United States Government Accountability Office

Report to the Honorable Charles E. Schumer, Majority Leader, U.S. Senate

March 2023

NATIONAL GUARD HELICOPTERS

Additional Actions Needed to Prevent Accidents and Improve Safety

Accessible Version

GAO-23-105219

GAO Highlights

Highlights of GAO-23-105219, a report to the Honorable Charles E. Schumer, Majority Leader, U.S. Senate

March 2023

NATIONAL GUARD HELICOPTERS

Additional Actions Needed to Prevent Accidents and Improve Safety

Why GAO Did This Study

National Guard helicopter units perform a range of federal and state missions, including combat search and rescue, medical evacuations, and disaster relief. The Army and Air National Guard experienced helicopter accidents that resulted in the deaths of 28 National Guard personnel during fiscal years 2012 through 2021, based on reported data.

GAO was asked to review issues related to National Guard helicopter accidents. This report examines (1) the trends from fiscal years 2012 through 2021 in reported Army and Air National Guard helicopter accidents in non-combat scenarios and reported causes; and evaluates the extent to which (2) the Army and Air National Guard used existing processes to promote safety and reduce risks during helicopter training; and (3) the Army and Air Force have addressed challenges, if any, that hindered National Guard helicopter pilot training.

GAO analyzed accident data from fiscal years 2012 through 2021; reviewed documents; and interviewed officials from a non-generalizable sample of units selected based on factors such as locations where accidents occurred.

What GAO Recommends

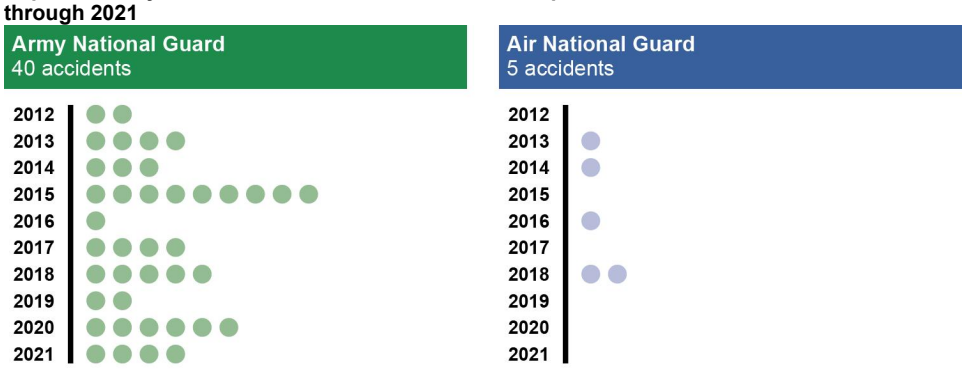
GAO is making 8 recommendations to the Army and Air Force, including that they take steps to ensure that their National Guard helicopter units continuously evaluate and update risk management worksheets and develop comprehensive strategies to address challenges that have hindered National Guard helicopter pilot training. The department generally agreed with GAO's recommendations.

View GAO-23-105219. For more information, contact Cary Russell at (202) 512-5431 or russellc@gao.gov.

What GAO Found

Army and Air National Guard reported 298 helicopter accidents during non-combat flight operations from fiscal years 2012 through 2021. Approximately 45 of those were considered serious helicopter accidents in that they involved death, permanent disability, extensive hospitalization, property damages of $500,000 or more, or a destroyed helicopter (see figure). These non-combat helicopter accidents fluctuated over time and were mainly due to human errors such as not following training standards, overconfidence, poor communication, and lack of awareness, according to GAO's analysis of Department of Defense data.

Reported Army and Air National Guard Serious Helicopter Accidents, Fiscal Years 2012 through 2021



Source: GAO analysis of Department of Defense data. | GAO-23-105219

Accessible Data for Reported Army and Air National Guard Serious Helicopter Accidents, Fiscal Years 2012 through 2021

	Army National Guard	Air National Guard
2012	2	0
2013	4	1
2014	3	1
2015	9	0
2016	1	1
2017	4	0
2018	5	2
2019	2	0
2020	6	0
2021	4	0

Note: Serious helicopter accidents include those that involved death, permanent disability, extensive hospitalization, property damages of $500,000 or more, or a destroyed helicopter. GAO analyzed non-combat helicopter accidents for four Army National Guard and one Air National Guard helicopter types, which were the primary helicopters used by the National Guard in fiscal years 2012 through 2021.

The Army and Air National Guard use a variety of processes to promote safety and reduce risks during helicopter training, but the effectiveness of their

respective flight safety training programs can be improved. National Guard helicopter units use risk management processes during aviation operations, but GAO found each component did not continuously evaluate and update unit level risk management worksheets to incorporate relevant safety information such as accident data and unit culture surveys. By evaluating these worksheets on a routine and recurring basis, Army and Air National Guard helicopter units will ensure those units have cyclical feedback and evaluation of this key risk management process to help ensure risk management procedures are effective.

The Army and Air National Guard established flying hour goals, but pilots did not fly enough on average to meet them due to lack of aircrew availability, maintenance issues, and simulator access. For example, having too few maintenance personnel limited the number of helicopters available for training. The Army and Air Force, including their National Guard components, have taken steps to mitigate these challenges, such as conducting formal studies, but these steps have not fully addressed the identified challenges. By developing comprehensive strategies, the Army and Air Force would be better positioned to fully address the identified challenges that have hindered National Guard helicopter pilot training.

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Abbreviations

DOD	Department of Defense
FY	Fiscal Year

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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March 14, 2023

The Honorable Charles E. Schumer
Majority Leader
United States Senate

Dear Majority Leader Schumer:

National Guard helicopter units perform a range of federal and state missions, including combat search and rescue, medical evacuations, and disaster relief.[1] Army and Air National Guard have experienced several recent high-profile helicopter accidents in on-duty, non-combat scenarios.[2] These types of accidents resulted in the deaths of 28 National Guard personnel from fiscal years 2012 through 2021, based on reported data. Helicopter accidents take many forms, including collisions, wire strikes, and hard landings, and can be caused by human, environmental, and mechanical factors.[3] Recent reports have raised concerns about the readiness and safety of military aviation more broadly. For example, a report by the National Commission on Military Aviation Safety found that

[1]Generally, the National Guard can operate in three different statuses: (1) state status—state funded, under the command and control of the governor; (2) Title 32 status—federally funded, under the command and control of the governor; and (3) Title 10 status—federally funded, under the command and control of the Secretary of Defense.

[2]The Department of Defense (DOD) refers to accidents that occur outside of engagement with an adversary as "mishaps." A mishap is an unplanned event or series of events that results in damage to DOD property; occupational illness to DOD personnel; injury or death to on- or off-duty DOD military personnel; injury or death to on-duty DOD civilian personnel; damage to public or private property; or injury or death or illness to non-DOD personnel, caused by DOD activities. Throughout this report, we use the term "accident" to mean mishap. Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018).

[3]For the purposes of this report, when we use the term aircraft we are specifically referring to helicopters. Some military service policies and measures include the term aircraft because the guidance is more broadly applicable to all aircraft. For the purposes of this report, the term resources refers to personnel, funding, equipment, and other tools used to support helicopter training and maintenance.

aviation accidents led to 198 deaths, 157 aircraft lost, and a cost to taxpayers of close to $9.41 billion from 2013 through 2018.[4]

The Army Combat Readiness Center and the Air Force Safety Center have the responsibility to track, record, and analyze accidents and accident trends for their respective military services, including National Guard units. In 2018, we reported that the military services' safety centers did not collect standardized data as part of their accident investigations.[5] Among other things, we recommended that the Department of Defense (DOD) take steps to help ensure that the safety centers collect standardized data elements for aviation accidents specifically. DOD concurred with our recommendations, and as of November 2022, a DOD official reported that the department was working to implement them.

You asked us to review issues related to National Guard helicopter accidents. This report (1) examines the trends from fiscal years 2012 through 2021 in reported Army and Air National Guard helicopter accidents in non-combat scenarios and reported causes; (2) evaluates the extent to which the Army and Air National Guard used existing processes to promote safety and reduce risks during helicopter training; and (3) evaluates the extent to which the Army and Air National Guard have addressed challenges, if any, that hindered helicopter pilot training.

Each of our objectives focuses on the primary Army and Air National Guard helicopter types used during fiscal years 2012 through 2021. The Army helicopters we focused on are the AH-64 Apache, UH/HH-60 Black

[4]National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States*, (Dec.1, 2020).

[5]GAO, *Military Aviation Mishaps: DOD Needs to Improve Its Approach for Collecting and Analyzing Data to Manage Risks,* GAO-18-586R (Washington, D.C.: Aug. 15, 2018).

Hawk, CH-47 Chinook, and UH-72 Lakota. For the Air Force, we focused on the HH-60G Pave Hawk.[6]

To address our first objective, we analyzed accident data provided by the Army Combat Readiness Center and Air Force Safety Center for the helicopters in our scope from fiscal years 2012 through 2021 to determine trends in helicopter accidents, such as number and rate of accidents by accident class, year, helicopter types, and event types such as collisions.[7] We met with agency officials who report, maintain, and use the accident data in order to understand how the information is used and to help us assess its reliability and completeness. We also performed electronic testing of the data to check for missing values and internal consistency. We determined the data were sufficiently reliable for the purposes of identifying general trends in the reported number and severity of accidents, accident rates, military deaths caused by accidents, and common causal factors for certain types of accidents.[8] We also analyzed available narrative descriptions of Class A and B accidents to examine causal factors, such as human and environmental factors.

To address our second objective, we identified and reviewed Army and Air National Guard processes that are intended to promote safety and

[6]According to Army and Air Force officials, these were the primary aircraft operated by the Army and Air National Guard from fiscal years 2012 through 2021. The Army National Guard operated some additional aircraft during fiscal year 2012, such as the AH-1 Cobra, OH-6 Cayuse, and OH-58 Kiowa. However, the Army AH-64 Apache, UH/HH-60 Black Hawk, CH-47 Chinook, UH-72 Lakota, and Air Force HH-60G Pave Hawk were the primary aircraft operated during this time frame, officials stated. For the purposes of this report, we refer to the helicopters by name (e.g., Apache, Black Hawk, Chinook, Lakota, and Pave Hawk), not classification. The Army and Air Force use a classification system involving letters and numbers to identify different types of helicopters. For the helicopters discussed in our report, the classification formula begins with a single letter that indicates the mission of the helicopter, such as “A” (Attack), “C” (Transport), “H” (Search/Rescue/Medical Evacuation), and “U” (Utility). The second letter, “H” indicates that the aircraft is a helicopter, and is followed by a number indicating a specific design. Single letter suffixes are then added after the design numbers to indicate the production model of the helicopter. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

[7]DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. DOD Instruction 6055.07.

[8]For the purposes of this report, we use the term trend to refer to the number of accidents and characteristics of those accidents reported over time or summarized for the period covered by our review.

reduce risks during helicopter training. We reviewed documents and interviewed a non-generalizable selection of unit personnel—selected based on factors such as locations where accidents occurred—to assess the use and implementation of the safety processes. We compared how the processes were used against criteria in DOD and military service-level guidance, and our prior work.[9] We determined the control environment component of the *Standards for Internal Control in the Federal Government* was significant to this objective, specifically the associated underlying principle that management should consider excessive pressures on personnel.[10]

To address our third objective, we analyzed data for the number of flying hours that Army and Air National Guard helicopter pilots performed for fiscal years 2017 through 2021. We identified factors that affected flying hour trends and challenges that hindered Army and Air National Guard helicopter pilot training. We also identified departmental, military service, and National Guard-specific initiatives to address identified challenges and determined the extent that those initiatives were implemented by the Army and Air National Guard. We determined the risk assessment component of the *Standards for Internal Control in the Federal Government* was significant to this objective, specifically the associated underlying principle that management should identify, analyze, and respond to risks related to achieving the defined objectives.[11] We also compared Army and Air Force initiatives to address helicopter pilot training challenges with leading practices for results-oriented organizations.[12] Appendix I provides further details on our objectives, scope, and methodology.

We conducted this performance audit from May 2021 to March 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our

[9]GAO, *Defense Management: DOD Needs to Take Additional Actions to Promote Department-Wide Collaboration*, GAO-18-194 (Washington, D. C.: Feb. 28, 2018).

[10]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 2014).

[11]GAO-14-704G.

[12]For example, see GAO, *Veterans' Health Care: Proper Plan Needed to Modernize System for Paying Community Providers*, GAO-16-353 (Washington, D.C.: May 11, 2016) and GAO, *Automated Vehicles: Comprehensive Plan Could Help DOT Address Challenges*, GAO-18-132 (Washington, D.C.: Nov. 30, 2017).

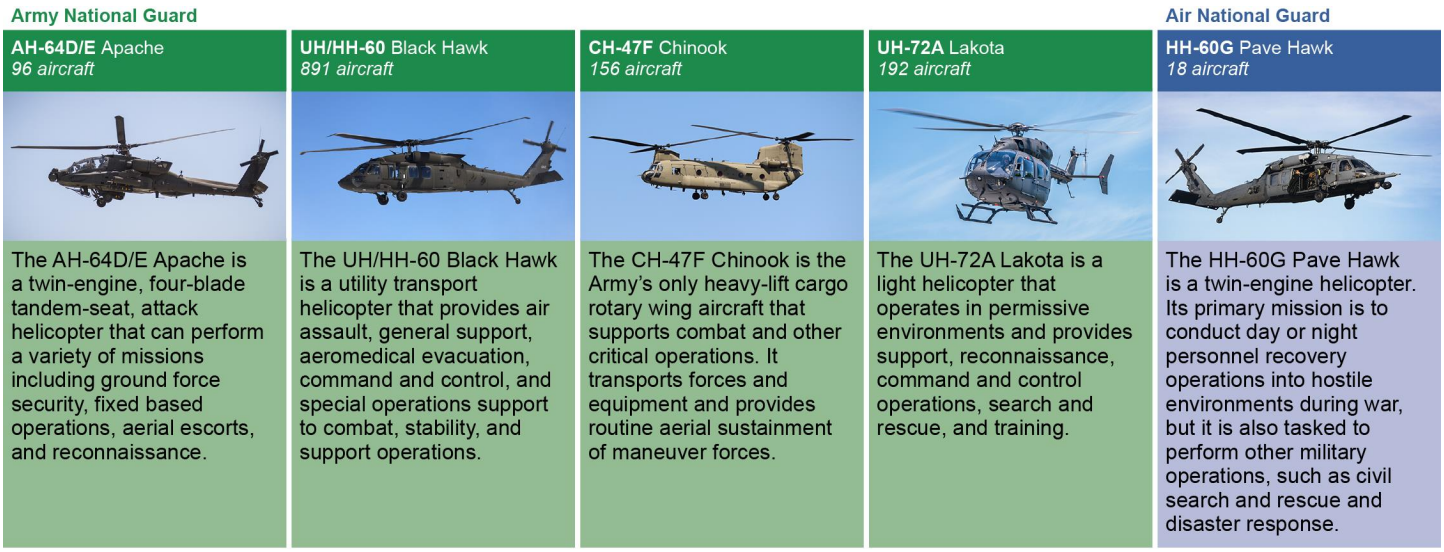
findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Army and Air National Guard Helicopter Types

Army and Air National Guard units use several types of helicopters to achieve their missions. The scope of helicopters in this report comprises variants of the Apache, Black Hawk, Chinook, and Lakota used by the Army National Guard, and the Pave Hawk used by the Air National Guard (see fig. 1).

Figure 1: Primary Army and Air National Guard Helicopters and Inventory as of Fiscal Year 2021



Source: GAO analysis of Department of Defense information. Photos (left to right): U.S. Army/Captain Brian Harris, U.S. Army/Scott T. Sturkol, U.S. Army/Scott T. Sturkol, U.S. Army National Guard/Specialist Michael Schwenk, and U.S. Air Force/Senior Airman Greg Nash. | GAO-23-105219

Accessible Data for Figure 1: Primary Army and Air National Guard Helicopters and Inventory as of Fiscal Year 2021

- **https://www.dvidshub.net/image/3338277/into-sky**
- **https://www.dvidshub.net/image/5186256/wisconsin-national-guard-uh-60-black-hawk-operations-fort-mccoy**
- **https://www.dvidshub.net/image/5660922/ch-47-chinook-sling-load-training-fort-mccoy**
- **https://www.dvidshub.net/image/6703101/gloucester-county-vaccine-mega-site-closes**

- https://www.dvidshub.net/image/5034135/joint-spin-up-joint-fight

Note: Unit aircraft inventories reflect unit authorization documents for fiscal year 2021. Actual quantities fluctuate daily based on factors such as transfers, fielding, maintenance, and depot repair.

As shown in figure 1 above, the Army National Guard operates a much larger inventory of helicopters compared with the Air National Guard. The Army National Guard flies more total hours each year than the Air National Guard. From fiscal years 2012 through 2021, the Army National Guard averaged about 200,000 flying hours per year (2,028,893 total flying hours) across these aircraft, and the Air National Guard averaged about 3,500 flying hours per year (34,720 total flying hours).

Aviation Accident Categories and Severity Classes

DOD defines an aviation mishap as an accident involving aircraft or flying operations. DOD categorizes aviation accidents in one of three ways: flight, flight related, and ground operations. Each aviation accident subcategory has its own distinct characteristics (see table 1).

Table 1: Department of Defense (DOD) Aviation Accident Subcategories

Subcategory	Subcategory characteristics
Flight	An accident where there is intent for flight and damage to DOD aircraft.
Flight Related	An accident where there is intent for flight and no reportable damage to the aircraft itself, but the accident involves a fatality, reportable injury, or reportable property damage.
Ground Operations	An accident where there is no intent for flight that results in damage to an aircraft or death or injury involving an aircraft.

Source: Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018). I GAO-23-105219

DOD also categorizes accidents by severity, with Class A accidents being the most severe, and Class D accidents being the least severe. Accident severity is determined based on criteria regarding the cost of damages or injuries resulting from the accident. DOD most recently adjusted the monetary thresholds for accident classes upward in October 2019 (see table 2).

Table 2: Department of Defense (DOD) Accident Classes from Fiscal Years 2012 through 2021

Class of accident	Cost of damages	Injuries
Class A	• Fiscal years (FY) 2020 through 2021: Greater than or equal to $2.5 million or resulted in a destroyed aircraft • FY 2012 through 2019: Greater than or equal to $2 million or resulted in a destroyed aircraft	Death or permanent total disability

Class of accident	Cost of damages	Injuries
Class B	• FY 2020 through 2021: $600,000 or more, but less than $2.5 million • FY 2012 through 2019: $500,000 or more, but less than $2 million	Permanent partial disability or inpatient hospital care for three or more individuals
Class C	• FY 2020 through 2021: $60,000 or more, but less than $600,000 • FY 2012 through 2019: $50,000 or more, but less than $500,000	Injury or occupational illness that results in a lost work day(s) not including shift being worked when injury or occupational illness occurred
Class D	• FY 2020 through 2021: $25,000 or more, but less than $60,000 • FY 2012 through 2019: $20,000 or more, but less than $50,000	Any recordable injury or illness that does not meet the threshold for Class A, B, or C

Source: Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018) and Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs*, (Oct. 15, 2019). I GAO-23-105219

There are also military service-defined accidents that fall below Class D. For example:

- An Army *Class E aviation accident* is an aviation accident in which the resulting total cost of property damage is $5,000 or more but less than $20,000. An Army Class F aviation incident is a recordable incident confined to aircraft turbine engine damage because of unavoidable internal or external foreign object damage, where that is the only damage (does not include installed aircraft auxiliary power units).[13]
- The Air Force categorizes work-related mishaps as either a *Class E mishap* if it involves damage or injury that does not meet Class D criteria or a *hazard* if it involves no damage or injury.[14]

Army and Air Force Helicopter Pilot Training Progression

The Army and Air Force have different training progressions for helicopter pilots and ways to monitor the status of aviation training. In general, once helicopter pilots have completed new pilot training, the Army and the Air Force both have set goals for how often helicopter pilots must fly in order

[13]Army Regulation 385-10, *The Army Safety Program* (Feb. 24, 2017).

[14]Department of the Air Force Instruction 91-204, *Safety Investigations and Reports* (Mar. 10, 2021) and Department of the Air Force Manual 91-223, *Aviation Safety Investigations and Reports* (Sept. 20, 2022).

to maintain currency (i.e., flying recently to remain qualified in an aircraft) and also to develop proficiency in specific flying skills or mission tasks.

The Army Aviation Training Strategy outlines the general training progression for Army helicopter pilots.[15] Initial training consists of basic training, professional military education, functional training, and then Initial Entry Rotary Wing Training, which occurs at Fort Rucker, Alabama. After completing this training, a pilot is assigned to a unit and begins to build experience to progress through readiness levels. Readiness level progression begins with development of individual level proficiency (readiness level 3) and progresses through crew to collective proficiency. Upon reaching readiness level 1, a pilot can fly without an instructor pilot. At this point "currency" and other training requirements set the minimum amount of flying hours that pilots need to perform on a recurring basis or within set intervals. Army currency standards are established in *Army Regulation 95-1 Flight Regulations*.[16] To be considered current in Army aircraft, individuals must take part in flight once every 60 days at a crew station with access to flight controls.

The Army also has additional standards in *the UH-60 Series Aircrew Training Manual* for Black Hawk helicopters, which applies to the four Army helicopters we included in our scope, though the semi-annual (i.e., every 6-month) flying hour requirements differ slightly by helicopter type.[17] Additionally, soldiers are assigned a flight activity category based on their role in the unit. For instance, unit leadership may not have as high of a flying hour requirement as a pilot whose primary job is flying. The Army's annual flying hour requirements by flight activity category are shown in table 3, below.

Table 3: Annual Army Flying Hour Requirements for Selected Aircraft

Aircraft	Flight activity category 1 (hours)	Flight activity category 2 (hours)	Flight activity categories 3 and 4 (hours)
Apache	140	100	0
Black Hawk	96	60	0
Chinook	90	66	0

[15]United States Army Aviation Center of Excellence, *Army Aviation Training Strategy*, (Fort Rucker, AL: Jan. 2020).

[16]Army Regulation 95-1, *Flight Regulations* (Mar. 22, 2018).

[17]United States Army Aviation Center of Excellence, *UH-60 Series Aircrew Training Manual* (Mar. 25, 2021).

Aircraft	Flight activity category 1 (hours)	Flight activity category 2 (hours)	Flight activity categories 3 and 4 (hours)
Lakota	96	60	0

Source: GAO analysis of Army information. | GAO-23-105219

Note: Flight activity categories are based on the flight task requirements and proficiency required by the position. Flight activity category 1 positions require a high degree of flight proficiency.

When personnel first enter the Air Force, they receive basic military training. After basic military training, a new pilot receives additional training, including undergraduate pilot training by the Air Force's Air Education and Training Command. Next, a pilot receives initial qualification training that is focused on the basic training necessary to qualify for flying duties. After initial qualification training, a pilot is assigned to a unit, and begins mission qualification training—additional training on the skills specific to the unit's capabilities.

The Air Force has different aircraft-specific training manuals. For example, the Pave Hawk training requirements are listed in Air Force Manual 11-2HH-60GV1.[18] In addition, Air Combat Command publishes a memorandum called the Ready Aircrew Program Tasking Memorandum to establish annual continuation training requirements for Air Force Pave Hawk pilots.[19] This document breaks down the different sorties that pilots are expected to fly over the course of 1-, 3-, and 12- month "lookbacks".[20] The Air Force establishes different sortie requirements for pilots who are experienced and inexperienced, and who are designated Combat Mission Ready versus Basic Mission Capable.[21] Table 4 summarizes these requirements for Pave Hawk pilots.

[18]Air Force Manual 11-2HH-60GV1, *HH-60G Aircrew Training* (Apr. 16, 2020).

[19]Air Combat Command, *HH-60G Ready Aircrew Program (RAP) Tasking Memorandum, Aviation Schedule 2022 (AS-22)* (Oct. 1, 2021).

[20]According to Air Force officials, one sortie typically averages about 3 hours of flying time in length.

[21]Combat Mission Ready means the aircrew members have successfully completed initial training and maintain certification, currency, and proficiency for the designated unit's combat mission. Basic Mission Capable means an aircrew member has successfully completed initial training and has passed an in-flight evaluation, but does not fly frequently enough to maintain mission ready status. Air Force Pave Hawk pilots are considered inexperienced until they reach 150 hours of flight time, 75 of which must occur using night vision devices.

Table 4: Fiscal Year 2022 Air Force Sortie and Flying Hour Requirements for Pave Hawk Helicopter Pilots

Component	Combat Mission Ready: *Experienced*	Combat Mission Ready: *Inexperienced*	Basic Mission Capable: Experienced	Basic Mission Capable: Inexperienced
Active Air Force	60 (approximately 180 hours)	72 (approximately 216 hours)	27 (approximately 81 hours)	31 (approximately 93 hours)
Air Force Reserve and National Guard	40 (approximately 120 hours)	51 (approximately 153 hours)	20 (approximately 60 hours)	24 (approximately 72 hours)

Source: GAO analysis of Air Force information. | GAO-23-105219

Note: According to our analysis of Air Force documentation and Air National Guard officials, a sortie (flying mission) averages approximately 3 hours in length.

Air Force officials told us that it takes approximately 150 flying hours annually (about 12.5 hours per month) to achieve combat mission readiness. According to the Pave Hawk training manual, crewmembers who are combat mission ready normally accomplish enough training to remain proficient in the primary missions of their weapon system and unit.[22]

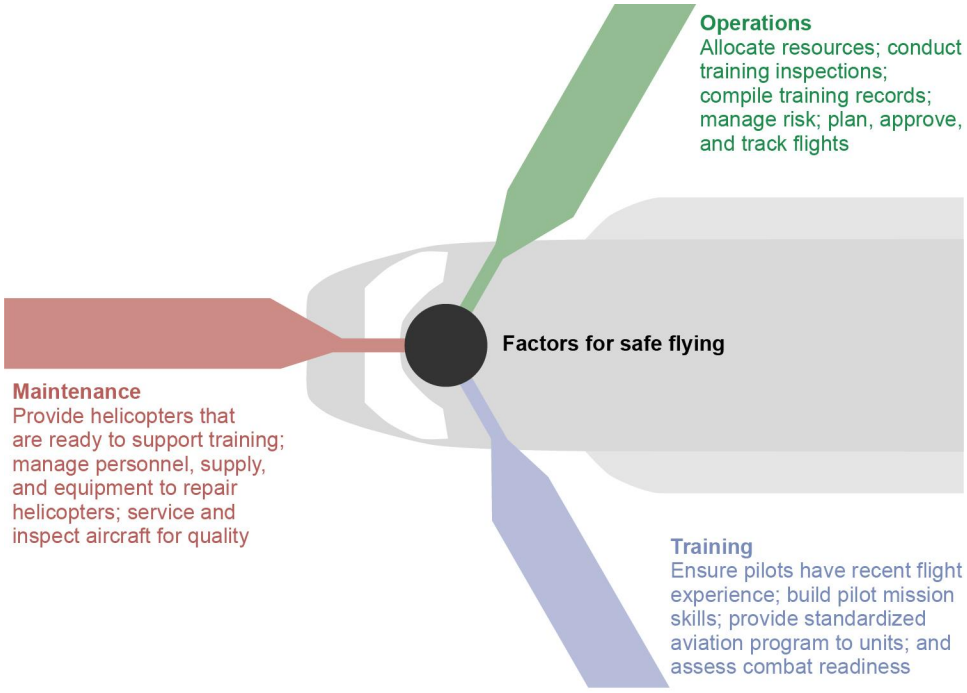
To help part-time pilots build up an initial level of experience, Army and Air National Guard units typically place new pilots that join a unit on temporary active duty orders for a period of time. In the Army, unit officials indicated this period lasts 30–60 days and focuses on readiness level progression as established in Army aviation training documentation. Air National Guard unit commanders reported that they bring new pilots in for an average of 235–270 days for Local Mission Qualification Training and experience-building flights that they called seasoning training.

Key Factors for Safe Flying

Army and Air National Guard officials told us safe flying is enabled by balancing resources for three key factors: operations, maintenance, and training, as shown in figure 2.

[22]Air Force Manual 11-2HH-60GV1, *HH-60G Aircrew Training* (Apr. 16, 2020).

Figure 2: Army and Air National Guard Factors for Conducting Safe Flight Operations



Source: GAO analysis of Department of Defense information. | GAO-23-105219

Note: We did not list all of the sub-factors, which could be shared among the three key factors. For example, Army and Air Force officials stated that personnel staffing levels are important to each of the three factors.

National Guard Helicopter Accidents Fluctuated and Were Mainly Caused by Human Error

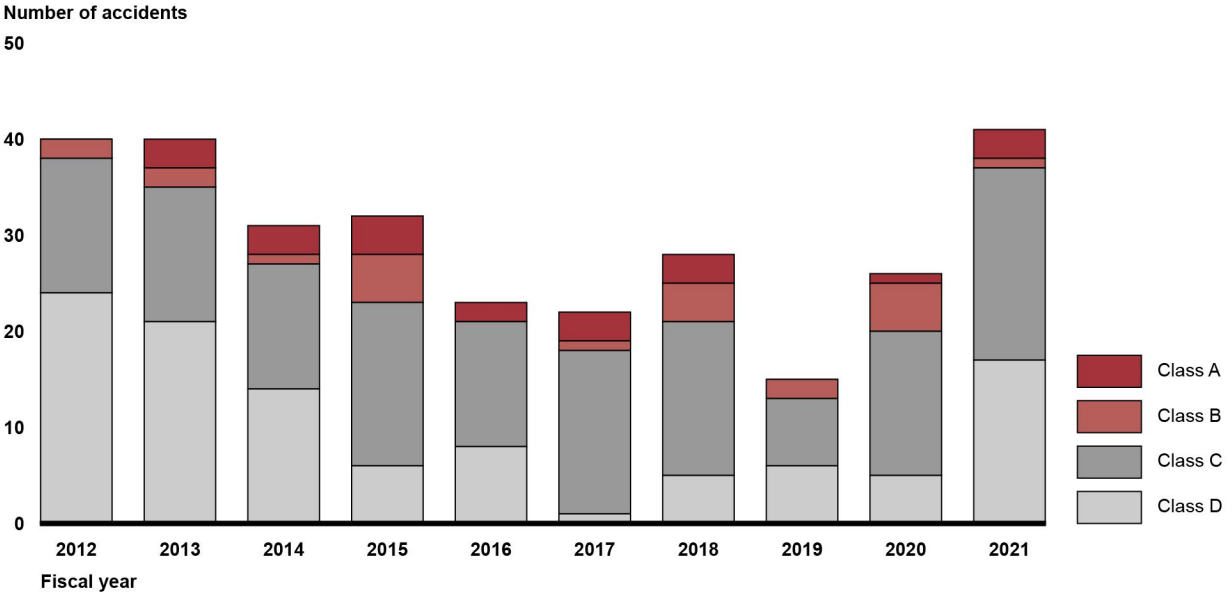
National Guard Helicopter Accidents Varied during Fiscal Years 2012 through 2021

The Army and Air National Guard reported 298 Class A through D helicopter accidents during non-combat scenarios for fiscal years 2012 through 2021, according to data provided by the Army Combat Readiness Center and Air Force Safety Center.[23] The annual number of reported Army and Air National Guard helicopter accidents varied during these 10

[23]DOD categories accidents by severity, with Class A accidents being the most severe and Class D accidents being the least severe. See table 2.

years. Total reported accidents decreased between fiscal years 2012 and 2016 and increased in the last two fiscal years (see fig. 3).

Figure 3: Reported Army and Air National Guard Class A-D Helicopter Accidents, Fiscal Years 2012 through 2021



Source: GAO analysis of Department of Defense data. | GAO-23-105219

Accessible Data for Figure 3: Reported Army and Air National Guard Class A-D Helicopter Accidents, Fiscal Years 2012 through 2021

Fiscal year	Class D	Class C	Class B	Class A
2012	24	14	2	0
2013	21	14	2	3
2014	14	13	1	3
2015	6	17	5	4
2016	8	13	0	2
2017	1	17	1	3
2018	5	16	4	3
2019	6	7	2	0
2020	5	15	5	1
2021	17	20	1	3

Note: We analyzed 298 Class A through D non-combat helicopter accidents for the four Army National Guard airframes in our scope—the Apache, Chinook, Black Hawk, and Lakota, and one Air National Guard airframe, the Pave Hawk. For more information on our methodology, see appendix I.

Our analysis found that the number of Class A and B accidents, which have the most serious injuries and financial costs, varied during this time period. The National Guard experienced at least one Class A or B helicopter accident each fiscal year, four or more such accidents in seven of the 10 fiscal years, and a high of nine in fiscal year 2015. After experiencing two Class B and zero Class A helicopter accidents in fiscal year 2019, the National Guard experienced six Class B and four Class A accidents during fiscal years 2020 through 2021.

Our analysis also found that recent increases in the reported number of helicopter accidents in the less serious classes (Class C and D) contributed to the variation in the total number of reported accidents. Officials with the Army Combat Readiness Center and Air Force Safety Center were uncertain about whether the reporting of Class C and D accidents were complete, noting that underreporting of less serious accidents likely occurs for a variety of reasons, including that the unit did not deem the accident serious enough to warrant reporting.[24] Units have consistently reported Class A and B helicopter accidents, these officials noted. According to Combat Readiness Center officials, in recent years the Army has placed an increased emphasis on reporting Class C and below accidents including by fielding a new reporting tool in fiscal year 2020 and developing a communications plan and training to increase the awareness of reporting requirements across the military service. According to officials, these efforts likely account for some of the increase in reported numbers of Class C and D helicopter accidents for fiscal years 2020 and 2021.

The Army National Guard has a much higher number of average flying hours and available helicopter inventory than the Air National Guard.[25] Consistent with its greater use of helicopters, the Army National Guard reported most of the total helicopter accidents as well as the most serious (Class A and B accidents). Specifically:

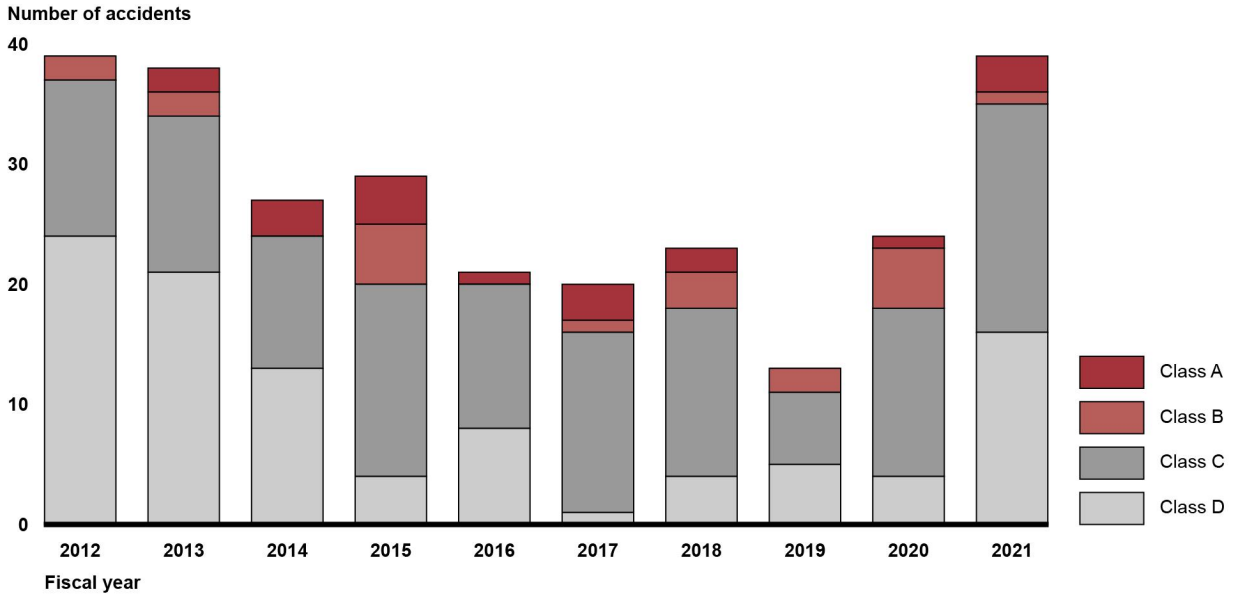
Army National Guard. Of the 298 accidents, the Army National Guard reported 273 Class A through D helicopter accidents during non-combat

[24]We have previously identified areas for improvement and made recommendations regarding DOD's approach for collecting, analyzing, and reporting accident data. See, for example, GAO-18-586R. DOD has made some progress in addressing the recommendations, but has not yet fully addressed them.

[25]From fiscal years 2012 through 2021, the Army National Guard averaged about 200,000 flying hours per year across an inventory of approximately 1,300 aircraft, and the Air National Guard averaged about 3,500 flying hours per year with an inventory of 18 aircraft.

scenarios for fiscal years 2012 through 2021 (see fig. 4). The Army National Guard reported 40 Class A and B helicopter accidents, or an annual average of 4 combined Class A and B accidents per year during fiscal years 2012 through 2021. The year with the highest number of Army National Guard Class A and B helicopter accidents was fiscal year 2015 with nine total, and the Army National Guard experienced at least two Class A or B accidents in each year except for 2016 (when there was one Class A accident reported).

Figure 4: Reported Army National Guard Class A–D Helicopter Accidents, Fiscal Years 2012 through 2021



Source: GAO analysis of Army accident data. | GAO-23-105219

Accessible Data for Figure 4: Reported Army National Guard Class A–D Helicopter Accidents, Fiscal Years 2012 through 2021

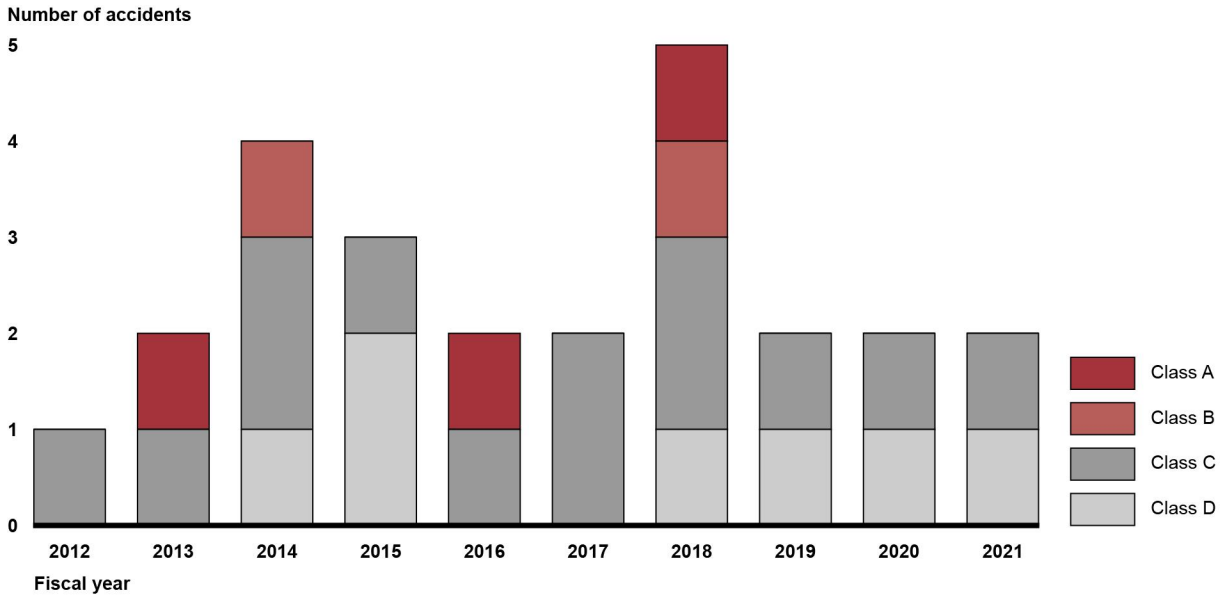
Fiscal year	Class D	Class C	Class B	Class A
2012	24	13	2	0
2013	21	13	2	2
2014	13	11	0	3
2015	4	16	5	4
2016	8	12	0	1
2017	1	15	1	3
2018	4	14	3	2
2019	5	6	2	0
2020	4	14	5	1
2021	16	19	1	3

Note: We analyzed 273 Class A through D non-combat helicopter accidents for the four Army National Guard airframes in our scope—the Apache, Chinook, Black Hawk, and Lakota. For more information on our methodology, see appendix I.

Appendix II provides more detail on Army National Guard accidents by fiscal year, accident class, and helicopter type.

Air National Guard. Of the 298 total accidents, the Air National Guard reported 25 Class A through D helicopter accidents during non-combat scenarios for fiscal years 2012 through 2021. Of the total, five were Class A and B accidents (see fig. 5).

Figure 5: Reported Air National Guard Class A–D Helicopter Accidents, Fiscal Years 2012 through 2021



Source: GAO analysis of Air Force accident data. | GAO-23-105219

Accessible Data for Figure 5: Reported Air National Guard Class A–D Helicopter Accidents, Fiscal Years 2012 through 2021

Fiscal year	Class D	Class C	Class B	Class A
2012	0	1	0	0
2013	0	1	0	1
2014	1	2	1	0
2015	2	1	0	0
2016	0	1	0	1
2017	0	2	0	0
2018	1	2	1	1

Fiscal year	Class D	Class C	Class B	Class A
2019	1	1	0	0
2020	1	1	0	0
2021	1	1	0	0

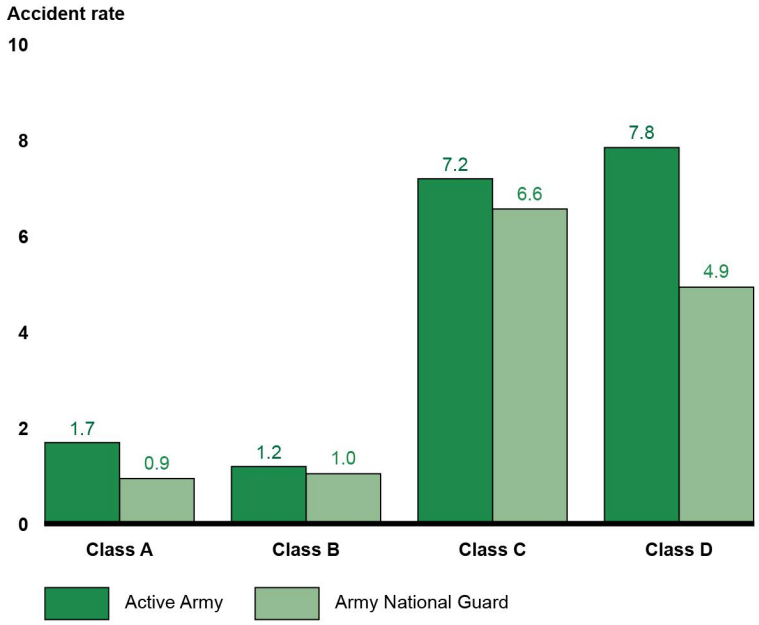
Note: We analyzed 25 Class A through D non-combat helicopter accidents for the Air National Guard Pave Hawk airframe included in our scope. The Class A accident from 2016 involved injuries to Air National Guard personnel that occurred aboard the variant of the Army National Guard Black Hawk helicopter. For more information on our methodology, see appendix I.

More specifically, the Air National Guard reported three Class A and two Class B helicopter accidents, and experienced these accidents in four of the 10 fiscal years in our scope. The Air National Guard also experienced a total of 13 Class C and seven Class D helicopter accidents during this same time period, or an average of about two Class C or Class D accidents each year. Appendix III provides more detail on Air National Guard helicopter accidents by fiscal year and accident class.

Accident rates. We also calculated Army and Air Force active component and National Guard component helicopter accident rates from fiscal years 2012 through 2021.[26] We found that the Army National Guard experienced accident rates below the Army active component across all accident classes over the 10-year period (see fig. 6).

[26]An "accident rate" is a measure of accidents per 100,000 flight hours and is a widely accepted standard for measuring the rate of accidents in the aviation community. Accident rate calculations can allow for comparisons across elements such as components and helicopter types, while accounting for different flight hours among those elements.

Figure 6: Class A–D Helicopter Accident Rate by Active Army and Army National Guard Component, Fiscal Years 2012 through 2021



Source: GAO analysis of Army data. | GAO-23-105219

Accessible Data for Figure 6: Class A–D Helicopter Accident Rate by Active Army and Army National Guard Component, Fiscal Years 2012 through 2021

	Active Army	Army National Guard
Class A	1.69	0.94
Class B	1.19	1.04
Class C	7.19	6.56
Class D	7.84	4.93

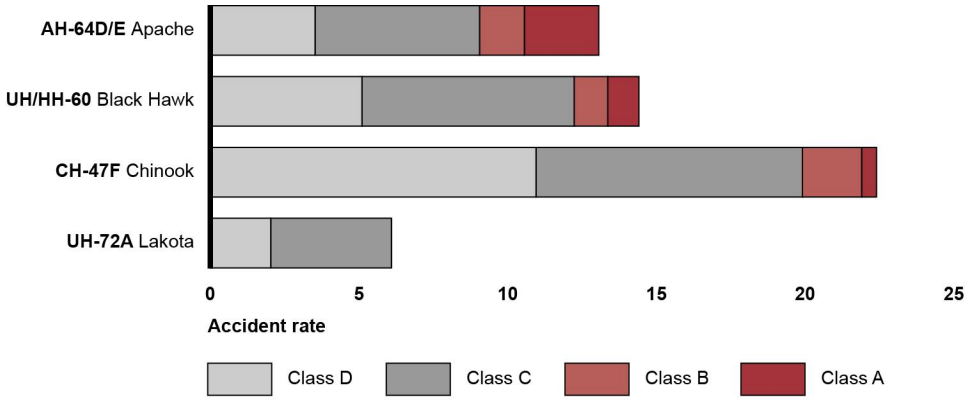
Note: Our analysis of accident rates follows a widely accepted standard of measuring accidents per 100,000 flight hours. The accident rate equals the number of accidents per year divided by the number of flight hours per year and then multiplied by 100,000. We analyzed 273 Class A through D non-combat helicopter accidents for the Army National Guard component and 720 Class A through D non-combat helicopter accidents for the active component, across the four airframes in our scope—the Apache, Chinook, Black Hawk, and Lakota. For more information on our methodology, see appendix I.

Our analysis found that the higher rate of Class A helicopter accidents in the Active Army (1.7 accidents per 100,000 flight hours) compared with

the Army National Guard (0.9 accidents per 100,000 flight hours) was statistically significant.[27]

Within the Army National Guard, the Chinook experienced the highest rate of total helicopter accidents followed by the Black Hawk, while the Apache had the highest rate of Class A accidents (see fig. 7).

Figure 7: Army National Guard Accident Rates by Helicopter Type and Class, Fiscal Years 2012 through 2021



Source: GAO analysis of Army data. | GAO-23-105219

Accessible Data for Figure 7: Army National Guard Accident Rates by Helicopter Type and Class, Fiscal Years 2012 through 2021

	Class D	Class C	Class B	Class A
AH-64D/E Apache	3.52	5.53	1.51	2.5
UH/HH-60 Black Hawk	5.1	7.13	1.13	1.05
CH-47F Chinook	10.95	8.96	1.99	0.5
UH-72A Lakota	2.03	4.06	0	0

Note: Our analysis of accident rates follows a widely accepted standard of measuring accidents per 100,000 flight hours. The accident rate equals the number of accidents per year divided by the number of flight hours per year and then multiplied by 100,000. We analyzed 273 Class A through D non-combat helicopter accidents for the four Army National Guard airframes in our scope—the

[27]We assessed statistical significance through a test of differences in accident rates. For these accident rate data, we assumed a Poisson distribution, which gives the probability of events over a fixed period of time. We determined statistical significance using an alpha level of 0.05.

Apache, Chinook, Black Hawk, and Lakota. For more information on our methodology, see appendix I.

We also compared Army Active and Army National Guard accident rates for each of the four helicopter types in our scope—the Apache, Black Hawk, Chinook and Lakota. However, the accident numbers for each individual airframe were too small to make meaningful conclusions.

In addition to the 10-year accident rates presented above, we also analyzed period mean rates for the Army National Guard. To do this we, compared the accident rate for the first five fiscal years of our scope (fiscal years 2012 through 2016) with the second five fiscal years of our scope (fiscal years 2017 through 2021). This analysis allowed us to determine if rates increased, decreased, or stayed the same (see table 5).[28] We detected no statistical difference in the accident rates between the two periods.

[28]The period mean is a calculation of the sum of the number of accidents in a given period divided by the sum of the flight hours in the period and then multiplied by 100,000. Period mean takes into account any changes across the period and does not emphasize any one year.

Table 5: Reported Army National Guard Accidents and Accident Rates by Class for Fiscal Years 2012 through 2016 and Fiscal Years 2017 through 2021

Accident Class	Fiscal years 2012 through 2016: Accidents	Fiscal years 2012 through 2016: Rate	Fiscal years 2017 through 2021: Accidents	Fiscal years 2017 through 2021: Rates
Class A	10	0.93	9	0.94
Class B	9	0.84	12	1.25
Class C	65	6.06	68	7.11
Class D	70	6.53	30	3.14

Source: GAO analysis of Army accident data. I GAO-23-105219

Note: Our analysis of accident rates follows a widely accepted standard of measuring accidents per 100,000 flight hours. The accident rate equals the number of accidents per year divided by the number of flight hours per year and then multiplied by 100,000. We analyzed 273 Class A through D non-combat helicopter accidents for the four Army National Guard airframes in our scope—the Apache, Chinook, Black Hawk, and Lakota. For more information on our methodology, see appendix I.

The Air Force Active and Air National Guard accident numbers for the helicopter were too small to make meaningful conclusions through rate analysis.[29] See appendix IV for more details on accident rates including number of accidents and amount of flying hours by helicopter type and component.

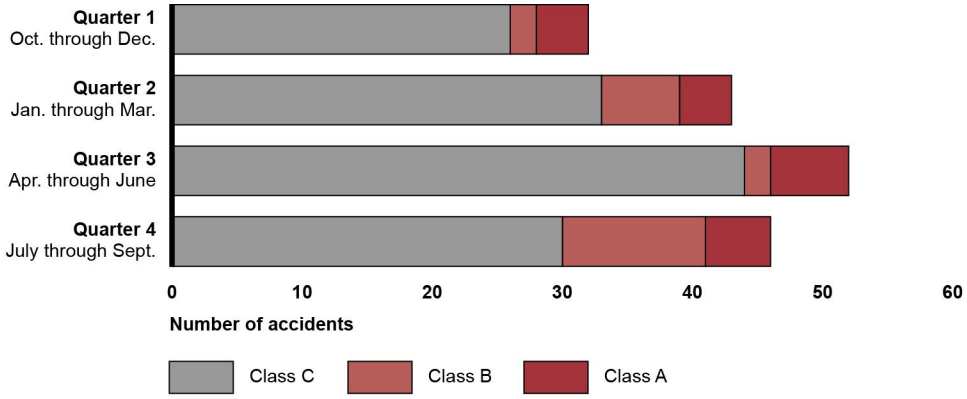
Additional trends and characteristics. We further analyzed Class A through C Army and Air National Guard helicopter accidents for fiscal years 2012 through 2021 to determine any trends in additional characteristics, including aviation accident categories, location, and the time of year when helicopter accidents occurred.[30] Of note, our analysis found:

[29]Rates based on small numbers should be interpreted with caution, as the rates are highly variable based on small changes to the number of cases, making it hard to distinguish random fluctuation from true changes in underlying risk of accident type. For more information on our methodology, see appendix I.

[30]We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States*, (Dec. 1, 2020). DOD categorizes aviation accidents in one of three ways: flight, flight-related, and ground operations. See table 1 for additional information on these categories.

- About 77 percent (133 of 173) of Army National Guard and about 72 percent (13 of 18) of Air National Guard Class A through C helicopter accidents were categorized as flight, or flight-related—meaning they involved the intent for flight. Descriptions related to those accidents included characteristics such as collisions with terrain or other foreign objects, hard landings, and accidents related to external operations such as hoist operations.
- Army National Guard units from 27 of the 54 states and territories experienced at least one Class A or B accident over these 10 years, and no state or territory had more than two Class A accidents among its units. Only two states (South Carolina and Utah) had more than two Class A or B accidents combined among its units.
- Army National Guard Class A through C total helicopter accidents occurred more frequently in the 3rd and 4th fiscal year quarters (see fig. 8). Accident numbers peaked in the summer months with June, July, and August providing the highest 3-month period of combined Class A and B accidents.

Figure 8: Army National Guard Accidents by Fiscal Year Quarter and Class, Fiscal Years 2012 through 2021



Source: GAO analysis of Army data. | GAO-23-105219

Accessible Data for Figure 8: Army National Guard Accidents by Fiscal Year Quarter and Class, Fiscal Years 2012 through 2021

	Class C	Class B	Class A
Quarter 1 Oct. through Dec.	26	2	4
Quarter 2 Jan. through Mar.	33	6	4
Quarter 3 Apr. through June	44	2	6

	Class C	Class B	Class A
Quarter 4 July through Sept.	30	11	5

Note: We analyzed 273 Class A through D non-combat helicopter accidents for the four Army National Guard airframes in our scope—the Apache, Chinook, Black Hawk, and Lakota. For more information on our methodology, see appendix I.

The accident numbers for the Air National Guard helicopters were too small to identify trends in location and time of year when helicopter accidents occurred. See appendices V and VI for additional details on Army and Air National Guard helicopter accident categories, unit location, and time of year, when helicopter accidents occurred.

Accident Data Shows Factors Related to Human Errors Caused Most Helicopter Accidents

Factors related to human error and aircraft operations made up the majority of reported causes in Army and Air National Guard Class A through C helicopter accidents, according to our analysis of reported accident data.

Army. We found that human error factors were cited as the primary causal factor in 38 of the 40 Army National Guard Class A and B accidents, and over 90 percent (125 of 133) of the Class C helicopter accidents, based on our analysis of reported accident data.

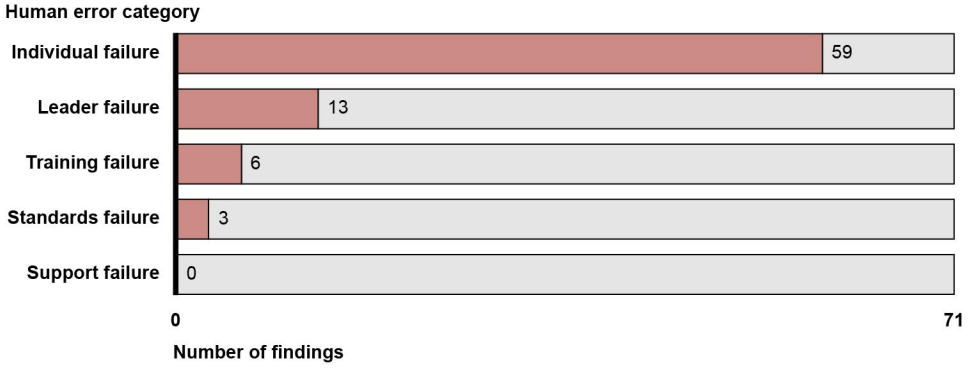
We further analyzed available accident investigation narratives from 26 Army National Guard Class A and B helicopter accidents between fiscal years 2012 and 2021.[31] These 26 investigation narratives were comprised of 71 findings that investigators determined were present and contributing to the accident, in addition to the primary causal factor identified in the

[31]The Army provided us with narratives for 26 of 40 Class A and B accidents from fiscal years 2012 through 2021. Army officials reported that they were unable to provide narratives for 14 accidents because of blank entries in the accident database. Officials said this could be due to improper data entry, failure to forward final reports to the Combat Readiness Center, or loss of entries due to data migration from a previous to the current information management system.

data above.[32] Investigators place present and contributing findings into one of the following categories: human error, materiel failure, or environmental factor. Human error was cited as a factor in 66 of the 71 present and contributing findings. In contrast, investigators cited materiel failure or environmental factors in five of the 71 findings.

Human error findings are further categorized as individual, leader, training, standards, or support failures.[33] As shown in figure 9, our analysis of the 26 Class A and B accidents with narratives found that "human error, individual failure" was the most common category of finding, cited as the present and contributing factor in 59 of 71 of the findings.

Figure 9: Findings by Human Error Category, as Identified in Class A and B Army National Guard Helicopter Accident Narratives for Fiscal Years 2012 through 2021



Source: GAO analysis of Army accident data. | GAO-23-105219

[32]More than one present and contributing finding can be cited per accident narrative. The investigation narratives included an additional 87 findings that investigators determined were present but did not directly contribute to the accident. They are classified as present but not contributing, suspected present and contributing, special observation, contributing to the accident, contributing to the severity of injury and other factors worthy of discussion. These findings can still result in recommendations.

[33]Individual failure occurs when a soldier knows and is trained to a standard but elects not to follow the standard (self-discipline—mistake due to own personal factors). Leader failure occurs when leaders fail to monitor mission execution and planning; correct inappropriate behavior; take appropriate action; or emphasize correct procedures, resulting in an accident. Training failure occurs when the soldier is not trained to the known standard (no training, incorrect training, or is insufficient in content or amount of training). Standards failure occurs when the standards or procedures are not clear, practical, or do not exist. Support failure occurs when inadequate equipment, facilities, or services (in type, design, availability, condition, or insufficient number or type of personnel) influence human error, resulting in an accident. Department of the Army Pamphlet 385-40, *Army Accident Investigations and Reporting* (Mar. 18, 2015).

Accessible Data for Figure 9: Findings by Human Error Category, as Identified in Class A and B Army National Guard Helicopter Accident Narratives for Fiscal Years 2012 through 2021

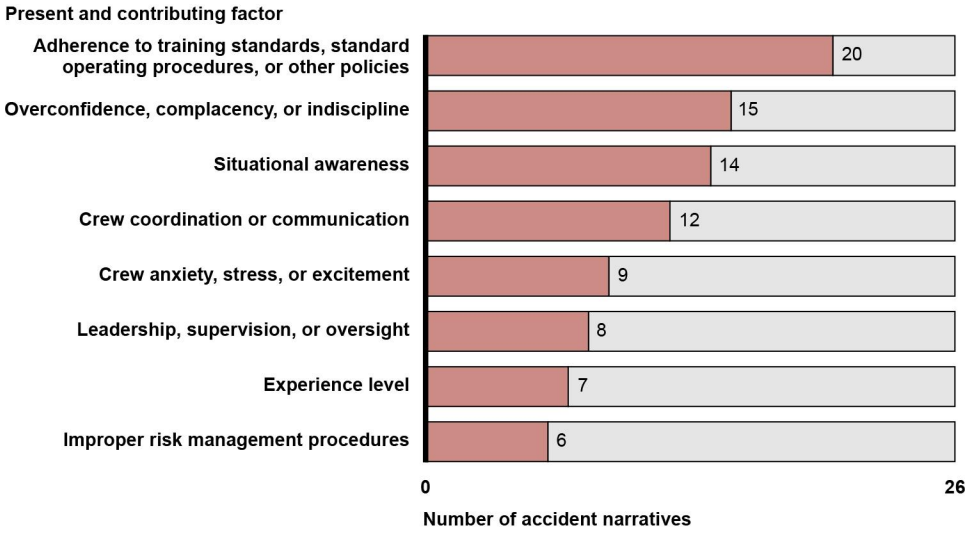
Human error category	Number of findings
Individual failure	59
Leader failure	13
Training failure	6
Standards failure	3
Support failure	0

Note: The Army provided us with narratives for 26 of 40 Class A and B accidents from fiscal years 2012 through 2021. Army officials reported that they were unable to provide narratives for 14 accidents because of blank entries in the accident database. These investigation narratives resulted in 71 distinct findings that investigators determined were present and contributed to the accident. More than one human error category can be cited per finding. We used the Army's definitions for the various failure categories, as described in Department of the Army Pamphlet 385-40, *Army Accident Investigations and Reporting* (Mar. 18, 2015).

We further analyzed the content of the 26 accident narratives and found that not following training procedures, situational awareness, and overconfidence were all cited as present and contributing factors in over half of the accident investigation narratives we reviewed (see fig. 10).[34]

[34]The Army provided us with narratives for 26 of 40 Class A and B accidents from fiscal years 2012 through 2021. Army officials reported that they were unable to provide narratives for 14 accidents because of blank entries in the accident database. Officials said this could be due to improper data entry, failure to forward final reports to the Combat Readiness Center, or loss of entries due to data migration.

Figure 10: Present or Contributing Causes Cited in Class A and B Army National Guard Helicopter Accident Narratives for Fiscal Years 2012 through 2021



Source: GAO analysis of Army accident data. | GAO-23-105219

Accessible Data for Figure 10: Present or Contributing Causes Cited in Class A and B Army National Guard Helicopter Accident Narratives for Fiscal Years 2012 through 2021

Present and contributing factor	Number of accident narratives
Adherence to training standards, standard operating procedures, or other policies	20
Overconfidence, complacency, or indiscipline	15
Situational awareness	14
Crew coordination or communication	12
Crew anxiety, stress, or excitement	9
Leadership, supervision, or oversight	8
Experience level	7
Improper risk management procedures	6

Note: The Army provided us with narratives for 26 of 40 Class A and B accidents from fiscal years 2012 through 2021. Army officials reported that they were unable to provide narratives for 14 accidents because of blank entries in the accident database. Officials said this could be due to improper data entry, failure to forward final reports to the Combat Readiness Center, or loss of entries due to data migration from a previous to the current information management system. More than one present and contributing finding can be cited per accident narrative, and—in some cases—investigators identified more than one type of human error category under one present and contributing finding.

Air Force. We found that operational factors were cited in 10 of 18 Class A through C Air National Guard helicopter accidents. The Air Force defines operational factors as those related to flying operations, to include air traffic control, operational guidance, flight crew training and flying supervision. We further analyzed these accidents and found human factors such as "Wrong Choice of Action During an Operation" and "Inadequate Real-Time Risk Assessment" were the most commonly cited factors.

These causal factors are consistent with themes we heard during our interviews with Army and Air National Guard units. For example:

- Army National Guard safety and aviation operations officials we interviewed told us that accidents are human factor-driven, largely caused by people not being disciplined in application of processes or regulations. Additionally, a unit safety official stated safety processes require enforcement from the unit. However, in analyzing the narratives, we found that "indiscipline" was commonly mentioned when an accident investigation board suspected a culture within a unit existed where a crew regularly operated against regulations without consequences.
- During our unit-level interviews, unit commanders and pilots consistently identified pilot inexperience—such as lack of proficiency and experience with specific missions—among the factors that contributed to helicopter accidents. For example, one company commander stated that new pilots get almost no experience with multi-ship operations during training events. Additionally, pilots explained that during mission briefings, prior to a flight, a discussion is held about how recently pilots have flown to understand aircrew experience with specific mission tasks and overall flying hour experience levels. We found that experience levels were cited among contributing factors in seven of the 26 (27 percent) accident investigation narratives we analyzed. Further, accident investigations recommended that units should allow less experienced crew members to fly the aircraft more and build their experience.

Several Factors Have Limited the Effectiveness of Helicopter Flight Safety Processes

The Army and Air National Guard use a variety of processes to promote safety and reduce risks during helicopter pilot training, including accident

investigations; safety program inspections; operational risk management processes; and unit-level safety culture evaluations. However, several factors have limited the effectiveness of key Army and Air National Guard safety processes, according to our analysis. Specifically:

- The Army has not comprehensively monitored recommendations from accident investigations.
- Army and Air National Guard unit-level operational risk management worksheets are not continuously evaluated and updated.
- The Army has not regularly evaluated National Guard aircrew performance during training.
- Army and Air National Guard workload and staffing imbalances hindered the scope of safety officer efforts.

Army Accident Investigation Recommendations Are Not Comprehensively Monitored

DOD has established procedures for accident notification, investigation, reporting and record keeping, and military service-level guidance further establishes how the Army and Air Force—including the Army and Air National Guard—are to implement these procedures.[35] Investigations into helicopter accidents may result in one or more recommendations for corrective actions.

Military service-level guidance further establishes procedures for documenting corrective actions taken to address these recommendations.[36] However, while the Air Force takes steps to comprehensively monitor recommendation implementation, we found limitations with the Army's approach.

[35]Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018); Army Regulation 385-10, *The Army Safety Program* (Feb. 24, 2017); Department of the Air Force Instruction 91-204, *Safety Investigations and Reports* (Mar. 10, 2021); and National Guard Supplement 1 to Army Regulation 385-10, *The Army Safety Program* (Feb. 12, 2015).

[36]AR 385-10, NG Supplement 1 to AR 385-10, and DAFI 91-204.

Air Force guidance distributes the responsibility for monitoring recommendations across different organizational entities.[37] For example, the Air Force Safety Center monitors implementation of all recommendations resulting from Class A and B on-duty accident investigations and recommendations from Class C accidents and below that are directed to the Headquarters, Air Force.[38] For all other recommendations resulting from helicopter accidents, an office of primary responsibility for individual units or other organizations is responsible for monitoring their status and documenting corrective actions when implementation is complete.

According to Air Force guidance, the office of primary responsibility for recommendation implementation must provide recommendation updates every six months—including supporting documentation—in the Air Force Safety Automated System, a database system maintained by the Air Force Safety Center, until the recommendation is closed.[39] In addition, each major command in the Air Force, including the Air National Guard, is responsible for reviewing all open recommendations from Class A and B accidents every 6 months and maintaining a record that tracks each recommendation status. Further, each numbered Air Force and wing safety staffs are encouraged to establish a similar process for Class C and below unit-level recommendations.

Data provided by the Air Force Safety Center showed 79 recommendations stemming from investigations into Air National Guard Class A and B helicopter accidents from fiscal years 2012 through 2021. As of July 2022, 54 recommendations were closed with supporting documentation of corrective actions that were taken to implement the recommendations, 13 were closed without any action taken and an acceptance of risk, and nine remained open and not yet implemented.[40] We also analyzed the implementation status of unit-level recommendations for Air National Guard Class C and D helicopter accidents for fiscal years 2017 through 2021. The 11 Class C and D

[37]DAFI 91-204.

[38]Air Force Safety Center officials added that, though they are not responsible for monitoring the implementation of additional recommendation types, they have the capability to monitor the status of all recommendations using the Air Force Safety Automated System—their accident tracking database.

[39]DAFI 91-204.

[40]An additional three recommendations were closed as duplicate recommendations.

accidents during this time resulted in three recommendations assigned to the National Guard Bureau or the three Air National Guard Rescue Wings that include squadrons operating the Pave Hawk and all were closed.[41]

We found that the Army takes some steps to monitor accident investigation recommendations, but lacks a comprehensive approach for monitoring the status of recommendations through to implementation. According to Army guidance, the Army's Combat Readiness Center is responsible for monitoring a sub-set of accident investigation recommendations that are broadly applicable across the Army and directed to the Department of Defense or Department of the Army.[42] In fulfilling this responsibility, the Combat Readiness Center monitors these recommendations to understand if the office responsible for implementing the recommendations has concurred, non-concurred, or concurred with comments, officials told us. However, according to Combat Readiness Center officials, they do not monitor the status of these Army-wide recommendations through implementation.

Army Combat Readiness Center officials provided us with recommendation tracking data on Army-wide recommendations stemming from investigations of Class A, B, and C Army National Guard helicopter accidents for fiscal years 2017 through 2021. According to these data, there were 22 Army-wide recommendations stemming from eight helicopter accidents over these 5 fiscal years. Of the 22 Army-wide recommendations, the office of primary responsibility concurred with 16 and non-concurred with six. However, because the Combat Readiness Center does not track recommendation implementation, it was unable to provide us with the implementation status of the 16 recommendations for which the office of primary responsibility concurred.

Separate from the Army-wide recommendations, individual commands, including the Army National Guard, are responsible for establishing and maintaining an accident recommendation monitoring system for recommendations directed to units within their assigned area of

[41]Three additional Air National Guard helicopter accidents during this time period—one Class A, one Class B, and one Class C—resulted in 33 primary recommendations, but none were assigned to the National Guard Bureau or the three Air National Guard Rescue Wings that include squadrons operating the Pave Hawk.

[42]AR 385-10. Throughout this report, we refer to this sub-set of recommendations as "Army-wide" recommendations.

responsibility.[43] According to aviation safety officials in the Army National Guard, the Army National Guard safety branch works with subordinate units to monitor unit-level recommendations and document corrective actions when implementation is complete. We requested the implementation status of unit-level recommendations for Army National Guard Class A, B, and C helicopter accidents for fiscal years 2017 through 2021. However, at the time of our review, these data were unavailable because the Army National Guard had not decided upon a central database for monitoring state responses to unit-level recommendations, officials told us. According to National Guard safety officials, the states use different reporting systems, and the Army National Guard does not comprehensively track the status of unit-level recommendations and the implementation of corrective actions.

DOD Instruction 6055.07 states that DOD components are to review safety investigation reports; to establish a system to identify problem areas; and to ensure that corrective actions from safety investigations are validated, approved, and monitored by the component authority until corrective action is complete.[44] However, the Army lacks a comprehensive approach to tracking recommendations through implementation because it has not identified a central reporting mechanism for monitoring their status and documenting any corrective actions taken to implement Army-wide and unit-level recommendations. The Army Safety Management Information System, managed by the Army Combat Readiness Center, includes this capability. Nevertheless, the Army National Guard has not established this database as a system of record and not all states were using it for tracking recommendation implementation steps according to Army safety officials.

Without taking additional steps to ensure that a system of record monitors the status of Army National Guard recommendations, the Army has limited oversight of recommendation implementation. As a result, the Army is unable to fully ensure that units implement recommendations from accident investigations that could improve flight safety.

[43]AR 385-10 and NG Supplement 1 to AR 385-10. Throughout this report, we refer to this sub-set of recommendations as “unit-level” recommendations.

[44]Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018).

Unit Operational Risk Management Worksheets Are Not Continuously Evaluated and Updated

The Army and Air Force have established processes for units to use in order to assess the risks of planned training and operations. One component of these processes is the use of risk management worksheets prior to engaging in training or other flight operations. Units are to use these worksheets to assess training and operational risk, identify potential mitigations, and make determinations on what level of risk to accept prior to executing training and operations, according to Army and Air Force guidance and related documentation. However, we found that Army and Air Force National Guard helicopter units were not continuously evaluating and updating their risk management worksheets on a routine basis.

Specifically, Army and Air National Guard helicopter aircrews use unit-established risk management worksheets to capture risks and associated mitigations, determine an overall risk level, and identify the required approval levels within a unit's chain-of-command.[45] According to Army and Air Force guidance, the required approval level increases in seniority in line with increased levels of identified risk.[46]

According to Army officials, the Army uses a standard operational risk management worksheet across aviation units, known as the Risk Common Operational Picture. This worksheet provides units with a baseline starting point for operational risk management. The standardized worksheet ensures that active, National Guard, and reserve component units assess certain risk factors such as experience, mission, weather, visibility, and aircraft condition and type, officials added. It also allows for inputs of unique risk considerations to the local operating area, such as local airspace restrictions.

The Air National Guard helicopter squadron worksheets we reviewed, though not standardized, were each comprised of similar risk factors. They were also similar to the Army's Risk Common Operational Picture, and included factors such as crew experience, mission, weather, and

[45]Army Regulation 95-1, *Flight Regulations* (Mar. 22, 2018); Air Force Instruction 90-802, *Risk Management* (Apr.1, 2019); and Air Combat Command Supplement to Air Force Instruction 90-802, *Risk Management* (Aug. 23, 2019).

[46]AR 95-1 and AFI 90-802.

visibility. According to Air Force officials, aviation unit operational risk management processes, to include operational risk management worksheets are commanders' programs driven by aircraft operations guidance. These officials also stated that Air National Guard helicopter units typically follow Air Combat Commands' operational guidance.[47] Officials also told us that Air Combat Command has considered an option to develop a common worksheet and that there has been past consideration for a standard worksheet for all Pave Hawk squadrons. Officials we met with had mixed views on the pros and cons of developing a standardized worksheet because of the diversity of aircraft and mission sets in the Air Force.

While Army and Air National Guard helicopter units have these operational risk management worksheets in place to assess risk in training and operations, we found that National Guard helicopter units did not continuously evaluate and update this risk management tool. Units have taken some steps to evaluate their operational risk management worksheets. For example, units we met with described reviewing their respective risk management worksheets in an ad hoc manner, for instance reviewing them for effectiveness following an accident. More specifically, personnel from one helicopter unit we met with described how the unit adjusted their worksheets following an accident to better account for an aircrew's experience mix, which was a contributing factor identified in the accident investigation.

According to Army and Air Force guidance, risk management is a cyclical and continuous process, of which evaluation and feedback are necessary steps.[48] According to personnel we spoke with, Army and Air National Guard units have access to a variety of safety-related information such as accident data, hazard reporting, after action reporting, and unit culture surveys.

However, we found that Army helicopter safety and operational guidance—to include supplementary guidance specific to the Army and Air National Guard—does not include specific instructions for helicopter units to continuously evaluate and update their operational risk management processes using safety related information. By establishing a process to continuously evaluate and update operational risk

[47]Air Combat Command Supplement to Air Force Instruction 90-802, *Risk Management* (Aug. 23, 2019).

[48]Army Techniques Publication 5-19, *Risk Management* (Nov. 9, 2021) and AFI 90-802.

management worksheets for its National Guard helicopter units on a routine and recurring basis, the Army would better ensure those units have cyclical feedback and evaluation of a key operational risk management process.

Air Force officials stated that any lack of a continuous evaluation of risk management processes by units is a unit-level compliance issue with the existing risk management directives.[49] Officials further stated that ensuring Air National Guard units are continuously evaluating their operational risk management worksheets could be part of the Air Force's unit inspection program, but it is currently not a component of the inspection program.[50] By incorporating an evaluation of Air National Guard helicopter unit processes for updating risk management worksheets into its unit inspection program or other means, the Air Force would better ensure its units are continuously updating a key risk management process consistent with Air Force guidance.

Taken together, these actions will help align Army and Air National Guard unit risk management procedures to (1) more accurately assess the risk to flying missions, and (2) be informed by relevant safety information such as accident data, hazard reporting, and unit culture surveys.

The Army Has Not Regularly Evaluated National Guard Aircrew Performance during Training

Human errors, such as not following training procedures, were the primary causal factors cited for Army and Air National Guard helicopter accidents, according to our analysis of accident data from fiscal years 2012 through 2021. However, while the Air Force has routinely evaluated the performance of Air National Guard aircrews during training, the Army

[49]Air Force Policy Directive 91-2, *Safety Program,* (Sept. 3, 2019) and AFI 90-802.

[50]The Air Force Inspection System involves synchronization of three inspection programs—Management Inspection, Unit Effectiveness Inspection, and the Commander's Inspection Program—with the purpose of, among other things, evaluating leadership effectiveness, management performance, aspects of unit culture and command climate and providing an independent assessment of unit compliance with established directives. Air Force Instruction 90-201, *The Air Force Inspection System* (Nov. 20, 2018) (incorporating changes from Air Force Guidance Memorandum to AFI 90-201, Dec. 5, 2022).

has not conducted regular evaluations of Army National Guard aircrews, according to our analysis.

The Army and Air Force use processes, distinct from safety program evaluations, to evaluate in-flight aircrew performance during training. Officials stated that these evaluations ensure that aviators are maintaining safe flying standards while the safety evaluations are to ensure that units maintain an active accident prevention program. In the Air Force, we found that Air Combat Command sends evaluators to Air National Guard helicopter units once every 4 years as part of the unit inspection cycle.[51] The Air Combat Command assessment includes in-flight evaluations of a unit's aircrew and a unit's flight examiners (i.e., unit aircrew members with designated evaluation duties at the unit, such as an instructor pilot).

The Army, through its Directorate of Evaluation and Standardization, assesses aircrew training program management, including adherence to standard operating procedures and regulations, aviation mission survivability programs, mission approval process, and flight operations through aviation standardization program evaluations. These assessments include written, oral, and in-flight evaluations of a unit's aircrew members.

According to our analysis, the Army has not conducted aviation standardization program evaluations for Army National Guard helicopter units on a regular or recurring basis, despite Army direction to complete these evaluations every 2 to 3 years.[52] We analyzed the schedule of Army program evaluations and found that 15 of the 54 National Guard states and territories had assessments since the start of fiscal year 2017, and five additional states had assessments scheduled to occur in fiscal years 2021, 2022, or 2023. At the time of our review, 32 states or territories had not had an assessment since the start of fiscal year 2017, nor did they have one scheduled.[53] The most recent evaluations of National Guard

[51]Air Combat Command Supplement to Air Force Instruction 11-202, Volume 2*, Aircrew Standardization and Evaluation Program*, (Apr. 23, 2019) (incorporating change 1, Oct. 4, 2019) and AFI 90-201.

[52]Army Training Circular No. 3-04.11, *Commander's Aviation Training and Standardization Program* (Apr. 14, 2022).

[53]According to our review, two states had an assessment since the start of fiscal year 2017 and an assessment scheduled to occur in fiscal years 201, 2022, and 2023.

units occurred following helicopter accidents at those units, Army officials added.[54] By comparison, active component units are generally assessed once every 2 to 3 years, Army Directorate of Evaluation and Standardization officials stated.

According to Army officials, scheduling aviation standardization program evaluations with Army National Guard units is difficult due to the number of Army National Guard aviation units and the amount of resources the Directorate of Evaluation and Standardization has available for this responsibility. Part-time pilot availability at National Guard operating locations and weather conditions that can ground aircraft during the limited flying schedules maintained by National Guard aviation units are additional limiting factors, according to Army officials.

Army Regulation 95-1, *Flight Regulations*, states that the aviation standardization program is designed to ensure a high degree of safety and aviation readiness for all Army components and establishes the Army Aviation Center of Excellence as the entity that is responsible for the aviation standardization program.[55] The guidance further directs the Army National Guard to conduct readiness evaluations through the Aviation Resource Management Survey every 24–36 months on all aviation components of combat aviation brigades and battalion-sized aviation units.[56] A prior Army-wide aviation study recognized opportunities to coordinate different readiness evaluation programs in order to meet the guidance for evaluation timeframes.[57]

[54]According to Army officials, the Directorate of Evaluation and Standardization also has personnel assigned to the Eastern and Western Army National Guard Aviation Training Sites to collaborate with National Guard aviators on how units conduct training programs of instruction.

[55]Army Regulation 95-1, *Flight Regulations* (Mar. 22, 2018).

[56]According to Army guidance, the Aviation Resource Management Survey program assists commanders in assessing the readiness and resource management of all assigned aviation units (manned and unmanned). Army Regulation 95-1, *Flight Regulations* (Mar. 22, 2018). Evaluations follow checklists that include but are not limited to functional areas including operations, standardization, supply, maintenance, and safety. The Aviation Resource Management Survey provides unit commanders summarized results that reflect readiness (standardization, safety, deployability, systemic and operational risk) of programs within their formations.

[57]U.S. Army, *Holistic Aviation Assessment Task Force Study Report, Regaining Decisive Action Readiness*, (June 2016).

In recognition of opportunities to coordinate on the programs, the Directorate of Evaluation and Standardization provides specialists to augment Aviation Resource Management Survey inspection teams, Army officials told us. These personnel generally perform ground-based tasks such as the evaluation of a unit's aviation standardization program paperwork. In May 2022, the Army Directorate of Evaluation and Standardization issued a memorandum giving guidance for personnel to make a "deliberate effort" to send additional personnel with the Aviation Resource Management Survey teams for the purpose of performing in-flight evaluations across all Army component units.

Notwithstanding this effort, the Directorate of Evaluation and Standardization and the Army National Guard have not developed a coordinated plan or identified the associated resources needed to conduct regular and recurring in-flight assessments of National Guard helicopter units. Leading practices for implementing effective cross-functional teams (i.e., teams that collaborate and integrate across organizational and functional boundaries) highlight the importance of senior management providing such teams with access to sufficient resources to accomplish organizational goals.[58]

By developing a coordinated plan and identifying necessary resources, the Army would be able to conduct more consistent aviation standardization program evaluations for Army National Guard, active, and reserve component aviation units. Regular and recurring in-flight assessments would give greater assurance that Army National Guard helicopter unit aircrews are performing training to standards, before a potential accident occurs.

Workload and Staffing Issues Hindered Scope of Army and Air National Guard Safety Officer Efforts

The scope of efforts carried out by safety officers in Army and Air National Guard helicopter units has been hindered due to workload and staffing imbalances. According to officials we spoke with, unit-level safety officers have a broad set of responsibilities for implementing unit safety programs to include flight and weapons safety. Among other things, safety officers

[58]See GAO, *Defense Management: DOD Needs to Take Additional Actions to Promote Department-Wide Collaboration,* GAO-18-194 (Washington, D.C.: Feb. 28, 2018).

are responsible for conducting unit-level safety briefings, monitoring occupational safety hazards, and recording accidents.

Safety Officer Perspectives

"Being a safety officer is difficult as a part-timer."

"There should be a full-time safety official at every battalion to coordinate with company commanders."

"They will not let you just be the safety guy; you will always have additional duties."

Source: GAO interviews with Army and Air National Guard personnel. | GAO-23-105219

Safety officers we spoke with said they could do more to support safety if it were their primary duty or if they were assigned as full-time to this role. However, safety officers said that the role is typically part-time. As a result, safety officers within the units we spoke with described limited time available to proactively perform certain safety activities, such as coordinating with other safety organizations; using data systems to perform hazard analysis; communicating with unit personnel for aircraft-specific insights; and overseeing the quality of hazard and accident reporting processes. Safety officials added that unit-level (company and squadron) safety officers are also responsible for maintaining their role as a pilot. The safety officers noted that they spent a high percentage of their time on flying. During the week, almost all of their "on-duty" time was spent on flying, while on drill weekends they are able to spend some time on safety-related activities.

According to Army and Air Force officials, Army and Air National Guard helicopter units do not have a consistent approach to staffing safety officers. For example, among the Air National Guard units we spoke with, staffing of the safety position at the wing-level differed. According to unit personnel, one wing filled its chief of safety position with a full-time status Air National Guard member, while another wing filled it with a traditional drill-status Air National Guard member. Neither wing was staffed with two flight safety officers—one for each aircraft type in the unit—as identified in their table of organization, according to officials. According to safety officials, wing-level staffing decisions are at the discretion of the wing commander. Reordering personnel to move from the squadron to the wing-level to fill a flight safety officer role may not always be preferred because it would require moving personnel from an aviator position in the flying unit to an administrative safety officer role at the wing-level. However, not having safety assistants at the wing-level with background in the Pave Hawk or the C-130 hindered the ability to have insight into any issues that are platform-specific, one safety official stated.[59]

According to Army officials, in the Army National Guard, full-time personnel fill the safety officer role at the Army Aviation Support Facility,

[59]Air National Guard Rescue Wings are typically comprised of three rescue squadrons: one that flies the Pave Hawk, one that flies the C-130, and one squadron of para-rescue personnel.

but safety is an additional duty to other roles as an aviator within flying units.[60] Further, each of the three facility safety officers we spoke with held an additional role in the unit. Officials explained that the safety officers in the battalion and subordinate units can be traditional drill-status Army National Guard members while also maintaining their duties as a pilot.

Despite these imbalances in staffing levels and workload, the Army and Air Force have not fully determined if current practices of assigning safety personnel are adequate, according to our discussions with officials about prior and ongoing personnel studies. According to Army officials, the Army and National Guard Bureau are currently conducting studies examining the total number of billets assigned for safety positions in Army National Guard units. According to Air Force officials, the Air National Guard conducted a similar study in 2017. However, these studies focus on the total number of billets assigned, not the priority assigned to the positions or the duty status of personnel needed to fill these billets to adequately support the safety mission, Army and Air Force officials stated.

DOD Instruction 6055.01 states that, in developing safety programs, commanders should provide staffing of sufficient quantities and technical competencies, and consider the quantity and mix of professional staffs and whether to assign safety responsibility as a primary or collateral duty, among other things.[61] In addition, *Standards for Internal Control in the Federal Government* state that management is responsible for evaluating pressure on personnel to help personnel fulfill their assigned responsibilities.[62] Army National Guard officials told us that some steps have been taken to assess the staffing structure of safety programs. For example, Army Headquarters is conducting a survey of additional duty safety officers from the active, guard, and reserve components, but results from this survey or any next steps had not been determined at the time of our review.

[60]Army Aviation Support Facilities support Army National Guard aviation programs, train personnel, maintain aircraft readiness, and provide field-level maintenance. National Guard Supplement 1 to Army Regulation 95-1, *Aviation Flight Regulations* (Nov. 30, 2018).

[61]Department of Defense Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program* (Oct. 14, 2014) (incorporating change 3, Apr. 21, 2021).

[62]GAO, *Standards for Internal Control in the Federal Government,* GAO-14-704G (Washington, D.C.: Sept. 10, 2014).

According to Air National Guard safety officials, the Air Force has taken some steps to address individual workload challenges of safety officers by directing units to cut back additional duty distractions as much as possible. In addition, the Air National Guard safety directorate has recommended wing commanders assign full-time personnel to the wing Chief of Safety position, officials stated.

However, neither the Army nor the Air National Guard have fully assessed the resource and workload allocations of safety personnel. The Army and Air National Guard also have not analyzed the effect of using full or part-time personnel in these roles to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement unit safety programs. By fully assessing the resource and workload allocations of safety personnel, the Army and Air National Guard would be better positioned to more appropriately tailor the number and duty status of personnel needed to meet the safety mission. This, in turn, could enhance National Guard helicopter units' ability to promote safety and to reduce risks during helicopter training.

Recent Efforts Have Not Fully Addressed National Guard Helicopter Training Challenges

The Army and Air National Guard have established flying hour goals for helicopter pilots related to how much and with what frequency they should fly. However, we found that National Guard helicopter pilots faced several challenges that hindered their ability to accomplish these flying hour goals, such as aircrew personnel availability, maintenance issues, and simulator access. The Army and Air Force, including their National Guard components have taken steps to mitigate these challenges, but have not fully addressed them.

Army and Air National Guard Have Flying Hour Goals, but Helicopter Pilots Did Not Fly Enough, on Average, to Meet Them

The Army and Air National Guard have established flying hour goals for helicopter pilots. These flying hour goals include developing proficiency as well as more basic skill maintenance for helicopter pilots (see sidebars below).

We analyzed flying hour data from fiscal years 2017 through 2021 and found that Army and Air National Guard helicopter pilots did not fly enough hours, on average, to meet established goals. Specifically:

Army Helicopter Pilot Flying Hour Goals

Minimum Flying Hours: Army National Guard officials calculated that helicopter pilots should fly, at a minimum, 6.77 hours per month. This goal accounts for simulator training and varying annual training requirements established in the Army's helicopter training manual.

Proficiency: The Army National Guard determined that helicopter pilots should fly 9.0 hours per month, on average. Army National Guard officials told us that this average number of flying hours is to allow enough pilots to achieve proficiency to support missions and deployments.

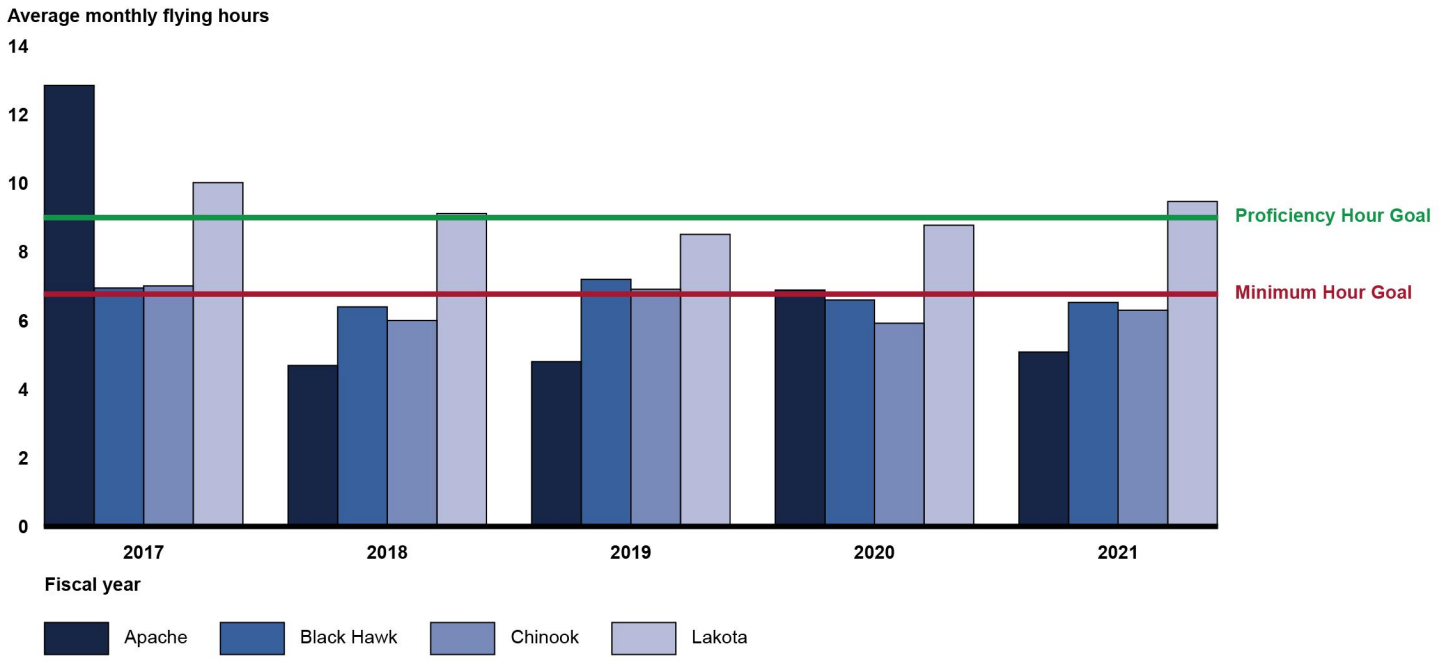
Source: GAO analysis of Army National Guard documentation and interviews with officials. I GAO-23- 105219

Army. In some fiscal years we found the average monthly flying hours flown by helicopter pilots for the Apache, Black Hawk or Chinook, were below the minimum flying hour goal of 6.77 hours per month. This number included 2 years when the average hours for pilots across all three aircraft did not meet the goal (see fig. 11). In addition, Army helicopter pilots did not meet the proficiency goal of flying 9.0 hours per month for the majority of helicopter types, on average.[63]

As these are averages, some pilots flew more hours while others flew fewer hours. For example, pilots from one Army location that flew both Black Hawk and Chinook helicopters had wide variation in flying hours from fiscal years 2017 through 2021. In this time period, average monthly flying hours for 69 percent of the pilots in the unit met or exceeded the 6.77 minimum hour goal and 54 percent met or exceeded the proficiency goal of 9.0 flying hours per month. Officials from the units we visited noted that some pilots fly much more frequently than others resulting in large flying hour disparities.

[63]The Army National Guard started developing its 9.0 flying hour training strategy in 2017 to increase proficiency among helicopter pilots, according to officials. According to Army National Guard documentation, the Army approved the goal of 9.0 flying hours per month in 2019. We are using these goals in our analysis to show how frequently Army National Guard helicopter pilots accomplished the flying hour goals, on average, per helicopter type. For more information on our methodology, see appendix I.

Figure 11: Average Monthly Flying Hours Compared with Flying Hour Goals for Army National Guard Pilots, by Helicopter Type, Fiscal Years 2017–2021



Source: GAO analysis of Army data. | GAO-23-105219

Accessible Data for Figure 11: Average Monthly Flying Hours Compared with Flying Hour Goals for Army National Guard Pilots, by Helicopter Type, Fiscal Years 2017–2021

Fiscal Year	Apache	Black Hawk	Chinook	Lakota
2017	12.85	6.95	7.01	10.02
2018	4.69	6.4	6	9.12
2019	4.8	7.2	6.91	8.51
2020	6.89	6.6	5.92	8.78
2021	5.08	6.53	6.3	9.47
Proficiency Hour Goal	9	9	9	9
Minimum Hour Goal	6.77	6.77	6.77	6.77

Note: We analyzed hours flown by pilots from four Army National Guard airframes in our scope—the Apache, Chinook, Black Hawk, and Lakota—from fiscal years 2017 through 2021 to calculate monthly averages. According to Army National Guard documentation, Army helicopter pilots require a minimum of 6.77 flying hours per month to achieve annual training requirements and 9.0 flying hours per month to achieve proficiency. We used the 6.77 and 9.0 flying hour goals in our analysis to show how frequently Army National Guard helicopter pilots completed those levels of flying hours per helicopter type. For more information on our methodology, see appendix I.

Army National Guard officials provided us information that shows pilots will continue to fall short of the 9.0 flying hour per month goal until at least fiscal year 2026, due to various challenges, including lack of resources. We discuss these challenges below in greater detail.

Air National Guard Helicopter Pilot Flying Hour Goals

Basic Mission Capable: Basic Mission Capable represents a minimum goal, and helicopter pilots should fly about 6.0 flying hours per month to achieve Basic Mission Capable training requirements, according to Air National Guard officials. To be considered Basic Mission Capable, an Air Force pilot must successfully complete initial pilot training and pass an evaluation.

Combat Mission Ready: Combat Mission Ready represents a helicopter pilot that is mission qualified. Helicopter pilots should fly about 12.5 hours per month to achieve Combat Mission Ready training requirements, according to Air Force officials. Combat Mission Ready means the helicopter pilot has successfully completed initial training and maintains certification, currency, and proficiency for the designated unit's combat mission, according to Air Force documentation.

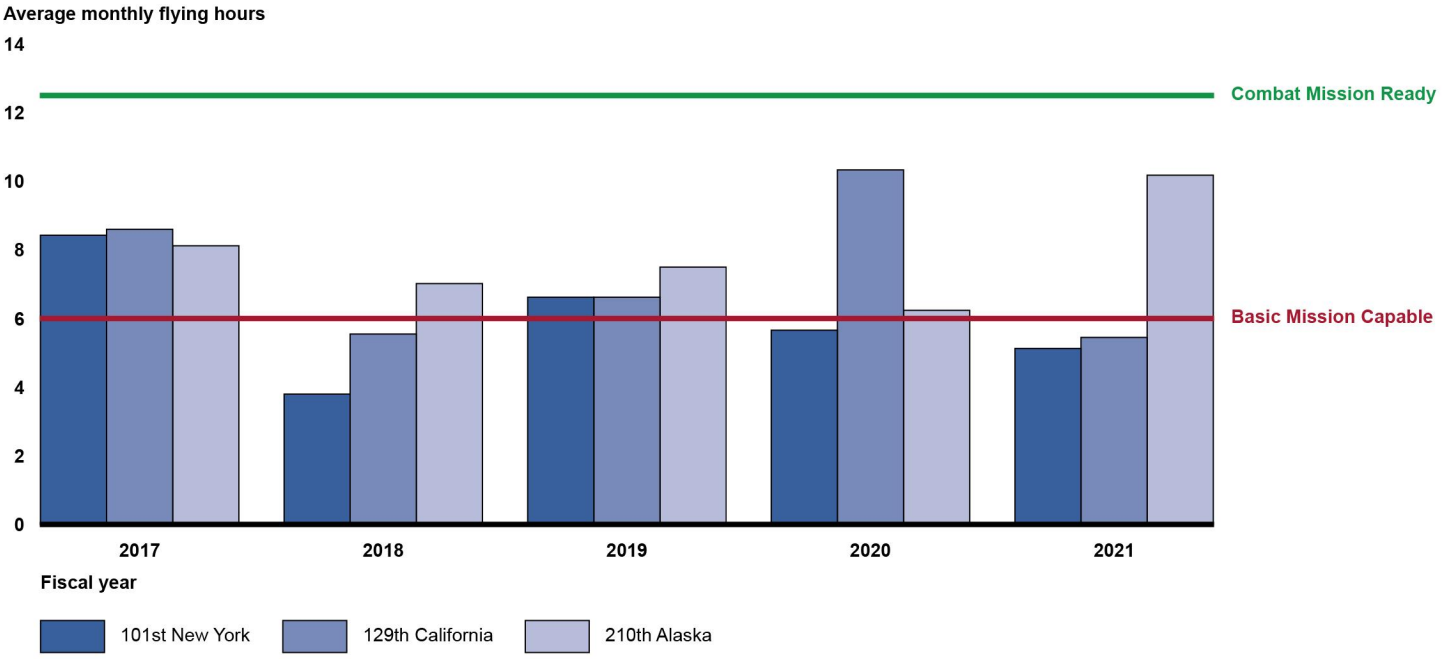
Source: GAO analysis of Air Force documentation and interviews with officials. I GAO-23-105219

Air Force. Across each of the three Air National Guard rescue helicopter squadrons, we found 3 fiscal years in which the average monthly flying hours for helicopter pilots in one or more units fell below the Basic Mission Capable flying hour goal of 6 hours (see fig. 12).[64] In addition, the monthly average flying hours for helicopter pilots fell below the Combat Mission Ready goal of 12.5 hours, for all three squadrons across all 5 fiscal years.

Personnel at both units we interviewed noted that some pilots flew a disproportionately large portion of the workload and some did not fly much at all. For example, in fiscal years 2020 and 2021, one of the Air National Guard helicopter units reported wide variation in flying hours among its pilots. In fiscal year 2020, 4 of 19 pilots in the unit averaged less than 6 hours of flying per month while 8 out of 19 averaged more than 12.5 hours per month of flying. Similarly, in fiscal year 2021, 2 out of 17 pilots averaged less than 6 hours of flying per month while 2 out of 17 pilots averaged more than 12.5 hours of flying per month. We discuss challenges that contributed to flying hour shortfalls below.

[64]The Air National Guard has three rescue squadrons that operate the Pave Hawk helicopter: 101st Rescue Squadron (New York Air National Guard), 129th Rescue Squadron (California Air National Guard), and 210th Rescue Squadron (Alaska Air National Guard).

Figure 12: Air National Guard Pave Hawk Helicopter Pilot Average Monthly Flying Hours by Unit Compared with Flying Hour Goals, Fiscal Years 2017–2021



Source: GAO analysis of Air Force data. | GAO-23-105219

Accessible Data for Figure 12: Air National Guard Pave Hawk Helicopter Pilot Average Monthly Flying Hours by Unit Compared with Flying Hour Goals, Fiscal Years 2017–2021

Fiscal Year	101st New York	129th California	210th Alaska
2017	8.43	8.6	8.12
2018	3.8	5.55	7.02
2019	6.62	6.62	7.5
2020	5.66	10.33	6.24
2021	5.13	5.45	10.18
Combat Mission Ready	12.5	12.5	12.5
Basic Mission Capable	6	6	6

Note: We analyzed the average number of hours flown per month by pilots for the Air National Guard Pave Hawk airframe included in our scope from fiscal years 2017 through 2021. According to Air Force guidance, Basic Mission Capable means an aircrew member has satisfactorily completed initial training, is qualified in some aspect of the unit mission, but does not fly frequently enough to maintain mission ready status. Combat Mission Ready means an aircrew member has satisfactorily completed initial training and maintains qualification and proficiency in the command or unit combat mission. Air Force officials told us that it takes about 6 hours per month to achieve Basic Mission Capable training requirements and 12.5 hours per month to achieve Combat Mission Ready training requirements. We used these flying hour goals in our analysis to show how frequently pilots from each helicopter type

have, on average, been able to meet those levels of flying hours. For more information on our methodology, see appendix I.

Army and Air National Guard officials noted that these flying hour trends existed even though they frequently over-executed their annual flying hours—meaning they flew more hours than they originally planned at the beginning of the year. Army National Guard flying hour data showed that most helicopter types flew more hours than they originally planned in fiscal years 2017 through 2021. Further, the data also showed that the Army National Guard, as a whole, over-executed helicopter flying hours by more than 18,000 hours annually, on average, during that same timeframe. Data provided by the Air National Guard showed that the three Rescue Squadrons over-executed their flying hours for 3 fiscal years in this same time frame (fiscal years 2017, 2019, and 2021).

The data also show that Army and Air National Guard flying hours varied year-to-year, by helicopter type, and across units for a variety of reasons, including responding to state and regional emergencies and preparing for deployment. For example, officials from the Air National Guard rescue squadron in California explained that, in fiscal year 2020, they flew 1,363 hours—almost 400 hours more than average—largely as a result of responding to what they described as one of the busiest wildfire seasons on record. In addition, Army and Air National Guard officials told us that units generally have increasing training needs as a deployment nears. Army National Guard analysis to support the development of its training strategy shows that they plan a 7 percent increase in flying hours for units in the year before they deploy.

National Guard Helicopter Pilots Faced Several Challenges That Hindered Their Ability to Meet Flying Hour Goals

Army and Air National Guard pilots faced several challenges that hindered their ability to complete flying hour goals during fiscal years 2017 through 2021, according to our analysis. These challenges included (1) aircrew personnel factors, (2) maintenance factors, and (3) limited simulator access to conduct training.

Part-Time Pilot Challenges

"It is extremely challenging to maintain flying hour minimums as a part-time pilot."

"It is a battle to keep part-time pilots proficient. The squadron really only has time to keep them current on minimum requirements."

Source: GAO interviews with Army and Air National Guard unit personnel. I GAO-23-105219

Aircrew Personnel Challenges Limited Pilot Opportunities to Fly

We found factors related to Army and Air National Guard aircrew personnel that hindered the ability of helicopter pilots to meet flying hour goals. These factors included helicopter pilots' part-time role in the National Guard and shortages of key aircrew personnel types.

Traditional National Guard personnel serve in a part-time status and made up 63 percent (70 out of 111) of the pilots at the 5 locations from which we obtained data.[65] According to our analysis of flying hour data, part-time pilots flew, on average, between 2.7 and 9.8 hours per month less than their full-time counterparts who were at the same locations during fiscal years 2017 through 2021 (see table 6).

Table 6: Comparison of Average Monthly Flying Hours for Part-Time and Full-Time Army and Air Force National Guard Pilots at Selected Facilities, Fiscal Years 2017 through 2021

Facility	Full-time pilot average	Part-time pilot average	Difference
Facility 1[a]	14.3	8.3	5.9
Facility 2	13.1	3.3	9.8
Facility 3	11.0	8.0	3.0
Facility 4	11.9	9.2	2.7

Source: GAO analysis of Army and Air Force data. | GAO-23-105219

Note: One additional facility we visited was unable to provide data on full-time and part-time pilot flying hours and thus it is not reflected in the table. Due to the sensitivity of describing the number of flying hours for specific units we reported the information by facility anonymously.

[a]Facility 1 was only able to provide data from fiscal years 2020 and 2021.

Officials noted several reasons that part-time pilots attained fewer flying hours, such as balancing flying with their full-time employment; the unit not having enough funding to bring them in to fly more hours; and maintenance and parts-availability challenges, which are harder for part-time pilots to work around. These factors made it challenging for part-time pilots to meet all of the training requirements on an annual basis, officials added.

[65]Traditional National Guard personnel usually report one weekend each month and 2 weeks every summer for training. Pilots who are traditional National Guard personnel also are expected to report to the unit regularly to meet their established flying hour goals. Many National Guard units are also comprised of military personnel who serve full-time in the unit. These personnel are called Active Guard and Reserve. One of the units we visited did not provide a breakdown of their mix of full-time and part-time pilots.

Among the units we met, we also identified shortages of two key aircrew personnel types that hindered helicopter pilots' ability to complete training: instructor pilots and non-pilot aircrew. For example:

- **Instructor pilots.** We obtained information from five National Guard units and found that four of these units faced instructor pilot shortages. Instructor pilots provide oversight and instruction for individual training, and evaluate pilots' ability to perform flying tasks. Instructor pilot shortages made it more difficult to schedule training and evaluation "check-rides"—a training flight during which an instructor pilot accompanies a pilot who needs training, according to unit officials with whom we met. Officials told us that "check-ride" training flights are commonly used in National Guard units because the pilots are less likely to be current.
- **Non-pilot aircrew.** Among the units we met with, non-pilot aircrew shortages also affected training opportunities for helicopter pilots. Several helicopter types used by the Army or Air National Guard, including the Black Hawk, Chinook, and Pave Hawk, require non-pilot aircrew in order to meet mission requirements and offer realistic training. For example, Air Force officials told us that operations and training involving the Pave Hawk requires an aircrew of two pilots and two special mission aviators (non-pilot aircrew). Officials from the two Air National Guard units we spoke to said shortages of non-pilot aircrew limited training opportunities for pilots and directly resulted in flights being cancelled or flight missions going unaddressed. Army National Guard units we met with noted some non-pilot personnel shortages and acknowledged that it was a challenge for training on certain aircraft types and mission sets.

Maintenance Challenges Limited Aircraft Availability for Pilot Training

We also found factors related to maintenance challenges that hindered the ability of helicopter pilots to meet flying hour goals. These factors included limited aircraft availability due to maintenance needs, maintenance personnel shortfalls, and challenges with refurbished aircraft.

Overall, helicopter aircraft availability in National Guard units was a challenge between fiscal years 2017 through 2021, according to our analysis of Army and Air Force mission capable information. The Army and Air National Guard used mission capable rates to measure the availability of aircraft for training. One of the metrics they used tracked

aircraft not being available due to maintenance issues.[66] Figure 13 shows how selected National Guard helicopters did not meet mission capable goals for maintenance during fiscal years 2017 through 2021, which caused the lack of available aircraft for helicopter pilot training.

[66]Army and Air National Guard assess the health and readiness of their aircraft through mission capable rates, which show the percentage of total time when an aircraft can fly and perform at least one core mission. The military services also track not mission capable due to maintenance rates, which show the percentage of total time when an aircraft is not capable of performing any of its assigned missions due to maintenance. During fiscal years 2017 through 2021 the Army National Guard goal for not mission capable due to maintenance was to be under 10 percent and the Air National Guard goal fluctuated during the 5-year span, but the average goal was to be under 34 percent.

Figure 13: Number of Times Selected Army and Air National Guard Helicopter Types Met Annual Mission Capable Goals Due to Maintenance Issues, Fiscal Years 2017 through 2021

Source: GAO analysis of Army and Air Force data. | GAO-23-105219

Note: The Army National Guard goal for not mission capable due to maintenance was to be below 10 percent, and none of their helicopter types achieved that goal during the 5-year span. The Air National Guard not mission capable due to maintenance goals fluctuated during the 5-year span, and the goal averaged being below 34.6 percent.

Study Finds Air National Guard Units Need Two Shifts for Maintenance

The 2019 Air National Guard maintenance staffing study validated the need for two separate shifts of maintenance personnel at its Rescue Wings so that maintenance could achieve and sustain flight generation rates. Night operations are imperative for Air National Guard helicopter pilots, as 27 percent of the training requirements involve night training, and part-time pilots often report after their full-time work and are not ready to fly until the evening. Officials from the Air National Guard units we spoke with agreed that two shift maintenance operations are a necessity, and officials from one unit told us they have been trying to staff two shifts out of the personnel they currently have, but they do not have enough people.

Source: GAO analysis of Air National Guard information. I GAO-23-105219

Army and Air National Guard officials told us that maintenance personnel shortfalls are a key reason that aircraft are unavailable for helicopter pilot training. Army National Guard officials provided us documentation that showed funding for maintenance personnel was less than half of what was needed based on flying hour funding. In the Army, officials from separate locations noted that they were staffed at 65 and 74 percent of their required personnel for maintenance, respectively. Officials from these locations cited maintenance as a key factor that limited how much flying was available week-to-week.

Additionally, the New York and California Air National Guard units required 43 additional maintenance positions, according to a 2019 maintenance staffing study (see sidebar).[67] This represented a shortfall in their maintenance personnel levels. As of June 2022, those increases had not been fully resourced—instead 25 personnel were added across

[67]Air National Guard, *Logistics Composite Model Final Report for Aircraft Maintenance Manpower Combat Search & Rescue (HH-60G, HC-130J)*, (Oct. 30, 2019).

all three units, including the unit in Alaska, according to information we obtained from the Air National Guard.[68]

An additional maintenance challenge that limited the availability of helicopters for pilots to train on in the Air National Guard was the quality of refurbished aircraft from the "Operational Loss Replacement Program." This program provided refurbished Army helicopters to Air National Guard units to replace airframes that were lost during operations.[69] Specifically, New York Air National Guard officials told us that these helicopters required over 3,600 hours of unplanned maintenance to integrate the aircraft into the unit's flight schedule, between 2019 and 2021. Officials noted that the unit lost 8,352 hours of aircraft availability in that timeframe as a result of the quality and condition of the aircraft and the resulting additional maintenance they required. This number of hours equated to about 21 percent of the total availability of the unit's aircraft in those years. Additionally, officials from the California Air National Guard unit told us that most of the helicopters they received through the program were performing better than their previous helicopters, but one aircraft had persistent flight control challenges, limiting its availability for pilot training.

Separately, officials from one Air National Guard helicopter unit explained that the three helicopter rescue squadrons will likely encounter another maintenance challenge in 2024 and 2025. During that time, the units will only be able to fly three of the six helicopters they normally have per squadron due to a gap between when the legacy Pave Hawk model is retired and when the new version of the helicopter will be provided to the units, according to current Air Force plans to field the aircraft. The officials expressed concerns about the lack of availability of aircraft for pilot training, and equated the flying hour challenge they will face with the effect of the operational loss replacement program roll-out.

[68]Air National Guard, *Logistics Composite Model Final Report for Aircraft Maintenance Manpower Combat Search & Rescue (HH-60G, HC-130J)*, (Oct. 30, 2019). Air National Guard officials told us that the 25 personnel would be assigned as follows: 10 in New York, 8 in Alaska, and 7 in California.

[69]In 2019, the Air Force acquired helicopters from the Army as part of the "Operational Loss Replacement Program". This program refurbished Army variant Black Hawk helicopters and made them compatible with the Air Force's Pave Hawk version, and then gave the refurbished helicopters to the Air National Guard for use. The goal of the program was to replace some helicopters lost in operations and provide the Air National Guard with aircraft that had fewer flying hours and better maintenance performance.

Lack of On-Site Simulators Limited Training Options for Helicopter Pilots

Limited simulator access also hindered Army and Air National Guard pilots' ability to meet flying hour goals. Simulators are essential for training emergency procedures and gaining experience needed for flying, according to Army and Air National Guard officials, and several units did not have simulators near their home station.[70] For example:

Army. Officials at some Army National Guard facilities told us they did not have on-site helicopter simulators. Officials at two of the Army National Guard facilities noted that obtaining simulator time was a challenge due to travel time and coordinating availability with other units. We found that having a simulator on-site was associated with the amount of simulator training time that pilots accomplished. For example:

- Pilots at one facility who told us they had a simulator on site averaged over 32 hours of simulator time per year, according to our analysis of simulator usage data provided by the facility.
- Pilots at another facility who told us they did not have a simulator on site but were able to travel to simulators at other locations averaged about 14.6 hours of simulator time per year, according to our analysis of simulator usage data provided by the facility.
- Pilots at another facility that did not have a simulator on site but were able to travel to simulators at other locations averaged between 12 and 18 hours of simulator time per year, according to officials at that facility.

Air Force. Officials told us that none of the three Air National Guard helicopter rescue squadrons had on-site helicopter simulators. Pave Hawk helicopters are the only helicopters used by Air National Guard units, and none of the Air National Guard Rescue Squadrons have Pave Hawk helicopter simulators on-site. The only Pave Hawk simulator available for Air National Guard pilots is at Kirtland Air Force Base, New Mexico. One unit leader noted that having a simulator on-site would be a

[70]Army National Guard helicopter simulator flying hour requirements vary from 8 to 48 hours per year depending upon the airframe, flight activity category of the pilot (see table 3), and the distance a pilot is from the simulator facility. National Guard Supplement 1 to Army Regulation 95-1, *Flight Regulations* (Nov. 30, 2018). Air National Guard requires helicopter pilots to fly a simulator refresher once every two years. Air Combat Command, *HH-60G Ready Aircrew Program (RAP) Tasking Memorandum. Aviation Schedule 2022 (AS-22)* (Oct. 1, 2021).

"game-changer" for their training. This is because an on-site simulator would allow pilots to accomplish some training when helicopters are not able to fly due to weather, maintenance, or other conditions.

According to officials, simulator availability will be even more limited in the near future. The current version of the Pave Hawk helicopter simulator—located only at Kirtland Air Force Base—will phase out when the new version of the aircraft becomes available in early 2024. Air National Guard units will not have access to a simulator until completion of the transition to the new aircraft—planned to occur between the last quarter of fiscal year 2025 to the middle of fiscal year 2026, depending upon location, at which point units will receive an on-site simulator, officials stated.

Recent Initiatives Have Not Fully Addressed Challenges with National Guard Helicopter Pilots' Ability to Meet Flying Hour Goals

Various departmental, military service, and National Guard initiatives identified personnel, maintenance, and training challenges that hindered helicopter pilots' ability to meet flying hour goals. These initiatives included formal studies with associated recommendations, training and helicopter program modernization strategies, and other mechanisms that provide oversight of resources to enable helicopter pilot training. The Army and Air Force, including their National Guard components, have taken steps to address several challenges, but we found that some of these actions remain incomplete. We also found that key Army and Air National Guard helicopter pilot training documents did not always establish clear priorities to address the challenges that have affected National Guard helicopter pilots' ability to meet flying hour goals. Further, some initiatives lacked comprehensive data that could be used to set milestones and monitor progress toward addressing these challenges.

Army and Air Force actions to implement recommendations are incomplete. Army and Air Force efforts to implement prior study recommendations aimed at improving National Guard helicopter pilots' ability to meet flying hour goals or to identify and address resource challenges were incomplete, according to our analysis. Specifically, two recent studies focused on improving DOD and military service aviation programs included recommendations that apply to the Army and Air National Guard components. For example:

- **Army Holistic Aviation Assessment.** The Army conducted an assessment in 2016 with the purpose of comprehensively assessing Army aviation to ensure its readiness for the future.[71] The assessment resulted in 63 recommendations to address various challenges faced by Army aviation, including six recommendations directed specifically to, or directly involving the Army National Guard. According to our analysis of Army documentation, three of these recommendations have been implemented and one has been partially implemented. Officials told us the remaining two recommendations, which would change the alignment of some units and give units more ability to train with their counterparts across state lines, have not been implemented. Officials we spoke with stated that implementing two of these recommendations in particular—aligning resources so National Guard aviation units could participate in Combat Training Center rotations and establishing an organization to identify National Guard unit resource needs prior to mobilization—has improved training.
- **National Commission on Military Aviation Safety.** The John S. McCain National Defense Authorization Act for Fiscal Year 2019 established the National Commission on Military Aviation Safety to improve aviation safety across the Department of Defense.[72] The National Commission on Military Aviation Safety's work was supported by the Army and Air National Guard and resulted in a 2020 report that made 25 recommendations, including 14 that we determined are relevant to National Guard helicopter pilot training.[73]

However, we found that several recommendations from these reports have not been fully implemented. For example, the Army's *Holistic Aviation Assessment Task Force Study Report* recommended that the Army initiate and sponsor a comprehensive audit of resources required to support all aspects of rotary-wing flight operations across all components. Such an analysis would help the Army National Guard identify existing resource shortfalls and would establish a baseline for measuring progress

[71]U.S. Army, *Holistic Aviation Assessment Task Force Study Report, Regaining Decisive Action Readiness*, (June 2016).

[72]Pub. L. No. 115-232, § 1087 (2018).

[73]National Commission on Military Aviation Safety, *Report to the President and Congress of the United States*, (Dec. 1, 2020). Of the 25 recommendations made by the National Commission on Military Aviation Safety, we determined that 14 were directed to military services. Five of the recommendations related to Congress establishing a Joint Safety Council and actions that the Council should take. The Joint Safety Council was established in the National Defense Authorization Act for Fiscal Year 2022. The Joint Safety Council had its first meeting on August 26, 2022.

in addressing the shortfalls, according to the study report. As of October 2022, this recommendation had not been implemented.

Similarly, we found several key recommendations made by the National Commission on Military Aviation Safety that require National Guard participation and that relate to helicopter pilot training have not been fully implemented. For example, neither the Army nor the Air National Guard have implemented a recommendation to reduce the administrative duties for pilots by providing aviation units with personnel who could carry out those duties instead. The administrative burdens on pilots was a challenge identified across the military services in the National Commission on Military Aviation Safety report and several National Guard units we met with noted that it is especially important for part-time pilots to be focused primarily on flying when they are with the unit. Officials told us that the Air Force active component implemented the recommendation by using contractors to fulfill certain administrative duties, such as flight scheduling, but Air National Guard units were not included in the contract. We also found that similar recommendations from the National Commission on Military Aviation Safety to allow pilots and maintainers to reduce non-aviation-related training to the minimum have not been implemented. Personnel at three of the five facilities we gathered information from identified non-aviation training requirements as a challenge that limited their unit's ability to fly.

Additionally, the Air Force Ready Aircrew Program includes a feedback mechanism for units to report resource limitations that constrain pilot training opportunities. The units use this feedback mechanism to recommend ways to increase their flying hours, but Air Force actions in response to this feedback from the units were incomplete.[74] For example, the New York Air National Guard unit used this mechanism to report significant training challenges as a result of maintenance personnel shortfalls. This challenge aligns with the findings of a 2019 staffing report that found the unit required 23 additional maintenance personnel to safely conduct flight operations.[75] However, as of September 2022, only 10 of those positions were filled.

[74]The Air Force Ready Aircrew Program establishes the minimum number of training events and simulator missions that helicopter pilots must complete during an annual training cycle.

[75]Air National Guard, *Logistics Composite Model Final Report for Aircraft Maintenance Manpower Combat Search & Rescue (HH-60G, HC-130J)*, (Oct. 30, 2019).

Similarly, the Commander of the California Air National Guard helicopter unit identified a need for more full-time personnel in pilot positions and non-pilot crewmembers in order to meet flying hour goals. However, the Air National Guard had not taken action to address this issue.

Key National Guard helicopter training documents have not set clear priorities. Separately, we also identified that Army and Air National Guard training strategies did not establish clear priorities to address the full-range of challenges that have affected National Guard helicopter pilots' ability to meet flying hour goals.

For example, the Army National Guard officials told us that the training strategy seeks to balance pilot availability and helicopter maintenance needs with operational demands. The training strategy identified a flying hour goal of 9.0 hours per month to achieve this goal, along with a need for increased contract and military maintenance. Officials told us that, based on requirements established in the training strategy, the Army National Guard is planning to allocate additional funds for contract maintenance in fiscal year 2023. However, Army officials noted that contract maintenance funding does not address all of the identified maintenance needs. Specifically, they said the training strategy does not identify the number of military maintenance personnel that units will need in order to provide the additional helicopter maintenance that the training strategy calls for. Officials at Army National Guard support facilities told us they would benefit from clearer guidance on maintenance personnel levels and resources to match those desired staffing levels.

In the Air Force, the Ready Aircrew Program does not establish clear training priorities for the Air National Guard units, because it does not account for the inability of many National Guard pilots to meet flying hour goals. The 2022 Ready Aircrew Program Tasking Memorandum included 26 different skills that Pave Hawk pilots must perform annually, regardless of whether they are active duty or National Guard.[76] According to officials, it is a challenge for many National Guard helicopter pilots, especially those who are part-time, to train to all of these different skills on an annual basis. However, the number of different skills that Pave Hawk helicopter pilots train to has been the same for the active duty and National Guard pilots for the last 3 years, according to our analysis of Ready Aircrew Program Tasking Memorandums for fiscal years 2020,

[76]Air Combat Command, *HH-60G Ready Aircrew Program (RAP) Tasking Memorandum, Aviation Schedule 2022 (AS-22)* (Oct. 1, 2021).

2021, and 2022. Air National Guard unit personnel confirmed that the number of different skills that active duty and National Guard pilots train to has been the same for much longer.

In the absence of clear guidance from the Air Force on which skills to prioritize, unit officials told us they have established training priorities considering a range of factors, such as deployment requirements, aircraft availability, and recent pilot flying experience, among others. Air National Guard unit personnel told us that the annual training requirements, which are updated every year, should be adjusted to reflect the differences between active and National Guard flying hours. They noted that there are several of the 26 skills, such as electronic warfare and denied/degraded communications, for which Air National Guard pilots may only need to train to when they are preparing to deploy. Unit leaders told us they have de-emphasized some skills for pilots who are not able to meet flying hour goals, and instead have focused on maintaining basic flying skills.

Army and Air National Guard lack comprehensive data for monitoring progress. We found that some Army and Air National Guard initiatives to improve helicopter pilots' ability to meet flying hour goals lacked comprehensive data that could be used to set milestones and monitor progress toward addressing these challenges. Specifically, the Air National Guard's Readiness of Combat Capabilities Review and the Army's efforts to share key unit readiness information across states have not fully incorporated key unit-identified measures into their organization-wide reviews.

The Air National Guard's Readiness of Combat Capabilities Review has taken some steps to increase the quality of maintenance data reported by units to higher headquarters. Officials we met with stated that this initiative has allowed units to better report maintenance challenges. However, the review process has not comprehensively incorporated measures that are used by units to monitor progress toward accomplishing flying hour goals. For example, the Air National Guard review we analyzed did not include data on maintenance personnel shortfalls, which unit personnel identified as a key factor that limited flying hours for training.

The Air National Guard Readiness of Combat Capabilities Review also has not tracked unit operational demand for aircraft flying hours, meaning the Air National Guard does not have insight into the level of flying hours needed to satisfy all unit training needs. Instead, the Air National Guard

has focused on metrics that measure limitations with unit maintenance as it exists, including metrics on how often aircraft were available and how quickly repairs were made. While the existing measures allow for certain insights, they do not provide insight in other areas, such as the magnitude of the maintenance shortfalls compared with the actual operational demand of the pilots in the units. Such insights would allow for more effective monitoring of shortfalls, and units we met with noted that these measures would give a clearer picture of what factors limit training and how to prioritize resources to yield the greatest improvements.

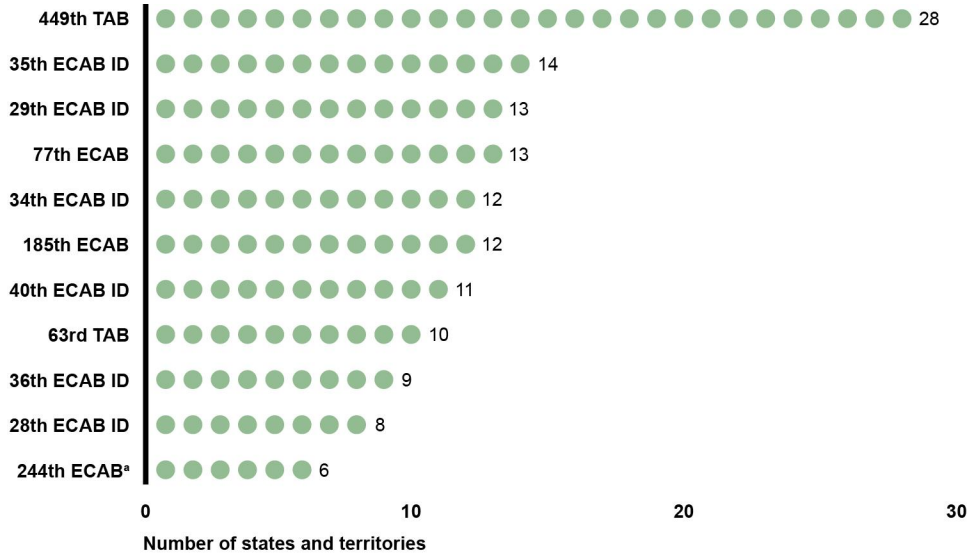
Similarly, we identified metrics that Army National Guard units used to manage training that are not shared with the Army National Guard Bureau. These metrics included tracking training hours flown for part-time and full-time personnel and pilot flight waivers.[77] Units use these metrics to understand challenges and risks with their personnel training, and they could provide similar insights and improved monitoring to the National Guard on the training status of units. For example, tracking part-time and full-time flying hours provides insight on the nature of the training challenges faced by the units, since part-time and full-time pilots face different barriers to training. Additionally, tracking the number of pilot flying hours waived by units would give better insight into the risk units are taking by not flying enough. The lack of comprehensive tracking of waivers was also noted by the National Commission on Military Aviation Safety, which reported that waiver usage was among the causal factors identified in accident reports, including fatal Class A accidents.[78]

Establishing a comprehensive and consistent set of metrics to monitor how units across the Army National Guard are addressing challenges would also allow the Army National Guard to prioritize and allocate resources to obtain the most return on its investments. This is particularly important in the Army National Guard due to the dispersed nature of units, which are frequently spread across many states (see fig. 14). Army National Guard officials told us that sharing of such key data across states is limited, which further emphasizes the importance of more effective central monitoring.

[77]Waivers, including training, individual or flight hours, are granted by unit commanders to helicopter pilots for a specific flying hour requirement they are unable to complete.

[78]National Commission on Aviation Safety, *Report to the President and Congress of the United States*, (December 2020).

Figure 14: Number of States and Territories That Provide Units to Army National Guard Brigades and Divisions



ECAB Expeditionary Combat Aviaitoin Brigade
ID Infantry Division
TAB Theater Aviation Brigade

Source: GAO analysis of Army information. | GAO-23-105219

Accessible Data for Figure 14: Number of States and Territories That Provide Units to Army National Guard Brigades and Divisions

	Number of states and territories
449th TAB	28
35th ECAB ID	14
29th ECAB ID	13
77th ECAB	13
34th ECAB ID	12
185th ECAB	12
40th ECAB ID	11
63rd TAB	10
36th ECAB ID	9
28th ECAB ID	8
244th ECAB	6

[a]The 244th ECAB is comprised of units from the Army Reserve and the Army National Guard.

Our prior work has found that developing robust, comprehensive plans that define goals, priorities, and performance measures as well as required resources and investments could assist high-performing organizations when facing major challenges.[79] Further, according to *Standards for Internal Control in the Federal Government*, agency managers should identify, analyze, and respond to risks related to achieving defined objectives.[80] Although the Army, Air Force, and their National Guard components have taken some steps to address challenges that have hindered National Guard helicopter pilots' ability to meet flying hour goals, they have not been able to fully address these challenges because they have not developed a comprehensive strategy to respond to them.

Officials we met with explained that addressing helicopter pilot training challenges is complex. Resource needs are interconnected and require a coordinated and comprehensive response to ensure that resource adjustments are mutually supportable and are aligned with the objectives the National Guard helicopter units will be expected to achieve. For example, the ability of a unit to execute flying hours relies upon funding for flying hours, funding for maintenance, and personnel staffing levels for maintenance and operations, among other factors.

Furthermore, officials explained that over the past several decades, the National Guard has transitioned to be more of an operational force and is no longer a strategic reserve force. This means that National Guard units are expected to mobilize and deploy regularly, not just in the case of emergencies.[81] While the use of the force has transitioned to this more operational model, officials from the Army and Air National Guard stated that the resourcing of National Guard units is more like that of a strategic reserve force. This has meant that National Guard units have received fewer resources than their current missions require, according to these officials. Part of the reason for the ongoing mismatch between strategy and resources is that the National Guard helicopter community has had to

[79]For example, see GAO, *Veterans' Health Care: Proper Plan Needed to Modernize System for Paying Community Providers*, GAO-16-353 (Washington, D.C.: May 11, 2016), and GAO, *Automated Vehicles: Comprehensive Plan Could Help DOT Address Challenges*, GAO-18-132 (Washington, D.C.: Nov. 30, 2017).

[80]GAO, *Standards for Internal Control in the Federal Government,* GAO-14-704G (Washington, D.C.: September 2014).

[81]National Guard Bureau, *2021 National Guard Bureau Posture Statement: Force for the Future*.

continue to support operations while trying to determine how to optimize their training without a clear idea of what their end-goal strategy and available resources will be. As a result, the efforts to address the mismatch between the strategy and resourcing for National Guard helicopter pilots have not been coordinated and comprehensive, but instead have been piecemeal.

By developing a comprehensive strategy that defines goals, priorities, and performance measures, the Army and Air Force would be better positioned to address the complex and inter-related challenges that have hindered National Guard helicopter pilots from achieving their training objectives.

Conclusions

From fiscal years 2012 through 2021, 28 National Guard helicopter crew members lost their lives in accidents that DOD attributed to operator errors, such as not adhering to training standards. National Guard helicopter accident prevention is a multifaceted effort that requires effective safety and risk management processes and well-aligned and supported training programs. A breakdown in planning, oversight, or implementation can lead to injuries to military service members, including deaths, and damage to helicopters.

The Army and Air National Guard use a variety of processes to promote safety and reduce risks during helicopter pilot training, but factors have presented challenges to safer helicopter operations. The Army has not established a system of record for tracking the status of accident investigation recommendations through implementation. Additionally, Army and Air National Guard helicopter units have not continuously evaluated and updated operational risk management worksheets, and generally make such changes in an ad-hoc manner. Further, the Army has not developed a coordinated plan and identified the necessary resources to routinely schedule Army National Guard units for flight evaluations, while Air Force units and active duty Army units are regularly inspected. Finally, workload and staffing issues hinder the scope of National Guard safety officer efforts, but the Army and Air Force have not determined whether National Guard helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs.

National Guard helicopter pilots have faced challenges meeting their flying hour goals. The challenges are complex and require a coordinated approach to ensure that any resource adjustments are supportable and are aligned with priorities. The Army and Air Force, including their National Guard components, have taken some steps to address challenges that have hindered National Guard helicopter pilots' ability to meet flying hour goals, but they have not been able to fully address these challenges. By developing a comprehensive strategy that defines goals, priorities, and performance measures, the Army and Air Force would be better positioned to address the complex and inter-related challenges that have hindered National Guard helicopter pilots from achieving their training objectives.

Recommendations for Executive Action

We are making the following 8 recommendations to DOD:

The Secretary of the Army should ensure that the Director of the Army National Guard, in coordination with the Army Combat Readiness Center, establishes a system of record for tracking the status of accident investigation recommendations through implementation. (Recommendation 1)

The Secretary of the Army should ensure the Chief of Staff of the Army, in coordination with the Director of the Army National Guard, updates safety or operational guidance to establish a process to continuously evaluate and update operational risk management worksheets for Army National Guard helicopter units to reflect relevant safety information such as accident data, hazard reporting, and unit culture surveys. (Recommendation 2)

The Secretary of the Air Force, in coordination with the Chief of Staff of the Air Force and the Director of the Air National Guard, should incorporate an evaluation of unit processes for updating risk management worksheets as a component of the Air Force's unit inspection program or other means to ensure that the worksheets reflect relevant safety information such accident data, hazard reporting, and unit culture surveys. (Recommendation 3)

The Secretary of the Army should ensure the Army Training and Doctrine Command's Army Aviation Center of Excellence, in coordination with the Director of the Army National Guard, develops a coordinated plan and

identifies the resources necessary for conducting in-flight aviation standardization program evaluations of Army National Guard helicopter unit aircrews on a regular and recurring basis. (Recommendation 4)

The Secretary of Army should ensure the Director of the Army National Guard assesses the resource and workload allocations of safety personnel to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs. (Recommendation 5)

The Secretary of the Air Force should ensure the Director of the Air National Guard assesses the resource and workload allocations of safety personnel to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs. (Recommendation 6)

The Secretary of the Army should ensure that the Chief of Staff of the Army, in coordination with the Director of the Army National Guard, develops a comprehensive strategy that includes goals, priorities, and performance measures to address the challenges that hinder Army National Guard helicopter pilot training. (Recommendation 7)

The Secretary of the Air Force should ensure that the Chief of Staff of the Air Force, in coordination with the Director of the Air National Guard, develops a comprehensive strategy that includes goals, priorities, and performance measures to address the challenges that hinder Air National Guard helicopter pilot training. (Recommendation 8)

Agency Comments and Our Evaluation

We provided a draft of this report to DOD for comment. In its written comments, reproduced in appendix VII, DOD concurred or partially concurred with all eight of our recommendations. DOD also provided technical comments, which we incorporated as appropriate.

In concurring with our second recommendation, DOD indicated that Army aviation unit commanders have the flexibility to add guidance related to continuous evaluation and modification of operational risk management processes. We agree that Army guidance provides certain operational risk management responsibilities to unit commanders. However, in our report, we found that reevaluation of these processes, particularly unit risk management worksheets was not occurring on a continuous basis.

Instead, risk management worksheets were updated in an ad-hoc manner, such as following an accident. We further found that Army National Guard units have access to safety information that could be used to inform the cyclical and continuous nature of the operational risk management process as described in Army risk management guidance, including the evaluation and feedback aspects of the process. We continue to believe that the Chief of Staff of the Army should coordinate with the Director of the Army National Guard to update safety or operational guidance to ensure units have a process that draws on relevant safety information to continuously evaluate and update operational risk management worksheets. The Army also stated that the standardization of accident reporting across its three components should remain within the purview of the Chief of Staff of the Army. This matter is outside of the scope of our recommendation, but we believe that there would be utility in considering the perspectives of the Director of the Army National Guard in light of the evidence we found in our report associated with this recommendation and we believe coordination on this effort would not diminish the authority of the Chief of Staff of the Army.

DOD partially concurred with our third recommendation. In the draft report we provided to DOD, our third recommendation originally called for the Secretary of the Air Force to ensure that the Chief of Staff of the Air Force, in coordination with the Director of the Air National Guard, updates safety or operational guidance to establish a well-defined process for the continuous evaluation of operational risk management practices that is informed by relevant safety data such as accident data, hazard reporting, and unit culture surveys. In its comments, DOD stated that the Department of the Air Force has multiple ongoing efforts based on existing DOD instructions, and Air Force policy to ensure that the ongoing evaluation of operational risk management practices are informed by safety trends. DOD's comments further stated that operational guidance for risk management is already established as a well-defined process throughout the Air Force, including the Air National Guard. DOD also stated that any lack of updates to an individual risk management program is a compliance issue, not a lack of process. DOD stated that the intention of our recommendation would be better met if Air Force inspection checklists were updated with a specific item to verify the Air National Guard helicopter unit's compliance with existing helicopter risk management operations directives. Finally, in its comments, DOD stated our recommendation should be revised to focus on ensuring helicopter units continually evaluate risk management practices for compliance, to include risk management worksheets that are informed by safety trends such as mishap data, hazard reporting, and unit culture surveys. As

discussed in our report, we found that Air National Guard helicopter unit reevaluations of risk management worksheets—a key element of the unit-level operational risk management process—were not happening on a continuous, recurring basis. Instead, the risk management worksheets were updated in an ad-hoc manner, such as following an accident. We agree that the Air Force should ensure that Air National Guard helicopter units continually evaluate risk management processes for compliance, to include risk management worksheets that are informed by safety trends such as mishap data, hazard reporting, and unit culture surveys. As a result of DOD's comments, we adjusted our recommendation to focus on Air National Guard unit implementation of the Air Force's existing risk management directives with respect to evaluation and updating as part of the risk management process.

In concurring with our fifth recommendation, DOD's comments stated that the Army National Guard is severely limited in the number of full-time personnel they can have, which reduces the ability to assign full-time aviation safety officers. We continue to believe that the Army National Guard would benefit from fully assessing the resource and workload allocations of safety personnel so that they would be better positioned to more appropriately tailor the number and duty status of personnel needed to meet the safety mission and reduce risks during helicopter training. Further, such an assessment of the resource and workload allocations of safety personnel could help the Army National Guard develop options to better prioritize existing resources for safety officers, or determine if other approaches could help alleviate some of the challenges we reported, such as unit-level aviation safety personnel serving as the safety officer, a pilot, and additional duties.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees and the Secretaries of Defense, Army, and Air Force, and the Chief of the National Guard Bureau. In addition, the report will be available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have questions about this report, please contact me at (202) 512-5431 or russellc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VIII.

Sincerely yours,

Cary Russell
Director, Defense Capabilities and Management

Appendix I: Objectives, Scope, and Methodology

This report examines (1) the trends from fiscal years 2012 through 2021 in reported Army and Air National Guard helicopter accidents in non-combat scenarios and reported causes; and evaluates the extent to which (2) the Army and Air National Guard used existing processes to promote safety and reduce risks during helicopter training; and (3) the Army and Air National Guard have addressed challenges that hindered helicopter pilot training.

Each of our objectives focuses on the primary Army and Air National Guard helicopter types used during fiscal years 2012 through 2021. The Army helicopters we focused on are the AH-64 Apache, UH/HH-60 Black Hawk, CH-47 Chinook, and UH-72 Lakota. For the Air Force, we focused on the HH-60G Pave Hawk.[1] We also obtained information and data from, and performed interviews with, officials from the National Guard Bureau; the Army, including its headquarters, the Combat Readiness Center, Training and Doctrine Command, and its Aviation Directorate; and the Air Force, including Air Combat Command and Air Force Safety Center. Additionally, we met with officials from five National Guard helicopter unit locations: three Army (Edgewood, Maryland; Rochester, New York; and Morrisville, North Carolina) and two Air Force (101st Rescue Squadron, Westhampton Beach, New York; and 129th Rescue Squadron, Mountain

[1]According to Army and Air Force officials, these were the primary aircraft operated by the Army and Air National Guard from fiscal years 2012 through 2021. The Army National Guard operated some additional aircraft during fiscal year 2012, such as the AH-1 Cobra, OH-6 Cayuse, and OH-58 Kiowa. However, the AH-64 Apache, UH/HH-60 Black Hawk, CH-47 Chinook, UH-72 Lakota, and HH-60G Pave Hawk were the primary aircraft operated during this time frame officials stated. For the purposes of this report, we refer to the helicopters by name (e.g., Apache, Black Hawk, Chinook, Lakota, and Pave Hawk), not classification. The Army and Air Force use a classification system involving letters and numbers to identify different types of helicopters. For the helicopters discussed in our report, the classification formula begins with a single letter that indicates the mission of the helicopter, such as “A” (Attack), “C” (Transport), “H” (Search/Rescue/Medical Evacuation), and “U” (Utility). The second letter, “H” indicates that the aircraft is a helicopter, and is followed by a number indicating a specific design. Single letter suffixes are then added after the design numbers to indicate the production model of the helicopter. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

View, California). We selected these units to ensure we included each of the selected helicopter types in our scope. We also considered the geographic locations of the units to include units from a variety of states. To facilitate meeting with unit leaders, pilots, maintainers, and safety personnel, we selected units where operational flying units were co-located with maintenance and headquarter units. Finally, we also ensured we visited units that had experienced the most serious helicopter accidents that involved death, permanent disability, or extensive hospitalization during fiscal years 2017 through 2021 to assist us in learning about how units respond and learn from such accidents.[2]

For objective one, we requested data on all accidents for the helicopters in our scope that occurred during fiscal years 2012 through 2021 from the Army Combat Readiness Center and the Air Force Safety Center. We analyzed these data to determine trends in helicopter accidents, such as number and rate of accidents by accident class, year, helicopter types, and event types such as collisions.[3] Different iterations of data provided by the Army contained different observations and data fields. We joined multiple spreadsheets of data that we received to allow us to run crosscutting analysis involving fields from different spreadsheets. We met with Army and Air Force officials who report, maintain, and use the accident data in order to understand how the information is used and to help us assess its reliability and completeness. We also performed electronic testing of the data to check for missing values and internal consistency. Based on officials' statements, we determined the reporting for Class A and B accidents was likely more complete than reporting for

[2]The Department of Defense (DOD) refers to accidents that occur outside of engagement with an adversary as "mishaps." A mishap is an unplanned event or series of events that results in damage to DOD property; occupational illness to DOD personnel; injury or death to on- or off-duty DOD military personnel; injury or death to on-duty DOD civilian personnel; or damage to public or private property; or injury or death or illness to non-DOD personnel, caused by DOD activities. Throughout this report, we use the term "accident" to mean mishap. Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018). We included data from fiscal year 2012 through fiscal year 2021, which was the most recent full year of data available at the time of our analysis.

[3]DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. DOD Instruction 6055.07.

less serious accidents.[4] Specifically, according to Army Combat Readiness Center officials, the Army has placed an increased emphasis on reporting Class C and below accidents and these efforts likely account for some of the increase in reported numbers of Class C and D helicopter accidents for fiscal years 2020 and 2021. We note this limitation in the report where relevant to the findings. Overall, we determined the data were sufficiently reliable for the purposes of identifying general trends in the reported number and severity of accidents over time, accident rates, and additional characteristics such as quarter and month of the accident, type of accident, and state guard location.[5]

Our analysis of National Guard helicopter accidents included accidents reported by home station units as well as mobilized units. According to safety officials, National Guard component units differ from active component units in that they have more stable personnel, fly in the same general airspace for training and missions, and spend more training hours on individual training missions as opposed to collective training exercises. National Guard helicopter units would bring these experiences to bear when mobilized, so we determined accidents involving these units should be included as part of the National Guard in our analysis.

To calculate accident rates, we obtained flying hours from Headquarters Department of the Army, Military Operations-Aviation, Headquarters Air Force Readiness Division, and the Air National Guard Flying Hour Program. We met with Army and Air Force officials who report and maintain flying hour data in order to understand how the information is

[4]DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. Department of Defense Instruction 6055.07. For the first 7 years within our scope, fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[5]For the purposes of this report, we use the term trend to refer to the number of accidents and characteristics of those accidents reported over time or summarized for the period covered by our review.

used and to help us assess its reliability and completeness. Our analysis of accident rates follows a widely accepted standard of measuring accidents per 100,000 flight hours. Accident "rates" equal the number of accidents in a given period divided by the sum of the flight hours in the period and then multiplied by 100,000. We assessed statistical significance through a test of differences in accident rates. For these accident rate data, we assume a Poisson distribution, which gives the probability of events over a period of time.

To examine causal factors, we analyzed identified causal factors for Class A through C National Guard helicopter accidents and available accident investigation narratives for Class A and B accidents.[6] We shared drafts of our data tables with the Army and Air Force to confirm our approach.

For objective two, we identified and reviewed Army and Air National Guard processes that promote safety and reduce risks during helicopter training. Specifically, we reviewed the processes the Army and Air National Guard used for reporting and tracking accidents. We compared their processes with standards set in DOD and military service-level safety guidance.[7] We also reviewed the Army and Air National Guard processes for updating and implementing operational risk management processes and compared the processes that were used with various military service-level guidance documents such as Department of the Army Regulation 95-1, *Flight Regulations* and the Army National Guard supplement, and Air Force Instruction 90-802, *Risk Management* and the Air Combat Command supplement.[8] Further, we reviewed the extent that safety program inspections and other processes evaluate in-flight aircrew

[6]The Army provided us with narratives for 26 of 40 Class A and B accidents from fiscal years 2012 through 2021. Army officials reported that they were unable to provide narratives for 14 accidents because of blank entries in the accident database. Officials said this could be due to improper data entry, failure to forward final reports to the Combat Readiness Center, or loss of entries due to data migration from a previous to the current information management system.

[7]DOD Instruction 6055.07; Army Regulation 385-10, *The Army Safety Program*, (Feb. 24, 2017); Department of the Air Force Instruction 91-204, *Safety Investigations and Reports*, (Mar. 10, 2021); and National Guard Supplement 1 to Army Regulation 385-10, *The Army Safety Program*, (Feb. 12, 2015).

[8]Army Regulation 95-1, *Flight Regulations* (Mar. 22, 2018); National Guard Supplement 1 to Army Regulation 95-1, *Flight Regulations* (Nov. 30, 2018); Air Force Instruction 90-802, *Risk Management* (Apr. 1, 2019); and Air Combat Command Supplement to Air Force Instruction 90-802, *Risk Management* (Aug. 23, 2019).

performance during training compared with military service-level guidance such as Army Regulation 95-1, *Flight Regulations* and our prior work related to collaboration and cross-functional teams.[9] We interviewed Army and Air National Guard safety officials to determine the extent that workload and staffing issues effect the scope of their efforts. We assessed these approaches against guidance in DOD Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program*.[10] We determined the control environment component of the *Standards for Internal Control in the Federal Government* was significant to this objective, specifically the associated underlying principle that management is responsible for evaluating pressure on personnel to help personnel fulfill their assigned responsibilities.[11] Additionally, we interviewed leaders, pilots, mechanics, and safety personnel from selected units to assess their use and implementation of the safety processes. We compared how the units used these processes against the standards and procedures in DOD and military service-level guidance and federal internal control standards.

For objective three, we analyzed flying hour data for pilots from Army and Air National Guard helicopter units that flew the helicopter types within our scope for fiscal years 2017 through 2021. We used flying hour data provided by agency officials that they obtained from their data systems. These flying hours are used by the military services to track flying hour execution and compute accident rates, among other things. To ensure the reliability of the data we discussed the data with knowledgeable agency officials and sent our analysis results to the military services to review for errors. We compared the flying hour data we obtained with training goals set by the military services. Some of these training goals are established in military service-wide guidance, such as Army Regulation 95-1, *Flight Regulations*; Army Training Circular 3-04.11, *Commander's Aviation Training and Standardization Program;* and Air Force Instruction 11-102,

[9]GAO, *Defense Management: DOD Needs to Take Additional Actions to Promote Department-Wide Collaboration,* GAO-18-194 (Washington, D.C.: Feb. 28, 2018).

[10]Department of Defense Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program* (Oct. 14, 2014) (incorporating change 3, Apr. 21, 2021).

[11]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 2014).

Flying Hour Program Management.[12] Other flying hour goals are established in platform-specific guidance, such as Army's *UH-60 Series Aircrew Training Manual* and Air Force's annual HH-60G *Ready Aircrew Program Tasking Memorandums* and still other goals are set by organizations and units, such as Army National Guard's 9.0 flying hour strategy.[13]

We identified factors that affected flying hour trends and challenges that hindered Army and Air National Guard helicopter pilot training by reviewing military service- and unit-developed data and reports and interviewing officials at various levels, including officials at units that we selected based on factors such as where accidents occurred. We reviewed mission capable information from the Army and Air Force and summarized not mission capable due to maintenance information we obtained from the Army and Air Force. Additionally, we analyzed maintenance resource levels, which were identified as a key limitation to Army and Air National Guard pilot training. We used various Army staffing guides and Army and Air National Guard staffing studies to identify any shortfalls. We also identified departmental, military service, and National Guard-specific initiatives to address identified challenges, including reports by the National Commission on Military Aviation Safety and the Army's Holistic Aviation Assessment Task Force, and determined the extent that those initiatives were implemented by the Army and Air National Guard.[14] We determined the risk assessment component of the *Standards for Internal Control in the Federal Government* was significant to this objective, specifically the associated underlying principle that management should identify, analyze, and respond to risks related to achieving the defined objectives.[15] We also determined that our prior work

[12]Army Regulation 95-1; Army Training Circular 3-04.11, *Commander's Aviation Training and Standardization Program* (Apr. 14, 2022); Air Force Instruction 11-102, *Flying Hour Program Management* (Dec. 8, 2020).

[13]United States Army Aviation Center of Excellence, *UH-60 Series Aircrew Training Manual* (Mar. 25, 2021); Air Combat Command, *HH-60G Ready Aircrew Program (RAP) Tasking Memorandum, Aviation Schedule 2022 (AS-22)* (Oct. 1, 2021).

[14]National Commission on Military Aviation Safety, *National Commission on Military Aviation Safety Report to the President and Congress of the United States*, (Dec. 1, 2020). *Holistic Aviation Assessment Task Force Study Report*, (June 2016).

[15]GAO-14-704G.

related to leading practices for results-oriented organizations was relevant.[16]

We conducted this performance audit from May 2021 to March 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[16]For example, see GAO, *Veterans' Health Care: Proper Plan Needed to Modernize System for Paying Community Providers*, GAO-16-353 (Washington, D.C.: May 11, 2016) and GAO, *Automated Vehicles: Comprehensive Plan Could Help DOT Address Challenges*, GAO-18-132 (Washington, D.C.: Nov. 30, 2017).

Appendix II: Army National Guard Helicopter Accidents by Helicopter Type for Fiscal Years 2012 through 2021

This appendix provides information on the numbers of reported Army National Guard helicopter accidents in four classes, based on severity.[1] Table 7 shows the reported numbers of Class A through D Army National Guard helicopter accidents for the four Army helicopter airframes in our scope—Apache, Black Hawk, Chinook and Lakota—for fiscal years 2012 through 2021.[2]

Table 7: Reported Army National Guard Class A-D Helicopter Accidents by Helicopter Type, Fiscal Years 2012 through 2021

		Fiscal year	Fiscal year	Fiscal year	Fiscal year	Fiscal year	Fiscal year	Fiscal year	Fiscal year	Fiscal year	Fiscal year	
Helicopter type a and accident class	**Class**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Apache	A	0	1	1	1	1	0	1	0	0	0	**5**
Apache	B	0	0	0	0	0	1	2	0	0	0	**3**
Apache	C	1	2	2	1	0	2	0	2	0	1	**11**

[1]DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[2]For the purposes of this report, we refer to the helicopters by name (e.g., Apache, Black Hawk, Chinook, Lakota), not classification. The Army uses a classification system involving letters and numbers to identify different types of helicopters. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

Helicopter type a and accident class	Class	Fiscal year 2012	Fiscal year 2013	Fiscal year 2014	Fiscal year 2015	Fiscal year 2016	Fiscal year 2017	Fiscal year 2018	Fiscal year 2019	Fiscal year 2020	Fiscal year 2021	Total
Apache	D	4	0	1	0	0	0	0	0	1	1	**7**
Apache	All	5	3	4	2	1	3	3	2	1	2	**26**
Black Hawk	A	0	1	1	3	0	3	1	0	1	3	**13**
Black Hawk	B	2	1	0	5	0	0	1	2	2	1	**14**
Black Hawk	C	9	10	7	11	6	11	10	3	8	13	**88**
Black Hawk	D	18	15	7	3	5	0	2	2	0	11	**63**
Black Hawk	All	29	27	15	22	11	14	14	7	11	28	**178**
Chinook	A	0	0	1	0	0	0	0	0	0	0	**1**
Chinook	B	0	1	0	0	0	0	0	0	3	0	**4**
Chinook	C	3	1	1	2	1	1	2	1	4	2	**18**
Chinook	D	2	2	3	1	2	1	2	3	3	3	**22**
Chinook	All	5	4	5	3	3	2	4	4	10	5	**45**
Lakota	A	0	0	0	0	0	0	0	0	0	0	**0**
Lakota	B	0	0	0	0	0	0	0	0	0	0	**0**
Lakota	C	0	0	1	2	5	1	2	0	2	3	**16**
Lakota	D	0	4	2	0	1	0	0	0	0	1	**8**
Lakota	All	0	4	3	2	6	1	2	0	2	4	**24**
Total		**39**	**38**	**27**	**29**	**21**	**20**	**23**	**13**	**24**	**39**	**273**

Source: GAO analysis of Army data. | GAO-23-105219

Note: DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[a]For the purposes of this report, we refer to the helicopters by name (e.g., Apache, Black Hawk, Chinook, Lakota), not classification. The Army uses a classification system involving letters and numbers to identify different types of helicopters. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

Appendix III: Air National Guard Helicopter Accident Data by Helicopter Type for Fiscal Years 2012 through 2021

This appendix provides information on the numbers of reported Air National Guard helicopter accidents in four classes, based on severity.[1] Table 8 shows the reported numbers of Class A through D Air National Guard helicopter accidents for the one Air Force helicopter airframe in our scope— the Pave Hawk—for fiscal years 2012 through 2021.[2]

[1]DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[2]For the purposes of this report, we refer to the helicopters by name (i.e., Pave Hawk), not classification. The Air Force uses a classification system involving letters and numbers to identify different types of helicopters. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

Table 8: Reported Air National Guard Class A-D Helicopter Accidents by Helicopter Type, Fiscal Years 2012 through 2021

Helicopter type[a] and accident class	Class	Fiscal year 2012	Fiscal year 2013	Fiscal year 2014	Fiscal year 2015	Fiscal year 2016	Fiscal year 2017	Fiscal year 2018	Fiscal year 2019	Fiscal year 2020	Fiscal year 2021	Total
Pave Hawk	A	0	1	0	0	1[b]	0	1	0	0	0	**3**
Pave Hawk	B	0	0	1	0	0	0	1	0	0	0	**2**
Pave Hawk	C	1	1	2	1	1	2	2	1	1	1	**13**
Pave Hawk	D	0	0	1	2	0	0	1	1	1	1	**7**
Pave Hawk	All	1	2	4	3	2	2	5	2	2	2	**25**

Source: GAO analysis of Air Force data. | GAO-23-105219

Note: DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[a]For the purposes of this report, we refer to the helicopters by name (i.e., Pave Hawk), not classification. The Air Force uses a classification system involving letters and numbers to identify different types of helicopters. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

[b]The Class A accident from 2016 involved injuries to Air National Guard personnel that occurred aboard the variant of the Army National Guard Black Hawk helicopter.

Appendix IV: Army and Air Force Helicopter Accident Rate Data by Helicopter Type and Component for Fiscal Years 2012 - 2021

This appendix provides information on Army and Air Force helicopter accident rates in four classes, based on severity.[1] Table 9 shows the amount of flying hours and reported numbers of Class A through D accidents for the four Army helicopter airframes in our scope—Apache, Black Hawk, Chinook and Lakota—and the one Air Force helicopter airframe in our scope— the Pave Hawk—by component, for fiscal years 2012 through 2021.[2]

[1]Our analysis of accident rates follows a widely accepted standard of measuring accidents per 100,000 flight hours. The accident rate equals the number of accidents per year divided by the number of flight hours per year and then multiplied by 100,000. DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[2]For the purposes of this report, we refer to the helicopters by name (e.g., Apache, Black Hawk, Chinook, Lakota, and Pave Hawk), not classification. The Army and Air Force use a classification system involving letters and numbers to identify different types of helicopters. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

Table 9: Reported Army and Air Force Class A-D Helicopter Accident Rate by Helicopter Type and Component, Fiscal Years 2012 through 2021

Helicopter type[a]	Component	Flying hours	Class A accidents	Rate	Class B accidents	Rate	Class C accidents	Rate	Class D accidents	Rate
Apache	Army Active	1,207,987	28	2.32	23	1.9	83	6.87	114	9.44
Apache	Army National Guard	199,024	5	2.5	3	1.51	11	5.53	7	3.52
Chinook	Army Active	405,423	12	2.96	4	0.99	43	10.61	42	10.36
Chinook	Army National Guard	200,902	1	0.5	4	1.99	18	8.96	22	10.95
Blackhawk	Army Active	1,914,170	26	1.36	21	1.1	143	7.47	138	7.21
Blackhawk	Army National Guard	1,234,593	13	1.05	14	1.13	88	7.13	63	5.1
Lakota	Army Active	490,254	2	0.41	0	0.0	20	4.08	21	4.28
Lakota	Army National Guard	394,374	0	0.0	0	0.0	16	4.06	8	2.03
Pave Hawk	Air Force Active	172,986	4	2.31	6	3.47	116	67.06	132	76.31
Pave Hawk	Air National Guard	34,724	2[b]	5.76	2	5.76	13	37.44	7	20.16

Source: GAO analysis of Army and Air Force accident and flying hour data. | GAO-23-105219

Note: Our analysis of accident rates follows a widely accepted standard of measuring accidents per 100,000 flight hours. The accident rate equals the number of accidents per year divided by the number of flight hours per year and then multiplied by 100,000. DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019).

[a]For the purposes of this report, we refer to the helicopters by name (e.g., Apache, Black Hawk, Chinook, Lakota, and Pave Hawk), not classification. The Army and Air Force use a classification system involving letters and numbers to identify different types of helicopters. Department of the Air Force Instruction 16-401, Army Regulation 70-50, Naval Air Systems Command Instruction 13100.16, *Designating and Naming Defense Military Aerospace Vehicles* (Nov. 3, 2020).

[b]The Air National Guard experienced an additional Class A accident in 2016 that involved injuries to Air National Guard personnel that occurred aboard the variant of the Army National Guard Black Hawk helicopter.

Appendix V: Additional Trends and Characteristics of Class A through C Army and Air National Guard Helicopter Accidents

This appendix provides information on Army and Air National Guard helicopter accidents by aviation accident category in three classes, based on severity.[1] Table 10 shows the number of Army National Guard Class A through C helicopter accidents by aviation category, for fiscal years 2012 through 2021. Table 11 shows the number of Air National Guard Class A through C helicopter accidents by aviation category, for fiscal years 2012 through 2021.

[1]DOD categorizes aviation accidents in one of three ways: flight, flight related, and ground operations. A flight accident occurs when there is intent for flight and damage to DOD aircraft; a flight related accident occurs when there is intent for flight and no reportable damage to the aircraft itself, but the accident involves fatality, reportable injury, or reportable property damage; and a ground operations accident occurs when there is no intent for flight but the accident results in damage to an aircraft or death or injury involving an aircraft. Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018). DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States*, (Dec. 1, 2020).

Table 10: Reported Army National Guard Class A through C Helicopter Accidents by Category, Fiscal Years 2012 through 2021

Aviation accident category and class	Class	Fiscal year 2012	Fiscal year 2013	Fiscal year 2014	Fiscal year 2015	Fiscal year 2016	Fiscal year 2017	Fiscal year 2018	Fiscal year 2019	Fiscal year 2020	Fiscal year 2021	Total
Aircraft Ground	A	0	0	0	0	1	3	0	0	0	1	5
Aircraft Ground	B	1	0	0	0	0	0	0	0	3	0	4
Aircraft Ground	C	2	1	1	6	3	2	4	1	4	7	31
Flight	A	0	2	2	4	0	0	2	0	1	2	13
Flight	B	1	2	0	5	0	1	3	2	2	1	17
Flight	C	9	10	8	9	7	11	9	5	9	9	86
Flight Related	A	0	0	1	0	0	0	0	0	0	0	1
Flight Related	B	0	0	0	0	0	0	0	0	0	0	0
Flight Related	C	2	2	2	1	2	2	1	0	1	3	16
Total		15	17	14	25	13	19	19	8	20	23	173

Source: GAO analysis of Army data. | GAO-23-105219

Note: DOD categorizes aviation accidents in one of three ways: flight, flight related, and ground operations. A flight accident occurs when there is intent for flight and damage to DOD aircraft; a flight related accident occurs when there is intent for flight and no reportable damage to the aircraft itself, but the accident involves fatality, reportable injury, or reportable property damage; and a ground operations accident occurs when there is no intent for flight that results in damage to an aircraft or death or injury involving an aircraft. Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018). DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States* (Dec.1, 2020).

Table 11: Reported Air National Guard Class A through C Helicopter Accidents by Category, Fiscal Years 2012 through 2021

Aviation accident category and class	Class	Fiscal year 2012	Fiscal year 2013	Fiscal year 2014	Fiscal year 2015	Fiscal year 2016	Fiscal year 2017	Fiscal year 2018	Fiscal year 2019	Fiscal year 2020	Fiscal year 2021	Total
Aircraft Ground	A	0	0	0	0	0	0	0	0	0	0	0

Aviation accident category and class	Class	Fiscal year 2012	Fiscal year 2013	Fiscal year 2014	Fiscal year 2015	Fiscal year 2016	Fiscal year 2017	Fiscal year 2018	Fiscal year 2019	Fiscal year 2020	Fiscal year 2021	Total
Aircraft Ground	B	0	0	0	0	0	0	0	0	0	0	0
Aircraft Ground	C	0	1	0	1	0	2	1	0	0	0	5
Flight	A	0	0	0	0	0	0	1	0	0	0	1
Flight	B	0	0	0	0	0	0	1	0	0	0	1
Flight	C	1	0	2	0	0	0	0	1	0	1	5
Flight Related	A	0	1	0	0	1a	0	0	0	0	0	2
Flight Related	B	0	0	1	0	0	0	0	0	0	0	1
Flight Related	C	0	0	0	0	1	0	1	0	1	0	3
Total		1	2	3	1	2	2	4	1	1	1	18

Source: GAO analysis of Air Force data. | GAO-23-105219

Note: DOD categorizes aviation accidents in one of three ways: flight, flight related, and ground operations. A flight accident occurs when there is intent for flight and damage to DOD aircraft; a flight related accident occurs when there is intent for flight and no reportable damage to the aircraft itself, but the accident involves fatality, reportable injury, or reportable property damage; and a ground operations accident occurs when there is no intent for flight that results in damage to an aircraft or death or injury involving an aircraft. Department of Defense Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping* (June 6, 2011) (incorporating change 1, Aug. 31, 2018). DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality* Costs (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety*, Report to the President and the Congress of the United States*, (Dec. 1, 2020).

[a]The Class A accident from 2016 involved injuries to Air National Guard personnel that occurred aboard the variant of the Army National Guard Black Hawk helicopter.

Appendix VI: Additional Trends and Characteristics of Class A through C Army National Guard Helicopter Accidents

This appendix provides information on Army National Guard helicopter accidents by state guard location, fiscal year quarter, and month for three accident classes, based on severity.[1] Table 12 shows the number of reported Army National Guard Class A through C accidents by state guard location, for fiscal years 2012 through 2021. Table 13 shows the number of reported Army National Guard Class A through C helicopter accidents by fiscal year quarter, for fiscal years 2012 through 2021. Table 14 shows the number of reported Army National Guard Class A through C accidents by month, for fiscal years 2012 through 2021.

[1]DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States*, (Dec. 1, 2020).

Table 12: Reported Army National Guard Class A through C Helicopter Accidents by State Guard, Fiscal Years 2012 through 2021

Army National Guard state abbreviation	Army National Guard state	Class A	Class B	Class C	Total
AK	Alaska	0	0	5	**5**
AL	Alabama	0	0	1	**1**
AR	Arkansas	0	2	2	**4**
AZ	Arizona	2	0	5	**7**
CA	California	1	0	10	**11**
CO	Colorado	0	1	6	**7**
CT	Connecticut	0	1	3	**4**
DC	District of Columbia	0	0	0	**0**
DE	Delaware	0	0	0	**0**
FL	Florida	0	0	1	**1**
GA	Georgia	0	2	2	**4**
GU	Guam	0	0	0	**0**
HI	Hawaii	0	0	0	**0**
IA	Iowa	0	0	2	**2**
ID	Idaho	2	0	1	**3**
IL	Illinois	0	0	2	**2**
IN	Indiana	1	0	7	**8**
KS	Kansas	0	1	3	**4**
KY	Kentucky	0	0	4	**4**
LA	Louisiana	2	0	1	**3**
MA	Massachusetts	0	0	1	**1**
MD	Maryland	0	1	1	**2**
ME	Maine	0	0	1	**1**
MI	Michigan	0	0	2	**2**
MN	Minnesota	1	0	1	**2**
MO	Missouri	0	0	2	**2**
MS	Mississippi	1	0	3	**4**
MT	Montana	0	0	2	**2**
NC	North Carolina	2	0	2	**4**
ND	North Dakota	0	0	2	**2**
NE	Nebraska	0	1	7	**8**
NH	New Hampshire	0	0	1	**1**
NJ	New Jersey	0	0	1	**1**

Army National Guard state abbreviation	Army National Guard state	Class A	Class B	Class C	Total
NM	New Mexico	0	1	0	**1**
NV	Nevada	0	0	0	**0**
NY	New York	1	1	2	**4**
OH	Ohio	1	0	1	**2**
OK	Oklahoma	0	1	4	**5**
OR	Oregon	0	0	0	**0**
PA	Pennsylvania	1	1	5	**7**
PR	Puerto Rico	0	0	0	**0**
RI	Rhode Island	1	0	3	**4**
SC	South Carolina	2	2	7	**11**
SD	South Dakota	1	0	1	**2**
TN	Tennessee	0	0	5	**5**
TX	Texas	0	1	10	**11**
UT	Utah	0	3	4	**7**
VA	Virginia	0	1	1	**2**
VI	Virgin Islands	0	0	0	**0**
VT	Vermont	0	1	2	**3**
WA	Washington	0	0	2	**2**
WI	Wisconsin	0	0	4	**4**
WV	West Virginia	0	0	0	**0**
WY	Wyoming	0	0	1	**1**
Total		**19**	**21**	**133**	**173**

Source: GAO analysis of Army data. | GAO-23-105219

Note: DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States* (Dec. 1, 2020).

Table 13: Reported Army National Guard Class A through C Helicopter Accidents by Fiscal Year Quarter, Fiscal Years 2012 through 2021

Quarter	Fiscal year	Accident class A	Accident class B	Accident class C	Accident class A-C
Q1	2012	0	0	2	2
Q1	2013	1	1	1	3
Q1	2014	0	0	2	2
Q1	2015	2	1	3	6
Q1	2016	0	0	4	4
Q1	2017	0	0	4	4
Q1	2018	0	0	5	5
Q1	2019	0	0	1	1
Q1	2020	1	0	1	2
Q1	2021	0	0	3	3
Q1	**Total**	**4**	**2**	**26**	**32**
Q2	2012	0	1	6	7
Q2	2013	0	1	3	4
Q2	2014	0	0	2	2
Q2	2015	2	1	7	10
Q2	2016	0	0	1	1
Q2	2017	0	1	2	3
Q2	2018	0	0	3	3
Q2	2019	0	1	2	3
Q2	2020	0	0	3	3
Q2	2021	2	1	4	7
Q2	**Total**	**4**	**6**	**33**	**43**
Q3	2012	0	0	1	1
Q3	2013	1	0	6	7
Q3	2014	2	0	5	7
Q3	2015	0	0	4	4
Q3	2016	1	0	5	6
Q3	2017	1	0	5	6
Q3	2018	1	1	3	5
Q3	2019	0	1	1	2
Q3	2020	0	0	6	6
Q3	2021	0	0	8	8
Q3	**Total**	**6**	**2**	**44**	**52**

Quarter	Fiscal year	Accident class A	Accident class B	Accident class C	Accident class A-C
Q4	2012	0	1	4	5
Q4	2013	0	0	3	3
Q4	2014	1	0	2	3
Q4	2015	0	3	2	5
Q4	2016	0	0	2	2
Q4	2017	2	0	4	6
Q4	2018	1	2	3	6
Q4	2019	0	0	2	2
Q4	2020	0	5	4	9
Q4	2021	1	0	4	5
Q4	**Total**	**5**	**11**	**30**	**46**

Source: GAO analysis of Army data. | GAO-23-105219

Note: DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety*, Report to the President and the Congress of the United States* (Dec.1, 2020).

Table 14: Reported Army National Guard Class A through C Helicopter Accidents by Month, Fiscal Years 2012 through 2021

Month	Class A	Class B	Class C	Class A through C
January	2	2	8	12
February	1	1	9	11
March	1	3	16	20
April	2	1	8	11
May	1	0	17	18
June	3	1	19	23
July	5	5	11	21
August	0	4	13	17
September	0	2	6	8
October	0	0	11	11
November	2	1	6	9
December	2	1	9	12
Total	**19**	**21**	**133**	**173**

Source: GAO analysis of Army data. | GAO-23-105219

Note: DOD categorizes the severity of accidents by grouping them into classes, with Class A accidents being the most severe and Class D accidents being the least severe. For fiscal years 2012 through 2019, DOD defined Class A accidents as the most serious accidents resulting in death or permanent total disability, destruction of a DOD aircraft, or $2 million in damages or greater. Class B accidents resulted in permanent partial disability or inpatient hospital care for three or more individuals and/or damages of $500,000 or more, but less than $2 million. Class C accidents resulted in injury or occupational illness that resulted in one or more lost workdays not including the shift being worked when the injury occurred and/or damages of $50,000 or more but less than $500,000. DOD adjusted the cost thresholds for accident classes upward in October 2019 so that, for example, Class A accidents represent damages of $2.5 million or higher. Assistant Secretary of Defense for Readiness Memorandum, *Revision to Accident Severity Classification Cost Thresholds and Recording of Injury and Fatality Costs* (Oct. 15, 2019). We performed additional analysis on Class A through C accidents because officials who work with these data told us that reporting is more robust for these classes of accidents. Furthermore, the National Commission on Military Aviation Safety report identified Class C accidents as a potential leading indicator for more serious Class A and B accidents. National Commission on Military Aviation Safety, *Report to the President and the Congress of the United States*, (Dec. 1, 2020).

Appendix VII: Comments from the Department of Defense

ASSISTANT SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

READINESS

FEB 17 2023

Mr. Cary Russell
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Mr. Russell:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-23-105219SU, "NATIONAL GUARD HELICOPTERS: Additional Actions Needed to Prevent Accidents and Improve Safety," dated December 14, 2022 (GAO Code 105219).

The Department appreciates the opportunity to comment on the draft report. We concur with 7 recommendations and partially concur with 1 of the recommendations and the Department's comments are attached.

The point of contact for this effort is Ms. Karen Nelson, who can be reached at (703) 693-9821, or karen.f.nelson9.civ@mail.mil.

Sincerely,

Shawn G. Skelly

Attachment:
As stated

GAO DRAFT REPORT DATED DECEMBER 14, 2022
GAO-23-105219 (GAO CODE 105219)

"NATIONAL GUARD HELICOPTERS: ADDITIONAL ACTIONS NEEDED TO PREVENT ACCIDENTS AND IMPROVE SAFETY"

DEPARTMENT OF DEFENSE COMMENTS TO THE GAO RECOMMENDATION

RECOMMENDATION 1: The GAO recommends that the Secretary of the Army should ensure that the Director of the Army National Guard, in coordination with the Army Combat Readiness Center, establishes a system of record for tracking the status of accident investigation recommendations through implementation.

DoD RESPONSE:

Concur.

The Office of the Under Secretary of Defense for Personnel and Readiness finalized safety business processes and data standards in coordination with the Military Departments. The agreed upon standards include tracking of Aviation Class 'A' – 'C' recommendations and implementation status. The DoD Components are scheduled to be fully operational with the revised standards by February 2024, whereby the Army Combat Readiness Center (CRC) will ensure the Army's system of record, the Army Safety Management Information System (ASMIS), has the capability to track implementation of accident investigation recommendations across the aviation enterprise. In the interim, Army National Guard Aviation and Safety Division (ARNG-AV) maintains a record of all findings and recommendations for all Class 'A' – 'C' aviation mishaps, and conducts periodic internal follow-up to track implementation.

RECOMMENDATION 2: The GAO recommends that the Secretary of the Army should ensure the Chief of Staff of the Army, in coordination with the Director of the Army National Guard, updates safety or operational guidance to establish a well-defined process for the continuous evaluation of operational risk management practices that is informed by relevant safety data such as accident data, hazard reporting, and unit culture surveys.

DoD RESPONSE:

Concur with Comment.

Army Aviation units have the flexibility to add to their guidance at the commander's discretion for continuous evaluation and modification of operational risk management practices. There is acknowledgement that there should be standardization of accident reporting across all three Army components to the maximum extent possible, however the Army recommends these actions remain within the purview of the Chief of Staff of the Army.

RECOMMENDATION 3: The GAO recommends that the Secretary of the Air Force should ensure the Chief of Staff of the Air Force, in coordination with the Director of the Air National Guard, updates safety or operational guidance to establish a well-defined process for the continuous evaluation of operational risk management practices that is informed by relevant safety data such as accident data, hazard reporting, and unit culture surveys.

DoD RESPONSE:

Partial Concur.

The Department of the Air Force has multiple ongoing efforts based on existing DoD instructions and Air Force policy to ensure that the ongoing evaluation of operational risk management practices is informed by safety trends. Operational guidance for helicopter risk management is already established as a well-defined process across the Total Force (U.S. Air Force, Air National Guard and Air Force Reserves). Any lack of appropriate updates to an individual risk management program is a compliance issue, not a lack of process. The intention of the recommendation would be better met if Air Force Unit Effectiveness Inspection and Continual Evaluation checklists/worksheets were updated with a specific item to verify the Air National Guard helicopter unit's compliance with existing helicopter risk management operations directives. Suggest this recommendation be revised to focus on ensuring helicopter units continually evaluate risk management practices for compliance, to include risk management worksheets that are informed by safety trends such as mishap data, hazard reporting, and unit culture surveys.

RECOMMENDATION 4: The GAO recommends that the Secretary of the Army should ensure the Army Training and Doctrine Command's Army Aviation Center of Excellence, in coordination with the Director of the Army National Guard, develops a coordinated plan and identifies the resources necessary for conducting in-flight aviation standardization program evaluations of Army National Guard helicopter unit aircrews on a regular and recurring basis.

DoD RESPONSE:

Concur.

RECOMMENDATION 5: The GAO recommends that the Secretary of Army should ensure the Director of the Army National Guard assesses the resource and workload allocations of safety personnel to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs.

DoD RESPONSE:

Concur with Comment.

The ARNG is severely limited on the number of full time Active Guard Reserve (AGR) and Dual Status T-32 Technician authorizations, which reduces the ability to assign full time aviation safety officers.

RECOMMENDATION 6: The GAO recommends that the Secretary of the Air Force should ensure the Director of the Air National Guard assesses the resource and workload allocations of safety personnel to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs.

DoD RESPONSE:

Concur.

RECOMMENDATION 7: The GAO recommends that the Secretary of the Army should ensure that the Chief of Staff of the Army, in coordination with the Director of the Army National Guard, develops a comprehensive strategy that includes goals, priorities, and performance measures to address the challenges that hinder Army National Guard helicopter pilot training.

DoD RESPONSE:

Concur.

RECOMMENDATION 8: The GAO recommends that the Secretary of the Air Force should ensure that the Chief of Staff of the Air Force, in coordination with the Director of the Air National Guard, develops a comprehensive strategy that includes goals, priorities, and performance measures to address the challenges that hinder Air National Guard helicopter pilot training.

DoD RESPONSE:

Concur.

Accessible Text for Appendix VII: Comments from the Department of Defense

FEB 17 2023

Mr. Cary Russell
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Mr. Russell:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-23-105219SU, "NATIONAL GUARD HELICOPTERS: Additional Actions Needed to Prevent Accidents and Improve Safety," dated December 14, 2022 (GAO Code 105219).

The Department appreciates the opportunity to comment on the draft report. We concur with 7 recommendations and partially concur with 1 of the recommendations and the Department's comments are attached.

The point of contact for this effort is Ms. Karen Nelson, who can be reached at (703) 693-9821, or karen.f.nelson9.civ@mail.mil.

Sincerely,

Shawn G. Skelly

Attachment:
As stated

GAO DRAFT REPORT DATED DECEMBER 14, 2022 GAO-23-105219 (GAO CODE 105219)

“NATIONAL GUARD HELICOPTERS: ADDITIONAL ACTIONS NEEDED TO PREVENT ACCIDENTS AND IMPROVE SAFETY”

DEPARTMENT OF DEFENSE COMMENTS TO THE GAO RECOMMENDATION

RECOMMENDATION 1: The GAO recommends that the Secretary of the Army should ensure that the Director of the Army National Guard, in coordination with the Army Combat Readiness Center, establishes a system of record for tracking the status of accident investigation recommendations through implementation.

DoD RESPONSE:

Concur.

The Office of the Under Secretary of Defense for Personnel and Readiness finalized safety business processes and data standards in coordination with the Military Departments. The agreed upon standards include tracking of Aviation Class 'A' – 'C' recommendations and implementation status. The DoD Components are scheduled to be fully operational with the revised standards by February 2024, whereby the Army Combat Readiness Center (CRC) will ensure the Army's system of record, the Army Safety Management Information System (ASMIS), has the capability to track implementation of accident investigation recommendations across the aviation enterprise. In the interim, Army National Guard Aviation and Safety Division (ARNG-AV) maintains a record of all findings and recommendations for all Class 'A' – 'C' aviation mishaps, and conducts periodic internal follow-up to track implementation.

RECOMMENDATION 2: The GAO recommends that the Secretary of the Army should ensure the Chief of Staff of the Army, in coordination with the Director of the Army National Guard, updates safety or operational guidance to establish a well-defined process for the continuous evaluation of operational risk management practices that is informed by relevant safety data such as accident data, hazard reporting, and unit culture surveys.

DoD RESPONSE:

Concur with Comment.

Army Aviation units have the flexibility to add to their guidance at the commander's discretion for continuous evaluation and modification of operational risk management practices. There is acknowledgement that there should be standardization of accident reporting across all three Army components to the maximum extent possible, however the Army recommends these actions remain within the purview of the Chief of Staff of the Army.

RECOMMENDATION 3: The GAO recommends that the Secretary of the Air Force should ensure the Chief of Staff of the Air Force, in coordination with the Director of the Air National Guard, updates safety or operational guidance to establish a well-defined process for the continuous evaluation of operational risk management

practices that is informed by relevant safety data such as accident data, hazard reporting, and unit culture surveys.

DoD RESPONSE:

Partial Concur.

The Department of the Air Force has multiple ongoing efforts based on existing DoD instructions and Air Force policy to ensure that the ongoing evaluation of operational risk management practices is informed by safety trends. Operational guidance for helicopter risk management is already established as a well-defined process across the Total Force (U.S. Air Force, Air National Guard and Air Force Reserves). Any lack of appropriate updates to an individual risk management program is a compliance issue, not a lack of process. The intention of the recommendation would be better met if Air Force Unit Effectiveness Inspection and Continual Evaluation checklists/worksheets were updated with a specific item to verify the Air National Guard helicopter unit's compliance with existing helicopter risk management operations directives. Suggest this recommendation be revised to focus on ensuring helicopter units continually evaluate risk management practices for compliance, to include risk management worksheets that are informed by safety trends such as mishap data, hazard reporting, and unit culture surveys.

RECOMMENDATION 4: The GAO recommends that the Secretary of the Army should ensure the Army Training and Doctrine Command's Army Aviation Center of Excellence, in coordination with the Director of the Army National Guard, develops a coordinated plan and identifies the resources necessary for conducting in-flight aviation standardization program evaluations of Army National Guard helicopter unit aircrews on a regular and recurring basis.

DoD RESPONSE:

Concur.

RECOMMENDATION 5: The GAO recommends that the Secretary of Army should ensure the Director of the Army National Guard assesses the resource and workload allocations of safety personnel to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs.

DoD RESPONSE:

Concur with Comment.

The ARNG is severely limited on the number of full time Active Guard Reserve (AGR) and Dual Status T-32 Technician authorizations, which reduces the ability to assign full time aviation safety officers.

RECOMMENDATION 6: The GAO recommends that the Secretary of the Air Force should ensure the Director of the Air National Guard assesses the resource and workload allocations of safety personnel to determine whether helicopter units are appropriately staffed, or if any adjustments are needed to workloads or resource levels to implement operational flight safety programs.

DoD RESPONSE:

Concur.

RECOMMENDATION 7: The GAO recommends that the Secretary of the Army should ensure that the Chief of Staff of the Army, in coordination with the Director of the Army National Guard, develops a comprehensive strategy that includes goals, priorities, and performance measures to address the challenges that hinder Army National Guard helicopter pilot training.

DoD RESPONSE:

Concur.

RECOMMENDATION 8: The GAO recommends that the Secretary of the Air Force should ensure that the Chief of Staff of the Air Force, in coordination with the Director of the Air National Guard, develops a comprehensive strategy that includes goals, priorities, and performance measures to address the challenges that hinder Air National Guard helicopter pilot training.

DoD RESPONSE:

Concur.

Appendix VIII: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the contact named above, Matthew Ullengren (Assistant Director), William Carpluk, Charles Culverwell, Lorraine Ettaro, Christopher Gezon, Alexandra Gonzalez, Scott Hiromoto, Ron La Du Lake (retired), Lashai McCullough, Randy Neice, and Clarice Ransom made key contributions to this report.

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