

Thinking Differently about Air Bases

Evolving with the Evolving Strategic Environment

COL KEVIN L. PARKER, USAF

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This 2016 statement from Miranda A. A. Ballentine, the former assistant secretary of the Air Force for Installations, Environment, and Energy, remains true today and is a call to action for the Air Force, DOD, and Congress. “The Air Force is currently maintaining installations that are too big, too old, and too expensive for current and future needs.”¹ The USAF has performed the same core missions from its bases since 1947. How the service performs those missions has changed drastically since then. According to the *Air Force Future Operating Concept*, this evolution will continue.² Despite these changes, the Air Force’s bases will remain essential because “the foundation of Air Force readiness and lethality is an integrated network of resilient installations.”³ However, changing factors in the strategic environment demand that the service changes the way it operates, maintains, modifies, and protects its permanent air bases.

Many concepts in this article apply to Base Realignment and Closure (BRAC), but BRAC is not the only answer. BRAC is indeed sorely needed and necessary to reduce costs; however, neither BRAC, nor reforms on the margins, will adequately prepare Air Force bases for the future. Without deliberate adaptation,

today's bases will not meet the demands of the future strategic environment. Achieving different outcomes will take new thought and actions. Thinking differently about air bases requires starting with strategy, breaking down installations to the fundamental functions they perform, and rebuilding the network of bases with strategy in mind.

What's Changed?

With continued fiscal pressure, the service will still be asked to do more than its resources allow.⁴ This gap is unlikely to close with constrained federal budgets and growing mandatory spending. Fiscal relief in the 2019 defense budget did not solve all challenges.⁵ The 2018 *National Defense Strategy (NDS)* called for providing lethal combat capabilities at less cost with better management, affordability, budget discipline, and financial stewardship.⁶ Lack of resources may sound like a timeless problem, but the cumulative effect has contemporary consequences. The 2019 US Air Force Infrastructure Investment Strategy states, "Two decades of taking risk in infrastructure created a fiscally unsustainable posture" and that current funding levels will create "readiness and lethality risks due to continued and increasingly rapid degradation of infrastructure."⁷

There are also operational changes. Global reach—the ability to quickly create effects around the world—has long been one of the Air Force's fundamental competencies. Global reach has meant the ability to launch intercontinental ballistic missiles or fly anywhere worldwide to drop bombs or supplies. Whether B-2 bombers on 40-hour missions, orbiting space capabilities, unmanned intelligence, surveillance, and reconnaissance platforms, or effects produced through cyberspace, much more of the Air Force now has global reach compared to 1947. Adversaries have similarly grown in global reach. Cyber, missile, and terrorism threats present risks for air bases with a new level of complexity. In an era of great-power competition as described in the *NDS* and hybrid or gray zone warfare, the line between peace and war is now thin and porous—and is likely to become more so.⁸ These changes in the strategic environment should influence the Air Force's approach to its installations.

What Functions Do Air Bases Perform?

The evolution of air bases may not have kept pace with the changes in airpower and the strategic environment. Not every base serves the same purpose. The types of assigned missions span a wide range, but most bases look and feel similar despite specialized missions. Exploring possibilities for improvement requires a detailed look at the types of air bases that exist and the functions they perform. There

are four major categories of Air Force installations: force employment, force generation, force development, and institutional headquarters.⁹ Some bases serve a combination of these categories, but the functions are consistent across the service.

Force employment is the first major category of air bases. Airmen project air-power against adversaries from these bases, which include locations within and outside the US. There are three types of force employment bases: direct-power projection, bases stateside with ongoing combatant commander missions, and integrated reach-back bases.

Direct-power projection bases are typically overseas, have assigned forces under a combatant command, and are within operational reach of probable military objectives. One example is RAF Lakenheath in the United Kingdom with personnel and F-15s assigned to US Air Forces in Europe under US European Command. Bases in this category face increasing ballistic missile threats, which create greater challenges to survivability of forces while on these installations. Countering this changing threat may drive new weapons and operational concepts. Until those long-lead-time changes occur, direct-power projection bases will remain consistent into the future.

The second type of force employment bases consists of installations in the US conducting combatant commander missions. Many of these missions have been performed from the states for decades. For example, homeland defense missions in airspace control and fighter intercepts now under US Northern Command date back to when America's air forces were envisioned as key to coastal defense in 1933.¹⁰ Nuclear deterrence forces with intercontinental ballistic missiles under US Strategic Command also fit this category. These missions are being conducted around-the-clock, every day from installations within the US.

The third type of force employment base is the integrated reach-back base. This continually evolving category is home to combatant commander missions that have not traditionally been performed from within the US. These missions were previously performed within a forward theater of operations, but advances in technology and telecommunications have enabled over-the-horizon operations. One example is intelligence processing, exploitation, and dissemination (PED) conducted at distributed common ground stations with globally networked intelligence capabilities. This mission was formerly performed in a forward theater out of necessity to meet dynamic requirements in a relevant timeframe. Once telecommunications advanced significantly, much of PED was moved out of theater to be performed as reach-back. Well-removed from harm's way, analysts are now connected with information collection platforms to provide timely intelligence to units engaged in operations.

Other advances have allowed over-the-horizon operations to evolve from mere reach-back to now actively participating in battlefield operations with limited forward physical human presence. MQ-9 Reaper operations exemplify this type of mission. Launch and recovery teams, with small footprints, make up the forward presence. Separate mission control elements perform flying and intelligence collection from the US with no proximity ties to a runway. In attack squadrons, these remote elements can even strike targets. Cyber operations go a step further because they can be performed entirely from the rear with no forward presence.

War-fighting headquarters (not an organize, train, and equip Title 10 headquarters) also fit in the integrated reach-back category. Air Force component headquarters, along with the command and control (C2) functions for conducting combatant-commander-directed operations, are part of the apparatus to employ airpower. One example is an air operations center (AOC), a C2 organization for wielding airpower for joint force commander objectives. AOCs provide strategy, targeting, weaponeering, and direction to units conducting air operations, but they do not need to be directly in harm's way. For example, the AOC for Operation Odyssey Dawn over Libya in 2011 was a continent away in Ramstein AB, Germany.¹¹

Force generation is the second major category of air bases; these bases are home stations for units not actively engaged in mission operations but could be tasked to do so. These bases are where units prepare for the moment when they are called into action. When returned from forward operations, units use these bases for rest and refit. The home station is primarily used for operational proficiency training to be ready for the next fight. This is where aircrews fly training missions to maintain currency in their wartime skills. Deployment readiness is a key component of force generation bases. Not only do these bases support readiness but assigned units must also be prepared to mobilize and deploy to a theater of operations so they require the infrastructure capacity to support the deployment of assigned forces. Force generation deployment timelines vary by assigned mission type and component; that is, active duty forces are usually postured to “get out the door” quicker than Reserve component units.

Force development is the third major category of air bases and includes training and education, depot maintenance, research and development (R&D), and acquisition functions. These bases develop the force—Airmen and their weapon systems.

The Air Force trains and educates Airmen at all levels. Training missions include basic training for initial officer and enlisted entry into service. Technical training covers applied skills through courses within career specialties through basic and advanced level courses, including undergraduate flight training. Educa-

tion units provide Airmen with knowledge and thinking skills through professional military education and other offerings.

Depot maintenance, another force development activity, provides major overhauls and modifications to weapon systems—mostly aircraft. Depots perform maintenance support beyond the scope of line or field-level maintenance units. Without depot maintenance, B-52s and C-130s would not still be flying after more than 50 years. Depots keep planes flying by extending their service life and making them more capable through weapon system modifications. These upgrades make platforms more capable through efficiencies, added capabilities, and modernization. Depots provide force development by sustaining a viable force and handing improved assets back to the operational force.

The last type of force development base—R&D—explores science and technology for potential military applications. These missions take promising technologies and conduct specific research to further develop them for fielding. Acquisition functions then procure and field operational systems. Management of research, development, testing, and procurement is performed at R&D bases, which primarily develop the “machine” portion of the force.

Institutional headquarters, the fourth and final major category of bases, are necessary to operate and sustain a viable force. Headquarters performing the C2 of assigned forces under combatant commanders were covered above in the force employment category. But the headquarters mission to organize, train, and equip forces for use by combatant commanders, as specified by Title 10, is largely administrative in nature. Institutional headquarters bases host administrative functions required for running a large organization, such as personnel management, payroll, household goods movement management, centralized management of installations support, and so forth. Examples of Air Force and joint organizations that perform these functions are the Air Force Personnel Center, Defense Finance and Accounting Services, Joint Personal Property Shipping Office, and Air Force Installation and Mission Support Center. These examples and others administer the business of the force. When considered together, functions of the four major base types build on each other to produce airpower: administer the force at institutional headquarters bases, develop the force at force development bases, generate the force at force generation bases, and employ the force at force employment bases.

Where Should Air Bases Be?

For some functions, location matters from a geostrategic perspective. For force employment, weapon systems have to be within operational range of the likely locations on which they will be expected to create effects. This means an air-to-ground fighter unit must be within reasonable flight times of targets it is expected

to strike. Similarly, tanker units must be within reasonable flight times of the refueling tracks where they will be needed. These principles are no different than when Giulio Douhet considered force structure and locations of a budding Italian Air Force in 1921.¹²

For force generation, key attributes are those that contribute to mobilization and training; location can matter here too. For Army units, force generation requires deploying thousands of tons of materiel to a fight, so access to railroad and ship transportation nodes are important. Although proximity to transportation nodes is also key for air forces, they are slightly less critical due to the ability to airlift Air Force assets, aircraft that can self-deploy, and the need to get to the fight quickly.

Some force development bases benefit from favorable location characteristics. For example, to maintain necessary levels of readiness in flying units, regions with predominantly fair weather and access to ranges are beneficial. Weather is also important to some, although fewer, activities of force development bases. For basic training, weather should be sufficient to accommodate outdoor activities like marching. Undergraduate flying training needs predictably good flying weather with infrequent interruption from extreme winds, fog, or storms. In contrast, professional military education and most technical schools could take place at any location. Similarly, institutional headquarters have no location requirements driven by weather, terrain, or geostrategic interests.

What Is on Air Bases?

With a grasp of where bases should be, analyzing air bases further requires evaluating what is inside the fence-line. Airmen, facilities, and equipment on any air base are partially tied to the assigned missions from the categories above (force employment, force generation, force development, institutional headquarters). The concentric rings shown below (see fig. 1) describe how tightly these activities connect to assigned missions. Among all resources on a base, some are directly tied to generating the assigned mission (that is, fighter pilots, maintainers, and maintenance hangars at fighter force generation bases; or missileers, maintainers, and silos at ICBM force employment bases). This set of resources performs **mission generation** and is the tightest ring of activities around the mission. This ring is necessary to conduct the mission but alone is not sufficient to sustain mission operations or a viable force.

Mission support, the next ring out, is made up of activities that enable mission generation; that is, supply functions, fire stations, telecommunications network operations, and so forth. Many of these activities are necessary to generate the mission, especially over an extended period of time. For example, launching all

scheduled sorties is possible on one day, but repeating the same schedule the next day often requires resupply.

Community support, the farthest ring, is full of activities like commissaries, child development centers, libraries, and so forth. Few of these have a direct link to mission generation but most do impact keeping Airmen happy, healthy, productive, and importantly—re-enlisting. Community support is not necessary to fight, but it is key to having a fighting force. These concentric rings not only describe what activities are on air bases now but can inform what should be on air bases in the future.



Figure. Concentric rings show how tightly community support, mission generation, and mission support activities connect to assigned missions.

Not all bases are created equal. Air National Guard and Air Force Reserve bases have few community support facilities because most citizen Airmen who make up the Reserve component do not work on base full-time. In their citizen role, they have jobs, homes, and communities outside of the Air Force. They also typically spend more time in their communities before relocating, which allows time to establish robust ties with support networks. These factors allow Reservists and Guardsmen, in their Airmen's role, to rely significantly less on Air Force-provided community support.

Most active duty bases function, look, and feel much the same with many similar activities and facilities. Almost all include a commissary, base exchange (retail sales store), dining facility, dorm complex, family housing, fitness center, and chapel. This generally standardized look and feel may be comforting to Airmen who have spent most of their adult lives on Air Force bases, but it may not match the future strategic environment. Like the Reserve component, each active

duty base should have its mission support and community support activities tailored to fit its purpose and circumstances.

One potential strategic mismatch is military family housing on air bases. As worldwide missile threats proliferate in range, lethality, and quantity, leaders should consider the appropriateness of housing families on bases.¹³ Continuing to house families on overseas bases may be seen as irresponsible, especially where missile flight times from adversaries are shorter, providing less warning. With further proliferation, the differences between missile threats on bases within the US and those outside will diminish. The future will also require deliberating the appropriateness of housing families on base within the homeland. Housing is only one of many examples of what could or should shift off base.

What's outside the Fence?

Few air bases are self-contained islands; so, equally important to what is inside the fence-line, is what lies outside. Some Air Force bases grew up from civil airports after expansion of the Army Air Corps in World War II.¹⁴ Much like early coal mining towns, these outposts grew into cities in their own right. Since there were not enough facilities and services to eat, live, exercise, educate dependent children, or worship, the Air Force (or its organizational predecessor) built dining facilities, houses, gyms, schools, and chapels. These basic services spread to commissaries, exchanges, libraries, clubs, intramural sports fields, swimming pools, and various morale, welfare, and recreation facilities and services. Life on an Air Force base became familiar and relatively standard from place to place. Many mission support and community support services were necessary, and all were added value to Airmen. However, those were different times in a different environment. Despite growth outside the fence, bases have remained mostly unchanged and now have duplicative community support activities on and off base.

Military family housing is one area that has incrementally adapted to off-base growth. The Air Force mechanism for defining housing requirements for on-base housing is a Housing Requirements Market Analysis. Its methodology includes defining a floor requirement for on-base housing consisting of two primary components. First is the group of "key and essential personnel" who are required to live on base for command and control or response needs. Second is 10 percent of military personnel assigned to the base. This second component's purpose is to "maintain a viable military community." After these two floor requirements are met, the methodology looks to maximize the use of off-base housing. If community housing can accommodate all other military families, then no additional housing will be built or maintained on base. Only the deficit that community housing cannot absorb drives a requirement for additional on-base housing. DOD

and Air Force policy stress reliance on the private sector as the primary source for housing for accompanied personnel.¹⁵ With this methodology, housing is one of the bright spots where the services and facilities on base have adapted to off-base community growth.

Although housing is a bright spot for some modernizing adjustments, it still has room for improvement. The methodology still includes a 10-percent floor to maintain a military community on base. As a requirement driver, it is unclear why the DOD allows and the Air Force wants non-key- and- essential families to live on base or why 10 percent is sufficient to form a “military community.” Where adequate community housing has sufficient capacity, there is no evident need for the Air Force to house families on base. One example is Aviano AB, Italy, which has no on-base housing at all, but the 31st Fighter Wing assigned there accomplishes its mission every day without on-base housing for key and essential personnel or a “military community” on base. The floor requirement methodology is an anachronistic policy by the Air Force and DOD; its continuance drives a significant bill for maintaining government housing (even if through privatization) and the staff to run it. Based on the annual price tag, the value of the military community feeling for such a small population may not be worth the cost and warrants a policy refresh.

Other base services also need a take another look at evaluating the availability of identical services in local communities. Here are a few examples. Maxwell AFB is in Montgomery, Alabama’s capital city of 200,000 people. Maxwell has a base exchange, while there are three major shopping areas and three major discount retailers within 12 miles. There is also a commissary on base even though there are eight major grocery store chain locations within 10 miles. There is even another separate commissary on Maxwell’s Gunter Annex just 11 miles away. Similarly, Langley Air Force Base in Hampton, Virginia has a base library despite the presence of seven different public library branches (Hampton, Newport News, and York County) within 10 miles.¹⁶ On-base services are available to all military personnel, not just those on base. But, off-base residents have to drive farther from their homes to shop or check out books on base. The added convenience for the small populations that live on base hardly justifies these facility and operating expenses. Some might view these free or discounted services as military benefits, but compensation packages could be adjusted to address a change and still create overall savings.

On-base, government-provided services should be strictly limited to those which are necessary but unavailable (or inadequate) in the local community. The term *necessary* could be open to interpretation, so it requires clear limits. Food, housing, child care, and basic retail items within reasonable convenience should

round out the list of *necessary* services. Any additions to these necessary services might be beneficial, but the decision to add any should not be at the installation level. Base commanders will naturally want to add recreational opportunities and more convenient services to increase the quality of life of their Airmen and families. Although these are always well-intentioned efforts, wing commanders can make local decisions with enterprise-wide impacts (costs and benefits) on the entire Air Force. They simply lack the information to adequately compare their own location to others at a point in time. Additional services should only be considered by Air Force Headquarters in instances where data exists reflecting a lack of specific services and how that gap leads to documented lower mission productivity or retention below force sustainment rates. Base commanders are indeed the most informed on mission impacts, and their input should be highly valued; however, these inputs should be provided to headquarters leaders, who can make decisions with full consideration of more comprehensive factors. Except for rare circumstances, bases should rely on their local communities. Installations should self-perform only where necessary services are unavailable or too limited in capacity to service the military population.

The Air Force should aggressively pursue the provision of more base services from outside itself and the DOD. There is a small office under the assistant secretary of the Air Force for Installations, Environment, and Energy chartered to seek out and develop community partnerships in the best interest of the service. After only a few years, this office has produced several agreements with positive return on investment.¹⁷ One such mutually beneficial partnership agreement at Robins AFB, Georgia allows military medical staff to conduct required certification training at local community hospitals rather than traveling to other government facilities, saving the Air Force \$434,000 and the community \$2 million.¹⁸ These efforts should continue in a more deliberate manner to divest more services not requiring the government to self-perform. Even with increased efforts, these initiatives, wholly reliant on willing participant communities and enterprising public officials, will only reap dividends at a glacial pace.

A more radical approach, although more difficult, would be to leverage a competitive environment through a new round of BRAC. In previous rounds, BRAC commissions developed a list of recommended bases to close and re-align. Throughout the process, potentially affected communities gathered data, compiled their own analysis, rallied support, and laid out a compassionate defense for how their particular communities were great places for bases. The 2005 BRAC Commission cited receiving over 200,000 pieces of correspondence.¹⁹ Similarly, the 1991 BRAC Commission claimed more than 100 phone calls per day.²⁰ The DOD should not resist this natural, self-preserving enthusiasm from their partnered

defense communities. Instead, DOD should work with Congress to adjust the BRAC process to capitalize on this energy and achieve better BRAC outcomes.

Commercial industry models may provide helpful insights to structure a BRAC process. When a major auto manufacturer seeks a location to build a new assembly plant, it does not hide its list of possible sites until reaching a decision. The company knows many communities would love to host a new business to create jobs and increase tax revenue. Capitalizing on this keen interest, the automaker engages in negotiations with a shortlist of communities. In negotiations, the automaker considers many factors including skilled labor availability, access to transportation hubs, and cost of living. One of these factors is the package of incentives the local communities or governments may offer. The automaker creates a competitive market where communities offer incentives such as tax breaks, donations or inexpensive leasing of land, upgrading the transportation network, and the like.

If ever authorized another BRAC, DOD should put a list of defense communities on notice and capitalize on their energy early to create a competitive market. Communities should not only be able to provide input of fact, but they should also be able to make offers to influence the analysis and outcomes. Tax incentives from local governments may not be appropriate for Air Force bases, but there are endless possibilities they can offer to “sweeten the deal” to keep a base in their town or region. Examples could include subsidies to local homeowners and landlords, incentives for businesses who provide services Airmen need such as fitness centers and child care centers, and actions to improve school ratings to help improve retention in the service.²¹ These incentives could result in lower housing costs and divestiture of government-run services, lowering the overall Air Force cost to run its installations. Previous BRAC rounds have realized savings just from closures and realignments, but future rounds could also leverage competitive markets to achieve even more recurring savings while also moving faster to a more affordable installation model.

Developing a Strategy

With an understanding of what functions bases perform, where they should be located geostrategically, and how they interact with local communities, a new strategy could make Air Force bases more effective and efficient. This strategy should come from evaluating different combinations and permutations of missions and locations. The first step would be to consider starting from scratch where all the chess pieces (missions) are removed from the board (the map), then start purposefully laying the pieces back on the board. The first pieces to place would be the force employment missions, those directly engaged in combatant com-

mander operations, where geostrategic locations matter. An example is choosing a location for an alert fighter intercept mission. To be effective, this mission must be along an avenue of likely approach from an adversary. Since starting completely from scratch is cost prohibitive, this mission should likely go to an existing fighter base with infrastructure already in place. When utilizing existing bases, the primary siting factor must be meeting mission requirements. All force employment missions with geostrategic interests should be similarly placed.

Before moving on to place the next set of missions, force employment bases should be evaluated for any adjustments that can create efficiencies. Specifically, each warrants an evaluation of the utilization rate of expensive infrastructure and a check for efficient combinations. For example, the location of a space launch mission greatly influences its operations due to the physics of orbits, planetary paths, gravity, and rotational speed closer to the equator. So space launch would be one of the first missions to place. One facet of expensive infrastructure for space launch is reliable electrical power. Since ideal launch windows only occur with limited periodic recurrence, having highly reliable power is essential to ensure an outage does not delay a launch and force waiting until the next launch window.²² Providing electricity with the needed reliability is expensive. Other missions have similar needs for uninterrupted electrical power. One example is an MQ-9 mission control element, which must maintain constant communication with any remotely piloted aircraft (RPA) it is operating. Unlike space launch, RPA control missions can happen from anywhere in the world. A combination to produce better efficiency would be to co-locate an MQ-9 mission control element on a space launch base. This would allow for the two separate missions to benefit from the same expensive investment in highly reliable power. The alternative, which is the status quo, is to replicate the infrastructure and service in two different locations rather than maximize the utilization of expensive infrastructure.

One method of measuring infrastructure utilization rate is evaluating the daily sortie rate per runway. As an example, the B-2 mission has a small number of operational aircraft assigned to a single base. It likely has a low sortie rate for its runway, even including T-38 sorties B-2 pilots fly for proficiency. Air Force Reserve flying units with as few as eight mobility aircraft assigned have similarly low runway utilization rates. Runways, taxiways, airfield lighting, fire response coverage, and tower operations are sunk costs regardless of their utilization rates. So, where mission requirements do not drive specific locations, or where slight adjustments to existing locations would still meet geostrategic mission requirements, missions should be consolidated. One example is McEntire Joint National Guard Base, South Carolina, where the 169th Fighter Wing flies F-16s just 21 miles from Shaw AFB's 20th Fighter Wing that also flies F-16s. Consolidating

combinations would garner efficiencies and maximize the utilization of expensive infrastructure.

After meeting geostrategic interests and maximizing utilization of expensive infrastructure, where bases and mission should go is a matter of efficiency. Force generation bases, focused largely on readiness training, should be located within regions of predictably good flying weather and minimized flight time to available ranges. Less flight time reduces fuel costs and flying hours, which drives a reduction in maintenance requirements and extends aircraft service life. Better aircraft availability and minimized downtime can also increase student throughput, so similar efficiencies are possible with the few force development missions that have weather requirements; that is, undergraduate pilot training. Finding these efficiencies, while still meeting operational needs, is the next step of optimizing the basing and force laydown.

Many force development missions, like technical schools, could be located at any base. The same is true for institutional headquarters. Three main interests should influence basing decisions for missions without specific location requirements. The first is the available capacity in existing facilities and infrastructure. Capacity assessments determine how much additional mission of different types a base could take. For scenarios where an additive mission doesn't quite fit, the cost of constructing the additional needed capacity must be considered.

The second interest is the cost associated with permanent changes of station (PCS) for members transitioning from one base to another. The Air Force should seek opportunities in basing that would allow for fewer PCSs, similar to institutional headquarters are typically on a base that it oversees; that is, Air Combat Command Headquarters on Joint Base Langley-Eustis, Virginia creates cross-flow opportunities with the 1st Fighter Wing there. Analyzing existing assignment data could reveal what bases most of the headquarters staff come from (inbound) and goes to (outbound). For example, officers can transition from a tour in the 2nd Bomb Wing to a headquarters tour at Air Force Global Strike Command—both at Barksdale AFB, Louisiana—with a no-cost permanent change of assignment (PCA) rather than a PCS. A PCA avoids the costs for travel, dependent travel, household goods shipment, and dislocation allowance. Many locations like this exist today, but an evaluation is warranted to determine which bases feed the most personnel directly to institutional headquarters staffs and if efficiency opportunities exist.

A primary candidate for evaluation is the set of force development missions at Maxwell AFB. Maxwell is home to Air Force officer professional military education. Several hundred field-grade officers PCS to Maxwell each year to be students at Air Command and Staff College and Air War College. Each school is

one-year long, and the majority of students PCS upon graduation. Opportunities for PCAs are extremely limited, because there are few other missions at Maxwell. Some existing programs leverage PCAs with deliberate assignments to instructor duty with a planned follow-on tour as a student, but these are few in number. Classrooms, auditoriums, and library space are not expensive facilities compared to airfield infrastructure and highly reliable power, so they could be relocated to pair with missions that would feed more PCAs for students. Simple analysis could determine where the percentages of students come from before or go to after their year at school. Alternatively, bringing one of the institutional headquarters to Maxwell would gain similar efficiencies.

The third major consideration is the operating cost of a mission at a particular location. In weapon systems, the lifetime operating and sustainment costs always exceed the initial acquisition cost. Installations are similar, but the long-term costs include basic allowance for housing, cost of living adjustments, locality pay, utilities rates, civilian recruiting incentives, area cost factors for construction, temporary duty travel costs to and from the base, facility and program operating costs, and so forth. Relying on off-base community support and leveraging competitive markets could reduce these costs.

Using the three main factors of capacity, PCS costs, and operating costs, the Air Force could evaluate permutations and combinations of non-location-specific missions at different bases. The analysis should include Reserve component opportunities as well as joint and sister service tenants who occupy space on Air Force bases. This type of analysis is no small task but could identify savings by moving missions through a BRAC round. Even without BRAC, smaller movements to create efficiencies are possible under authorities already residing with the Secretary of the Air Force. Small moves with positive returns on investments would provide useful case studies to further BRAC advocacy. The four BRAC rounds are still providing \$8 billion in annual recurring savings. The 2005 round added another \$4 billion in annual savings.²³ European Infrastructure Consolidation, at a cost of \$1.4 billion, will save \$500 million annually.²⁴ The closure of RAF Mildenhall, United Kingdom alone will save \$125 million each year, so a single closure can create real savings.²⁵

Conclusion

Current and future challenges in the national security environment demand a thoughtful approach to Air Force installations. Not everything is changing—air bases will remain the platforms by which Air Force units fly, fight, and win in air, space, and cyberspace. But increasing threats against air bases, expanding global reach and interconnectedness, and demanding fiscal constraints call for change.

Today's air bases—what they do, where they are, what is on them, and what services they self-perform—are not ideal for the future. The current state is the result of a legacy force laydown and decades of suboptimized, evolutionary, and local decisions. Preparing the Air Force for the future will require thinking differently about air bases.

Applying new thinking requires analysis by a combination of Air Force planners and installation support professionals. Their starting point should be what functions bases perform—force employment, force generation, force development, and institutional headquarters. Some of these functions have geostrategic interests that should influence their locations. For functions without geostrategic interests, there are opportunities for efficiencies through combining multiple functions onto fewer bases. Efficiencies can come from maximizing the utilization rate of expensive infrastructure, reducing PCS moves, and migrating to bases with lower operating costs. The Air Force can drive down operating costs by divesting activities, especially in community support, that local communities can adequately provide in sufficient capacity. The Air Force and DOD can also creatively incentivize local communities to lower operating costs. Since defense communities have great motivation to keep their bases, it is possible to create a competitive market to DOD's advantage.

None of these actions will create an ideal force laydown or affordable installations overnight. However, without a strategy to work toward these outcomes over time, Air Force installations will continue to drift further out of alignment with the demands of the future strategic environment. With the actions outlined here, nested in a deliberate strategy, the Air Force can and should incrementally adapt its installations to meet modern needs. ★

Notes

1. Miranda A. A. Ballentine, "Witness Statement of the Honorable Ms. Miranda A. A. Ballentine, Assistant Secretary of the Air Force for Installations, Environment, and Energy," House Appropriations Subcommittee on Military Construction—Veterans Affairs, Installations, Environment, and Base Realignment and Closure, 3 March 2016, 2, <https://docs.house.gov/meetings/AP/AP18/20160303/104549/HHRG-114-AP18-Wstate-BallentineM-20160303.pdf/>.

2. Department of the Air Force, *Air Force Future Operating Concept: A View of the Air Force in 2035* (Washington, DC, September 2015), 2, <https://www.af.mil/Portals/1/images/airpower/AF-FOC.pdf/>.

3. Gen Tod D. Wolters, commander, US Air Forces in Europe, et al., memorandum for record, "US Air Force Infrastructure Investment Strategy," 29 January 2019, <https://www.af.mil/Portals/1/documents/March%202019/U.S.%20Air%20Force%20Infrastructure%20Investment%20Strategy.pdf?ver=2019-03-26-082941-197×tamp=1553603418934/>.

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Col Kevin L. Parker, USAF

Colonel Parker (BS, Texas A&M; MA, Webster University; MMOAS, Air Command and Staff College; MPhil, School of Advanced Air and Space Studies [SAASS]; MSS, US Army War College; PhD, SAASS) is the commander of the 86th Civil Engineer Group, Ramstein AB, Germany.

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