department of Defense as much as others do. Speaking up during closed-door sessions may be permissible, but speaking publicly is rarely permitted. Even if they could, many members of the JCS will not speak publicly about readiness issues both because they do not want to make America’s enemies aware of potential chinks in their armor and because their words might reduce the impact of recruiting efforts and morale within their standing force. While it may make sense to some that the services “would know” how they are doing, the reality is somewhat different. The average soldier, sailor, or airman is not part of the tip of the spear, and while those in operational units would have a feel for how their individual unit is doing, they may not see the bigger picture.
3. The authorized active duty end strength was 510,000 personnel in 1991. *Air Force Magazine*, Vol. 79, No. 05 (May 1996), p. 40. In 2015, authorized active duty end strength was 317,000. *Air Force Magazine*, Vol. 99, No. 05 (May 2016), p. 26, <http://www.airforcemag.com/Almanacs/Pages/default.aspx> (accessed April 11, 2017).
4. “Opening Statement of Gen[eral] David Goldfein, VCSAF, SASC Confirmation Hearing to be CSAF,” Committee on Armed Services, U.S. Senate, June 16, 2016, https://www.armed-services.senate.gov/hearings/16-06-16-nomination_-goldfein (accessed April 13, 2017).
5. Courtney Albon, “Air Force: 1,900 Fighter Jets Is Low-end Requirement; Service Likely Needs About 2,100,” *Inside Defense*, March 30, 2017, <https://insidedefense.com/daily-news/air-force-1900-fighter-jets-low-end-requirement-service-likely-needs-about-2100> (accessed April 11, 2017).

General Nowland's reference to levels of readiness is based on the formal Department of Defense (DoD) grading system for readiness, known as the Status of Resources and Training System (SORTS). That system uses measures for personnel, supply, equipment, and training levels to make a comprehensive capability assessment of fighting units. A C1 designation is the highest level and is given to units that can fully carry out their wartime mission. C2 units can carry out "most" of their wartime missions, C3 units can carry out portions of their wartime missions, and C4 units need additional resources and/or training in order to execute their mission successfully. Organizations with a C1 or C2 score are the only ones considered combat ready.⁶

When General Nowland said that only four squadrons are at the highest level of readiness, he presumably meant that those squadrons are C1. His "less than 50%" reference echoes the CSAF's statement during his confirmation hearing, but what does that really mean, and how prepared is the Air Force for high-threat, high-intensity war with a near-peer competitor?

While the nuances and classification levels of the SORTS grading system will not allow us to know how many units are in that "less than 50%" level of readiness, we can make a good determination of what that means based on historic trends. At the most basic level, operational fighter squadrons have to be prepared for two events: high-threat/high-intensity combat (HiTHI) and low-threat/low-intensity combat (LoTLI).

The highest level of readiness is required for HiTHI combat operations. The associated missions have surface-to-air and air-to-air radar missile threats that can engage aircraft at significant ranges and at virtually any altitude. Successfully defeating these threats and then destroying the targets the pilots were sent to engage in the first place requires a combination of tactics, electronic countermeasures, and exceptionally well-developed air-to-air and surface-attack flying skills.

Air Force employment in a LoTLI operation is generally conducted at medium or high altitudes, and with the advent of precision guided munitions (PGM), employment of ordnance is generally done

from straight and level flight. Destroying targets in this environment involves more weapons system programming skills than actual flying faculties.

Units that are prepared to fly HiTHI combat operations can very easily step into a low-threat environment and employ very effectively due to the limited number of players involved and lower repetitions required to master low-threat tactics. The other side of the coin is not true, however, because units that have trained or prepared only for LoTLI conflicts would likely be much less effective and suffer heavy losses if they were forced into a higher tier without a significant amount of study, spin-up time, and training sorties.

The U.S. has not been involved in a HiTHI campaign since the initial invasion of Iraq against the standing Iraq military in 1991. The capability the Air Force demonstrated through the pummeling of Saddam Hussein's regime in a major combat operation (MCO) was actually due to the capability and readiness levels that carried over from the Cold War. To understand this more easily, it may be helpful to look back at Air Force preparations for a war in Europe in the face of the Soviet threat of the 1980s.

Cold War Readiness Levels

The scenario for a war between NATO and the Soviet Union was well understood by the U.S. military. It would begin with hordes of Soviet armor forces flooding westward through Germany's Fulda Gap, moving with and protected by high-end surface-to-air missile systems. Mobile SA-4, SA-6, SA-8, and SA-11 radar missile systems, coupled with very effective, short-range surface-to-air missiles (SAMs) and motorized anti-aircraft artillery (AAA), created a high threat environment for every allied aircraft flying in theater. Massive numbers of Soviet MiG-25, MiG-23, and MiG-21 fighter aircraft would fly cover for thousands of T-62 tanks and armored infantry fighting vehicles collectively trained to blitz through the countryside in numbers that far exceeded those on NATO's books. Together, they posed a formidable threat.

Soviet ground and aviation assets vastly outnumbered those tasked within NATO's ranks with stopping their advance. To offset the Soviet numerical advantage, the U.S. Air Force had invested in the

6. R. Derek Trunkey, "Implications of the Department of Defense Readiness Reporting System," Congressional Budget Office *Working Paper* No. 2013-03, May 2013, http://www.cbo.gov/sites/default/files/cbofiles/attachments/44127_DefenseReadiness.pdf (accessed April 11, 2017).

F-15C, F-15E, F-16C, and A-10 aircraft's superior technology, but the real advantage for U.S. forces was pilot experience in the air. The average U.S. pilot flew well over 200 hours a year, with the most proficient very often exceeding 300 hours a year. Intelligence on how much airborne training Russian pilots received was said (and later confirmed) to be between 125 and 150 hours a year. NATO fighter units would not consider taking pilots who flew less than 150 hours in the previous year into combat, as they likely would not survive the associated threats, and their lack of competence would put other pilots and the mission itself at risk.

Training was intense in Europe and consumed generous amounts of airspace that allowed high, medium, and low-altitude maneuvering and incredibly realistic engagements. NATO aircraft practiced large force employment (LFE) packages against countless NATO fighters posing as adversary aircraft. That training was coupled with regular trips to Red Flag exercises in Las Vegas, Nevada, where pilots faced actual Soviet SAM radars (acquired by various means) coupled with adversary threat aircraft that provided incredible training.

The combination of a technological edge and much better training in the air would have helped the United States and its NATO allies to counter the numbers the Soviets could pit against them in the air and on the ground. However, even with that high-end training and level of flying time, the skills required to execute that high-threat mission were perishable. With few exceptions, the prevailing thought within the U.S. Air Force was that if pilots flew two or fewer sorties a week, their skill sets would diminish: They would become less competent. If they flew three times a week, they could sustain their skills, and if they flew four or more times a week, they improved across the board. That rule of thumb applied even to the best pilots at the pinnacle of their fighter faculties.

Current Readiness

The decline in fighter flying hours, range space, and high-intensity training began in Europe in the mid-1990s. The low-altitude airspace allotted for training all but disappeared, and large arrays of massive windmills began to spring up in the heartland of Germany. Bombing ranges that had always been at a premium became even harder to come by,⁷ and the restrictions placed on upper-level airspace became even more challenging.⁸

The U.S. Air Force experienced a decline in readiness shortly after the successful invasion of Iraq in 2003 as a result of a reduction in aircraft inventory (part of the peace dividend cuts) and an increase in unit deployments to the Middle East. Budget sequestration, initiated in 2012, accelerated that slide by forcing the Air Force to ground 50 percent (18 of 36) of its active duty, combat-coded squadrons temporarily in fiscal year (FY) 2013 and reduce overall flying hours for the year by 18 percent.⁹

Shortfalls of spare parts, coupled with a shortage of aircraft maintenance personnel, further reduced flying hours to the point where fighter pilots who once averaged more than 200 hours a year struggled to get 120 hours in 2014¹⁰—a level comparable to that of the Soviets in the 1980s. In 2015, the average rose to 150 hours, thanks in part to a slight uptick in funding and averaging in the surge of flying time accumulated during combat deployments to the LoTLI conflicts in Syria, Iraq, and Afghanistan. Simulators (sims) have improved greatly over the years, and much of the training associated with fifth-generation employment can be conducted only in sims; however, the availability of those fifth-generation sims is still very limited. In an interview conducted last summer with 31 F-35A pilots, the average time those pilots received in a sim on any given month was 3.3 hours. The time was universally considered valuable, but no one interviewed believed the sim could be used as a one-for-one replacement

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7. Available bombing ranges in Germany are often several hundred miles away from operational fighter squadrons, and that distance, coupled with frequent bad weather, makes the available training opportunity quite low. The average pilot interviewed had not been to a conventional bombing range in more than a year.
 8. In Germany, the air-to-air airspace has a floor of 11,000 feet mean sea level (MSL) and prohibits the employment of chaff and flare, or flying supersonic below 36,000 feet MSL. Those restrictions effectively nullify habit patterns that are critical to survival in combat.
 9. U.S. Air Force, "Sequestration Implementation Plan," 2013, <http://breakingdefense.sites.breakingmedia.com/wp-content/uploads/sites/3/2013/02/airforcememo.pdf> (accessed April 11, 2017).
 10. John Venable, "Fighter Pilots Aren't Flying Enough to Hone the Skills of Full-Spectrum War," *DefenseOne*, November 21, 2016, <http://www.defenseone.com/ideas/2016/11/fighter-pilots-arent-flying-enough-hone-skills-full-spectrum-war/133328/> (accessed April 11, 2017).

for time in the air. Pilot assessments of the availability, fidelity, and utility of fourth-generation aircraft sims were notably below those of assessments by pilots flying the F-35.

While flying in any combat environment may sound like an incredible opportunity to refine high-end skillsets, the reality is markedly different. The vast majority of the time spent by fighter pilots in a cockpit over Iraq, Afghanistan, or Syria is spent waiting to be employed in that very benign (for aircraft) threat environment. Unfortunately, most of the training they receive in preparation for those deployments is of the same level of intensity, but they do get to fly. When they return to their permanent bases, those same pilots rarely average more than two sorties a week.

Fifteen of the pilots interviewed for this paper are currently based in Europe, and seven of those 15 had recently returned from a six-month deployment to the Persian Gulf region in support of counter-ISIL/ISIS engagements in Syria and Iraq. Those seven pilots flew an average of 375 hours during that six-month deployment, and the average for their 33-pilot unit was above 300 hours—twice the annual flying time an average fighter pilot receives in just six months. Two things were notable when they returned to their home unit late last fall.

- They were completely out of currency (unqualified) in their unit’s primary mission, suppression of enemy air defense (SEAD).
- The massive amount of flying time they received during their deployment was factored into the average for fighter pilots across the Air Force, meaning that the average pilot actually received less than the Air Force’s advertised uptick to 150 hours per pilot/year in 2015.

This squadron was one of several that have deployed (and continue to deploy) to the fight, making it easy to see just how the hours/sorties associated with deployed operations can inflate the “average” number of hours/sorties for the fighter force writ large.

The unusually high number of sorties flown by this particular squadron during their deployment demonstrated that the manning levels for opera-

tions, as well as the maintenance manning and sortie generation capabilities for forward-based units in Europe and the Pacific, are relatively healthy when compared to the stateside Air Force. Though the SORTS scores for these units are classified, they are likely C2 or below because the number of sorties they get to train to their wartime mission does not measure up to C1 standards in spite of the fact that these pilots flew exceptionally high numbers of hours. Unfortunately, the funding available for most stateside units for day-to-day operations and maintenance will not allow them to sustain even a relatively healthy tempo, as reflected in the data gleaned through pilot interviews.

But it is not just funding. The day-to-day tempo and reduced manning and all-too-frequent deployments combine to remove the “white space” that maintenance teams need to train newly acquired maintenance apprentices (3-levels) into fully capable Journeymen (5-level)¹¹ capable of working unsupervised. Giving maintenance squadrons the time they need to do that requires more capacity (more personnel) and/or a reduction in the number of deployments that they currently endure.

The 46 Air Force pilots interviewed for this paper were from four different squadrons based at three different locations. Each was asked a battery of questions to assess and cross-check the amount of training they had received, and each was asked to assess his/her own level of competency/readiness to execute their combat mission. Table 2 depicts the raw results of those interviews.

The current state of Air Force fighter readiness has many intangibles, but the things that can be measured, such as average sortie per aircraft/month and total flying time, point to a readiness level not witnessed by the Air Force since the Carter Administration.

While that should gain our immediate concern, the long-term impact that a 14-year starvation diet has had on the faculties, retention, and mindset of our fighter force should be setting off claxons.

Faculties. Learning the ins and outs of executing fighter tactics, techniques, and procedures relies on hands-on knowledge and detailed instruction handed down by ever-cascading generations of fighter pilots. Fighter faculties peak at the nine-year point of a career, after which most pilots move on to a

11. AFSC 2R1X1 Maintenance Production Management Career Field Education and Training Plan, Department of the Air force, February 2000, pp. 12-13.

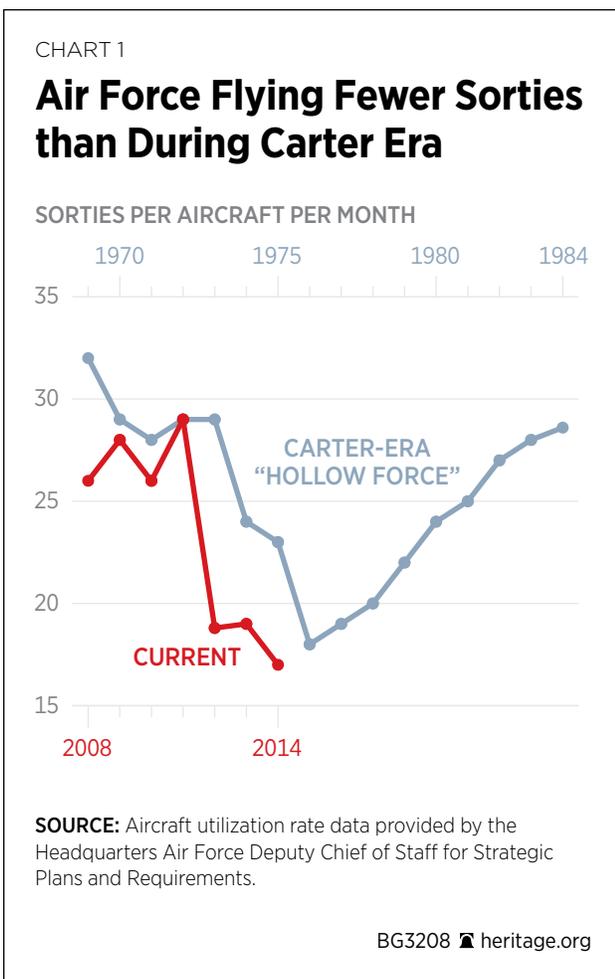
TABLE 2

Fighter Pilot Readiness Assessment

Pilots Interviewed	Hours/Month	Sorties/Month	Sorties/Week	Consider Themselves Mission Ready
31 (Stateside)	11.1	8.5	2.1	Yes
15 (Overseas)	12.5	9.6	2.4	Yes

SOURCE: Air Force pilot responses to author questionnaires.

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two full generations of fighter pilots have come and gone since HiTHI operations were part of their regular training regimen. Moreover, none of the current crop of pilots have flown at a rate that compares with the readiness levels of the 1980s and 1990s.

For all practical purposes, the experience level in HiTHI operations is absent in most organizations. This means that if our Air Force was called upon to engage a near-peer adversary in a high-intensity conflict, pilots would be forced to learn new skills and adopt that high-threat mindset on the fly. Mission success rates would likely be low during the first days of conflict, and the potential for combat losses among pilots and aircraft would be significant without a change in the current training regimen.

Mindset. The greatest loss suffered through this period cannot be fully quantified: the loss of a fighter pilot’s unquenchable thirst for more time in the air. The vast majority of the 46 fighter pilots believed that a little over two sorties a week (150–170 hours a year) would be sufficient to prepare pilots for “full spectrum” operations.

After the pilots had answered the survey questions, each was told of the sortie mindset of pilots from the 1980s and 1990s and the impact that flying two, three, or four sorties a week had on their abilities. Every pilot surveyed agreed—often enthusiastically—with that dated logic. When they were then asked to compare the two-three-four sortie-per-week logic with their previous answers, all acknowledged that they had underestimated the real requirement. Some attributed their initial readiness assessments to the fact that they had never believed that more sorties were even a possibility. Others ascribed it to years of institutional Air Force rhetoric that led them to believe that two sorties a week (eight a month) was sufficient. Either way, that mindset is troubling.

string of staff, leadership, and professional military education assignments. As those pilots cycle out, they pass their experience and mindsets on to the follow-on generations.

The last time Air Force fighter pilots flew in a high-threat environment was in January 1991 during Desert Storm. Training for HiTHI operations began to wane beyond that success and all but ended following the invasion of Iraq in March 2003. Almost

Two decades ago, fighter pilots on active duty knew that such a low level of training would not be sufficient, and even when the average pilot flew well over 200 hours a year to achieve “full spectrum capable” readiness, he fought for more.

The difference in mindsets may be the result of years of depressed budgets slowly eroding expectations about what it means to be ready. There is an old saying that “you can get used to hanging if you hang long enough,” and that slow, almost imperceptible suppression of expectations may be to blame. That change in mindset has to begin early in a pilot’s career for it to seem acceptable throughout a career, and there is no better example of how subtle shifts in the expectation for quality can affect the whole than the standards for flight school.

Baseline Readiness Begins at Flight School

Cold War combat aircrews were fueled with confidence. Part of that confidence came from the screening process they went through in order to make it to any air force cockpit. A rigorous screening process necessarily results in higher failure (washout) rates for student pilots who are unable to meet the standards demanded by combat operating environments. When training standards are lowered, efficiencies certainly rise, but that in no way means the service is getting a better force.

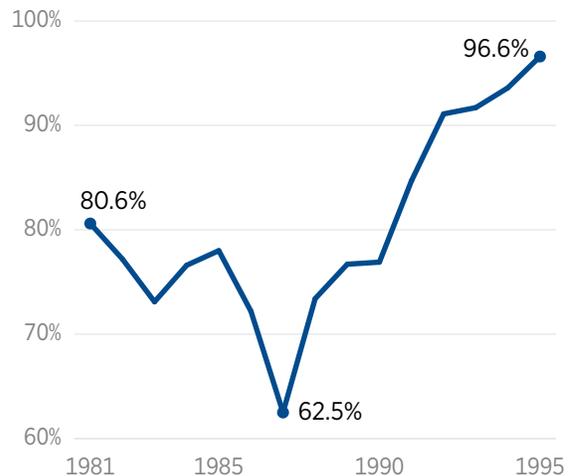
A snapshot of the graduation rates from 1981 through 1990, when the Iron Curtain fell, depicts a significant screening or washout rate. Graduation rates varied from year to year, but on average, less than 80 percent of those entering undergraduate pilot training received their wings at the completion of the yearlong course. After 1990, however, something changed. Flying the same aircraft and arguably under the same curriculum, graduation rates climbed significantly to the point where 90 percent or more of the students who entered classic undergraduate pilot training (UPT) received their wings.

In the mid-1990s, UPT was phased out, and the Air Force began a two-track flight-training program called specialized undergraduate pilot training (SUPT). Student pilots fly a turboprop aircraft (the

CHART 2

Pilot Graduation Rates Rose Dramatically in Early 1990s

AIR FORCE UNDERGRADUATE PILOT TRAINING GRADUATION RATES



SOURCE: Data provided by U.S. Air Force Air Education and Training Command.

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T-6 Texan) in a common training phase very similar to the first six months of UPT. At the end of that phase, the majority of students are assigned to one of two advanced training tracks, the bomber/fighter (B/F) or airlift/tanker (A/T) tracks.

While many believe that the transition to SUPT delivered the spike in graduation rates, there is no evidence that supports that belief. Air Force archive data were not made available beyond 1995, but interviews¹² and insights¹³ point to a likelihood that the high rates of graduation have continued through today. Fifteen of the pilots interviewed for this paper were graduates of 15 different bomber/fighter track classes, and 90 percent of the officers who entered those classes within that track received their wings.

Those who were interviewed stated that the attitude of the individual student pilot was the biggest

12. Fifteen pilots interviewed from 15 different classes. The average graduation rate was 90 percent from Undergraduate Pilot Training (UPT); 97 percent for Introduction to Fighter Fundamentals (IFF); and 96 percent for Formal Training Units (FTUs).

13. General Don Cook, Commander of Air Education and Training Command (AETC), stated that Moody Air Force Base in Georgia had a 100 percent graduation rate for 2002. Every student who entered flight school that year at Moody went on to receive his or her wings.

driver for retention in flight school as well as the follow-on training programs such as the Introduction to Fighter Fundamentals (IFF) and aircraft-specific Formal Training Units or FTUs. Following graduation from flight school, individuals selected to fly fighters move into the IFF course to learn the maneuvering, communications, and procedures associated with flying operational fighter aircraft. On successful completion of that course, which lasts from two to three months, they move into an FTU where they learn how to fly and employ a fighter aircraft at a basic level of proficiency. On successful completion of the FTU, which lasts from four to six months, they move on to operational units where pilots are taught the operational employment requirements for that unit's specific missions.

Most of those interviewed stated that students who struggled to measure up to course training standards but were willing to keep trying were offered additional sorties and time to bring them up to standards. While noble in thought, the repercussions of this practice can be significant.

"Meeting standard" is not solely a function of performing a maneuver or task as it should be performed. It is also a function of how quickly and ably a student pilot can catch on, which is itself a measure of the student's aptitude for quickly adapting to changing conditions or circumstances. Arguably, the more time and practice a student needs to master a skill relative to his/her peers, the less able a pilot will be to keep pace with dynamic combat environments that do not grant multiple attempts at success. When "slow learners" are passed along to operational units, the additional time and effort needed to keep them up to speed with their peers come at the expense of their peers and the unit as a whole when the numbers of aircraft, flying hours, and funded resources are limited.

The pilots interviewed for this paper were all top performers with great attitudes and track records, but the system is not currently wired to deliver that to every operational unit, fighter or otherwise. Pride is important in any leading-edge organization, and

lowering unit standards to accommodate those who cannot measure up under normal conditions affects much more than readiness.

Groucho Marx famously quipped, "I would never belong to a country club that would have me as a member." Pilots take pride in being part of a unit with high performance standards, and that also affords them the opportunity to fly as much as possible. When units are faced with such low sortie rates and are forced to lower their standards, the most driven pilots will seriously consider "moving on" to other pursuits. Repeated instances of low standards/reduced flying hours eventually result in deep frustration among pilots and make it that much harder to retain them in the service.

Retention. Low sortie rates and increased emphasis on additional duties¹⁴ have contributed directly to the current Air Force shortfall of 873 fighter pilots,¹⁵ well short of what is needed to fill the cockpits, staff, and leadership billets within the service. Headquarters staffs, the service academies, and other staff and training billets have been gutted of fighter pilots in order to help fill cockpits. The current operations tempo, coupled with the ever-growing non-flying duties that each pilot now must assume, will drive some of the Air Force's most driven and qualified pilots to the exit door. "Take rates" for pilot retention bonuses are now at 34 percent,¹⁶ which is a real indicator of future flight from the service.

While more flying time and stability in their personal lives is certainly a major factor for pilots trying to decide whether to remain with or leave the service, major airline hiring is at least as big a draw. The airlines hired 4,100 pilots in 2016, a number three times as large as the number of pilots that the Air Force produces every year, and are expected to continue that rate of hiring for the next 10 to 15 years.¹⁷ It takes two years for an individual to become an operational fighter pilot; replacing losses in institutional talent will take more years than anyone can fully assess. But there is a flicker of hope for retention.

14. Defined for this paper as administrative tasks assigned to aircrews that do not further or even involve the flying mission.

15. 2016 pilot shortage statistic provided by Office of the Secretary of the Air force, Public Affairs, on April 11, 2017.

16. Stephen Losey, "How the Air Force Is Scrambling to Head off an Exodus of Fighter Pilots," *Air Force Times*, September 17, 2016, <https://www.airforcetimes.com/articles/the-fight-for-pilots> (accessed April 11, 2017).

17. Christopher Woody, "The Air Force May Pay Pilots Nearly a Half-Million Dollars to Stay in Uniform," *Business Insider*, March 30, 2017, <http://www.businessinsider.com/air-force-pay-pilots-bonus-incentives-to-stay-in-uniform-2017-3> (accessed April 11, 2017).

The first of the current Chief of Staff's initiatives—to revitalize the squadron—has begun to have an impact on line pilots who want to stay. That initiative carries the expectation that the Air Force will assign three to five additional support personnel to each squadron to shoulder some of the additional duty weight currently being carried by pilots as part of their daily duties, thus freeing them to study, conduct mission prep, and fly more. All of the pilots interviewed expressed a genuine willingness to give the Air Force one more assignment to implement such a program before taking their talents elsewhere.

Ready for Anything

One final area important to understanding readiness involves the backup capabilities and systems needed to ensure that operations can be continued even when favored systems fail or are no longer available. Chief among these systems are modern precision guided munitions, used almost exclusively in operations over the past 15 years. Sustained, high-rate employment of PGMs in the air campaigns over Iraq, Syria, and Afghanistan has severely taxed the U.S. global inventory of these munitions on several occasions.¹⁸

Importantly, the rate of use in current operations and the pressure this has placed on both inventory and production would pale in comparison to the rates required for combat operations against a major competitor in a long-running conventional war. A high-intensity conflict with any near-peer competitor would deplete stockpiles of Global Positioning System (GPS) and laser-guided PGMs faster than industry is currently prepared to replenish them, and if an enemy were to deny or severely hamper the employment of GPS weapons, more than half of the current arsenal of PGMs would be rendered useless. Running out of those specialized munitions or flying in an environment where GPS signals are altered or denied would expose a hole in our readiness that few service leaders have been willing to consider.

While many in industry and the DoD scoff at the thought of running short of GPS and laser-guided munitions, most have merely written off the risk of

CHART 3

2016 Fighter Pilot Shortage



NOTE: Total active duty, National Guard, and reserve shortfall is 1,211 fighter pilots, approximately 873 of which are active duty.

SOURCE: Aircraft fighter pilot requirement figures provided by the Secretary of the Air Force/Public Affairs.

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a major war as so unlikely as to be not worth considering. Even if war were to break out, they believe that the intelligence community would provide sufficient warning to allow the U.S. to expand the production capacity required to keep up with HiTHI PGM expenditures over a lengthy period of time.

Not only is this assumption flawed, but it can set us up for incredibly costly setbacks. As former Secretary of Defense Robert Gates noted several years ago, history does not always align with one's expectations:

[W]hen it comes to predicting the nature and location of our next military engagements, since Vietnam, our record has been perfect. We have never once gotten it right, from the Mayaguez to Grenada, Panama, Somalia, the Balkans, Haiti, Kuwait, Iraq, and more—we had no idea a year before any of these missions that we would be so engaged.¹⁹

Furthermore, even if we were given enough lead time to produce the required inventory, there is no guarantee that the U.S. constellation of GPS satellites would survive or remain sufficiently robust to provide the signals needed for precision guidance.

In every war, in order to capture and hold the initiative, aggressors leverage surprise and every

18. Stephen Snyder, "The US Is Dropping Bombs Quicker Than It Can Make Them," Public Radio International, April 10, 2016, <https://www.pri.org/stories/2016-04-10/us-dropping-bombs-quicker-it-can-make-them> (accessed April 11, 2017).

19. Larry Shaughnessy, "Defense Secretary Warns Against Fighting More Ground Wars," CNN, February 26, 2011, <http://www.cnn.com/2011/US/02/25/gates.west.point/index.html> (accessed April 13, 2017).

asymmetric advantage they possess while denying them to their opponents. If there is one thing the world recognizes as a strength of the United States it is America's ability to employ precision targeting to profound effect on the battlefield, but this ability critically depends on the kinetic end of the strike system—the PGM.

Several of the world's major military powers, such as China and Russia, are investing heavily in anti-satellite programs that run the gamut from ground-based ASAT missiles²⁰ to orbital ASAT programs that may deliver a kinetic strike capability²¹ or co-orbital robotic interference that can alter signals, mask denial efforts, or even pull adversary satellites necessary for surveillance and targeting out of orbit.²² If a near-peer competitor were able to degrade regional GPS signals to the point of neutralizing the reliant munitions, the U.S. would need a backup method of putting ordnance on target. Since the first days of World War I, airmen within the United States air forces have had that capability, but that is no longer the case today.

Delivering unguided munitions (“dumb” bombs or rockets) to a target is an art form, and mastering it to the point of being able to hit targets regularly requires hundreds of repetitions exercised during peacetime training—but the Air Force does not mandate such training. Rather, it has consistently conveyed from the highest echelons of leadership the idea that PGMs will always be available.

This idea is now so engrained within the institutional Air Force that the F-35 is not built and the software is not programmed to enable the accurate delivery of unguided munitions. The message has been so deeply absorbed within the ranks of the service that Basic Surface Attack (BSA) or dumb bomb delivery is no longer practiced as part of the training plan in many fighter squadrons. Of the 15 operational pilots interviewed in Europe for this paper, only two had been to a bombing range and practiced delivering dumb bombs during the past year. Several had experienced it only years earlier while learning to fly the F-16 at FTU.

Learning (or relearning) this difficult art in the heat of combat would challenge the best of fighter pilots, but it would really weigh down those who needed a few extra sorties or a little extra time to “catch.” The learning curve in combat would be costly under the best of circumstances, but with today's baseline of readiness, the potential for setbacks in the air (meaning higher casualties and lost engagements) would translate into setbacks, lost battles, and higher casualty rates on the ground—setbacks that might be much greater than anyone could anticipate, much less tolerate.

While the associated scenario may seem far-fetched, U.S. forces have always trained (at least up to September 11, 2001) for the most challenging end of the spectrum of conflict. Why would service leadership direct, much less allow, airmen to train to anything less today? Mindset is certainly part of it, but the lack of flying time overrides everything. With precious few opportunities to train for their primary role, squadrons and the pilots therein no longer have the bandwidth to prepare for anything other than their primary missions.

Overall Assessment of Readiness

Most pilots now receive less than three hours per week (150 hours per year) of flying time, and those three hours are insufficient to gain and improve the skills needed to win in a high-threat combat environment. This makes it hard to fathom which units the Air Force would point to as ready for full-spectrum combat.

While the four squadrons highlighted by General Nowland as C1 may fly just enough to make the low end of that grade, it is hard to imagine how the squadrons that fall below that level of readiness would fare in an all-out war with a near-peer enemy. Not only do Russia and China field greater numbers of fighters than the U.S., but in many cases, they also conduct more training and spend more time in the air than their U.S. and NATO counterparts do. Russia's SA-20 and S-400 surface-to-air missile (SAM) systems, coupled

20. Bill Gertz, “China Tests Anti-Satellite Missile,” *The Washington Free Beacon*, November 9 2015, <http://freebeacon.com/national-security/china-tests-anti-satellite-missile/> (accessed April 11, 2017).

21. Weston Williams, “Russia Launches Anti-Satellite Weapon: A New Warfront in Space?” *The Christian Science Monitor*, December 22, 2016 <http://www.csmonitor.com/USA/Military/2016/1222/Russia-launches-anti-satellite-weapon-A-new-warfront-in-space> (accessed April 11, 2017).

22. “MYSTERY Russian Satellite: ORBITAL WEAPON? Sat GOBBLER? What?” *The Register*, November 14, 2014, http://www.theregister.co.uk/2014/11/18/russia_secret_satellite_kosmos_2499/ (accessed April 11, 2017).

with its 4+ generation aircraft, mean that the technological edge once enjoyed by the U.S. is gone and will not return until the F-35 is fielded in numbers large enough to counter those threats. At our programmed rate of acquisition, that will not be for some time.

The Heritage Foundation estimates that it will take at least 500 fighter aircraft to engage and win in an MRC, and the number of fighter pilots it would take to man those cockpits is slightly less than a third of the total number of fighter pilots in the Air Force.²³ There is no doubt that they would come through in a crisis, but at the current level of readiness across the Air Force, the learning curve and associated losses would be significant, and any combat setbacks suffered by the Air Force would ripple through the other services as well.

What Congress and the Air Force Should Do

Congress should increase operations and maintenance (O&M) funds to support greater aircraft availability. The Air Force budget for O&M should increase by 4 percent in 2018 and by a total of 20 percent over the next five years to allow pilots to master their primary missions and be prepared to employ effectively beyond GPS and other system failures.

Congress should end artificial budgetary caps and restrictions on the budget for DoD immediately. In the interim, it should increase the Air Force budget for FY 2017 through supplemental funding sufficient to initiate procurement of needed spares/repair parts, hire additional maintenance personnel, and hire additional contract support personnel to offset the current shortfall in USAF personnel, all of which is necessary to clear backlogged maintenance actions and fund needed flight hours.

Congress should incrementally increase the authorized Air Force end strength to 326,000 in FY 2018; to 337,000 airmen²⁴ over the next five years,

the level recently recommended by Senator John McCain (R-AZ); and to 350,000 by 2025.²⁵ Recovering from the damage created by end-strength reductions and the enduring impact of the Budget Control Act will not happen overnight. Maintenance personnel and pilots take significant time and money to recruit and train, but the first steps toward recovery are needed immediately.

The Air Force should add another undergraduate pilot training wing to increase the first phase (T-6) of pilot production while cutting the service commitment associated with flight school to seven years post-graduation. This would both allow the Air Force to increase its pilot force and entice more highly qualified applicants to apply and allow greater screening that would improve the quality of the force.

Congress should institute targeted incentive programs to reduce the 3,400-aircraft maintainer²⁶ and 873-plus pilot shortfalls. Aviator flight pay and aviation continuation pay (ACP, or retention bonuses) currently combine to total a maximum of \$35,080 a year for pilots, but ACP is paid only to vulnerable (meaning eligible to exit) aviators with dollar amounts that were established two decades ago. Bonus programs like the ACP should be terminated and replaced with robust incentive pay programs for career fields that are particularly technical, demanding, or dangerous. Congress should authorize and the Air Force should immediately institute a graduated incentive pay program for aircraft maintainers that runs for the duration of a maintenance career and should increase flight incentive pay for each of the 10-year groupings by a factor of seven.

Finally, the Air Force should review all training requirements for individuals at the squadron level and dramatically reduce non-combat or non-mission-related tasks, duties, and training.

23. The tempo and tasks associated with wartime employment require an increase in fighter squadron manning. Typical peacetime manning may be as low as 1.25 times the number of jets in each squadron: A squadron with 24 jets would have 30 assigned pilots. Wartime manning levels exceed that number.

24. Hailey Haux, "SecAF, CSAF Testify on FY 2017 AF Posture," U.S. Air Force, February 10, 2016, <http://www.af.mil/News/ArticleDisplay/tabid/223/Article/654237/secaf-csaf-testify-on-fy-2017-af-posture.aspx> (accessed March 8, 2017).

25. Oriana Pawlyk, "Air Force Wants 350K Airmen by 2024," Military.com, December 22, 2016, <http://www.military.com/daily-news/2016/12/22/air-force-350k-airmen-2024.html> (accessed March 8, 2017).

26. 2016 maintainer shortage statistic provided by Headquarters Air force Deputy Chief of Staff for Logistics, Engineering, and Force Protection (HAF A4) on April 13, 2017.

Conclusion

Air Force leaders know that their pilots need more flying time and valuable training opportunities. They must convey this to Congress and the Trump Administration in a way that will make them increase the funding required to rebuild a robust and well-trained roster of maintainers and pilots; a fleet of mission-ready aircraft; and a munitions stockpile that will allow the service to reestablish higher expectations for sorties, training, and performance. If they are successful, the men and women of the United States Air Force will regain absolute dominance in air warfare before the next crisis arrives at our door.

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