



The Mitchell Forum

Acquiring the Air Force We Need

By John Venable

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Key Points

- The 2018 study *The Air Force We Need* stated the service is 25 percent below the capacity it needs to execute the *2018 National Defense Strategy*.
- The Trump administration has delivered the first surge in defense spending not tied to ongoing combat operations in more than 30 years—one the Air Force could use to bring capacity, capability, and readiness to levels required to dominate a peer fight.
- The Air Force has chosen not to accelerate aircraft procurement, spending the majority of surge funding to research capabilities and technologies to field sometime in the future.
- Peacetime surges in defense spending are infrequent and short lived—the Air Force should reduce funding for research to nominal levels and accelerate the fielding of advanced aircraft in production.

Abstract

After 28 years of downsizing, combat deployments, and funding challenges, and despite billions of dollars spent on research and development, the Air Force lacks the capacity to meet the challenges laid out in the *2018 National Defense Strategy*. Making do with a minimal, aging force structure while spending disproportionate sums in search of the next revolutionary change puts the United States at risk not just for the present, but also during an almost 20-year acquisition cycle. The Air Force of 2040 will be comprised of current weapons systems and those that can be acquired from active production lines or are nearing production. The service needs to acquire as many next-generation fighters, bombers, and advanced air refueling platforms as it can now, while the current surge in funding is available.

Introduction

From the late 1930s through today, the Air Force has been guided by more than 41 plans and strategic concepts, each designed to put the service on better footing for the next conflict. In actuality, just three went on to infuse the service with numerically sufficient quantities of the most advanced equipment to execute the missions the nation expected of its Air Force. Their successful implementation was based on the presence of three elements: a viable concept to execute, a plan to acquire the most advanced technology available for fielding, and commensurate funding to procure weapons systems in numbers sufficient for the mission set.

More than thirty years have passed since the last of those plans was fulfilled by the Reagan-era buildup. During those three decades, the number of Air Force fighter and bomber platforms on flight lines around the world withered to less than half the number the service possessed the last time it was prepared for a peer-level fight. The lack of funding required to refresh those weapons systems with leading-edge technology has left the Service with a dated fleet of aircraft that is too small for the mission at hand. With the current plus-up in defense funding, the Air Force could begin to field the systems it requires to meet the *2018 National Defense Strategy* (NDS), but it has chosen not to do so. The Air Force should move in earnest to fill those gaps before the opportunity is lost.

How Much Airpower Does the Nation Need?

The 2018 NDS directed the services to prepare for a large-scale, high-intensity conventional war with China or Russia.¹ That mission requires a force that, with little advance warning, can rapidly deploy, fight, and defeat a regional threat or peer competitor anywhere in the world. Later that year, the Air Force released a strategic study on the capacity and capabilities needed to execute the NDS called *The Air Force We Need* (TAFWN). It was based on thousands of wargame simulations and assessed that the service needed, among other things, one additional strategic airlift squadron, seven additional fighter squadrons, five additional bomber squadrons, and 14 additional tanker squadrons to execute that strategy.² Yet, the Air Force has done surprisingly little since 2018 to accelerate aircraft procurement, placing the bulk of its expanded budget into research and development.

Since World War I, American airmen have been enamored with technology and how emerging capabilities could change the nature of combat and dictate service strategy. Certainly, increments in technology have elevated warfighting to new levels, but nothing has changed the fundamental methods of war in any of the three domains.³ For example, U.S. ground forces' weapons have evolved from muskets to missile systems with ranges of

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1 James Mattis, Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: U.S. Department of Defense, 2018), <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.

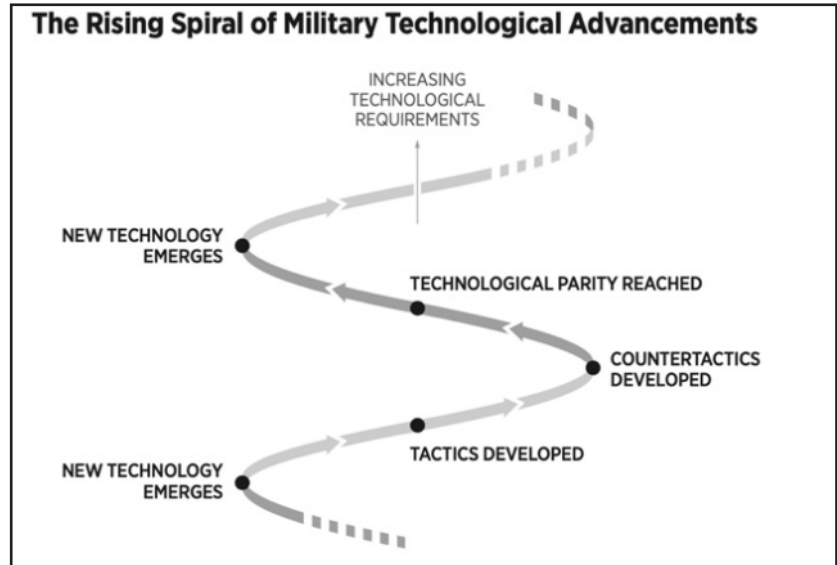
2 See Secretary of the Air Force, Public Affairs (SAF PA), "The Air Force We Need: 386 Operational Squadrons," September 17, 2018, <https://www.af.mil/News/Article-Display/Article/1635070/the-air-force-we-need-386-operational-squadrons/>.

3 See, for example, Michael Riggs, *Edicts of Ares: 13 Absolute Rules of Warfare* (Bloomington, IN: Xlibris Corp., 2006).

more than 100 nm.⁴ The Navy has evolved from a fleet of mere surface combatants to a force that operates above and below the waves as well. Technological advances in the land and sea domains have delivered increased speed, range, firepower, and maneuverability. While those advances have been more methodical for the other services than for the Air Force, these increments have been offset with novel tactics and technological gains by competent adversaries. It is unlikely that the Air Force, on its current trajectory, will be the service to overcome outmoded warfighting regimes.

Figure 1: The Spiral of Technology

Source: Heritage Foundation; SR223 heritage.org.



While highly effective against dictators and rogue elements in medium- to low-threat conflicts, technological advantages have been historically short-lived when peer adversaries go to war. The race to capitalize upon the advantages afforded by radar in World War II stand as an illustrative example of this reality. The technology proved vital, but neither side possessed an overwhelming advantage in this area, with unilateral gains often measured in weeks before the other side gained parity. Peer-level fights certainly require combatants to pursue the most advanced technology available, but generally speaking, plans, concepts, and doctrine built on a perceived unilateral technological advantage have not played out well. At the end of the day, what has allowed the United States and its allies to prevail is having sufficient numbers of competitive weapons systems and fully trained airmen to employ them.⁵

Each of the 41-plus landmark acts, strategic concepts, road maps, and vision statements that have guided the Air Force since its inception was unquestionably well-intended and, indeed, noble. But just three went on to infuse sufficient leading-edge technology to enable the service to execute its wartime mission against a peer adversary: the air war plan for World War II; the 1953 Air Force nuclear doctrine, and the service’s Strategy, Force, and Capabilities planning in the early 1980s. While none of the three underlying concepts turned out to be a game changer, it is worth briefly exploring the roots of their respective successes.

4 The MGM-140 surface-to-surface Army Tactical Missile System (ATACMS) has a range of over 180 nm. Lockheed Martin, “ATACMSTM Long-Range Precision Tactical Missile System,” 2011, <https://www.lockheedmartin.com/content/dam/lockheed-martin/mfc/pc/army-tacticle-missile-system-block-ia-unitary-atacms/mfc-atacms-block-1a-unitary-pc.pdf>.

5 Adapted from Rafael S. Cohen, *Air Force Strategic Planning: Past, Present, and Future* (Santa Monica, CA: RAND Corporation, 2017), https://www.rand.org/content/dam/rand/pubs/research_reports/RR1700/RR1765/RAND_RR1765.pdf.

Air War Plan for World War II

In 1941, the U.S. Army's Air War Plans Division (AWPD) solidified the concept of daylight precision bombing by issuing the Army's concept for the air war over Europe. Titled AWPD-1, the plan detailed a concept for a six-month strategic bombing campaign that would defeat or significantly cripple the Axis powers before any land invasion of Europe took place. It relied on the revolutionary B-17 bomber, considered invulnerable to attack and boasting a demonstrated peacetime bombing accuracy of 75 feet.⁶ The B-17s range, bomb-carrying capacity, armament, and service ceiling were impressive; it was initially thought to out-perform all known pursuit (fighter) aircraft.⁷ Unfortunately, none of those claims proved true.

Bombing accuracy suffered significantly under the high-threat conditions over Germany. Postwar studies estimated high-altitude bombing accuracy during the war was actually within 3,300 feet of the intended target—a miss distance 44 times greater than prewar estimates.⁸ And, when pitted against a competent peer equally determined to win, the B-17 and its sibling heavy-bombers proved to be anything but invulnerable to attack.

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From the 8th Air Force alone, the number of heavy-bomber crewmembers who would die over Europe exceeded the total number of Marines killed in the Pacific theater.⁹ The Air Corps was forced to overcome accuracy challenges and combat losses through the sheer force of numbers, which, fortunately, were also provided through AWPD-1. The service fielded the most advanced technology of the day while acquiring more than 62,000 fighters, 59,000 bombers, and almost 24,000 airlift aircraft.¹⁰

Strategic bombing was important to the overall victory in Europe, but the concept that a six-month bombing campaign would win the war in Europe proved to be wrong. Still, it allowed the United States to field the most technologically advanced aircraft available in number and thoroughly prepare airmen in every facet of air combat. Ultimately, it did allow the allies to win the air war over Europe. Those fundamental elements would be tested again as the Air Force moved to embrace nuclear weapons in the Cold War.

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- 6 Merton J. Peck and Frederic M. Scherer, *The Weapons Acquisition Process: An Economic Analysis* (Boston: Harvard University, Graduate School of Business Administration, Division of Research, 1962), p. 619. Bombing accuracy is measured in terms known as Circular Error Probable (CEP), which uses cumulative deliveries to estimate that a bomb dropped by a weapons system will land within a specified distance 50 percent of the time. In the B-17's case, the distance was within 75 feet of the target.
 - 7 Robert T. Finney, *History of the Air Corps Tactical School, 1920–1940* (Washington, DC: Air Force History and Museums Program, 1998), p. 68, <https://media.defense.gov/2010/Sep/27/2001329737/-1/-1/0/AFD-100927-026.pdf>. Originally published in 1955 by the USAF Historical Division of the Air University's Research Studies Institute.
 - 8 Postwar estimates put the real CEP for heavy bombers at 3,300 feet, 44 times the B-17's demonstrated CEP of 75 feet that was measured under ideal peacetime conditions. Kathleen T. Rhem, "Technology, Doctrine Changes Allow for Better Bombing Runs," U.S. Department of Defense, March 19, 2003, <https://archive.defense.gov/news/newsarticle.aspx?id=29272>.
 - 9 Of the 250,000 Eighth Air Force aircrew members who flew missions during the war, there were 58,000 casualties: 18,000 killed, 6,500 wounded, and 33,500 missing. Gerald Astor, *The Mighty Eighth: The Air War in Europe as Told by the Men Who Fought It* (New York: Berkley Caliber, 2015), p. 22.
 - 10 W.F. Craven and J. L. Cate, eds., *The Army Air Force in World War II*, Section VI, *Men and Planes* (Chicago: Chicago University Press, 1955), p 354, <https://www.ibiblio.org/hyperwar/AAF/VI/AAF-VI-10.html>.

1953 Nuclear Doctrine

Nuclear weapons were at forefront of the competition for funding within the Defense Department from the late 1940s through the mid 60s. The Air Force argued that aircraft were more survivable and could deliver those weapons more accurately and efficiently than the other services. In 1953, it issued Air Force Manual 1-2 (AFM 1-2) reinforcing the concept of strategic bombing.¹¹

Air Force arguments prevailed when President Eisenhower ruled that nuclear weapons would be used from the outset of a general war.¹² The win gave the Air Force the preponderance of the nuclear mission along with the lion's share of the Defense Department budget through two administrations, allowing the service to field more than 7,000 fighter, 2,900 bomber, 1,300 airlift, and 900 air refueling platforms.¹³

The idea that nuclear weapons would fundamentally change the way future wars were waged and that they would be the dominant factor in future military planning proved wrong.

Like AWPD-1, the underlying concept behind AFM 1-2 did not age well. The idea that nuclear weapons would fundamentally change the way future wars were waged and that they would be the dominant factor in future military planning proved wrong.¹⁴ Still, AFM 1-2 delivered the second largest force buildup in the history of the Air Force and allowed the service to prepare for conflict.

Those platforms incorporated the most technologically advanced equipment available at the time, but their design and the associated aircrew training was tailored to a nuclear mission that valued speed over maneuverability. The lack of balance proved less than ideal for the conventional air battles that would take place over Vietnam. However, the lessons learned in both aircraft design and aircrew training would shape one of the most historically successful and enduring road maps in Air Force history.

Air Force 2000, the Airlift Master Plan, and the Tactical Fighter Roadmap

In the early 1980s, the Air Staff crafted The USAF Strategy, Force, and Capabilities Plan, which detailed the capabilities and structures the Air Force needed to meet national strategic priorities. That plan would give birth to the Air Force 2000, the Airlift Master Plan, and the Tactical Fighter Roadmap. Collectively, they spelled out how the Air Force would field the latest technology and grow capacity to reach a 40-wing fighter force.¹⁵

The plans were written in a way that easily captured congressional support and were perfectly timed. When the Reagan-era funding arrived, senior Air Force leaders executed

11 Ibid., pp. 7, 26.

12 This approach was known as the "New Look" policy that emphasized nuclear weaponry as the primary means by which to deter war.

13 Kevin N. Lewis, *The U.S. Air Force Budget and Posture over Time* (Santa Monica, CA: RAND Corporation, February 1990), p. 9, <https://www.rand.org/pubs/reports/R3807.html>. Numbers calculated from tables in the U.S. Air Force Statistical Digests for fiscal years 1953 (p. 122); 1955 (p. 89); 1957 (p. 101); and 1963 (p. 81), accessed March 31, 2020, <https://www.afhistory.af.mil/USAF-STATISTICS/>.

14 Air Force Manual 1-2 was oriented toward nuclear deterrence and general war, suited to the strategy of massive retaliation. Warren A. Trest, *Air Force Roles and Missions: A History* (Washington, DC: Air Force History and Museums Program, 1998), p. 159, <https://media.defense.gov/2010/Sep/22/2001330059/-1/-1/0/AFD-100922-020.pdf>.

15 Cohen, *Air Force Strategic Planning*, pp. 20–21.

the associated strategies, ultimately adding more than 2,600 fighter, bomber, air refueling, and strategic airlift (FBARA) aircraft to the Air Force inventory, including: more than 2,455 F-15, F-16, A-10, and F-117 fighters; 114 B-1 and B-2 bombers; 56 KC-10 Air Refueling aircraft; and 10 C-17 Strategic airlifters.¹⁶ The plans also delivered the kind of robust annual training that allowed fighter aircrews to master large-formation low-altitude employment against a peer competitor. Collectively, those assets and capabilities not only allowed the United States and its allies to win the Cold War, they have served as the backbone of the service for the last 40 years.

Pairing Funding with Strategic Concepts

The single most important attribute common to these three successful strategy concepts was that they had an administration willing to fund them.

The single most important attribute common to these three successful strategy concepts was that they had an administration willing to fund them. And in each instance, those funding windows were relatively short-lived. The surge that began in the early 1950s was the longest, lasting through two eight-year presidential administrations. The Reagan administration's surge lasted eight years, but, even at the height of the Cold War, it reduced its fiscal commitment to the Defense Department during the last three in favor of other national priorities. Air Force flight lines are still largely populated with aircraft from those surges. Given the age of this equipment, it is clear that a new bow wave of aircraft procurement is vital to sustaining key roles and missions.

While there have been several elevated levels of defense spending since the 1980s, those surges were linked to combat operations in Afghanistan, Iraq, and Syria. The drought in funding for non-combat expenditures forced the service to limit aircraft procurement to 11 percent of Air Force funding from 1990 through 2016, effectively suppressing the fielding of extraordinary technologies now found in crushingly small fleets of the F-22A and the B-2 Bomber.¹⁷ From the end of the Reagan administration through 2016, the Air Force acquired just 558 fighters, 7 bombers, no tankers, and 222 strategic airlift platforms for a total of 787 aircraft.¹⁸ It is worth noting that the U.S. Navy outpaced the Air Force for many years in terms of total aircraft procured during that same period.

16 Numbers derived from tables in the U.S. Air Force Statistical Digests for fiscal years 1980 through 1992 (1980 p. 93; 1981 pp. 3-8, 3-9; 1984 p. 101; 1984 pp. D-15-D-18; 1990/1991 pp. D-5-D-8; 1992 pp. E-105-E-109); John Pike, "B-2 Spirit," Federation of American Scientists, November 30, 1999, <https://fas.org/nuke/guide/usa/bomber/b-2.htm>; "F-117A: Serial Listings," F-117A: The Black Jet, updated December 16, 2019, <http://www.f-117a.com/Serial.html>; and "F-16 Users: United States of America Air Combat Command - ACC [Tactical Air Command - TAC]," F-16.net, accessed May 8, 2020, http://www.f-16.net/f-16_users_article23.html."

17 The Air Force originally planned to procure 750 F-22 aircraft. That number was reduced to 648 in 1996 and 277 in 2003. A total of 183 F-22s were actually fielded. Jeremiah Gertler, Air Force F-22 Fighter Program, Report for Members and Committees of Congress (Washington, DC: Congressional Research Service, July 11, 2013), p 7, <https://fas.org/sgp/crs/weapons/RL31673.pdf>. The Air Force originally planned to procure 132 B-2 aircraft. That number was later reduced to 75. A total of 21 B-2s were actually fielded. Steve Pace, *B-2 Spirit: The Most Capable War Machine on the Planet* (New York: McGraw-Hill, 1999), pp. 75-76.

18 The aircraft totals for 1990-2016 were extracted, compared, and analyzed from four different sources. As an example, the data for FY16 were extracted from the appendix of Deputy Assistant Secretary of the Air Force for Budget (SAF/FMB), *United States Air Force Fiscal Year 2017 Budget Overview* (U.S. Air Force, February 2016), p. A-46, "Air Force Total Aircraft Inventory (TAI)," <https://www.saffm.hq.af.mil/Portals/84/documents/FY17/AFD-160209-036.pdf?ver=2016-08-24-102126-717>; and various tables in the U.S. Air Force Statistical Digests for fiscal years 1980 through 2013; Pike, "B-2 Spirit"; "F-117A: Serial Listings," F-117A: The Black Jet; and "F-16 Users," F-16.net.

In 2017, the Department of the Air Force (DoAF) began to enjoy real budget growth for the first time in more than 26 years that was not associated with a contingency.¹⁹ Assuming the president's budget request for FY21 is approved as submitted, the DoAF's funding will have increased by 31 percent since 2016, making the current window an excellent opportunity to refresh and actually grow the Air Force fleet of aircraft.

The Air Force We Need

As it was for AWPD-1, AFM 1-2, and Air Force 2000, the release of the TAFWN study could not have been better timed. It aligned perfectly with the 2018 NDS, published just six months earlier, as well as the Trump administration's surge in defense spending. Of the 74-squadron shortfall identified by TAFWN, 27 are FBARA squadrons equating to a gap of 460 aircraft²⁰ that carry a total procurement price tag of more than \$80 billion.²¹

The DoAF could significantly close the gap between its current capacity and that of TAFWN if it allocated a greater portion of its budget to procurement. Since the end of FY18 when TAFWN was announced, however, funding for aircraft procurement has only grown from \$24.8 billion in FY19 to \$25.4 billion in FY21. That 2 percent growth rate that has not even kept up with inflation.

In spite of the need to recapitalize and grow the fleet, the Air Force is holding acquisition of the KC-46 steady at 69 total aircraft and actually decreasing procurement of the F-35 by 12 jets each year to compensate for the acquisition of the F15EX over the same five-year period. If the Air Force executes the whole of its aircraft procurement plan over the FYDP, the service will have acquired a total of just 552 fighters, 137 tankers, and potentially 8 bombers during the entirety of the Trump funding plus-up (See Table 2).

19 Up until FY21, the "Air Force" budget included Procurement, RDT&E, Personnel, and O&M for all space assets and personnel in the Department of the Air Force's (DoAF) portfolio. In order to compare the budgets year over year, this paper uses "DoAF" budget numbers for each of the subcategories. Additionally, the FY21 DoAF budget published in the Greenbook includes more than \$38 billion in "non-Blue" or "pass-through" funding that the Air Force will never be able to use or control, as it is designated for "other" agencies. The practice began in earnest following 9/11 and has artificially inflated the service's top line for the years since. This paper has removed pass-thru funding from all calculations and comparisons.

20 While the number of aircraft in any of those categories varies from unit to unit, there are approximately 30 fighters, 10 bombers, 15 tankers, and 15 strategic airlift aircraft in each squadron. Mathematically, *The Air Force We Need* calls for the addition of 182 fighters, 50 bombers, 210 refuelers, and 15 airlift aircraft to the current Air Force inventory. SAF PA, "The Air Force We Need: 386 Operational Squadrons."

21 \$80 billion is a rough estimate based on the need for 182 more F-35s (seven squadrons, 26 fighters per squadron, \$80 million each), 50 more B-21 bombers (five squadrons, 10 bombers per squadron, \$564 million each), 210 more KC-46s (14 squadrons, 15 tankers per squadron, \$169 million each), and 15 additional C-17s (one squadron, 15 aircraft per squadron, C-17s are no longer in production, but they averaged \$262 million each in FY20 dollars). Marcus Weisgerber, "Price Drop: Lockheed Pitches \$80M F-35A to Pentagon," *Defense One*, May 7, 2019, <https://www.defenseone.com/business/2019/05/price-drop-lockheed-pitches-80m-f-35a-pentagon/156825/>; *Air Force B-21 Raider Long-Range Strike Bomber* (Washington, DC: Congressional Research Service, updated November 13, 2019), p. 4, <https://fas.org/sgp/crs/weapons/R44463.pdf>; DoAF, *Department of Defense FY 2020 Budget Estimates*, Air Force Vol. 1, *Aircraft Procurement*, Air Force (Washington, DC: DoAF, March 2019), p. 25, https://www.saffm.hq.af.mil/Portals/84/documents/FY20/PROCUREMENT/FY20_PB_3010_Aircraft_Vol-1.pdf?ver=2019-03-18-152821-713; and "C-17 Globemaster III," U.S. Air Force Fact Sheet, accessed May 6, 2020, <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/1529726/c-17-globemaster-iii/>.

Research, development, test, and evaluation (RDT&E), on the other hand, has gone from 17 percent of Total Obligation Authority (TOA) in FY18, to 22 percent in FY21—a budget that has increased by \$10.7 billion to \$37.3 billion over those same years.²² It is important to put those numbers in perspective and understand their potential repercussions.

Fiscal Years	FY81-85	FY86-90	FY91-95	FY96-00	FY01-05	FY06-10	FY11-15	FY16-20	FY21-25
Personnel	34.7	45.5	37.2	30.8	34.8	34.7	32.8	32.2	37.0
O&M	48.8	49.4	44.5	39.5	48.5	49.1	49.9	51.2	55.2
Procurement (Total)	71.0	68.2	45.7	29.8	37.5	32.3	22.4	26.4	25.7
Aircraft/Parts	42.9	34.3	21.1	13.6	16.3	15.3	13.8	16.9	16.8
Space/Other	28.1	33.9	24.6	16.2	21.1	17.0	8.6	9.5	8.8
RDT&E	25.2	30.8	22.6	22.6	22.8	25.3	19.2	26.8	37.7
MilCon/FH/Brac/OCO	6.1	5.4	3.8	4.0	14.0	23.2	17.0	16.4	14.5
Total Budget	186.1	198.9	153.6	126.3	158.2	165.2	142.2	153.5	169.4

Table 1: Air Force Budget Outlays from Fiscal Year 1981 through Fiscal Year 2025 (in billions of FY20 dollars)²³

From 1962 through 2004, RDT&E averaged 13 percent of Air Force TOA, and the highest RDT&E funding level within any budget from 2005 through 2017 as a percentage of DoAF (blue) TOA was 18 percent. At no time from 1947 through 2017 did the RDT&E budget exceed the procurement budget, but it has done so every year since. In FY21, it will tower over procurement by 47 percent.²⁴ Some will point to the B-21 as the culprit, but no other Air Force RDT&E budget, including during the peak developmental years for the F-15, F-16, A-10, F-117, F-35, F-22, and the B-2 bomber, has ever approached that level of investment.

22 These numbers are estimates based on the requirements presented by the Air Force within the President’s Budget for FY21. For consistency, the calculations include procurement and RDT&E figures for the Space Force, as they were not separated in any previous fiscal year’s budget.

23 In order to simplify the table, funding for MilCon, Family Housing, Base Realignment and Closure (BRAC), Global War on Terror (GWOT), and Overseas Contingency Operations (OCO) are combined in the row labeled “Other.” Due to the inclusion of non-blue funding with Air Force TOA over numerous years and the need to remove that “passthrough” from budget estimates, the data for this chart were extracted, compared, and analyzed from four different sources. The final estimates were converted to FY20 dollars. Office of the Under Secretary of Defense (Comptroller) (OUSD(C)), *National Defense Budget Estimates for FY 2020* (Washington, DC: DOD, May 2019), Table 6-18, pp. 193–199, esp. pp. 196–198, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/FY20_Green_Book.pdf; OUSD(C), *National Defense Budget Estimates for FY 2021* (Washington, DC: DOD, April 2020), Table 2-1, pp. 30–33 and Table 6-18, p. 211, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2021/FY21_Green_Book.pdf; SAF/FMB, United States Air Force Budget Overviews for fiscal years 1997–2021, <https://www.saffm.hq.af.mil/FM-Resources/Budget/>; Kevin N. Lewis, *The U.S. Air Force Budget and Posture over Time* (Santa Monica, CA: Rand Corporation, February 1990), p. 18, <https://www.rand.org/pubs/reports/R3807.html>; and U.S. Air Force Statistical Digests for fiscal years 1980–2013, <https://www.afhistory.af.mil/USAF-STATISTICS/>.

24 SAF/FMB, *United States Air Force Fiscal Year 2021 Budget Overview* (U.S. Air Force, February 2020), p. 2, https://www.saffm.hq.af.mil/Portals/84/documents/FY21/SUPPORT_/FY21%20Budget%20Overview_1.pdf?ver=2020-02-10-152806-743.

For the 35-year period from 1990 to the end of current FYDP, the Air Force will have acquired less than 1,500 FBARA aircraft, which means even the platforms most would consider “modern” are becoming dated.

Assuming the procurement programmed in the service’s FY21 future years development plan (FYDP) is fully executed, and the most optimistic estimates for the B-21 materialize,²⁵ the Air Force will acquire 552 fighters, 8 bombers, and 137 air refueling platforms during the current surge in defense spending for a total of 697 FBARA platforms.²⁶ That is one-quarter of the 2,670 FBARA jets that were acquired during the Reagan Era.

Intentionally forgoing accelerated procurement during a period of robust funding would make sense if the service was already flush with modern equipment. Unfortunately, that is not the case. For the 35-year period from 1990 to the end of current FYDP, the Air Force will have acquired less than 1,500 FBARA aircraft, which means even the platforms most would consider “modern” are becoming dated. By 2025, the average age of the F-22, C-17, and B-2 fleets will be 18, 24, and 35 years, respectively.²⁷ Fourth-generation platforms that make up 80 percent of the fighter fleet will be an average of 32 years old.

Fiscal Years	FY81-85	FY86-90	FY91-95	FY96-00	FY01-05	FY06-10	FY11-15	FY16-20	FY21-25
Ftr	2497				558			552	
Bmbr	114				7			8	
Tnkr	59				0			137	
Strat Airlift	56				222			0	
Total	2670				787			697	

Table 2: Fighter Bomber Tanker and Airlift Procurement from FY 1981 to FY 2025²⁸

25 Roxana Tiron and Tony Capaccio, “Pentagon Seeks \$10.3 Billion to Buy the Stealthy B-21 Raider,” *Bloomberg Government*, February 10, 2020, <https://about.bgov.com/news/pentagon-seeks-10-3-billion-to-buy-the-stealthy-b-21-raider/>. Specific B-21 RDT&E, procurement, MILCON, O&M, and MILPERS funding figures for the (FYDP) provided by Anthony Capaccio on request. Unofficially, funding for the procurement of the B-21 begins in FY22, and procurement and RDT&E in that release total \$23.36 billion over the FY22 FYDP. The acquisition of the first 14 B-2s was accomplished through a masked process initiated on RDT&E funds in 1980s—long before that system was acknowledged. That fact, coupled with the equally impure nature of procurement (a large portion of “aircraft procurement” funding goes to things other than new airframes), requires rough estimates on procurement potential within both RDT&E and procurement funding as well the cost of each platform. Cost estimates for production vary from \$.56 to \$.256 billion per B-21. Assuming that 15 percent of RDT&E funds and .65 percent of procurement funds go to actual acquisition, the availability of \$23.36 billion would allow the AF to acquire between six and eleven B-21s over the FYDP, or approximately eight B-21s.

26 Estimates made by comparisons of USAF Aircraft inventories from FY 2016, 2017, and 2021 extracted from SAF/FMB, United States Air Force Budget Overviews for those fiscal years: (2016, p. A-37); (2017, p. A-46); (2021, p. 42), <https://www.saffm.hq.af.mil/FM-Resources/Budget/>; and DoAF, *Department of Defense FY 2021 Budget Estimates*, Air Force Vol. 1, *Aircraft Procurement, Air Force* (Washington, DC: DoAF, February 2020), pp. 1 (F-35A), 17 (F-15EX), 31 (KC-46A), https://www.saffm.hq.af.mil/Portals/84/documents/FY21/PROCUREMENT_FY21%20Air%20Force%20Aircraft%20Procurement%20Vol%201_1.pdf?ver=2020-02-10-145310-973.

27 “Total Force Average Aircraft Age (As of Sept. 30, 2018),” table in “USAF Almanac 2019,” *Air Force Magazine* 102, no. 5, June 2019, p. 59, http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2019/June%202019/AFM_June2019%20Full%20Issue.pdf. Seventeen months were added because of the difference between the aircraft data capture dates for the 2019 USAF Almanac and publication of this paper.

28 See footnotes 16, 19, and 27 for FY 1980–1990, FY 1990–2015, and FY 2016–2025 estimates, respectively.

What appears to be causing the spike in RDT&E funding is the belief that a yet-to-be-defined emerging capability will change the way the next peer-level war will be fought—not just in the air, but in all domains. The concept is not based on an invisible bomber or a special lot of nuclear weapons, but on a network that allows information to move seamlessly from any sensor to any shooter anywhere in the world almost instantaneously.²⁹ While a formal concept for this game-changing capability has yet to materialize, it has been under development since 2017 and is expected to be released early in General Charles “CQ” Brown’s new tenure as the Air Force Chief of Staff.³⁰ This concept is an important step forward and shows much promise, but it does not replace the need for a certain level of

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mass. In many ways, it harkens back to the Royal Air Force’s experience in the Battle of Britain, where radar and command and control air defense networks proved vital, but would not have won the day without enough defending fighter aircraft.

The Air Force has already invested heavily in the digital backbone for this concept through the Airborne Battle Management System (ABMS). ABMS is envisioned to rely on a common digital architecture and a heavy dose of artificial intelligence to help move information, process targets, and optimize their engagement. The Army and Navy have their own all-domain command and control efforts, and while there appears to be some level of cross-pollination between the three, they are still separate efforts.³¹ The idea of a joint effort has been adopted by the Joint Staff into the Joint All Domain Command and Control (JADC2) lexicon, but the Joint Staff does not have a budget to fund it. Believing this is the path to game changing capabilities, the Air Force has moved a great deal of funding into the development of the all-domain C2 technology and underlying platform. The move has come at the cost of its ability to significantly recapitalize its fleet, with the hope that Congress will provide enough supplemental funding to field the capacity and capability it needs to execute the 2018 NDS. To paraphrase General David Goldfein, there is no congressional lobby, no constituency for a digital highway, but there are plenty in Congress who will support Air Force weapons systems that will use it.³²

29 “Wars of the past have been about attrition—wars of the future will be about cognition. Our first question in any acquisition program of the future is not going to be what can it do; our first question will be how does it connect. I liken this to the Rubik’s cube. The center is the network with common data standards so information can flow at the speed of light.” Remarks by General David Goldfein, Chief of Staff, U.S. Air Force, to the Air Force Association, July 26, 2017, p. 3, https://www.af.mil/Portals/1/documents/csaf/CSAF_AFA_Breakfast_Remarks-26July17.pdf.

30 This is based on conversations between the author and senior Air Force leaders.

31 This was based on conversations with a U.S. Army contractor on Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); and Sydney J. Freedberg Jr., “ABMS Can’t Be ‘Sole Solution’ For Joint C2, Army Tells Air Force — Exclusive,” *Defense News*, January 22, 2020, <https://breakingdefense.com/2020/01/abms-cant-be-sole-joint-c2-solution-army-tells-air-force-exclusive/>.

32 The exact quote was, “I’ve not yet met a highway-man who is on the Hill lobbying, but I sure have met a lot of truckers.” Marcus Weisgerber, “US Air Force to Shift Billions of Dollars to Network Its Weapons,” *Defense One*, September 27, 2019, <https://www.defenseone.com/business/2019/09/us-air-force-shift-billions-dollars-network-its-weapons/159958/>.

With the F-35, KC-46, F-15EX, and B-21 currently in or nearing production, the opportunity for funding to be put to work is certainly at hand. The hope that congressional “adds” will overcome pending aircraft retirements to field TAFWN ignores the reality of an ever-expanding political divide in Congress and unsustainable levels of national debt that will only grow worse with the pandemic.³³ The 27 years of aircraft overuse and retirements that took place between the Reagan and Trump administrations contributed to an Air Force fleet that is now nearly half the size and twice the age of the fleet in 1990. It is hard to imagine how small or how old the fleet will become before the next surge in defense

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spending, moreover before the next war with a peer competitor. Whereas the idea that production lines would somehow come to the rescue in a peer-level crisis may seem plausible, those lines would not likely have enough time to produce enough weapons systems to meet the scenario/timing requirements within the 2018 NDS, even if Congress throws an endless stream of cash at them.³⁴

JADC2 will undoubtedly benefit the warfighter, but, based on the history of warfare, the concept will elevate warfighting to a new level, not fundamentally change the nature of war with a peer competitor. It’s true that the cycles in the evolution of technology have grown tighter during the digital age, but likewise has the ability of hostile nations to pilfer or otherwise compromise those advances. The combination makes any perceived technological leap or advantage less, not more, likely to be the pillar of a winning strategy of any future war with a peer competitor.

Winning such a conflict will come down to the same elements that allowed the United States and its allies to prevail in World War II: having the most technologically advanced aircraft available in number and exceptionally well-trained airmen to employ them. *The Air Force We Need* spells out the gaps in the capacity and capability the service needs to win such a war, and the Air Force needs to move aggressively to acquire those weapons systems while funding is still available. ★

33 The Air Force announced plans to retire 17 B-1s, 44 A-10s, and 30 tankers in 2021 (alone) and has conveyed plans to retire the entire fleet of A-10s and F-15Cs (516 total jets) by the end of the decade. Oriana Pawlyk, “The Air Force wants to send more than 100 aircraft to the ‘boneyard’ in order to buy future fighters,” *Military.com*, February 10, 2020, <https://www.airforcemag.com/air-force-budget-retires-28-kc-10s-kc-135s-despite-kc-46-delays-and-capability-issues/>; and Laura Seligman, “Legacy U.S. Air Force Fighters, Bombers Are on the Chopping Block,” *Foreign Policy*, February 3, 2020, <https://foreignpolicy.com/2020/02/03/pentagon-propose-cut-air-force-fighters-bombers-fleet/>.

34 Lt Gen Mark Kelly’s (Deputy Chief of Staff for Operations, Headquarters U.S. Air Force) actual quote was, “At the end of the day, if a peer fight kicks up, we’re going to have no time and all the money.” Abraham Manshie, “‘Every day is a shell game:’ Air Force budget prioritizes technology over warfighting, general says,” *Washington Examiner*, February 13, 2020, <https://www.washingtonexaminer.com/policy/defense-national-security/every-day-is-a-shell-game-air-force-budget-prioritizes-technology-over-warfighting-general-says>.

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