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Research Report

# Assessment of Beddown Alternatives for the F-35

Ronald G. McGarvey, James H. Bigelow, Gary James Briggs, Peter Buryk, Raymond E. Conley, John G. Drew, Perry Shameem Firoz, Julie Kim, Lance Menthe, S. Craig Moore, William W. Taylor, William A. Williams

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# Summary

As currently planned, the F-35 Joint Strike Fighter is the largest aircraft acquisition program in Department of Defense history. To ensure that the affordability of the F-35 program is not threatened by continuing operating and support (O&S) cost growth, the U.S. Air Force (USAF) is examining alternative strategies to reduce those costs.

One approach to reducing O&S costs is to increase the number of Primary Aerospace Vehicle Authorized (PAA) per squadron, across a constant total number of USAF PAA, with a resulting reduction in the number of F-35 home-station operating locations. In 2012, the commander of Air Combat Command (ACC/CC) approved a beddown plan to determine how to allocate the 960 combat-coded PAA across fighter squadrons and operating locations. The plan calls for the aircraft to be allocated into squadrons of 24 PAA in the Active Component (AC) and Air Force Reserve Command (AFRC), and 18 PAA per squadron in the Air National Guard (ANG). A total of 44 squadrons would be distributed among 31 operating locations.

At the request of the Vice Chief of Staff of the Air Force, RAND Project Air Force (PAF) assessed whether O&S savings could be achieved by (1) reconfiguring the 960 combat-coded PAA into larger squadrons (i.e., increasing the PAA per squadron),[1] (2) adjusting the mix of PAA across the AC and the Reserve Component (RC) of the AFRC and ANG, and (3) adjusting the percentage of the AC PAA assigned to home-station locations in the continental United States (CONUS). Specifically, this research addressed how a change along these three dimensions would affect the Air Force in the following areas:

- Ability to support both surge and steady-state contingency operations
- Ability to absorb the necessary number of F-35 pilots
- Requirements for maintenance manpower and support equipment (SE)
- Requirements for new infrastructure across the set of existing F-16 and A-10 bases[2]
- Ability to develop future senior leaders out of the pool of fighter pilots.

[1] For USAF fighter aircraft, no current squadron has more than 24 PAA. However, fighter squadron sizes have varied over time based on the facilities and aircraft numbers available, and they tend to peak during wartime and decrease during postwar drawdown periods. The analysis presented in this report will examine the potential for squadron sizes larger than 24 PAA to generate increased cost-effectiveness.

[2] We limit the infrastructure analysis to the bases that currently support F-16 and A-10 squadrons, as these are the aircraft the F-35 is designed to replace.

A set of 28 alternative beddowns was examined in this analysis, as presented in Table S.1. These beddowns varied the squadron size between 24 and 36 PAA (for AC and AFRC) and between 18 and 24 PAA (for ANG).[3] These beddowns also varied the percentage of combat-coded PAA in the AC between 45 and 75 percent, and the percentage of total combat-coded AC PAA in CONUS between 50 and 67 percent. The ACC/CC-approved beddown corresponds to beddown alternative 2A.

[3] The analyses presented in this report assume that each AFRC and ANG squadron is located at a single base. This assumption is consistent with the current beddown of combat-coded AFRC and ANG fighter/attack squadrons. It is possible that multiple RC squadrons could be assigned to a single wing at a single base, but this analysis did not consider such alternatives. This analysis does, however, examine the efficiencies associated with multisquadron wings for AC squadrons.

**Table S.1. F-35 Beddown Alternatives**

| Percentage of Total PAA in AC | Squadron Size (PAA) | Percentage of Total AC PAA in CONUS | Beddown Alternative | AC Squadrons | | RC Squadrons | | Total Squadrons |
|---|---|---|---|---|---|---|---|---|
| | | | | CONUS | OCONUS | AFRC | ANG | |
| 45 | 18 (ANG), 24 (AC/AFRC) | 50 | 1A | 9 | 9 | 7 | 20 | 45 |
| | | 67 | 1B | 12 | 6 | 7 | 20 | 45 |
| | 24 (ANG), 24 (AC/AFRC) | 50 | 1C | 9 | 9 | 6 | 16 | 40 |
| | | 67 | 1D | 12 | 6 | 6 | 16 | 40 |
| | 18 (ANG), 30 (AC/AFRC) | 50 | 1E | 8 | 7 | 5 | 20 | 40 |
| | | 67 | 1F | 10 | 5 | 5 | 20 | 40 |
| | 24 (ANG), 30 (AC/AFRC) | 50 | 1G | 8 | 7 | 5 | 15 | 35 |
| | | 67 | 1H | 10 | 5 | 5 | 15 | 35 |
| | 24 (ANG), 36 (AC/AFRC) | 50 | 1I | 6 | 6 | 4 | 16 | 32 |
| | | 67 | 1J | 8 | 4 | 4 | 16 | 32 |
| 60 | 18 (ANG), 24 (AC/AFRC) | 50 | 2A | 12 | 12 | 4 | 16 | 44 |
| | | 67 | 2B | 16 | 8 | 4 | 16 | 44 |
| | 24 (ANG), 24 (AC/AFRC) | 50 | 2C | 12 | 12 | 4 | 12 | 40 |
| | | 67 | 2D | 16 | 8 | 4 | 12 | 40 |
| | 18 (ANG), 30 (AC/AFRC) | 50 | 2E | 10 | 9 | 4 | 15 | 38 |
| | | 67 | 2F | 13 | 6 | 4 | 15 | 38 |
| | 24 (ANG), 30 (AC/AFRC) | 50 | 2G | 10 | 9 | 5 | 10 | 34 |
| | | 67 | 2H | 13 | 6 | 5 | 10 | 34 |
| | 24 (ANG), 36 (AC/AFRC) | 50 | 2I | 8 | 8 | 4 | 10 | 30 |
| | | 67 | 2J | 11 | 5 | 4 | 10 | 30 |
| 75 | 18 (ANG), 24 (AC/AFRC) | 50 | 3A | 15 | 15 | 4 | 8 | 42 |
| | | 67 | 3B | 20 | 10 | 4 | 8 | 42 |
| | 24 (ANG), 24 (AC/AFRC) | 50 | 3C | 15 | 15 | 3 | 7 | 40 |
| | | 67 | 3D | 20 | 10 | 3 | 7 | 40 |
| | 18 (ANG), 30 (AC/AFRC) | 50 | 3E | 12 | 12 | 2 | 10 | 36 |
| | | 67 | 3F | 16 | 8 | 2 | 10 | 36 |
| | 24 (ANG), 30 (AC/AFRC) | | | | | | | |
| | 24 (ANG), 36 (AC/AFRC) | 50 | 3I | 10 | 10 | 2 | 7 | 29 |
| | | 67 | 3J | 13 | 7 | 2 | 7 | 29 |

## Key Findings

### *Potential for Cost Reductions*

Our primary finding is that increasing the F-35 squadron size from the levels utilized in the ACC/CC-approved beddown (24 PAA per AC and AFRC squadron, 18 PAA per ANG squadron) can satisfy both expected surge and steady-steady deployment requirements, and can generate significant savings in the following areas:

- Annual pilot absorption flying costs (more than $400 million)
- Annual maintenance manpower costs (more than $180 million)
- One-time support equipment requirements (more than $200 million)
- Annualized facilities costs (more than 10 percent).

The lower bounds on these estimates can be achieved, and all deployment requirements satisfied, were the USAF to implement a posture that utilizes 30 PAA per AC and AFRC squadron and 24 PAA per ANG squadron (beddown alternatives 2G and 2H). The savings would increase were the USAF to select a posture with 36 PAA in AC and AFRC squadrons and 24 PAA in ANG squadrons (alternatives 2I and 2J), but this posture would assume increased risk; it has sufficient squadrons to satisfy surge wartime requirements, but it cannot satisfy steady-state requirements within the desired deploy-to-dwell ratios.

Further savings are possible in all categories except maintenance manpower, if the percentage of PAA in the AC were increased from the level assumed in the ACC/CC-approved beddown (60 percent). The percentage of AC PAA assigned to CONUS locations had little impact on these savings.

### *Deployment Requirements*

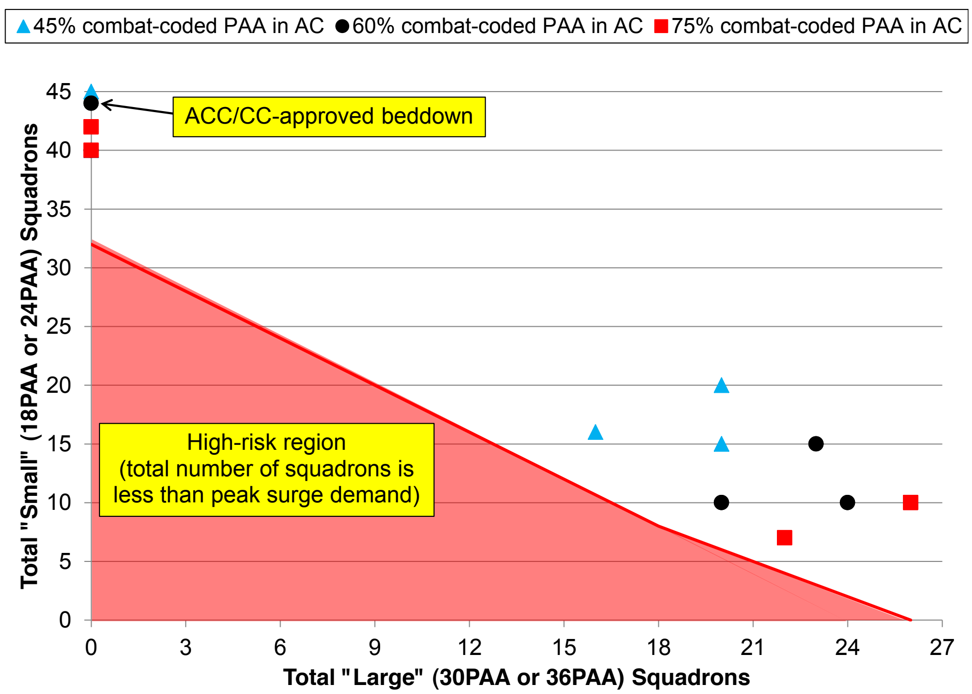
**We found that all 28 of the beddown alternatives satisfy surge requirements.** The surge and steady-state requirements used in this analysis were based upon analysis performed by the Directorate of Studies & Analysis, Assessments and Lessons Learned, Headquarters, U.S. Air Force (AF/A9). These requirements were based on an examination of two of the Integrated Security Constructs (ISCs) developed by the Department of Defense.

A key assumption in this analysis was that each squadron contained one independent or "lead" Unit Type Code (UTC).[4] Thus, each squadron could deploy to and operate out

[4] A UTC is a unit of capability specified by the required manpower and equipment.

of, at most, one location, regardless of squadron size. Figure S.1 demonstrates how the numbers of squadrons available in the 28 alternative F-35 beddowns compare to these squadron requirements. Each marker on the figure corresponds to one paired set of beddown alternatives.[5] The two members of each paired set differ only by the percentage of total AC PAA in CONUS—each member has an equal number of "large" and "small" squadrons. For example, beddowns 1G and 1H each have 20 "large" (in this case, 30 PAA) squadrons and 15 "small" (in this case, 24 PAA) squadrons. The red region on this figure corresponds to the range over which the number of squadrons is insufficient to satisfy the peak surge demand. Observe that all beddown alternatives lie outside of the red region; thus, all have sufficient squadrons to satisfy surge squadron requirements.

**Figure S.1. Ability of Alternative F-35 Beddowns to Satisfy Surge Deployment Requirements**




[5] The marker at 40 "small" squadrons and zero "large" squadrons actually corresponds to six beddowns: 1C, 1D, 2C, 2D, 3C, and 3D.

**Further, most alternatives satisfy rotational requirements within specified deploy-to-dwell ratios.** The primary distinction between surge and steady-state rotational requirements is that deploy-to-dwell considerations limit the number of combat-coded squadrons that are available for rotational deployments at any point in time. This analysis assumes that rotational requirements must be satisfied without exceeding the maximum deploy-to-dwell ratios presented in Table S.2. Note that these deploy-to-dwell ratios do not imply any specific deployment duration for any unit; rather, they identify the maximum percentage of time that a unit could be deployed, over an indefinite horizon.

**Table S.2. Maximum Allowable Deploy-to-Dwell Ratio for Rotational Requirements**

| | Non-surge | Post-surge |
|---|---|---|
| AC Squadrons | 1:3 | 1:2 |
| RC Squadrons | 1:11 | 1:5 |

NOTE: The deploy-to-dwell ratios presented in the post-surge column are consistent with current USAF guidance for periods other than surge. This level of deployment is viewed as the maximum supportable level; however, there are concerns that such a high level of deployment poses challenges to the longer-term sustainability of the force. Thus, based upon consultations with ACC, we modified the deploy-to-dwell ratio in non-surge to allow for less deployment stress on the force during non-surge periods. Note that this increases the requirement for the number of squadrons needed during non-surge periods.

This analysis assumes that all RC units and all AC units in CONUS are organized as associate units.[6] It is unclear how this organization into associate units would affect the F-35 force presentation model, and thus the maximum allowable deploy-to-dwell ratio in an RC or AC unit. This analysis assumed that the entire unit is available at the host unit's deploy-to-dwell rate. Alternatively, one could assume that the AC portion of an Active Associate unit was available for deployment at the more-stressing AC rate. However, this poses difficulties from a force presentation concept. If the AC portion is deployed with the rest of its Active Associate unit, force presentation is maintained as an integral squadron. If the AC portion is available at a different rate than the RC portion, then the AC pilots and maintainers would likely need to be sized to support an entire UTC package(s), with separate RC UTCs providing the remainder of a squadron's designed operational capability statement. In this case, the specific UTCs to be supported by the AC portion would need to be identified. Would the AC support an independent ("lead") or dependent ("follow-on") UTC? Would the force presentation of such AC units assume

[6] Thus, every beddown alternative includes both Active Associate units, in which an RC unit has principal responsibility for a weapon system and shares the equipment with an AC unit, and Classic Associate units, in which an AC unit retains principal responsibility for a weapon system and shares the equipment with an RC unit.

that AC UTCs deploy with other AC units, leaving the RC remainder to conduct its home-station mission? Or would AC UTCs deploy with *rainbowed* RC units?[7]

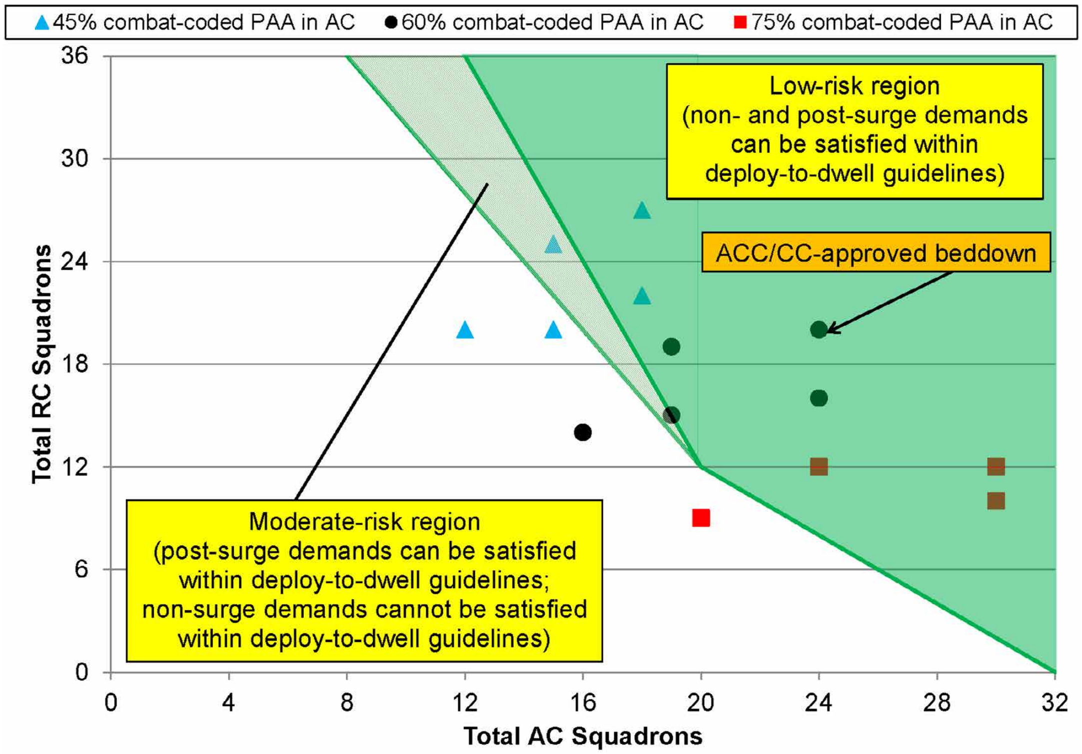
Based upon the required numbers of deployed aircraft and required numbers of deployed locations in the non-surge and post-surge scenarios, we identified the minimum number of squadrons necessary to support rotational requirements.

In Figure S.2, the solid-green region corresponds to the range over which all non-surge and post-surge demands can be satisfied within the deploy-to-dwell ratios identified in Table S.2. The light green region on this figure corresponds to the range over which all rotational requirements can be satisfied within the post-surge deploy-to-dwell ratios. Again, each marker corresponds to one set of paired beddown alternatives that differ only with respect to the percentage of AC PAA in CONUS. For example, beddowns 1I and 1J are represented by a single point on the figure since each has 12 AC squadrons and 20 RC squadrons. Observe that 18 of the 28 beddown alternatives have sufficient squadrons to satisfy rotational requirements within the deploy-to-dwell ratios presented in Table S.1; two additional beddowns can satisfy these requirements if the post-surge deploy-to-dwell ratios were applied during non-surge periods. Both increasing the squadron size (i.e., moving down and to the left within the set of triangles, circles, or squares in the figure) and decreasing the fraction of combat-coded PAA in the AC increase the risk that a beddown alternative will not be able to satisfy rotational deployment requirements within the specified deploy-to-dwell ratios.

It is important to recognize that, under a different employment construct than is currently envisioned in the ISCs (in which the F-35 is deployed in a manner similar to the F-16), the deployment requirements and associated logistics resource requirements might differ significantly from those presented here. Because the employment of the F-35 is still to be determined by the USAF, potential new concepts such as “many locations with very few F-35s at each location” could significantly change these requirements, and thus the supportability of an F-35 beddown that utilizes large squadron sizes.

[7] *Rainbowing* is a deployment strategy used by the RC in which a single deployment requirement is maintained over some duration through the rotation of personnel from multiple RC units.

**Figure S.2. Ability of Alternative F-35 Beddowns to Satisfy Rotational Deployment Requirements**




### *Pilot Absorption*

Our analyses of pilot absorption capacities for the beddown options were based on a steady-state absorption model that investigated potential "feasible" absorption conditions,[8] which will create enough experienced pilots to generate adequate pilot inventories, using achievable aircraft utilization (UTE) rates,[9] and maintaining acceptable unit experience levels, while enabling pilots to meet specified minimum Ready Aircrew Program (RAP) training requirements across all units in all components.

The historical norm for fighter pilot absorption has been to fill all AC inventory needs, plus all prior-service Guard and Reserve inventory needs, using pilots absorbed primarily in AC units. This has not been feasible since the late 1990s, however, because

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[8] Absorption capacities measure the number of new pilots that operational units can absorb per year. Operational units absorb new fighter pilots by providing the training, experience, and supervision needed to develop them into combat pilots, instructors, and leaders. Important factors include the unit manning and experience levels as well as facilities (e.g., simulators, ranges, and airspace) and aircraft utilization rates.

[9] For fighter aircraft, UTE is defined as the average number of sorties flown per PAA per month.

the post–Cold War drawdown took AC force structure below the required levels. For each of the 28 alternative beddowns, we examined three distinct absorption excursions using Active Associations, in which differing numbers of AC pilots operate ANG and AFRC airframes in ANG- and AFRC-assigned units. Similarly, the excursions examined alternatives for Classic Associations (in which ANG and AFRC pilots fly with AC units), which were assumed to exist for every CONUS-based AC unit.

**Achieving feasible absorption conditions will require both a change in the burden historically borne by RC units and additional resources allowing AC units to overfly RAP minimums.** Only one of the excursions analyzed—the first one—produced pilot inventories that approached the required levels, with a 2.4 to 7.5 percent overfly above the RAP minimums of AC units necessary to satisfy the required inventories. All excursions tended to impose a disproportionate share of the absorption burden on the ANG and AFRC units. The first absorption excursion tested required ANG unit UTE rates that are two to three sorties per PAA per month (15 to 23 percent) greater than the AC UTE for many beddown alternatives, and forced ANG unit experience levels to drop below 60 percent for several beddown alternatives.

We found that squadron size and AC/RC mix affected experience levels in RC units; i.e., RC experience level increases with squadron size and with the percentage of aircraft in the AC. The RC UTE requirement to meet pilot absorption decreases as squadron size increases; this requirement was not significantly affected by the AC/RC mix. Because the number of associated AC pilots per unit does not vary with RC squadron size in the first excursion, the inexperienced AC pilots have a lesser effect on the overall experience level for a larger RC squadron, and the increased flying needed to support the AC pilots is distributed over a larger number of aircraft in larger RC squadrons. As the percent of aircraft in the AC increases, more new AC pilots are absorbed each year, which in turn generates a larger pool of AC pilots who eventually depart the AC as experienced pilots and affiliate with RC units, decreasing the RC units' requirement to train their own inexperienced non-prior-service pilots. The AC UTE requirement decreases as the percentage of total aircraft in AC increases; this requirement was not significantly affected by squadron size. This is because the total AC pilot inventory requirement includes a large number of pilots who are not in F-35 operational units, but who are needed for other missions, such as test and training squadrons, or staff positions. This requirement for AC pilots outside the F-35 operational units was assumed to be constant across all beddown alternatives; thus, alternatives with less aircraft in the AC have fewer AC units through which to absorb the total pilot requirement, whereas alternatives with more aircraft in the AC have a broader base of AC units through which the non-operational units' fighter pilot requirements can be absorbed.

**These squadron size effects could have a significant impact on pilot absorption flying costs.** Under the first absorption excursion (given the set of UTE requirements identified for each of the 28 alternative beddowns), we identified the annual cost associated with generating the required number of sorties (assuming an average sortie duration of 1.4 flying hours) and a cost of $18,025 per flying hour.[10] Figure S.3 presents the annual pilot absorption costs associated with each of the 28 beddown alternatives (each marker on the figure again corresponds to one paired set of beddown alternatives).

As the fraction of combat-coded PAA in the AC is held constant (i.e., within the set of circles, squares or triangles in the figure), increasing the squadron size (i.e., moving down and to the left on the figure, with fewer squadrons) can significantly reduce the annual pilot absorption flying cost, due to the associated decreased UTE requirements. Observe that the ACC/CC-approved beddown has an annual pilot absorption flying cost of $4.4 billion. Within the alternative that maintains 60 percent of the combat-coded PAA in the AC, increasing AC and AFRC squadron size to 30 PAA while maintaining 18 PAA per ANG squadron can reduce these costs 4 percent relative to the ACC/CC-approved beddown, while increasing ANG squadron size to 24 PAA and maintaining 24 PAA per AC and AFRC squadron could reduce these costs by 8 percent. Increasing both AC and AFRC squadrons to 30 PAA and ANG squadrons to 24 PAA would reduce these costs by 10 percent, while a further increase to 36 PAA in the AC and AFRC could reduce costs by 12 percent.

As the squadron size is held constant, increasing the fraction of combat-coded PAA in the AC (e.g., comparing the marker farthest to the left for each colored set of markers) also generates cost reductions, again due to the associated decreased UTE requirements. When compared to the ACC/CC-approved beddown's $4.4 billion in annual pilot absorption flying costs, there are many alternative beddowns that satisfy all deployment requirements and reduce this cost by 10 percent or more.

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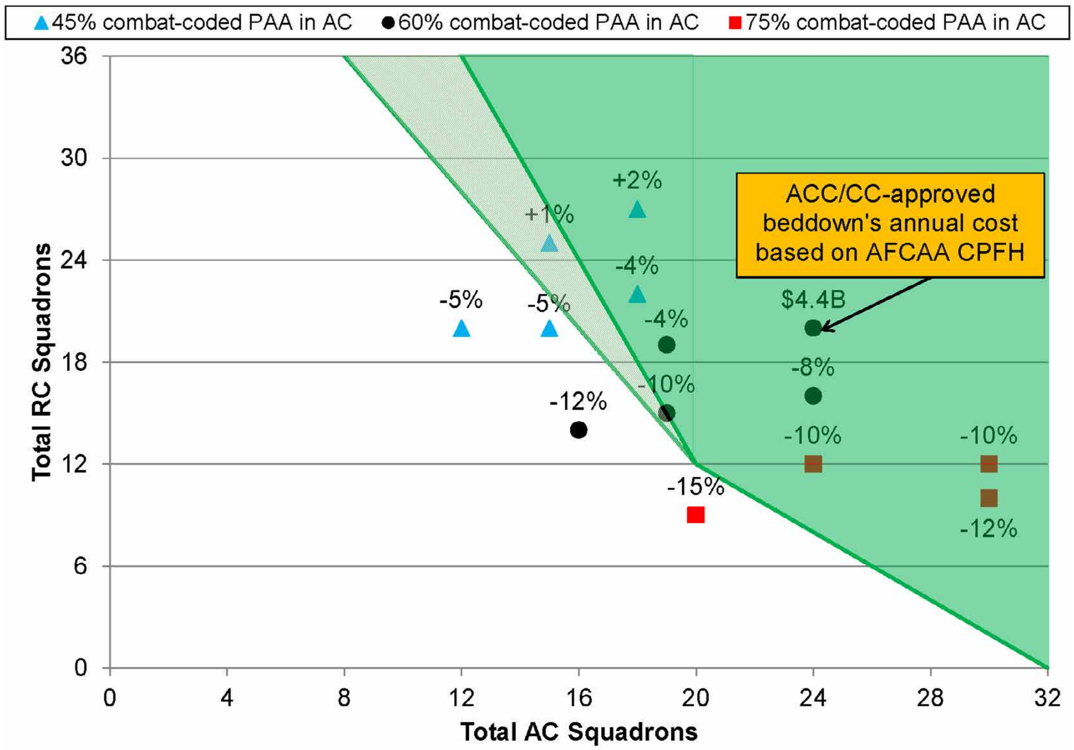
[10] The Air Force Cost Analysis Agency (AFCAA) provided us with an F-35A steady-state cost per flying hour (CPFH) in base year 2012 dollars. "Steady state" is defined here as the average cost during the period with the maximum number of PAA, which for the F-35A is fiscal years (FYs) 2036–2040. This factor includes cost growth above inflation and comprises costs for fuel ($6,604), consumables ($1,793) and depot level repairables ($9,628).

**Figure S.3. Annual Pilot Absorption Flying Costs, by Beddown Alternative**

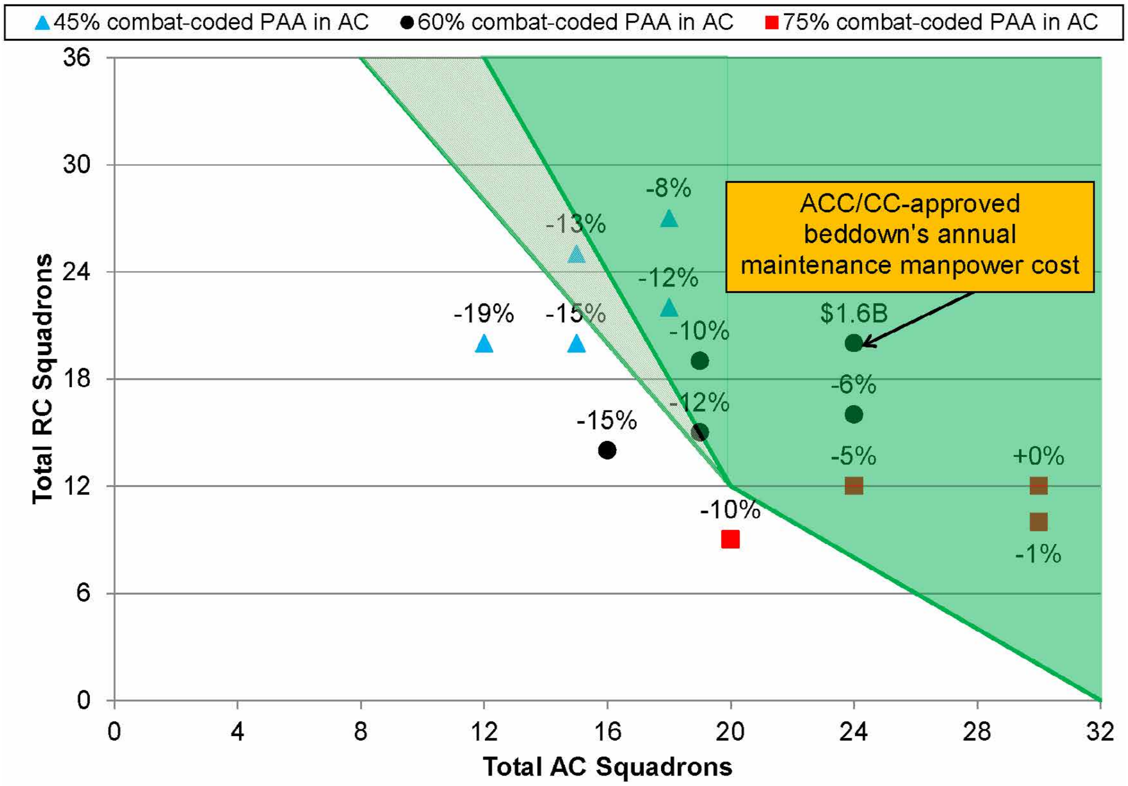



*Logistics Resources*

**We found that increasing squadron size reduces maintenance manpower requirements.** For combat-coded aircraft, the required maintenance manpower per PAA decreases as the number of PAA per squadron increases. We estimated that a squadron of 36 PAA could be supported by 26 percent fewer maintenance positions per PAA than could a single squadron of 18 PAA. Furthermore, assigning multiple squadrons to a single wing can generate additional savings beyond those generated by the squadron size effect. Our analysis suggests that a wing of three 36 PAA squadrons requires 6 percent fewer maintenance positions per PAA than a single squadron of 36 PAA.

Figure S.4 presents the total manpower costs associated with each of the 28 beddown alternatives, with the value for each alternative presented as the percentage difference between its cost and the cost of the baseline ACC/CC-approved beddown. Each marker on the figure again corresponds to one paired set of beddown alternatives—each member of the set has an equal number of RC and AC squadrons, they differ only in the percentage of total AC PAA in CONUS.

**Figure S.4. Total Annual Maintenance Manpower Costs, by Beddown Alternative**




As the fraction of combat-coded PAA in the AC is held constant (i.e., within the set of circles, squares or triangles in the figure), increasing the squadron size (i.e., moving down and to the left on the figure, with fewer squadrons) can significantly reduce the overall maintenance manpower cost. This is consistent with the manpower economies of scale discussed above. However, as the squadron size is held constant, increasing the fraction of combat-coded PAA in the AC (e.g., comparing the marker farthest to the left for each colored set of markers) increases the overall cost. This occurs because the RC is able to make use of part-time maintainers, who are much less expensive in a nondeployed steady-state role than are AC maintainers.

These results assumed that Active Associate units utilize only RC maintenance manpower, with the AC providing no maintenance manpower to the associate units. We also considered two alternative strategies that place AC maintenance manpower in the Active Associate unit. Under the second alternative, the AC would provide the maintenance manpower necessary to support the increased home-station flying caused by

AC pilots.[11] Under the third alternative, in addition to increasing pilot absorption capabilities, the AC manpower is used to generate an increased deployment capability: We identify the AC manpower necessary to support an entire set of UTCs, position these UTCs within Active Associate units, and make these UTCs available at the deploy-to-dwell ratios assumed for the AC. Under both the second and third alternatives, RC full-time manpower is reduced as AC maintenance manpower is added to the unit. However, because the typical AC maintainer would be expected to be less-experienced and less-productive than the typical RC maintainer, these positions were not traded on a one-for-one basis: An equivalency factor of approximately 1.44 AC maintainers per full-time RC maintainer was assumed.

Across the three alternatives considered, the total annual cost differs by no more than 1.3 percent. Said differently, the third alternative provides more deployment capability at essentially the same total cost. However, the number of AC maintainers required at Active Associate units varies significantly. For those beddowns that maintain 60 percent of combat-coded PAA in the AC (as in the ACC/CC-approved beddown 2A), the first and second alternatives can satisfy the AC pilot absorption requirements with between zero and 168 total AC maintenance positions at Active Associate units, while the third alternative provides an increased steady-state deployment capability through the use of between 980 and 1,400 total AC maintenance positions at Active Associate units. Because we found little difference between the manpower composition alternatives with respect to total annual maintenance manpower costs, the key tradeoff to be considered when evaluating these alternatives is the increase in deployment capability that can be achieved under the third alternative versus the increased AC maintenance manpower requirements at Active Associate units.

**We found that increasing squadron size reduces SE procurement costs.** As the fraction of combat-coded PAA in the AC is held constant, increasing the squadron size can significantly reduce the overall SE procurement cost, because economies of scale also exist for SE requirements. Furthermore, as the squadron size is held constant, increasing the fraction of combat-coded PAA in the AC also decreases the overall cost. This occurs because the ANG is limited to smaller squadron sizes, and when the fraction of total PAA in the AC is increased, fewer PAA are assigned to the smaller ANG squadrons.

[11] Note that this increased home-station flying was incorporated into the requirements for the first alternative, but it was not necessary to separate the home-station flying into different segments because RC manpower were performing all maintenance.

*Infrastructure*

**We found that, utilizing current F-16 and A-10 bases, little additional capacity would be required.** Our analysis considered infrastructure capacity across six resource categories.[12] As shown in Figure S.5, some of the resource categories proved sufficient for all bases under all beddown alternatives. In particular, for runway and ramp, no new capacity is needed—all F-35 requirements can be satisfied with existing infrastructure. The other resource categories (squadron operations/aircraft maintenance unit (AMU), ammunition storage, corrosion control, and maintenance) did require some additional capacity in most cases (denoted by the cross-hatched areas in the figure). However, these requirements are relatively small.[13]

The beddown alternatives also exhibit some cost reductions associated with consolidation to fewer bases. Larger squadron sizes reduce annualized facilities costs, while increasing the percentage of aircraft in the AC reduces facility costs.

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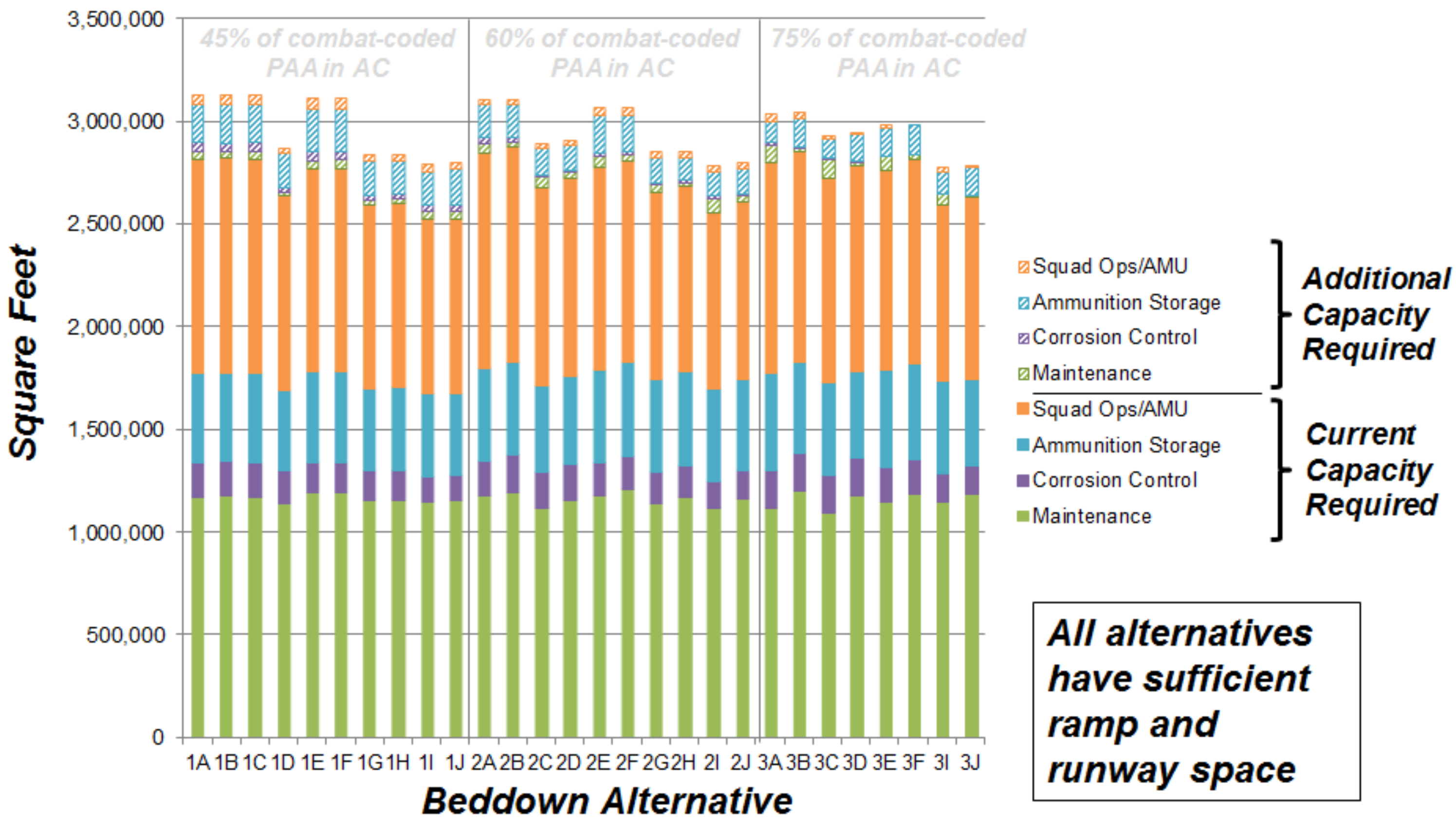
[12] This is not an exhaustive list of additional infrastructure required at a current F-16 or A-10 base in order for the base to support F-35 operations. As an example, based on the increased security classification requirements for fifth-generation fighter aircraft, increased cost would be necessary to support a higher level of classification for communications lines, sensitive compartmented information facilities, etc.

[13] Note that this is based on analysis of raw square footage data from an Office of the Secretary of Defense database (the Facility Program Requirements Suite) and does not address the condition or adequacy of current facilities and infrastructure.

**Figure S.5. F-35 Infrastructure Requirements, by Beddown Alternative**



### *Leader Development*

The F-35 beddown alternatives would substantially alter the numbers of PAA and units in the AC, ANG, and AFRC—and, consequently, the numbers of jobs such as squadron commander, group commander, and wing commander that are regarded as key developmental experiences. Hence, Air Force decisionmakers asked whether some alternatives would endanger development of future senior leaders. We assessed the Air Force's capacity for developing fighter pilots in the AC under the beddown alternatives.

**Leader development was found to be more affected by the assignment policy used than squadron size or AC/RC mix.** All in all, we concluded that the F-35 beddown alternatives would have a slight effect on the AC's capacity for producing future senior leaders with targeted combinations of experience. However, these results suggest that the USAF will be somewhat constrained with respect to fighter pilot leadership development, aside from the impacts of squadron size. To allow for a larger pool of candidates with the preferred characteristics, the USAF needs to be deliberate with its leadership development during the change from legacy fighter/attack aircraft to the F-35, but none of the beddown alternatives with at least 60 percent of the combat-coded PAA in the AC would jeopardize its ability to produce at least as many well-qualified candidates as have actually been promoted to general officer in recent years.

### *The Way Forward*

The findings from this analysis can be used to inform many issues that are within the purview of other USAF analyses and decision processes, including the Total Force Integration Roundtable's discussion of Associate Unit Force Presentation, the Directorate of Strategic Planning, Office of the Deputy Chief of Staff for Strategic Plans and Programs, Headquarters USAF (AF/A8X)'s Multi-Role Fighter Phase II Force Composition Analysis, and the Strategic Basing Process performed by the Office of the Assistant Secretary of the Air Force for Installations, Environment, and Logistics (SAF/IE) and the Office of the Deputy Chief of Staff for Strategic Plans and Programs, Headquarters USAF (AF/A8). In particular, these findings can help determine how F-35 associate units should be composed and resourced in order to meet the requirements of increased pilot absorption and (potentially) increased deployment capability.