

Availability and Use of Rotary-Wing Aircraft in the Department of Defense



At a Glance

In this report, the Congressional Budget Office analyzes patterns in the availability and use of rotary-wing aircraft by three military departments within the Department of Defense (DoD): the Army, the Department of the Navy (DoN, which includes the Marine Corps), and the Air Force. A fleet's availability rate is the percentage of aircraft that are possessed by operational squadrons (and not receiving maintenance in a depot) and available to be flown.

- **Fleet Sizes.** As of September 2023, DoD had about 5,400 rotary-wing aircraft. The Army had about 3,700; DoN had about 1,400; and the Air Force had about 300. Almost half of those rotary-wing aircraft were versions of H-60 transport helicopters.
- **Availability and Use Among the Services.** In recent years, availability rates of the Army's rotary-wing aircraft have been greater than availability rates of the Air Force's and DoN's aircraft. But DoN has flown its rotary-wing aircraft more hours per aircraft than the Air Force or Army has.
- **Age, Availability, and Use of Aircraft.** DoN replaced much of its rotary-wing fleet in the first half of the 2010s. The average age of the Army's rotary-wing aircraft (around 16 years) has remained relatively constant since 2000. The Air Force's rotary-wing aircraft appear to be older, on average, than those operated by the other services. But that is because when the Air Force rebuilds its helicopters, it does not renumber them like the other services do.

DoN's H-60s show a marked decline in availability rates in the first five years of operation—more so than the other services' H-60s. Similarly, although the availability and use of aircraft typically diminish with age, the decrease in availability and use of DoN's V-22 tiltrotor aircraft is nonetheless noteworthy.

Contents

DoD's Rotary-Wing Aircraft	2
 Servicewide Availability and Use	3
Aircraft Availability	3
Aircraft Use	4
 Fleets of Aircraft Operated by Multiple Services	5
H-60s	5
V-22s	6
H-1s	7
Comparing Measures of Availability for DoN's H-60s, V-22s, and H-1s	8
 Trends in the Age of DoD's Rotary-Wing Aircraft	9
Age of the Services' Fleets	9
Age of Fleets, by Type of Aircraft	10
 Age, Availability, and Use of DoD's Rotary-Wing Aircraft	11
Availability and Use of H-60s, by Age	12
Availability and Use of V-22s, by Age	13
Availability and Use of H-1s, by Age	14
About This Document	15

Notes About This Report

All years referred to in this report are federal fiscal years, which run from October 1 to September 30 and are designated by the calendar year in which they end.

Numbers in the text and figures may not add up to totals because of rounding.

The data in this report come from the Air Force's Reliability and Maintainability Information System (REMIS); the Global Combat Support System-Army Enterprise Aviation data system; and the Department of the Navy's Decision Knowledge Programming for Logistics Analysis and Technical Evaluation system (known as DECKPLATE) and its Aviation Maintenance Supply Readiness Report system (AMSRR).

On the cover (from left to right): A UH-60 Black Hawk, photo by Sgt. Timothy MacDuffie; an SH-60 Seahawk, photo by Photographer's Mate Airman James R. Evans; and an HH-60 Pave Hawk, photo by Master Sgt. Kelly Goonan. Photos courtesy of the Army, Navy, and Air Force.

Availability and Use of Rotary-Wing Aircraft in the Department of Defense

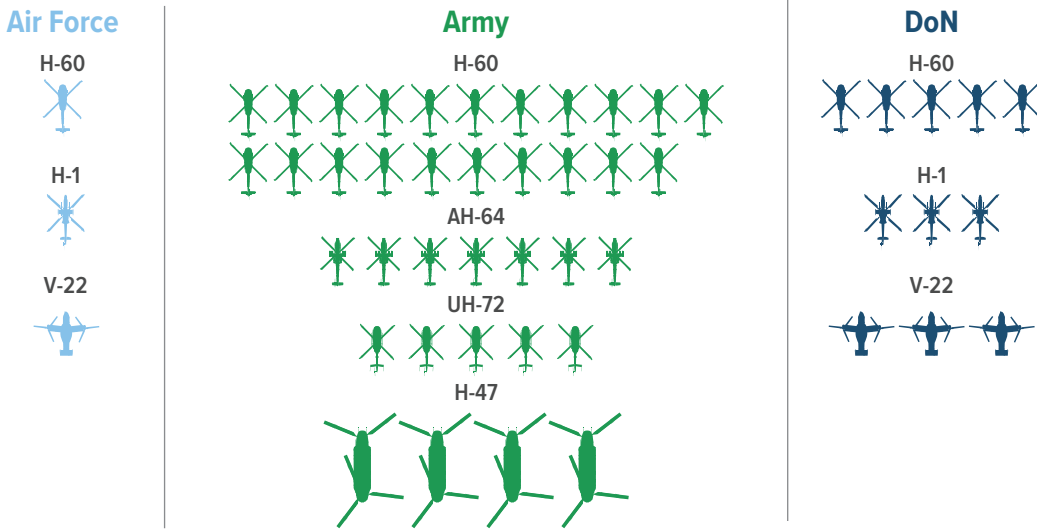
In this report, the Congressional Budget Office combines data from the Army, the Department of the Navy (DoN, which includes the Marine Corps), and the Air Force to analyze the availability and use of the Department of Defense's (DoD's) rotary-wing aircraft from 2000 to 2023. The report builds upon CBO's recent analyses of the availability and use of aircraft in those three services. (See *Availability and Use of Aircraft in the Air Force and Navy*, released in January 2022, and *Availability and Use of Aircraft in the Army*, released in September 2024.) Rotary-wing aircraft are mostly helicopters, but the term "rotary-wing" also encompasses the V-22 Osprey, a tiltrotor aircraft operated by DoN and the Air Force.

DoD's Rotary-Wing Aircraft

As of September 2023, DoD had roughly 5,400 rotary-wing aircraft. Almost half of them were versions of H-60 transport helicopters. (The Army refers to its H-60s as Black Hawks, DoN calls its H-60s Seahawks, and the Air Force refers to its G variant of the aircraft as Pave Hawks.)

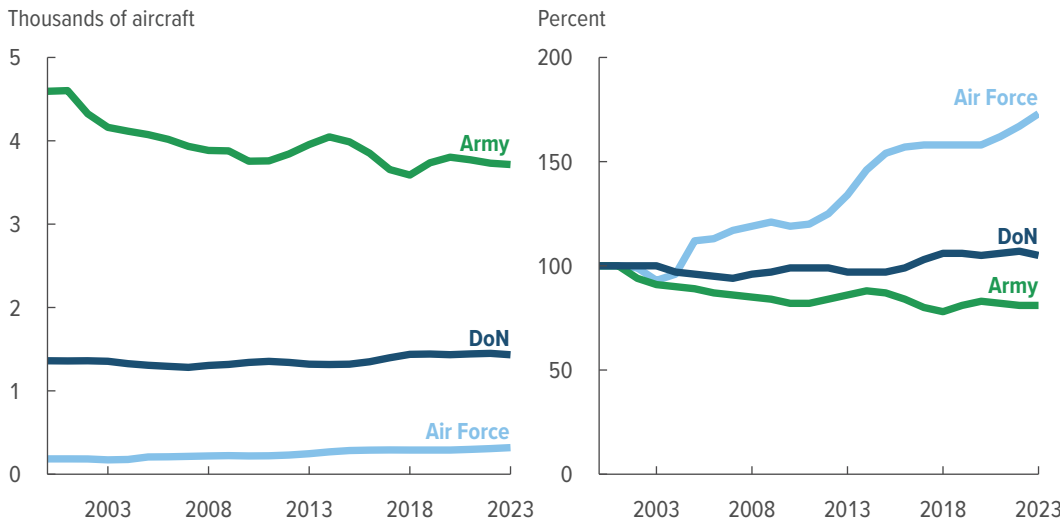
Inventory of DoD's Rotary-Wing Aircraft as of September 2023

1 icon = 100 aircraft



Along with its H-60s, DoD's other large fleets of helicopters consist of AH-64 Apaches, UH-72 Lakotas, H-47 Chinooks, and H-1s. Additionally, DoN and the Air Force operate V-22 Osprey tiltrotors. (The services also operate smaller helicopter fleets not shown here.)

Rotary-Wing Aircraft, by Number and as a Percentage Relative to 2000



The size of the Army's fleet of rotary-wing aircraft has diminished since 2000, whereas the size of DoN's fleet has been static. The much smaller Air Force fleet has grown as the V-22 has entered service.

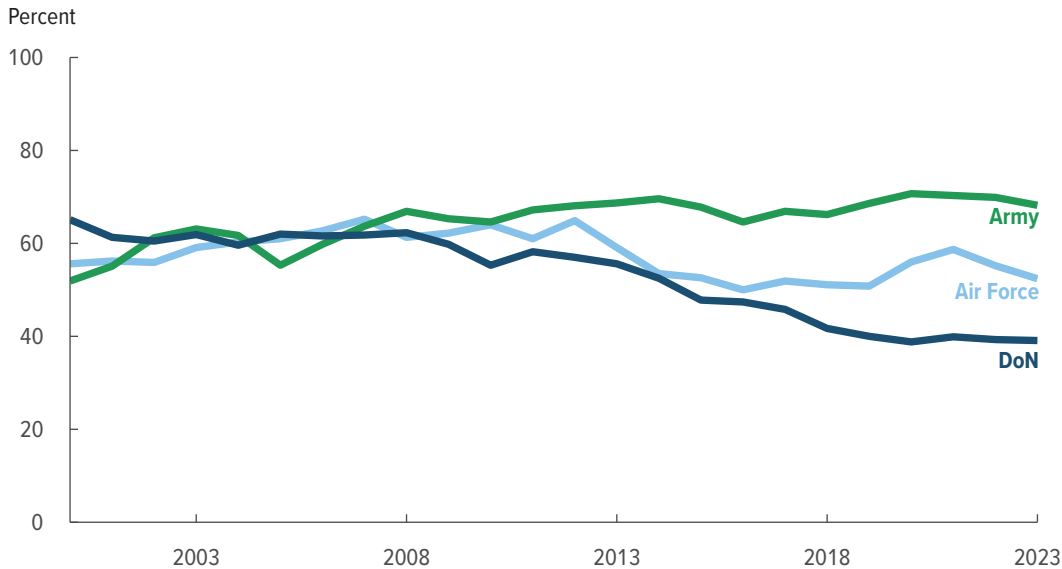
Service-wide Availability and Use

CBO analyzed the availability and use of DoD’s rotary-wing aircraft within each of the three services. (In this analysis, aircraft operated by the Marine Corps are counted among the aircraft operated by DoN.)

Aircraft Availability

To estimate a fleet’s availability rate, CBO began with the number of hours that aircraft are both mission capable and in the possession of operational squadrons. (An aircraft is mission capable if it can perform at least one of its missions; it need not be fully mission capable to be tallied as available.) The agency then divided that number by total hours in a year, which include the time aircraft spend receiving maintenance or in storage.

Availability Rates of Rotary-Wing Aircraft

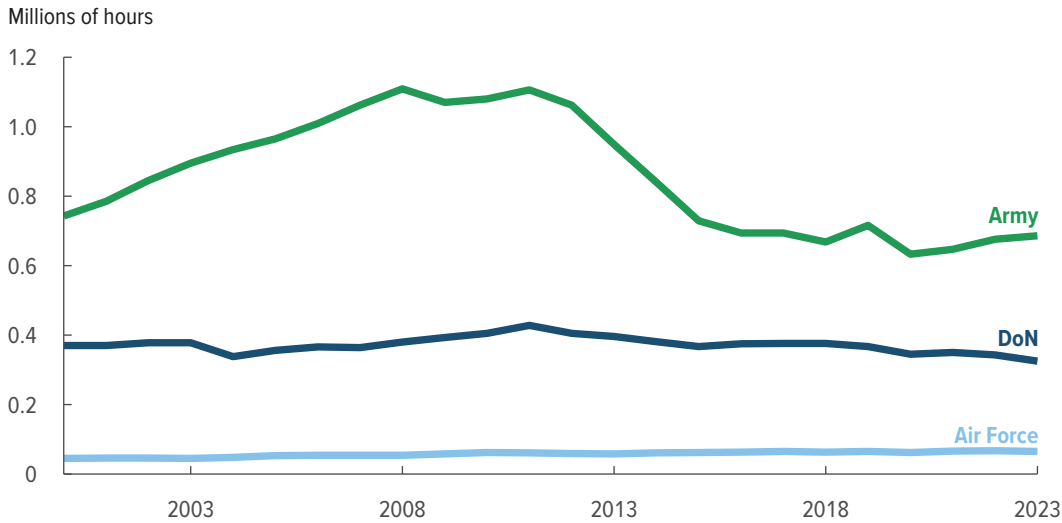


In recent years, the availability rates of the Army’s rotary-wing aircraft have been greater than the availability rates of the Air Force’s and DoN’s aircraft.

Aircraft Use

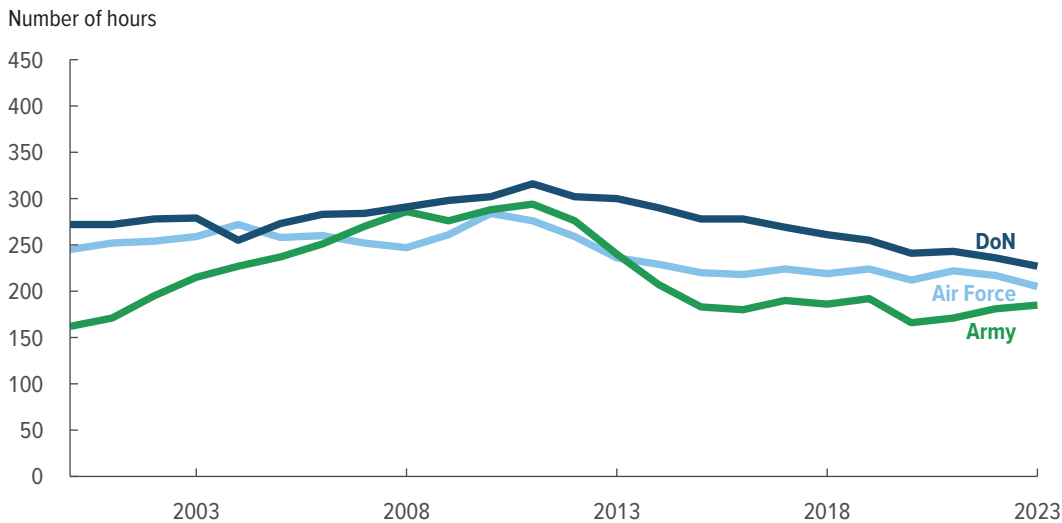
CBO measured each service’s use of aircraft on a fleetwide basis and on the basis of hours of use per aircraft. Observing an aircraft in use implies that it was capable of safe flight and that there was demand for it to fly. In a sense, then, aircraft use is a less direct measure of aircraft performance than availability rates are.

Total Flying Hours of Rotary-Wing Aircraft



Use of the Army’s rotary-wing aircraft increased in the late 2000s and early 2010s during the conflicts in Iraq and Afghanistan.

Average Annual Flying Hours per Rotary-Wing Aircraft



Since 2010, DoN has flown its rotary-wing aircraft more hours per aircraft than the Air Force and Army have flown theirs. All three services have experienced declining use per rotary-wing aircraft since 2011, though the decline has been more gradual in the case of DoN.

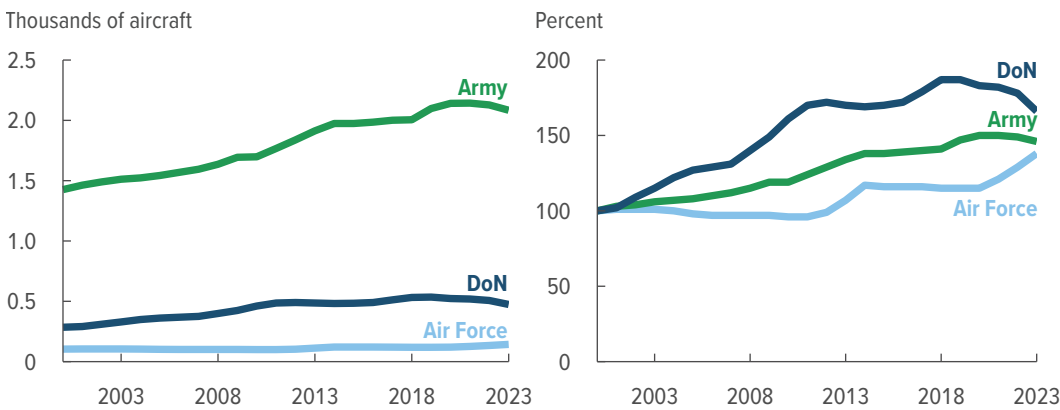


Fleets of Aircraft Operated by Multiple Services

To examine how different military services operated the same (or similar variants of) aircraft, CBO focused on the three types of rotary-wing aircraft operated in significant numbers by multiple services: the H-60 helicopter, operated by the Army, DoN, and the Air Force; the V-22 tiltrotor, operated by DoN and the Air Force; and the H-1 helicopter, operated by all three services. (The Army retired its fleet of H-1s in 2016, as is reflected in the data analyzed here. An Air Force V-22 was destroyed in an accident on November 29, 2023; that accident does not affect the data analyzed here, which run through September 2023, the end of fiscal year 2023.)

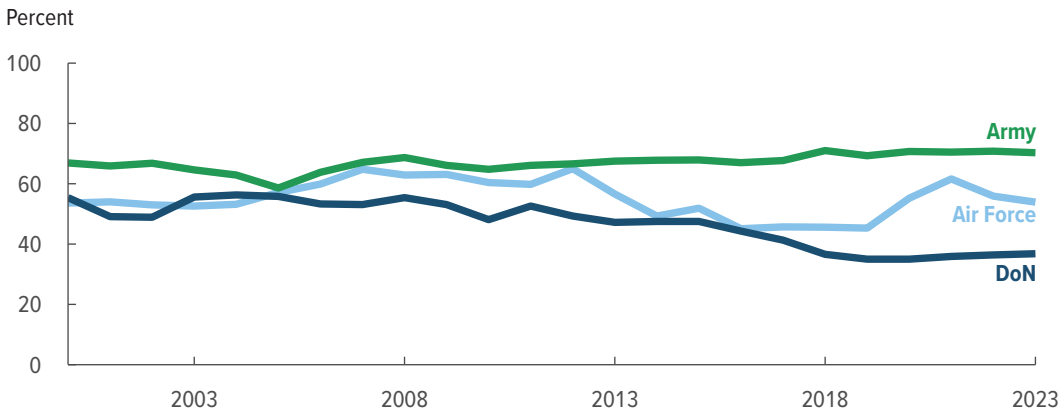
H-60s

H-60s, by Number and as a Percentage Relative to 2000



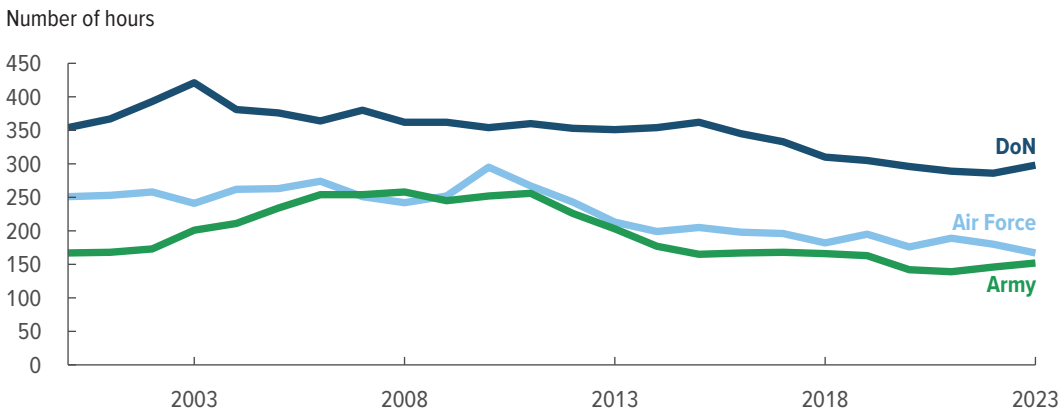
From 2000 to 2023, the size of the Army's H-60 fleet increased by almost 50 percent. DoN's H-60 fleet grew from 2000 to 2010 and then was relatively static through 2023.

Annual Availability Rates of H-60s



The availability of the Army's H-60s has been relatively constant since 2010, whereas the availability of DoN's H-60s has declined.

Average Annual Flying Hours per H-60



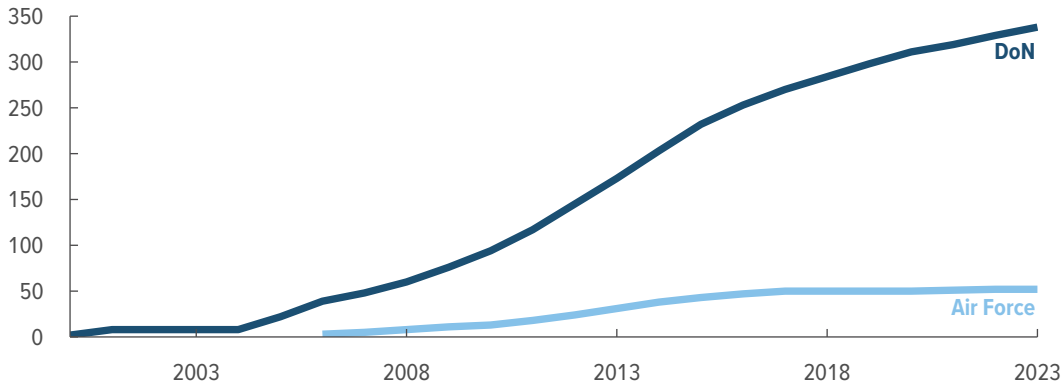
DoN's H-60s have flown many more hours per aircraft than the other services' H-60s.



V-22s

Number of V-22s

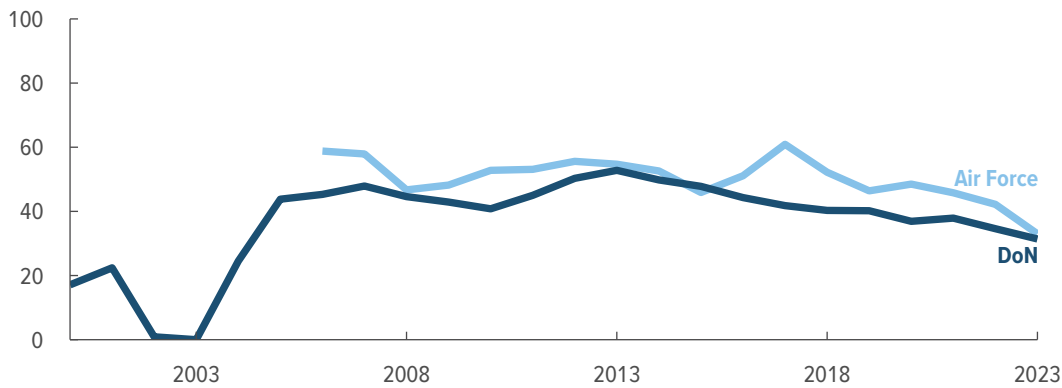
Number of aircraft



In 2023, DoN had almost 350 V-22s, and the Air Force had about 50.

Annual Availability Rates of V-22s

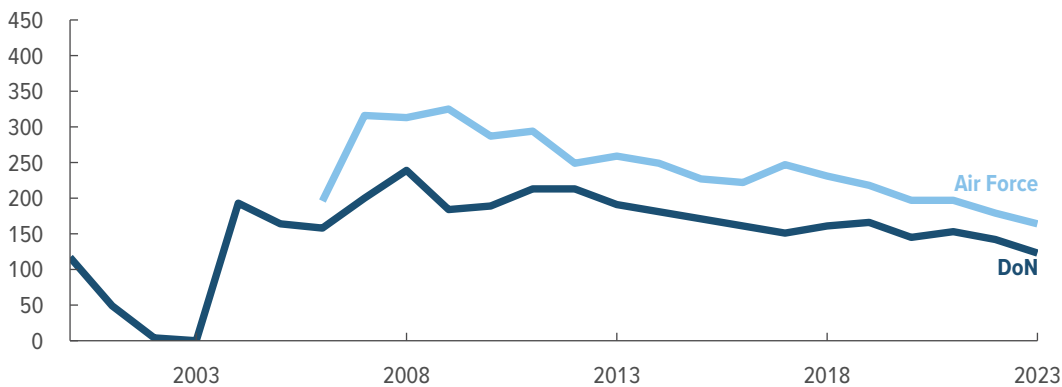
Percent



In recent years, the availability of DoN's and the Air Force's V-22s has been declining. The Air Force's fleet had a 61 percent availability rate in 2017 and a 33 percent availability rate in 2023.

Average Annual Flying Hours per V-22

Number of hours

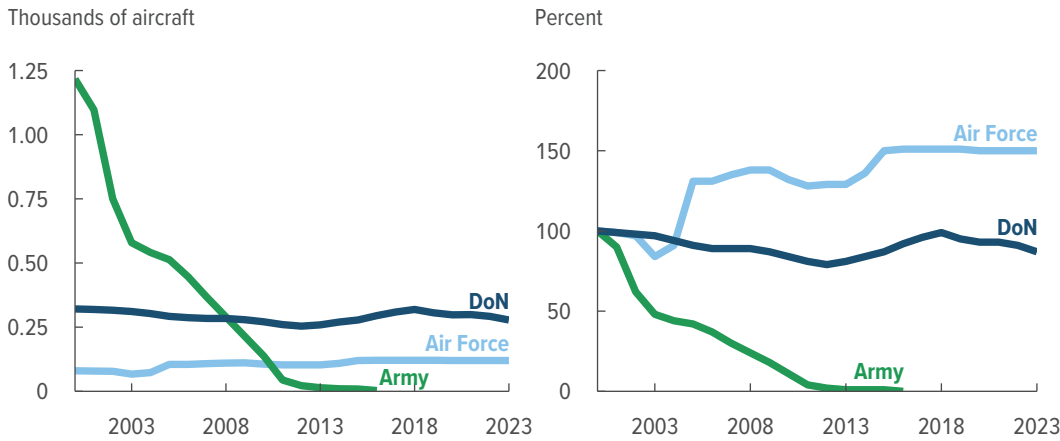


The Air Force has flown its V-22s more hours per aircraft than DoN has. Use of V-22s has trended downward in both services.



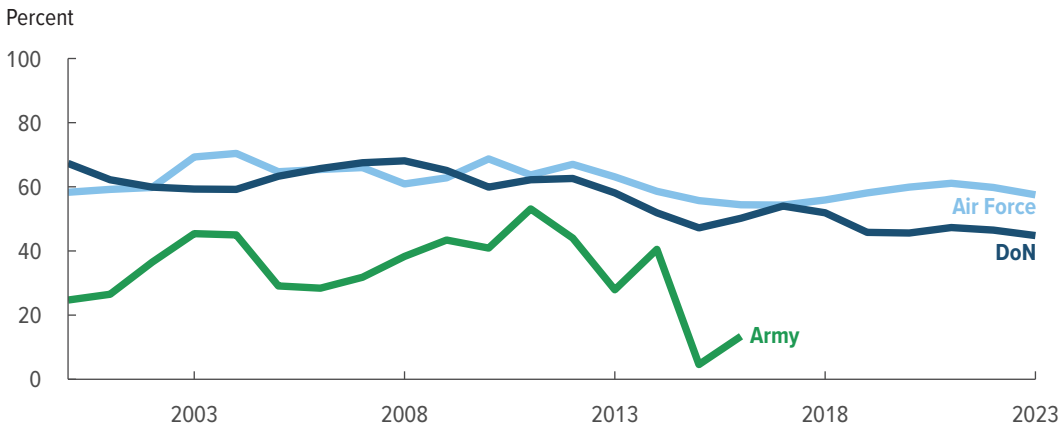
H-1s

H-1s, by Number and as a Percentage Relative to 2000



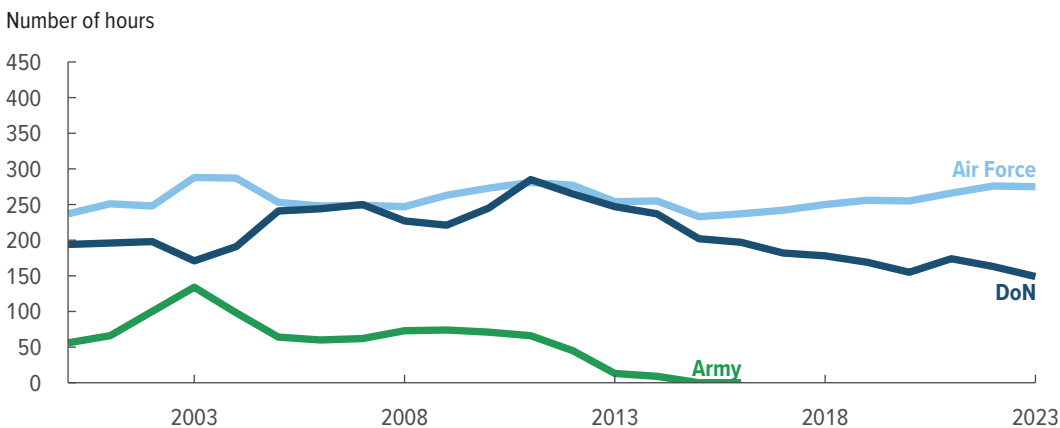
The Army had a large H-1 fleet, which it last operated in 2016; DoN and the Air Force have continued to operate their H-1s. In 2023, DoN had 278 H-1s, and the Air Force had 120.

Annual Availability Rates of H-1s



Before being retired in 2016, the Army's H-1s had markedly lower availability rates than the other services' H-1s. The availability of the Air Force's and DoN's H-1s has declined since 2010.

Average Annual Flying Hours per H-1

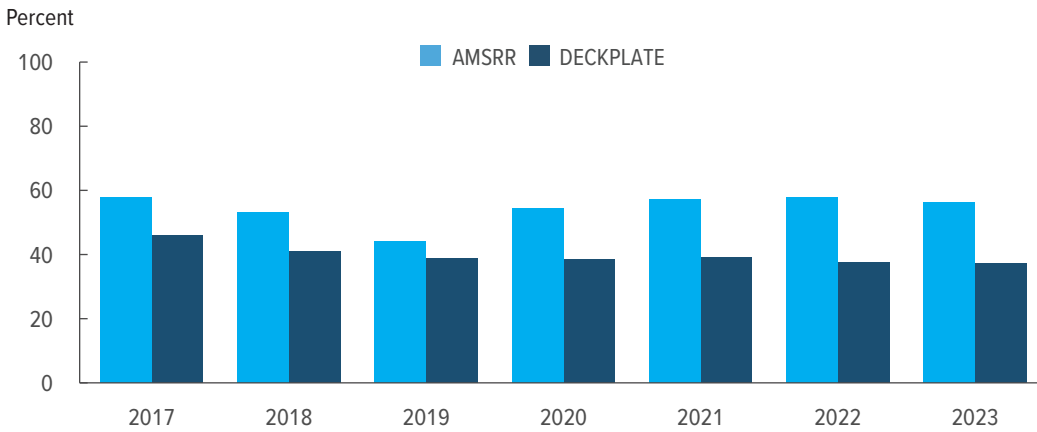


In recent years, the Air Force has flown its H-1s more hours per aircraft than DoN has flown its H-1s. In 2023, the average Air Force H-1 flew 275 hours, compared with 149 hours of flying for DoN's H-1s.

Comparing Measures of Availability for DoN’s H-60s, V-22s, and H-1s

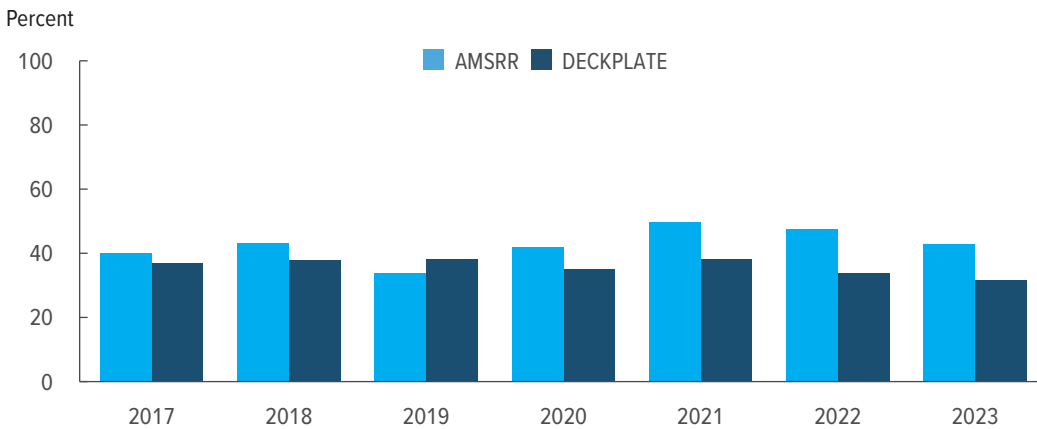
DoN uses two data systems to measure the availability of its aircraft. Maintenance and logistics personnel use the Decision Knowledge Programming for Logistics Analysis and Technical Evaluation system (DECKPLATE) to account for aircraft inventory. Commanders rely on the newer Aviation Maintenance Supply Readiness Report system (AMSRR) for daily projections of an aircraft’s ability to perform missions. (For more information, see CBO’s July 2023 report *DECKPLATE and AMSRR: Comparing Two Ways to Measure the Availability of F/A-18E/F Super Hornet Aircraft*.) Because monthly data from AMSRR are available only beginning in March 2017, availability rates of DoN’s aircraft reported in other sections of this report are based on DECKPLATE.

Annual Availability Rates of DoN’s H-60s



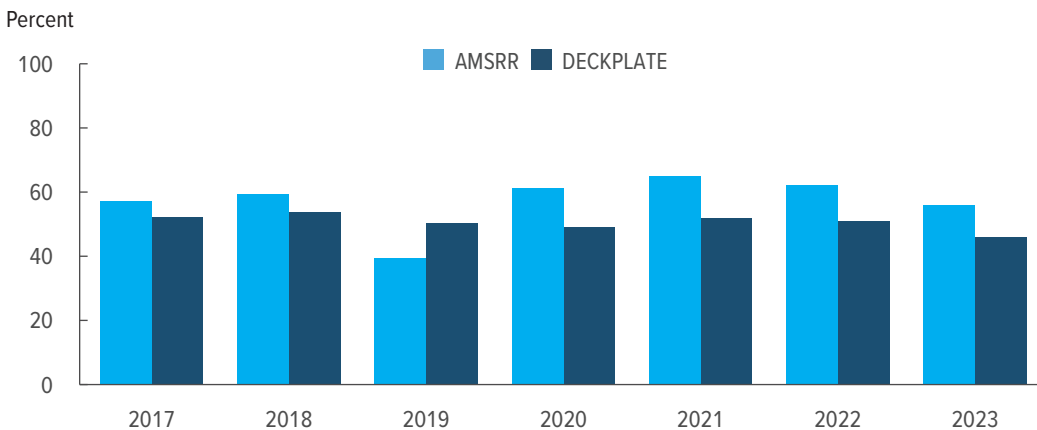
On average, AMSRR’s availability rates for H-60s were about 15 percentage points higher than DECKPLATE’s.

Annual Availability Rates of DoN’s V-22s



AMSRR’s availability rates for V-22s were about 7 percentage points higher, on average, than DECKPLATE’s. In 2019, however, availability rates in AMSRR were 5 percentage points lower than in DECKPLATE.

Annual Availability Rates of DoN’s H-1s



On average, AMSRR’s availability rates for H-1s were about 7 percentage points higher than DECKPLATE’s. But in 2019, availability rates in AMSRR were 11 percentage points lower than in DECKPLATE.



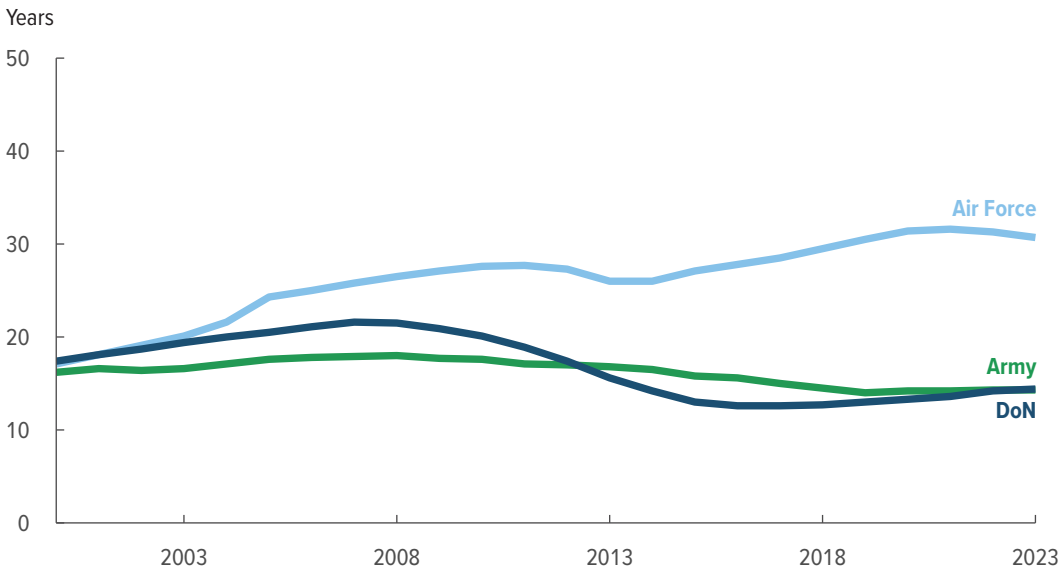
Trends in the Age of DoD’s Rotary-Wing Aircraft

CBO analyzed the age of DoD’s rotary-wing aircraft and how their age relates to availability and use.

Age of the Services’ Fleets

CBO obtained or estimated the date that each rotary-wing aircraft entered service (known as the acceptance date) and then used those dates to calculate fleetwide average ages from 2000 to 2023. However, the services track the ages of individual helicopters differently. When the Army and DoN rebuild a helicopter, they often change the aircraft’s tail number and record the rebuilt helicopter as a new and different aircraft. But when the Air Force undertakes heavy, depot-level maintenance on its H-60s and H-1s, it does not renumber the aircraft, which thus appear in the data as older aircraft with their original acceptance dates. (Neither DoN nor the Air Force has rebuilt their V-22s, so the data were not affected by differences in how the ages of those aircraft are tracked.)

Average Age of Rotary-Wing Fleets

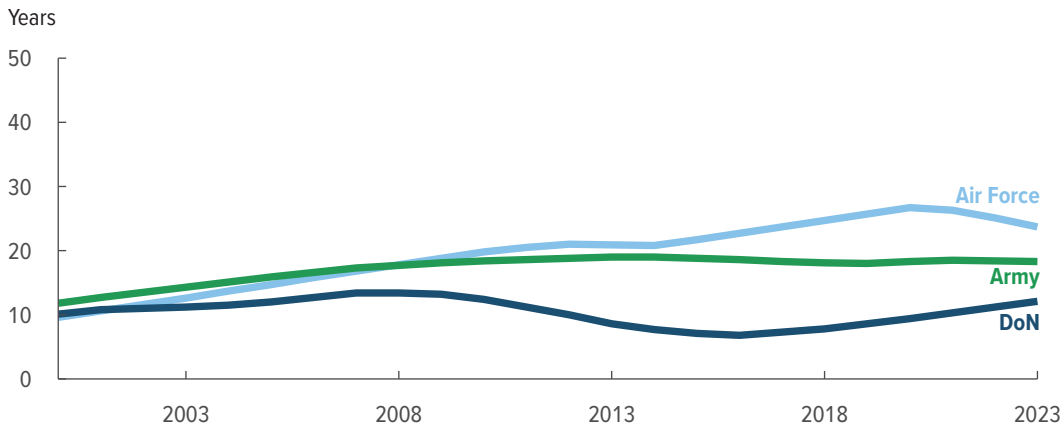


DoN replaced much of its rotary-wing fleet in the early 2010s. The average age of the Army’s rotary-wing aircraft has changed little. Although the Air Force appears to operate markedly older aircraft, that is because, unlike the other services, it does not renumber aircraft that it rebuilds.

Age of Fleets, by Type of Aircraft

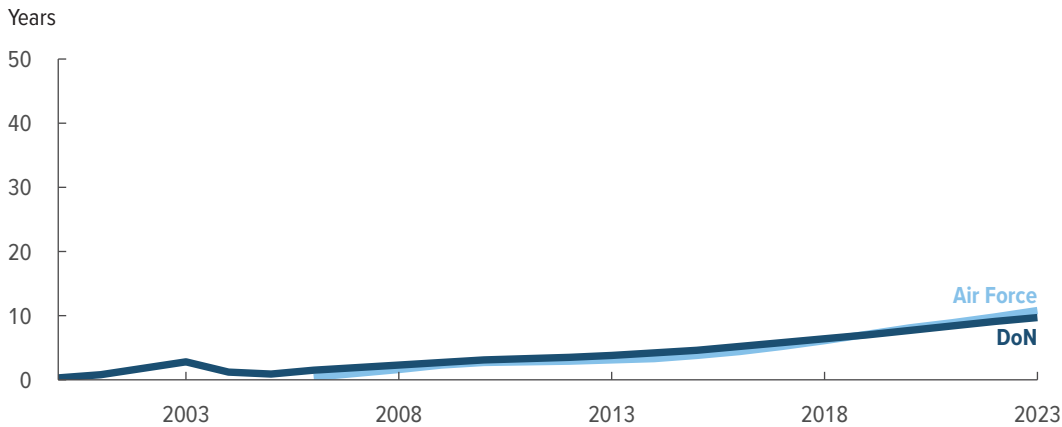
CBO compared the ages of fleets of H-60s, V-22s, and H-1s operated by the three services. As noted earlier, the services' different practices for tracking the ages of their aircraft complicates such comparisons. The Air Force's helicopters appear to be older because they were not renumbered after undergoing the type of large-scale, heavy maintenance and upgrade in a depot that might have caused the Army's or DoN's helicopters to be renumbered.

Average Age of H-60 Fleets



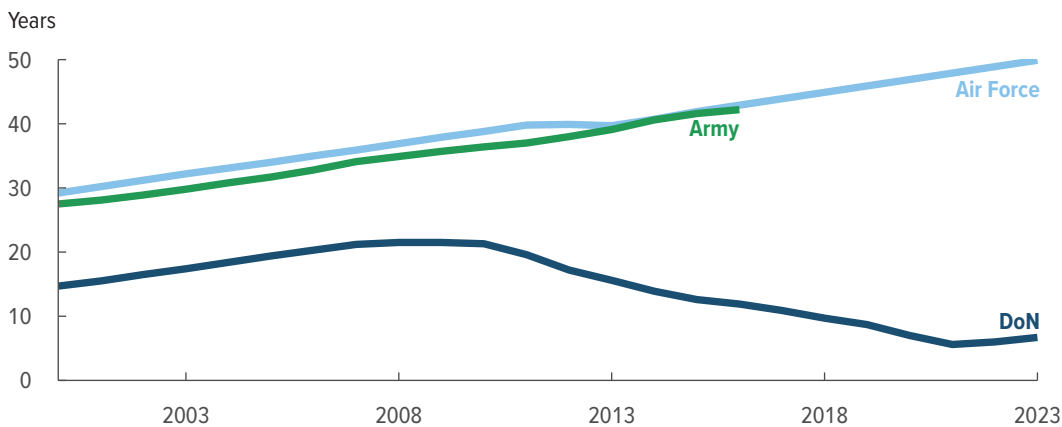
In 2023, the average age of the Air Force's H-60s was 24 years. The average age was lower for the Army's and DoN's H-60s—18 years and 12 years, respectively—partly because those services renumber their helicopters after rebuilding them.

Average Age of V-22 Fleets



DoN's and the Air Force's fleets of V-22s are roughly the same average age. V-22s have not yet been rebuilt, so the difference in the way the services measure their age is not a factor.

Average Age of H-1 Fleets



DoN's H-1s are much newer than the Air Force's. In 2010, DoN began replacing its H-1s with newer versions; the Marine Corps replaced the AH-1W with the AH-1Z, for example, and the UH-1N with the UH-1Y.



Age, Availability, and Use of DoD's Rotary-Wing Aircraft

In its February 2023 report *Availability and Use of the F/A-18E/F Super Hornet Fighter Aircraft*, CBO analyzed the relationship between the age of individual aircraft and their availability and use. In this report, the agency conducted that same type of analysis on the services' fleets of H-60s, V-22s, and H-1s.

For the Army's and DoN's aircraft, the data that CBO analyzed begin in 2000; for the Air Force's aircraft, the data begin in 1990. Although the Army's and DoN's H-60s and H-1s were in operation before 2000, CBO did not observe their availability and use before that year.

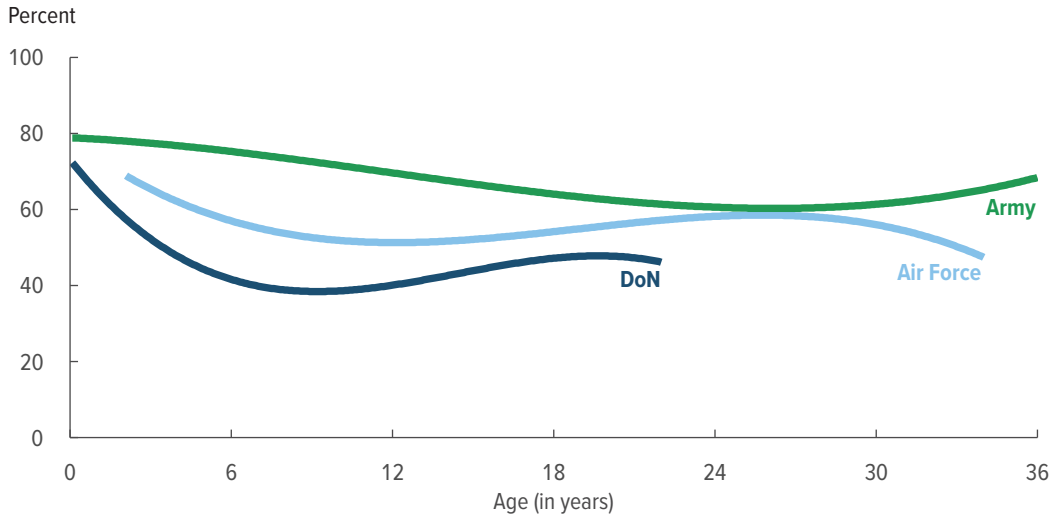
For its analysis of aging, CBO used a subset of its data. To reduce the amount of bias and problems with small sample sizes, CBO generally restricted its estimates to ages in which it observed at least 30 percent of the maximum number of aircraft. Measuring aircraft age in months, CBO calculated the number of observed possessed hours for each age-aircraft-service combination. (If a service possesses a helicopter for the entirety of a 31-day month, there would be 744 possessed hours.) If the measure for any age reached at least 30 percent of the maximum for that aircraft, CBO included it. For the Army's H-60s, for example, the maximum number of observed possessed hours in a month was 1,034,400, recorded for aircraft of 245 months of age (in the middle of year 21). That number of hours corresponds to about 1,416 aircraft of that age (in months) possessed by the Army. All months that had at least 30 percent of that number, about 310,320 hours or 425 aircraft, were included in CBO's analysis of the Army's H-60s. That means that observations for months 1 through 432 (years 1 through 36) were included for those aircraft.

CBO did not analyze how the age of aircraft affects their availability and use. Although the agency's analysis shows the average relationship between the age of aircraft and their availability and use, many factors other than age can affect an aircraft's availability and use, such as funding levels and the particular demands placed on it while in service.

Availability and Use of H-60s, by Age

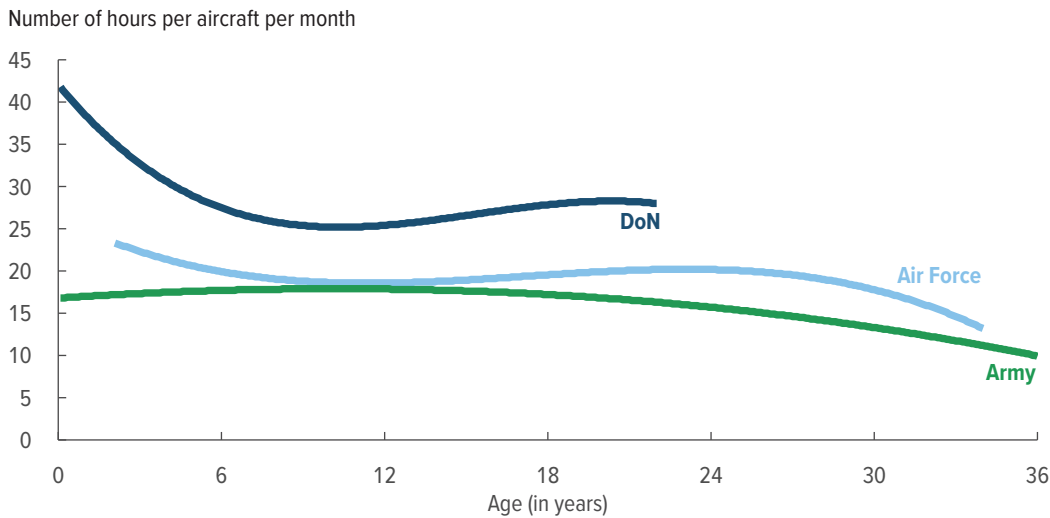
The H-60 is DoD’s most common rotary-wing aircraft. H-60s were first operated by DoD in the 1970s, well before the data that CBO analyzed were collected. Because of the services’ different practices for tracking the ages of their aircraft, the ages of the Air Force’s H-60s are not directly comparable with those of the Army’s or DoN’s.

Availability Rates of H-60s, by Age



When compared with aircraft of the same age, DoN’s H-60s have generally had the lowest availability rates. More so than was observed with the Army’s or Air Force’s H-60s, DoN’s H-60s show a marked decline in availability in the first five years of operation.

Flying Hours of H-60s, by Age



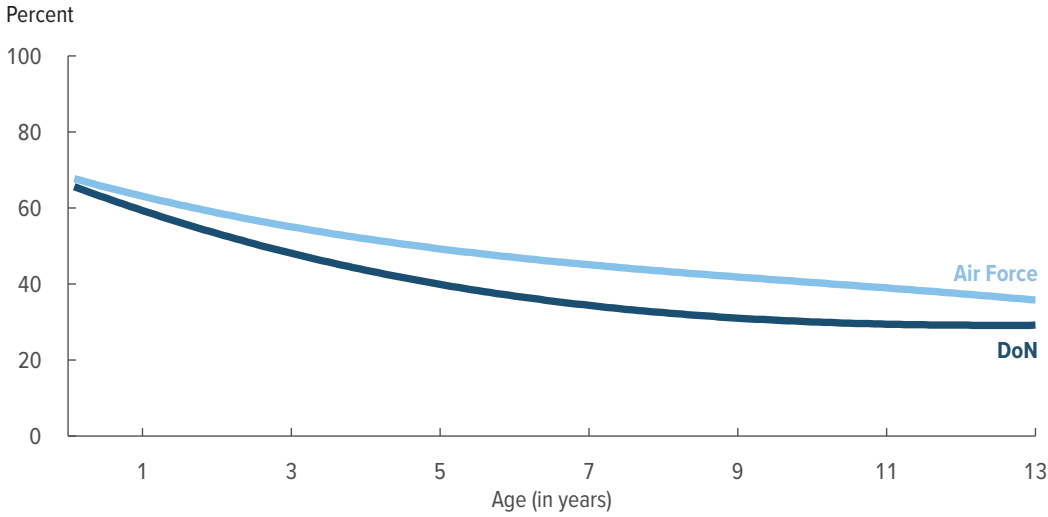
DoN’s H-60s have flown the most (when age is accounted for); and like their availability, their use in the first five years of operation declined before plateauing.



Availability and Use of V-22s, by Age

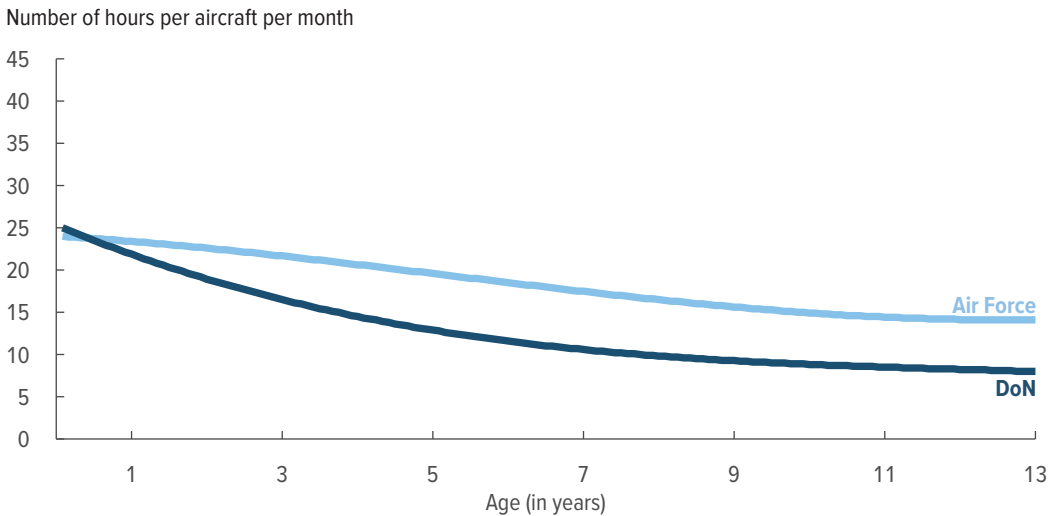
The V-22 fleet is considerably newer than most other rotary-wing fleets in DoD. Neither the Air Force’s nor DoN’s V-22s have experienced large-scale refurbishment. Because of the method that CBO used, the agency could analyze availability and use only for the first 13 years that an aircraft was in operation.

Availability Rates of V-22s, by Age



The availability of DoN’s and the Air Force’s V-22s has declined as the aircraft have aged. The decline has been greater for DoN’s aircraft.

Flying Hours of V-22s, by Age

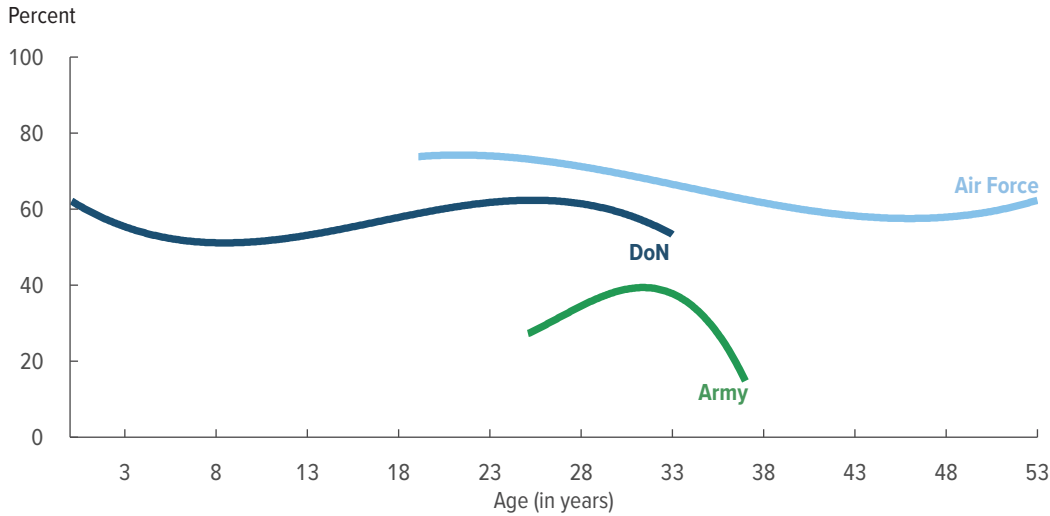


The use of DoN’s and the Air Force’s V-22s has also declined as the aircraft have aged—more so for DoN’s aircraft.

Availability and Use of H-1s, by Age

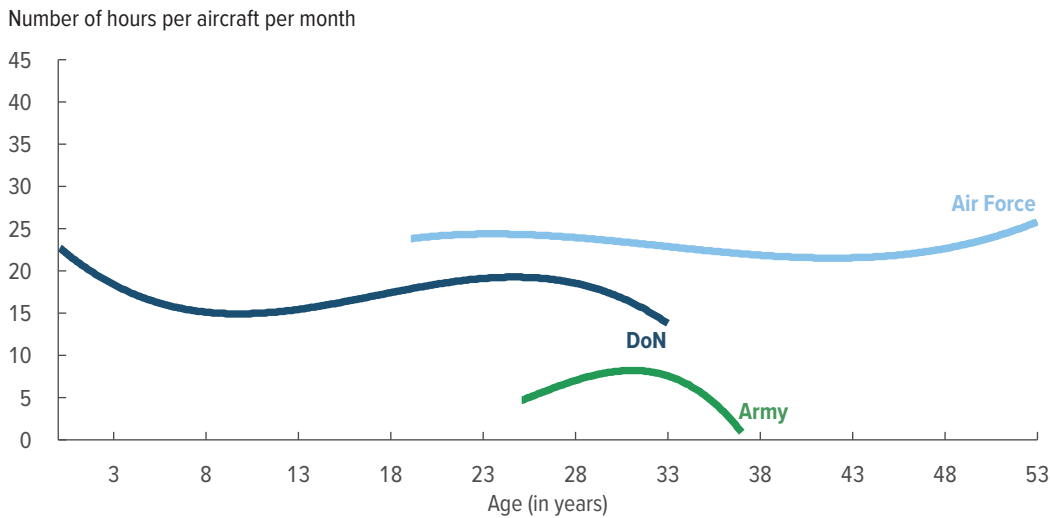
CBO’s analysis of the relationship between the age of the Army’s H-1s and their availability and use was limited because the Army retired its H-1s in 2016, leaving much fewer data for CBO to analyze. Moreover, because of the services’ different practices for tracking the ages of their aircraft, the ages of the Air Force’s H-1s are not directly comparable with those of the Army’s or DoN’s.

Availability Rates of H-1s, by Age



The Air Force’s H-1s have had greater availability rates than H-1s of the same age operated by the Army or DoN. Notably, the Air Force’s H-1s that are more than 50 years old have availability rates of about 60 percent.

Flying Hours of H-1s, by Age



Compared with other H-1s of the same age, the Air Force’s H-1s have flown more than those operated by the other services.



About This Document

This report was prepared at the request of the Chairman and Ranking Member of the Subcommittee on Readiness of the House Armed Services Committee. In keeping with the Congressional Budget Office's mandate to provide objective, impartial analysis, the report makes no recommendations.

Edward G. Keating and Nikhil Bhandarkar prepared the report with guidance from David Mosher. Sheila Campbell and Ron Gecan offered comments. Christopher Martin fact-checked the report.

Jennifer DiMascio of the Congressional Research Service provided comments on an earlier draft. The assistance of an external reviewer implies no responsibility for the final product; that responsibility rests solely with CBO.

Mark Doms and Jeffrey Kling reviewed the report. Scott Craver edited it, and R. L. Rebach created the graphics and prepared the text for publication. The report is available at www.cbo.gov/publication/60663.

CBO seeks feedback to make its work as useful as possible. Please send comments to communications@cbo.gov.



Phillip L. Swagel
Director
November 2024