Force Structure: Army's Analyses of Aviation Alternatives

Briefing for Congressional Defense Committees

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Introduction—The Army's Aviation

- The Army operates seven types of helicopters and two types of unmanned aircraft affiliated with the Army's combat aviation force structure (see fig. 1).

Figure 1: Helicopters and Unmanned Aircraft Affiliated with Army Aviation Force Structure

AH-64 Apache

Attack Reconnaissance

UH/HH-60 Blackhawk

Assault, Support, Medevac

CH-47 Chinook

Heavy Lift

LUH-72 Lakota

Security, Support, and Trainer

MQ-1C Gray Eagle

Reconnaissance and Target Acquisition

OH-58D Kiowa Warrior

Aerial Reconnaissance

OH-58 A/C Kiowa

Trainer – Supplemental Training Mission

TH-67 Creek

Trainer – Instrument Training Mission

RQ-7B Shadow

Reconnaissance and Target Acquisition

Source: Defense Video and Imagery Distribution System and the Department of the Army. | GAO-15-430R

Introduction (cont.)—The Army's Approved Combat Aviation Force Structure

- In fiscal year 2013, the Army authorized a combat aviation force that would require 71,000 soldiers; 2,945 attack and assault helicopters (810 AH-64 Apache helicopters and 2,135 UH-60 Blackhawk helicopters) at an estimated cost of $7.9 billion annually—excluding combat operations.
- The Army's authorized force structure included 21 combat aviation brigades (13 in the active component and 8 in the reserve component), and 2 theater aviation commands (in the Army's reserve component). These brigades and commands are made up of subordinate units as described in table 1.

Table 1: Units Subordinate to the Army's Combat Aviation Brigades and Theater Aviation Commands (Authorized in Fiscal Year 2013)

Subordinate unit	Description	Helicopters
Assault Battalion	Provides air assault and air movement capability.	30 UH-60 Blackhawk helicopters
Attack Reconnaissance Squadron	Supports early tactical operations and ground maneuver with reconnaissance, security, and attack.	30 OH-58D Kiowa Warrior helicopters
Attack Reconnaissance Battalion	Supports early tactical operations and ground maneuver with reconnaissance, security, and attack.	24 AH-64 Apache helicopters
General Support Aviation Battalion	Participates in all brigade operations including aerial command and control; heavy lift support; and aeromedical evacuation.	8 UH-60 Blackhawk helicopters, 12 CH-47 Chinook helicopters, 15 HH-60 Blackhawk Medevac helicopters
Aviation Support Battalion	Plans, coordinates, and executes the aviation brigade's sustainment and signal support requirements.	None.
Security and Support Battalion	Supports a variety of federal, state, and homeland security missions.	32 LUH-72 Lakota helicopters

Source: Department of the Army. | GAO-15-430R

Introduction (cont.)—The Army's Aviation Force Structure Proposal

- In January 2013, the Army started to analyze its aviation force structure to determine how much aviation capability would be needed in 2020. By August 2013, Army officials said that they developed a force-structure proposal that would enable the Army to retain its most-modern and most-capable helicopters. According to Army officials, the Army Chief of Staff approved the Army's proposal in October 2013. The Army's force-structure proposal called for the Army to
  - eliminate nearly 800 aircraft from the Army's planned force structure by divesting three types of older helicopters (OH-58D Kiowa Warrior, OH-58 A/C Kiowa, and TH-67 Creek); and
  - reduce end strength by about 10,700 military positions (about 6,100 regular Army—soldiers that are in the active component when not deployed—and 4,600 reserve component) resulting in a combat aviation force with about 60,000 regular Army and reserve-component positions.
- This proposal also called for significant changes in the allocation of units and helicopters relative to the force structure authorized in fiscal year 2013. Specifically, it would
  - eliminate three active-component combat aviation brigades and—from the reserve component—one theater aviation command and one OH-58D Kiowa Warrior squadron;
  - remove all AH-64 Apache helicopters from the reserve component and increase by 120 the number of AH-64 helicopters authorized for the active component;
  - convert eight Army National Guard and two Army Reserve attack reconnaissance battalions to four Army National Guard and two Army Reserve assault helicopter battalions;[1] and
  - transfer 159 UH-60 Blackhawk helicopters from the active component to the Army National Guard and Army Reserve.

[1]Four of these conversions were for two Army Reserve and two Army National Guard units and were previously directed by the Chief of Staff of the Army in June 2013.

Introduction (cont.)—The National Guard Bureau's Proposal

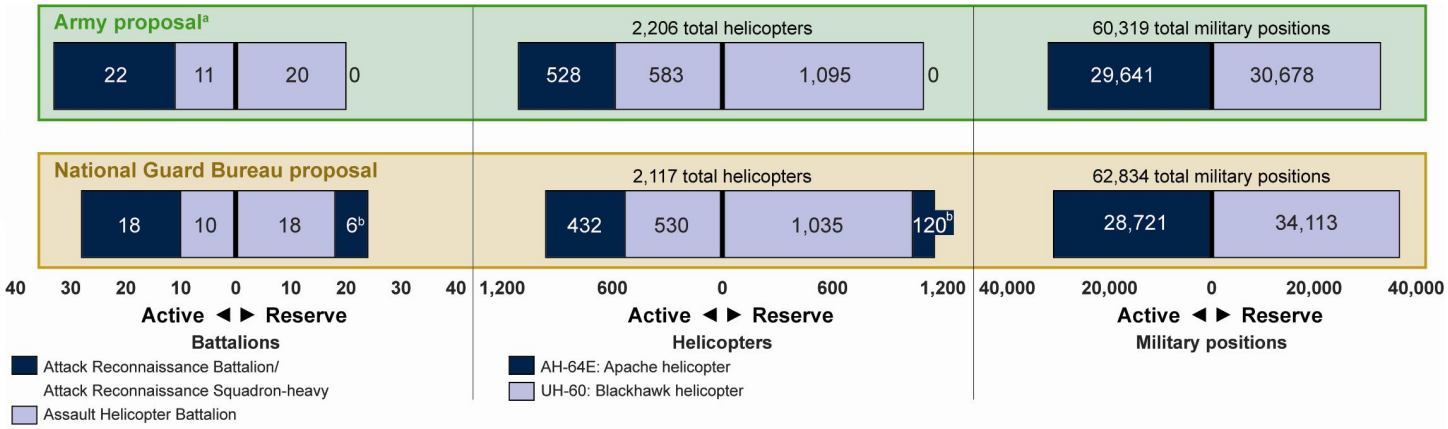
- Although National Guard Bureau (Bureau) officials state that they agree with many changes called for under the Army's proposal, the Bureau opposes moving the AH-64 Apache helicopters into the regular Army. The Bureau has stated that doing so will
  - result in operational risk because the Army will have fewer total AH-64 Apache battalions;
  - degrade the Army National Guard's role as a combat reserve and establish precedent for removing other combat capabilities from the Army National Guard; and
  - disrupt Army National Guard units and force structure across 20 states.
- In January 2014, the Bureau put forward an alternate force-structure proposal for the Army's combat aviation units. The Bureau's proposal, which has evolved over time, differs from the Army's in that it
  - reduces end strength by about 8,000 military positions (about 7,000 regular Army and 1,000 reserve component), resulting in a combat aviation force with about 63,000 military positions;
  - retains 120 AH-64 Apache helicopters and six attack reconnaissance battalions in the Army National Guard—two with the full complement of 24 aircraft and four with 18 aircraft;[2] and
  - divests two regular Army attack reconnaissance battalions,113 UH-60 Blackhawks, and 12 CH-47 Chinook helicopters from the Army's force structure.[3]
- The differences between the proposals are shown in figure 2 and appendix I.

[2]The Bureau's proposal calls for two multicomponent (units made up of regular Army and Army National Guard personnel and equipment) full-spectrum combat aviation brigades that include one fully equipped Army National Guard attack reconnaissance battalion each.

[3]Unlike the Army's proposal, the Bureau's proposal does not include a full-spectrum combat aviation brigade "equipment set" in South Korea. The Bureau does not specify where the helicopters associated with the equipment set's support battalions and assault helicopter battalion would be assigned under its proposal. Consequently, we did not include these helicopters as part of the Bureau's proposal.

Introduction (cont.)—Differences between the Army's and the National Guard Bureau's Proposals

Figure 2: Differences between the Army's and National Guard Bureau's Proposed Fiscal Year 2020 Force Structures by Battalions, Helicopters, and Military Positions—As of February 2015



Source: GAO analysis of Army data. | GAO-15-430R

[a]The Army's proposal includes an "equipment set" for a combat aviation brigade in South Korea. This equipment set comprises the helicopters associated with a full-spectrum combat aviation brigade and all of its subordinate units, including two attack reconnaissance battalions, one assault helicopter battalion, a general support aviation battalion, and an aviation support battalion. The Bureau's proposal does not include this "equipment set" and does not specify whether the Blackhawk helicopters from the equipment set would be retained in the Army's force structure. Consequently, we did not count those helicopters in figure 2 above.
[b]The Bureau's proposal would include four attack reconnaissance battalions that would be equipped with 18 of the 24 AH-64E Apache helicopters typically assigned to these types of units.

Army Proposal

29,641 Active Military Positions

30,678 Reserve Military Positions

Active Attack Reconnaissance Battalions	Active Assault Helicopter Battalions	Reserve Attack Reconnaissance Battalions	Reserve Assault Helicopter Battalions
22	11	0	20

Active AH-64E Helicopters	Active UH-60 Helicopters	Reserve AH-64E Helicopters	Reserve UH-60 Helicopters

National Guard Proposal

28,721 Active Military Positions

34,113 Reserve Military Positions

Active Attack Reconnaissance Battalions	Active Assault Helicopter Battalions	Reserve Attack Reconnaissance Battalions	Reserve Assault Helicopter Battalions
18	10	18	6

Active AH-64E Helicopters	Active UH-60 Helicopters	Reserve AH-64E Helicopters	Reserve UH-60 Helicopters

Introduction (cont.)—Analyses of the Army's and Bureau's Force-Structure Proposals

- In July 2014, the Deputy Secretary for Defense tasked the Director for the Office of the Secretary of Defense's Cost Assessment and Program Evaluation (CAPE) office with leading an analytic team comprised of senior officers and officials from DOD; Headquarters, Department of the Army; and the Bureau. The team was directed to analyze the Army's and Bureau's force structure proposals. Based on this review the team agreed that:
  - The Bureau's proposal would increase Army aviation costs over the Army's proposal by between $90 million and $180 million annually and could increase the up-front costs of implementing the force-structure proposal by nearly $570 million.
  - The Army's proposal would generate up to one-fifth more unit capacity—meaning units that are available to meet mission requirements—than the Bureau's alternate proposal.
  - The Bureau's proposal would require Army National Guard Apache units in multi-component combat aviation brigades to be mobilized during peacetime for one year out of every four to five years—a tempo that exceeds practices over the last decade.
  - The use of multi-component units in the Bureau's proposal presents training risk for operations due to planned training timelines much shorter than those experienced over the last decade.

Introduction (cont.)—Analyses of the Army's and Bureau's Force-Structure Proposals

- The Army staff analyzed and compared both force-structure proposals' relative abilities to meet future combat requirements and costs. Bureau officials provided input to the Army's analyses, and were kept informed of the Army's progress and results. Bureau officials said that the Bureau did not conduct its own analysis because it does not have the expertise needed to assess the performance and costs of its own force-structure proposal.
- Based on its analysis and the CAPE study team's conclusions, the Army judges that the Bureau's proposal would create unacceptably high risk to the aviation mission and force structure. Specifically, the Army concluded
  - the Bureau's proposal would result in not meeting combatant commander demands, inadequately trained formations, and less capable units; and,
  - mitigating these risks would require procuring additional Apache helicopters and Shadow aircraft (at a cost of $4.4 billion) and sustaining unplanned force structure (costing $338 million per year).

Objectives

- In 2014, Senate Report 113-176 included a provision for GAO to undertake a broad review of the Army's force-structure decision-making processes, models, and analyses. Additionally, Pub. L. No. 113-291 included a provision for GAO to compare the assumptions, cost estimates, and support personnel implications underlying the Army's aviation force-structure proposal with those underlying the Bureau's alternate proposal.[4] This briefing
  - compares the assumptions underlying the Army's and the Bureau's respective combat aviation force-structure proposals,
  - evaluates the Army's analyses of the two proposals' respective capacities to meet projected combat requirements, and
  - evaluates the Army's cost analyses and comparison of both proposals.
- This briefing also identifies how the Army's and the Bureau's proposed force structures would result in differing support requirements for the Army's Combat Aviation Brigades (presented in app. II).

[4]S. Rep. No. 113-176 at 83 (2014) and The Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, Pub. L. No. 113-291, § 1057 (2014).

Scope and Methodology

- We performed our work at the Headquarters, Department of the Army, U.S. Army Training and Doctrine Command Analysis Center, and the U.S. Army Aviation Center of Excellence because these components were primarily responsible for analyzing the Army's proposal and the Bureau's alternate. We obtained perspectives on the Army's analyses from the National Guard Bureau, and from CAPE. Appendix III summarizes the organizations where we performed fieldwork.
- To address our objectives, we took the following steps:
  - Compared the assumptions identified for each force-structure proposal, and interviewed knowledgeable officials to determine their views of the cause of any differences.
  - Evaluated whether the Army's assessment of the two force-structure proposals' abilities to meet future combat demands was reasonable by comparing its methodology to generally accepted research standards for study design, which we developed in our prior work;[5] reviewing technical documentation associated with the Army's model; and interviewing officials at the Center for Army Analysis and CAPE.

[5]GAO, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, GAO-06-938 (Washington, D.C.: Sept. 20, 2006). To identify these standards, we reviewed research literature and DOD guidance. We specifically applied the standards relating to study design. See GAO-06-938 for more information.

Scope and Methodology (cont.)

- We also evaluated the Army's cost analyses of the Army's and Bureau's proposals by comparing the Army's cost-estimating models and methodology for preparing these analyses to leading practices,[6] and evaluating the Army's use of these estimates against standards for internal control in the federal government.[7] Because the Army's proposal has been approved for implementation by the Army Chief of Staff, we also evaluated the Army's cost estimate for implementing its proposal and its anticipated annual costs against these criteria.
- We also created a data set using the Army's fiscal year 2014 and fiscal year 2020 personnel requirements documents for its combat aviation units, as well as composite personnel cost data. We worked with Army and Bureau officials to develop a definition for "support" and applied that definition as part of our analysis. We used data from these years because the Army did not begin implementing its proposed restructuring until the end of fiscal year 2014, and fiscal year 2020 is the year by which it is to be completed. We used the data set to compare the number and associated costs of military and civilian positions needed to support the Army's combat aviation brigades under each proposal.
- We also assessed the reliability of the Army's cost and personnel requirements data and cost-estimating models by reviewing documentation associated with the relevant data systems and interviewing knowledgeable officials. We determined the data were reliable for the purposes of our review.
- We met with officials from the Office of the Secretary of Defense; Headquarters, Department of the Army; and the National Guard Bureau to obtain oral comments on our preliminary briefing materials, and we incorporated their technical comments as appropriate.

[6]GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP (Washington, D.C.: March 2009). The methodology outlined in the Cost Estimating and Assessment Guide is a compilation of best practices that federal cost-estimating organizations and industry use to develop and maintain reliable cost estimates throughout the life of an acquisition program. See GAO-09-3SP for more information.

[7]We specifically applied federal standards related to information and communications. See GAO, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C.: November 1999).

Summary

- The Army and the Bureau agree on assumptions pertaining to strategy and the potential demand for combat aviation forces, but disagree on other assumptions such as the Army's budget constraints and how Army National Guard units would be trained, mobilized, and used in combat.
- The Army's analyses of the proposals' abilities to meet projected demand for forces were based on a reasonable methodology that met several generally accepted research standards for study design, which require the identification and consistent application of assumptions and the use of sensitivity analysis, but further sensitivity analysis could have been beneficial to decision makers.
  - The Army's analyses were based on DOD's classified planning scenario, and the Army applied many assumptions consistently across both proposals; however, the Army's analyses did not evaluate how varying the classified planning scenario—either by varying the rate at which units would deploy into a major combat operation in the scenario or the duration of the major combat operation—would affect the performance of the proposals.
  - In our view, the Army's analyses were based on a model and methodology that provides a reasonable approach for comparing the Army's and Bureau's force structure proposals, but varying the demand scenario could have been beneficial to decision makers.

Summary (cont.)

- The Army's cost analyses are based on relevant, sufficiently reliable, and timely estimates that enabled the Army to compare the costs of its and the Bureau's force structure proposals; however, the estimates were of limited value for projecting the actual costs of the Army's proposal.
  - **Operations and Support Costs**: In its analyses, the Army found that there was little difference between the proposals' estimated annual operations and support costs. We found that these estimates were substantially comprehensive and well documented, based on historic funding and manning levels, and that they applied assumptions comparably to each proposal. The estimates were limited because they did not reflect uncertainties about personnel, operations, or readiness of individual units, all of which affect potential costs. Additionally, based on its analyses the Army subsequently stated that additional force structure would need to be created to offset risks created by the Bureau's proposal. The Army estimated that the annual cost of sustaining this additional force structure would be about $338 million. However, this cost was not included in the Army's original estimate, and we did not validate its reliability.
  - **Implementation Costs**: The Army's estimates of the proposals' implementation costs included costs associated with pilot training and aircraft acquisitions, but excluded some battalion and command-level costs. The key difference between the two proposals is how many Apache helicopters would be needed. The Army's proposal calls for 690 Apache helicopters. The Bureau's proposal would require 11 additional Apache helicopters at a cost of at least $220 million. However, the Army stated that the Bureau's proposal would increase risk without acquiring a total of 115 additional helicopters and associated equipment, resulting in a total implementation cost of $5.52 billion for the Bureau's proposal.

Objective 1: Assumptions Regarding Strategy, Resources, and Component Roles

- The Army and the Bureau agree on assumptions about strategy and the anticipated future demands for combat aviation that underlay their force structure proposals, but differ on other assumptions about how Army National Guard units would be used.
- In summary, Army and Bureau officials
  - agree on the military strategy, anticipated demand for forces, near-term training resources, and Army National Guard readiness requirements (slide 16) and
  - disagree on the availability of resources, as well as on Army National Guard characteristics such as how its units will be trained, utilized, mobilized, and deployed (slide 17).

Objective 1: Assumptions Regarding Strategy, Resources, and Component Roles (cont.)

The Army and the Bureau agree on the following assumptions:

- **Military Strategy**: The armed forces will need to be able to simultaneously defend the homeland; conduct sustained, distributed counterterrorist operations; and deter aggression and assure allies through forward presence and engagement in multiple regions. If deterrence fails, U.S. forces need to be able to defeat a regional adversary in a large-scale conflict, and deny the objectives of—or impose unacceptable costs on—a second aggressor in another region.
- **Demand for Forces**: The base planning scenario for sizing and shaping the Army's force is Integrated Security Construct—B (Scenario 3), which Army and Bureau officials told us is one of three planning scenarios in DOD's 2014 classified planning guidance.
- **Near-Term Training Resources**: The priority for resourcing in the near term (fiscal years 2016-2019) will be on ensuring the full readiness of forces that expect to deploy and fight upon notification. Those forces include the global response force, and forces deploying next into combat operations. The remainder of the force will be subject to tiered readiness.
- **Readiness**: For any given mission, prior to deployment, the Army National Guard will meet the same training and readiness standards as regular Army soldiers with the same mission. The Army National Guard will be ready and available to operate in peacetime, in wartime, and in support of civil authorities for its assigned mission set, within the context of the Army's cyclical readiness model.

Objective 1: Assumptions Regarding Strategy, Resources, and Component Roles (cont.)

Table 2: Differing Assumptions between the Army's and National Guard Bureau's Force-Structure Proposals

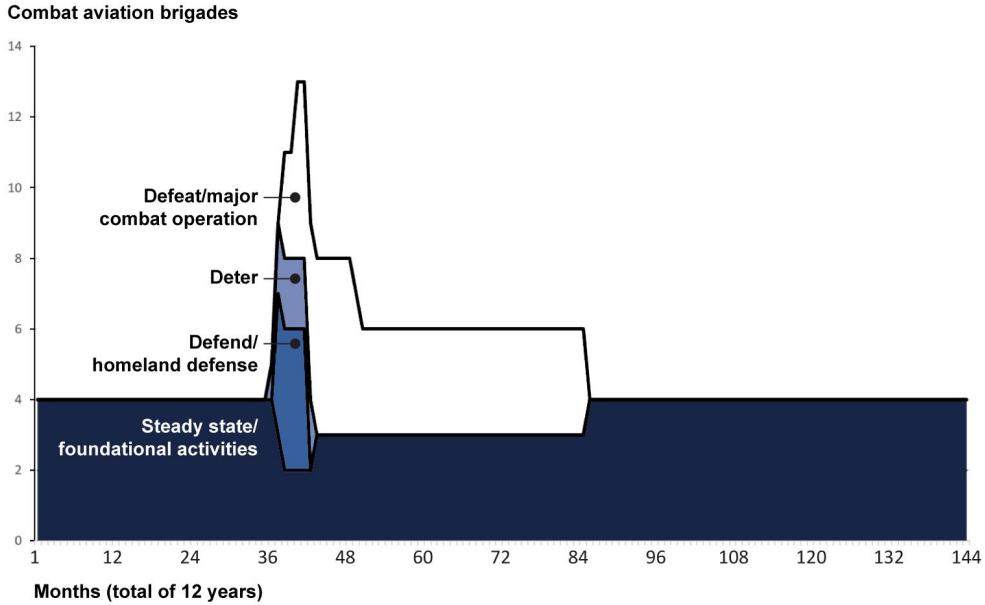
Category	Army position	National Guard Bureau (Bureau) position
Base budget	Army officials said that they anticipate the Army will continue to face budget pressures.	Bureau officials agree that the Army may continue to face constrained budgets, but stated that the Army should not base long-term force-structure decisions on short-term funding challenges.
Army National Guard training	Army officials stated that the Army may not have sufficient warning, or the resources to provide sufficient premobilization and postmobilization training time, to prepare Army National Guard full-spectrum combat aviation brigades for deployment against major combat operation missions.	Bureau officials stated that Army National Guard full-spectrum combat aviation brigades will be able to meet future mission requirements and deployment timelines given sufficient training resources and adequate notification and noted that historically the Army has been able to provide adequate advance notice.
Army National Guard dwell time	Army officials stated that for planning purposes they assumed that Army National Guard units will follow the Department of Defense's policy of 4 years of dwell time—time between deployments—for each year mobilized during unplanned combat operations.	Bureau officials stated that for planning purposes they assumed Army National Guard units would follow a policy of 2 years of dwell time for each year mobilized during unplanned combat operations.

Source: GAO analysis of Army and National Guard Bureau data. | GAO-15-430R

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces

- In October 2014, the Army analyzed the extent to which its force-structure proposal and the Bureau's alternate proposal would provide enough combat aviation brigades to meet anticipated requirements for a variety of different mission types (see fig. 3). The Army used the Department of Defense's (DOD) classified planning scenario (Integrated Security Construct—B) when assessing the proposals.

Figure 3: Unclassified Depiction of the Projected Demand for Combat Aviation Brigades



Source: U.S. Army Training and Doctrine Command Analysis Center. | GAO-15-430R

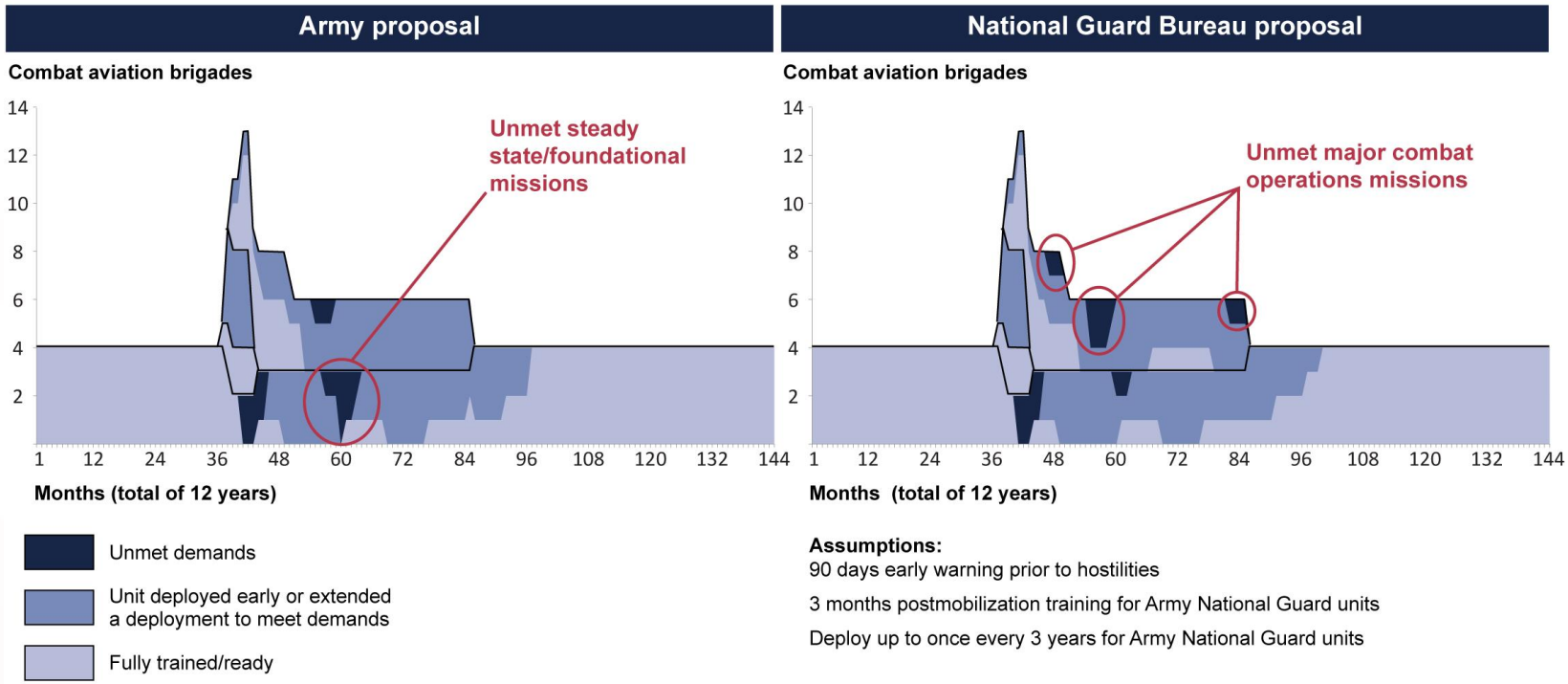
Note: According to Army officials, the DOD planning scenario is unclassified unless a specific location is referenced when depicting the scenario. Mission types include the following—
Steady State / Foundational Activities: Activities the Joint Force conducts by rotating forces globally to achieve strategic and operational interests. These include activities to build security globally, preserve regional stability, deter adversaries, and support allies and partners.
Defeat / Major Combat Operations: One of the four missions outlined in the 2012 Strategic Guidance and 2014 Quadrennial Defense Review (defeat an adversary). Specifically, U.S. forces will be prepared to defeat a regional adversary in a large-scale multiphased campaign in order to achieve national and strategic objectives.
Deter: U.S. forces will be able to prevent acts of aggression in one or more theaters. Specifically, "deter" is the prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits.
Defend / Homeland Defense: U.S. forces will defend U.S. territory from direct attack by state and nonstate actors. The Army will be positioned to come to the assistance of domestic civil authorities in the event such defense fails or in case of natural disasters, potentially in response to a very significant or even catastrophic event.

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces (cont.)

- The Army's October 2014 analysis sought to determine whether the Bureau's proposal could better meet the projected demand for units as compared to the Army's proposal, under assumptions favorable to the Bureau's option. Such assumptions included a 90-day notification prior to major combat operations, successful completion of a 3-month postmobilization training period, and deployments of once every 3 years for Army National Guard units.
- The October 2014 analysis found that under these favorable conditions, the Army's option was better able to meet the modeled demand for units, although both proposals met most mission requirements. The Army's proposal fully met 93 percent of modeled requirements and the Bureau's proposal fully met 91 percent of these requirements, with the Army's proposal better addressing major combat operation requirements and the Bureau's proposal better addressing foundational mission requirements (see fig. 4). However, the Army's analysis did not show potential risks if the favorable assumptions were incorrect.
  - Army officials who completed the analysis said that, in their view, the analytical results did not provide a meaningful basis for choosing between the two force-structure proposals. Bureau officials agreed that the differences between the two proposals were insignificant.
  - However, in making these assumptions, Army officials said that reviews completed by CAPE and RAND Corporation suggest that the postmobilization training period modeled would be infeasible and unrealistic. Specifically, they stated that even with 12-month advanced notice for deployment to lower-risk missions, Army National Guard AH-64 units required between 88 and 118 postmobilization days. Bureau officials disagreed with the Army's assessment and stated that the Army National Guard has met deployment timelines in the past and would continue to do so under its proposal.

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces (cont.)

Figure 4: Modeling Results Comparing Army and National Guard Bureau Proposals (October 2014)



Assumptions:
90 days early warning prior to hostilities
3 months postmobilization training for Army National Guard units
Deploy up to once every 3 years for Army National Guard units

Source: U.S. Army Training and Doctrine Command Analysis Center. | GAO-15-430R

Note: The Army's study prioritizes mission fulfillment as follows (in order of importance and priority): (1) Major Combat Operations, (2) Deter, (3) Enhanced Protective Posture / Homeland Defense, and then (4) Foundational Activities.

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces (cont.)

- In January 2015, the Army completed a sensitivity analysis to determine whether their conclusions would vary if the analysis used differing assumptions. Army officials told us that they modeled at least 15 different variations within the context of DOD's classified planning scenario that collectively varied the number of units needed to fill foundational mission requirements, and examined an excursion that included a second major combat operation mission with varying demands for combat aviation brigades.
- The Army also analyzed its proposal relative to the Bureau's original January 2014 proposal and adopted the following assumptions:
  - less warning time (30 days) prior to the beginning of major combat operations,
  - Army National Guard attack reconnaissance battalions would need a longer postmobilization training period (4 months) before they could deploy, and
  - Army National Guard units could deploy up to once every 3 years, which was consistent with the October 2014 analysis.

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces (cont.)

- This sensitivity analysis found that the Bureau's proposal was less able to meet mission demands than the Army's proposal when modeled using differing assumptions.
  - The Bureau's proposal experienced more shortfalls during the peak period of major combat operations (which officials said are characterized by high-intensity combat).
    - Both options demonstrated shortfalls for the first 5 months of the major combat operations period.
    - However, the Army's proposal met all demands during the final 4 months of the peak demand period while the Bureau's proposal met 83 percent of the demands.
  - The Bureau's proposal also experienced shortfalls during critical postcombat operations that officials said require the Army to relieve units that have been deployed for extensive periods. Specifically:
    - The Army determined that the Bureau's proposal would result in a shortfall of two or more combat aviation brigades during the first 15 months of stability operations 20 percent of the time.
    - In contrast, the model generated this magnitude of a shortfall in the availability of units only 3 percent of the time when using the Army's proposal.

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces (cont.)

- We found that the Army's analysis is based on a model and methodology that provides a reasonable approach for comparing the Army's and Bureau's force-structure proposals.
  - Generally accepted research standards for study design, which we derived in our prior work,[8] require that credible and well-designed studies clearly identify their assumptions and constraints; ensure that assumptions are necessary, reasonable, and consistently applied; and include sensitivity analyses to assess results across a variety of conditions, among other things.
  - We found that the Army's analysis met several of these design standards in that it
    - varied the level of readiness for each combat aviation brigade within its model,
    - identified assumptions and constraints underlying its analysis,
    - used the same assumptions throughout its analysis when assessing the proposals, and
    - based its assumptions for the mobilization and deployment of units on DOD and Army policies and guidance.
- However, we found that the Army's sensitivity analysis did not evaluate how the proposals would have performed if the Army modified DOD's classified planning scenario to vary (1) the rate at which units deploy into a major combat operation or (2) the duration of the major combat operations mission.

[8]GAO-06-938.

Objective 2: Proposals' Capacities to Meet Potential Demand for Forces (cont.)

- Army officials stated that they did not complete sensitivity analysis on the rate of deployment of units or the duration of major combat missions because they were directed to use DOD's approved planning scenario for sizing and shaping the Army's forces. These officials said that by using DOD's planning scenario they were able to
  - assess the proposals against a range of conditions;
  - complete a fair and objective analysis that enabled them to effectively differentiate between the force-structure proposals; and
  - ensure that their analysis would be seen as credible by DOD officials and other stakeholders.
- Bureau officials said that DOD's classified planning scenario assumes the need to deploy a large number of units in a short period and that this assumption favors the active Army. However, they noted that the Army has rarely, if ever, been required to meet such an aggressive deployment timeline in the past and, as a result, it may not be appropriate to allocate aviation capabilities based on this assumption.
- Officials from DOD's CAPE and the Center for Army Analysis agreed that the analyses have limitations but noted that in their view the Army's conclusions were correct. However, CAPE officials stated that additional sensitivity analysis would have departed from DOD practices for force structure planning and that the Army followed DOD accepted practices for sensitivity analysis within force structure planning processes.

Objective 3: Cost Analyses and Comparative Cost Estimates

- In March 2014, the Army estimated and compared the annual projected operating costs of its force-structure proposal and the Bureau's alternate, and found that the proposals would cost $6.75 billion and $6.80 billion, respectively, per year after implementation.
- The Army stated that the Bureau's proposal would leave two Army divisions unable to routinely train with their respective AH-64 battalions. According to the Army, if deployed to war under the Bureau's proposal, these divisions would be insufficiently trained, creating unacceptable risk to the force.
  - To address this risk, Army officials stated that the Army would need to obtain additional force structure, which would cost about $338 million annually to sustain. We did not validate the accuracy of this estimate.
  - Bureau officials told us that they disagree that the Bureau's proposal presents unacceptable risk. They stated that the Bureau's proposal would provide more attack reconnaissance battalions than the Army's original proposal, and that additional force structure would not be needed.
- These estimates are summarized in table 3.

Objective 3: Cost Analyses and Comparative Cost Estimates (cont.)

Table 3: Comparison of Army and National Guard Bureau Proposals' Estimated Annual Operating Costs upon Imple
Fiscal year 2014 dollars in billions

	Army proposal	National Guard Bureau (Bureau) Proposal
Active-Component Structure		
- Operations and Maintenance	$1.64	$1.58
- Personnel	2.27	2.20
Subtotal, Active-Component Structure	**$3.91**	**$3.78**
Reserve-Component Structure		
- Operations and Maintenance	0.68	0.76
- Personnel	0.61	0.64
- Military Technicians / Supplemental Training	0.30	0.36
Subtotal, Reserve-Component Structure	**$1.59**	**$1.76**
Pilot Training[a]	1.25	1.26
Total Estimate	**$6.75**	**$6.80**
Army-Identified Additional Costs[b]	**$0**	**$0.34**

Source: GAO analysis of Army data. | GAO-15-430R

Note: These cost estimates do not include an additional $0.06 billion per year under each proposal to operate three Light Utility Helicopter (LUH-72) battalions.
[a]The Army's March 2014 pilot training estimate was incomplete, and the Army provided us with an updated estimate, reflected in this table, in February 2015.
[b]The Army has stated that it would need to sustain additional force structure if the Bureau's proposal were implemented in order to mitigate operational risk. We did not evaluate the reliability of this estimate.

Objective 3: Cost Analyses and Comparative Cost Estimates (cont.)

- The Army also estimated the costs to implement the two proposals, which included the costs of acquiring helicopters and training pilots and crews to fly different aircraft (summarized in table 4). The Army estimated that its proposal would cost about $1 billion to implement, with $0.81 billion in onetime costs to acquire and operate 100 new LUH-72 Lakota aircraft that would replace the TH-67 training helicopter and OH-58 A/C helicopter, which are being retired.
- The Army's proposal would retain 690 AH-64 Apache helicopters; the Bureau's proposal would acquire 11 more Apaches—at a cost of $220 million to $420 million,[9] plus $150 million for additional Shadow aircraft.
  - The Army's proposal includes an unmanned equipment set with 48 Apache helicopters in South Korea; the Bureau's proposal reallocates this equipment set to active Army units that would rotationally deploy to Korea and other locations worldwide.
  - The Army's proposal includes 67 Apache helicopters as part of a logistics and maintenance fleet; whereas the Bureau's proposal includes 57 Apache helicopters.
- Army officials stated that eliminating the equipment set would leave less time for units to train before deployment, which would increase the likelihood that units will be unprepared for an unexpected crisis. They added that reducing the logistics fleet would require the Army to extend its Apache modernization program and increase costs.
- Army officials stated equipping the two additional battalions discussed previously, replenishing the equipment set, and meeting logistical and maintenance requirements would require 115 additional Apache helicopters (104 more than proposed by the Bureau), and associated aircraft, with a resulting total estimate of $5.52 billion.

[9]The Bureau estimate assumes that there will be no additional costs beyond $220 million to acquire the helicopters, based on Army acquisition data. However, the CAPE review team reported the costs to be $420 million, because the Bureau's proposal would acquire aircraft at a lower rate and over an extended schedule.

Objective 3: Cost Analyses and Comparative Cost Estimates (cont.)

Table 4: Comparison of Estimated Implementation Cost for the Army and National Guard Bureau Proposals (as of December 2014)
Fiscal year 2014 dollars in billions

	Army proposal	National Guard Bureau (Bureau) proposal
Aircraft Acquisition		
- Apache helicopter and Shadow unmanned aircraft[a]	$0	$0.57
- Light utility helicopter[b]	0.81	0.81
Subtotal, Aircraft Acquisition	**$0.81**	**$1.38**
Pilot training[c]	0.17	0.10
Total Estimate	**$0.98**	**$1.48**
Army-Identified Additional Costs[d]	**$0**	**$4.04**

Source: GAO analysis of Office of the Secretary of Defense and Army data. | GAO-15-430R

[a]Estimates based on Army acquisition data. The Bureau's proposal would acquire 11 additional Apache helicopters at an estimated cost of $220 million. Additionally, the Cost Assessment and Program Evaluation group estimates that the program could incur $200 million in added procurement costs due to a lower production rate and an extended schedule. The estimate also includes $150 million to equip 6 RQ-7B Shadow platoons in the Army National Guard.
[b]Directed by the Office of the Secretary of Defense in a revision to the Army's fiscal year 2015 proposed budget submission. Includes about $560 million in onetime procurement and about $250 million in onetime fleet modifications, operations, and sustainment costs.
[c]Includes pilot qualifications on new aircraft and advanced pilot training.
[d]According to the Army, implementing the Bureau's proposal would require 104 additional Apache helicopters (115 new acquisitions in total), at an additional cost of $3.96 billion, and equipment for three additional RQ-7B Shadow platoons (nine platoons in total) at an additional cost of $75 million.

Objective 3: Cost Analyses and Comparative Cost Estimates (cont.)

- Federal standards for internal control identify the need for agency decision makers to have relevant, reliable, and timely information that enables them to carry out their responsibilities.[10]
- The Army's estimates of annual costs were relevant and sufficiently reliable because the operations, maintenance, and military personnel cost estimates—which constitute the majority of the annual costs associated with the two proposals—reflected key characteristics of high-quality and reliable cost estimates.[11] We found that the estimates were:
  - substantially comprehensive, in that they covered all units affected by each force structure proposal;
  - substantially well documented by describing in detail how they were developed; and
  - based on historical funding and manning levels, with assumptions comparably applied to each proposal.
- The Army's implementation cost estimates were also relevant and sufficiently reliable because the key difference between the two proposals—the cost for additional Apache helicopters—was based on the agreed-upon programmatic cost estimates for acquiring the most-modern version of the helicopter.

[10]GAO/AIMD-00-21.3.1.
[11]GAO-09-3SP.

Objective 3: Cost Analyses and Comparative Cost Estimates (cont.)

- Although the Army's cost analyses are based on relevant, sufficiently reliable, and timely estimates that compare the costs of the Army's and the Bureau's force-structure proposals, our analysis found that the Army's cost estimates for implementing its proposal excluded some costs. In the U.S. Army Reserve, where one attack reconnaissance battalion has already begun converting to fly UH-60 Blackhawks, officials told us the process of converting a unit will increase costs at the battalion and command level. The officials added that such costs will include pay and allowances, unique equipment fielding, aircraft maintenance, training to increase individual and crew proficiency, and other supply and administrative actions.
- The Army agreed that its cost estimates for implementing the proposals were limited to include the costs associated with pilot training and aircraft acquisitions, and that not all operational costs were covered by its estimate. Officials told us that the Army intends to fund its aviation restructuring effort with $1.46 billion that it reprogrammed through fiscal year 2019 from cancelled OH-58D Kiowa Warrior modernization programs, and other transfers from canceled OH-58D pilot training.
- Army officials added that the reprogramming will make it possible to restructure the aviation force without increasing the Army's overall planned expenditures on aviation through fiscal year 2019. Army officials told us that should the Army be delayed in implementing its force-structure proposal it would incur costs beyond what has been planned for within its budget. To defray these costs, the officials said they would likely be forced to delay critical helicopter modernization programs.

Objective 3: Cost Analyses and Comparative Cost Estimates (cont.)

- The Army's cost analyses of annual operating costs were suitable for the purpose for which they were prepared, but were limited in projecting actual costs and cost savings, should its proposal be implemented.
  - The Army's estimates of annual operations, personnel, and maintenance costs did not include a risk and uncertainty analysis that accounted for potential ranges of personnel and operational tempo requirements under its proposal and the Bureau's alternate. As a result, the Army prepared a point estimate of the costs of each proposal, without determining where this estimate fell along the range of possible costs.
  - Additionally, the Army's analysis did not account for cost differences among similar units as they moved through the Army's rotational readiness cycle. Rather, the Army assumed that all units in each proposal were neither returning from deployment (when their relative costs would be low) nor preparing to deploy (when their relative costs would be high). The Army also did not include any additive costs of mobilizing reserve component units when it estimated the proposals' costs. As a result, the Army's estimate did not estimate costs across the full range of operations.
- Army officials told us that their approach to estimating costs was intended to permit a comparison of the two proposals. The officials added that their estimates were not developed based on Army programming data, and were not intended to be used to develop future budget proposals.
- CAPE officials stated that the use of point estimates is a DOD accepted practice for estimating operations costs and other costs, especially when these estimates are based on a large volume of historical data.

Agency Views

- We provided a draft of this briefing to the Army, the National Guard Bureau, and CAPE and met with officials to obtain their comments.
  - The Army generally agreed with our analysis. Army officials stated that the Army has sought to address the Bureau's concerns with its force-structure proposal and has sought to mitigate the Bureau's concerns where possible. For example, the proposal was modified at the Bureau's request to include the acquisition of 100 new LUH-72 Lakota helicopters as training aircraft, rather than transfer these aircraft from Army National Guard units. However, Army officials emphasized that in their view the Bureau's proposal creates unacceptably high risk for the force and if it were implemented it could result in the Army providing inadequately trained and less-capable units that would be unable to meet combatant commander requirements. Officials further stated that without additional funding being allocated to address the risk under that force structure, the Army would need to reprogram funds or cancel other long-term programs or both.
  - The Bureau generally agreed with our analysis and the limitations that we identified. The Bureau stated that the Army's analysis could have significantly benefited from more sensitivity analysis regarding the scenario used to model the demand for forces. Additionally, the Bureau stated that the Army's analysis was constrained by current policies pertaining to how often Army National Guard units can be mobilized.
  - CAPE officials generally agreed with our analysis.
- We incorporated these perspectives and other technical comments, as appropriate, throughout the briefing.

Appendixes

Appendix I: Comparison of Army and National Guard Bureau Force Structure Proposals, as of February 2015

Proposal	Component	Number and type of battalions	AH-64E Apache	UH/HH-60 Blackhawk	CH-47 Chinook	UH-72 Lakota
Army	Active	22 Attack Reconnaissance[a]	528			
		11 Assault Helicopter		330		
		11 General Support Aviation		253	132	
	Reserve[c]	0 Attack Reconnaissance				
		20 Assault Helicopter[b]		600		
		15 General Support Aviation		495	192	
		6 Security and Support				192
National Guard Bureau (Bureau)	Active	18 Attack Reconnaissance	432			
		10 Assault Helicopter		300		
		10 General Support Aviation		230	120	
	Reserve[c]	6 Attack Reconnaissance[d]	120			
		18 Assault Helicopter		540		
		15 General Support Aviation		495	192	
		6 Security and Support				192

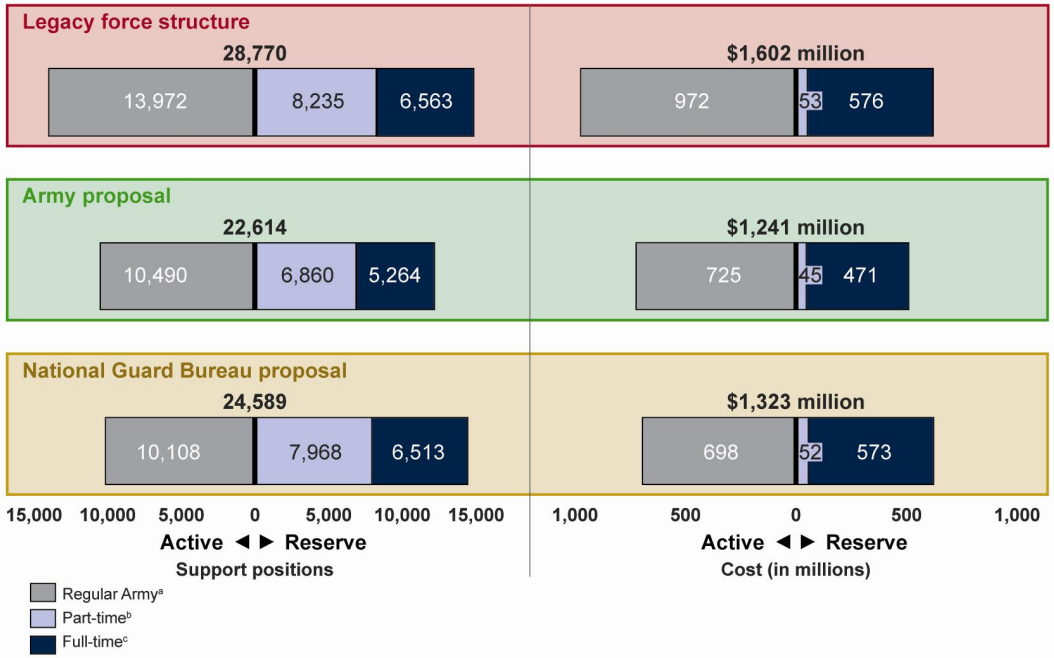
Source: GAO analysis of Army and National Guard Bureau data. | GAO-15-430R

[a]The Army's proposal includes two battalions' worth of equipment in South Korea. The Bureau's proposal does not include these battalions.
[b]Includes two Assault Battalions in the U.S. Army Reserve that are in the process of converting from Attack Reconnaissance battalions.
[c]"Reserve" includes the Army National Guard and the U.S. Army Reserve. It also includes two Theater Aviation Brigades, which are units stationed inside the United States that specialize in assault, heavy lift, aeromedical evacuation, and air movement.
[d]Includes 2 Attack Reconnaissance Battalions with 24 Apache helicopters each, and 4 battalions with 18 Apache helicopters each.

Appendix II: GAO Analysis of Personnel Support to Combat Aviation Brigades

- The Army's proposal and the National Guard Bureau's proposal will both result in a reduction in the overall number of required support positions, as shown in figure 5.
- We define "support" as personnel that directly or indirectly sustain combat aviation units—excluding flight crews and pilots. This includes mechanics, aviation operations personnel, and unmanned aircraft personnel.

Figure 5: Combat Aviation Brigades—Required Positions and Estimated Cost to Fund



Source: GAO analysis of Army and National Guard Bureau information. | GAO-15-430R

Notes: Some numbers may not sum up due to rounding.
[a]Regular Army refers to soldiers that are assigned to the active component when not deployed.
[b]Part-time refers to soldiers that are members of the Army Reserve or the Army National Guard and serve as either traditional reservists or guardsmen.
[c]Full-time includes full-time military personnel (active Guard/Reserve) and Military Technicians.

Legacy force structure

	Active	Reserve Part time	Reserve Full Time
Support Positions	13,972	13,972	6,563
Cost	$972 million	$53 million	$576 million

Army Proposal

	Active	Reserve Part time	Reserve Full Time
Support Positions	10,490	6,860	5,264
Cost	$725 million	$45 million	$471 million

National Guard Proposal

	Active	Reserve Part time	Reserve Full Time
Support Positions	10,108	7,968	6,513
Cost	$698 million	$52million	$573 million

Appendix II: GAO Analysis of Personnel Support to Combat Aviation Brigades (cont.)

Table 5: GAO Analysis of Required Positions and Estimated Cost to Fund Army and National Guard Bureau Force-Structure Proposals (as of February 2015)

	Army proposal		National Guard Bureau Proposal	
	Full-time support positions[a]	Military positions	Full-time support positions[a]	Military positions
Active Full-Spectrum Combat Aviation Brigade		10,490		10,108
Reserve Full-Spectrum Combat Aviation Brigade			2,381	2,480
Reserve Expeditionary Combat Aviation Brigade	5,264	6,860	4,131	5,488
Total number of positions	**5,264**	**17,350**	**6,513**	**18,076**
Total cost (fiscal year 2014 dollars in millions)[b]	**$471**	**$768**	**$573**	**$749**

Source: GAO analysis of Army and National Guard Bureau data. | GAO-15-430R

Notes: Some numbers may not sum up due to rounding.
[a]All data pertaining to the number of full-time support personnel required for each type of battalion were provided by the Army National Guard.
[b]Cost data for the full-time support positions were reported at $115,601 per active Guard/Reserve and $76,788 per Military Technician by the Army National Guard.

Appendix III: Fieldwork

Organization	Group
Office of the Secretary of Defense	• Cost Assessment and Program Evaluation
Department of the Army	• Department of the Army Military Operations-Aviation • Deputy Assistant Secretary of the Army—Cost and Economics • Office of the Army Deputy Chief of Staff, Programming • Office of the Army Deputy Chief of Staff, Program Analysis and Evaluation • Office of the Army Deputy Chief of Staff, Operations and Plans • U.S. Army Aviation Center of Excellence • U.S. Army Capabilities Integration Center • U.S. Army Force Management Support Agency • U.S. Army Forces Command • U.S. Army Training and Doctrine Command Analysis Center
National Guard Bureau / Army National Guard	• Support Special Assistant to the Director, Army National Guard Liaison for Aviation Transformation • Army National Guard Aviation • Personnel Programs, Resources and Manpower • Army National Guard, Plans • Army National Guard attack reconnaissance battalion (1-104th)[a] • Force Management Division
U.S. Army Reserve	• Office of the Chief of the Army Reserve • 11th Aviation Command Headquarters • U.S. Army Reserve assault helicopter battalion (8-229th)[a]

Source: GAO. | GAO-15-430R

[a]The two units we visited were chosen based on whether they were undergoing conversion, their deployment history, and their training location. While the information obtained at these units is not generalizable, it enabled us to obtain the perspectives of commanders and servicemembers who may be affected by the two force structure proposals discussed in this report.