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The Cost of Replacing Today's Naval Aviation Fleets

Annual Conference of the Western Economic Association International

R. Derek Trunkey, David Arthur, Edward G. Keating, and John Kerman
National Security Division

Outline

- **The Composition of the Department of the Navy's Current Aviation Fleet**
- Projected Annual Procurement Costs: 2020 Through 2050
- The Most Costly Categories of Aircraft
- The Department of Defense's Current Aviation Fleet
- Supplementary Material

The Department of the Navy, which includes the Navy and the Marine Corps, currently has an aviation fleet of about 4,000 aircraft.

Approximately 1,400 are fixed-wing fighter/attack aircraft, another 1,350 are helicopters or tiltrotor aircraft, and 750 are training aircraft. The remainder are surveillance, communication, cargo, or utility aircraft.

Selected Aircraft in the Department of the Navy's Aviation Fleet

Fighter and Attack Aircraft



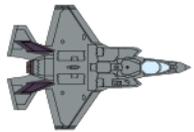
F/A-18C Hornet
Carrier-based
ground attack,
air superiority



F/A-18E Super Hornet
Carrier-based
ground attack,
air superiority



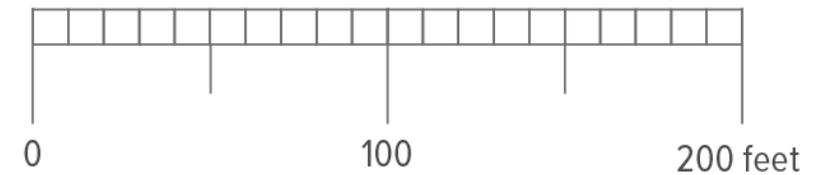
EA-18G Growler
Carrier-based
and expeditionary
electronic attack



F-35B Lightning II
Short takeoff/vertical
landing ground attack,
air superiority

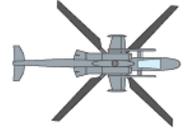


F-35C Lightning II
Carrier-based
ground attack,
air superiority

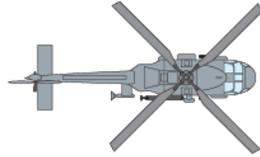


Selected Aircraft in the Department of the Navy's Aviation Fleet

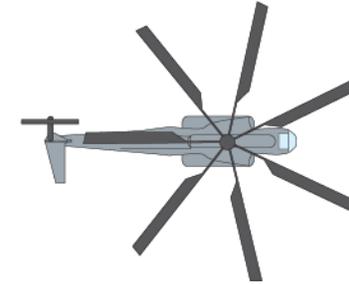
Helicopter and Tiltrotor



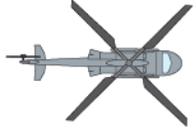
AH-1Z Viper
Attack helicopter



MH-60 Sea Hawk
Multimission helicopter



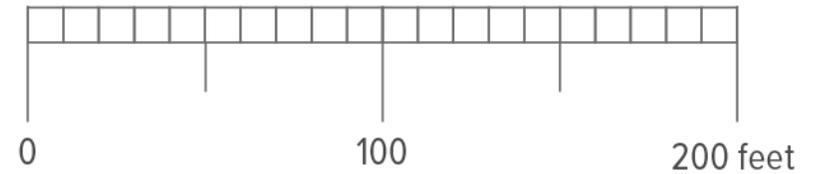
CH-53E Super Stallion
Heavy-lift helicopter



UH-1Y Venom
Utility helicopter

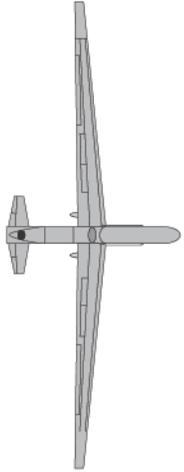


MV-22 Osprey
Medium-lift
tiltrotor

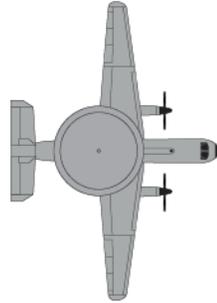


Selected Aircraft in the Department of the Navy's Aviation Fleet

Surveillance Aircraft



MQ-4C Triton
Land-based
unmanned maritime
reconnaissance



E-2C/D Hawkeye
Carrier-based
surveillance,
command
and control

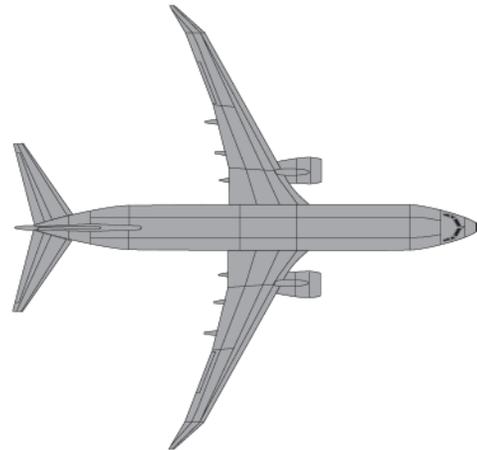
Aerial Refueling Aircraft



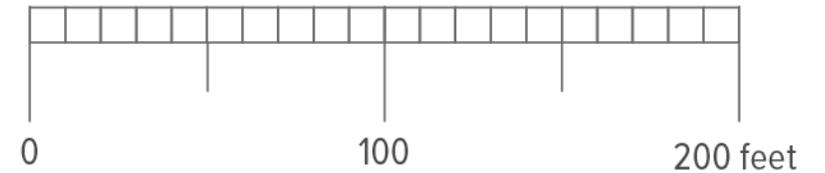
MQ-25A Stingray
Carrier-based
unmanned aerial
refueling



MQ-8C Fire Scout
Unmanned
reconnaissance

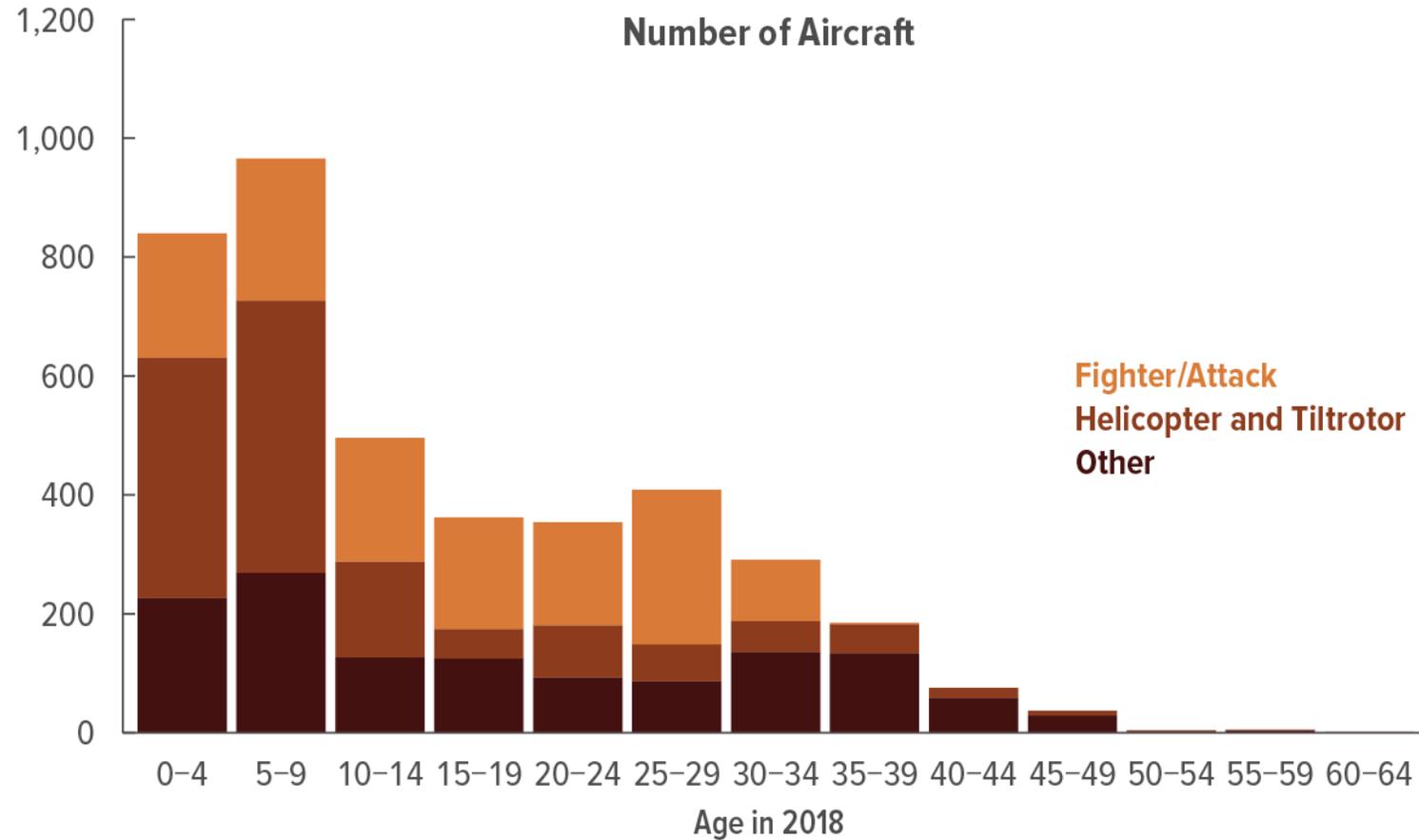


P-8A Poseidon
Land-based
armed maritime
patrol and
reconnaissance



Many of the Department of the Navy's aircraft are fairly new, and almost half were acquired or remanufactured within the past 10 years.

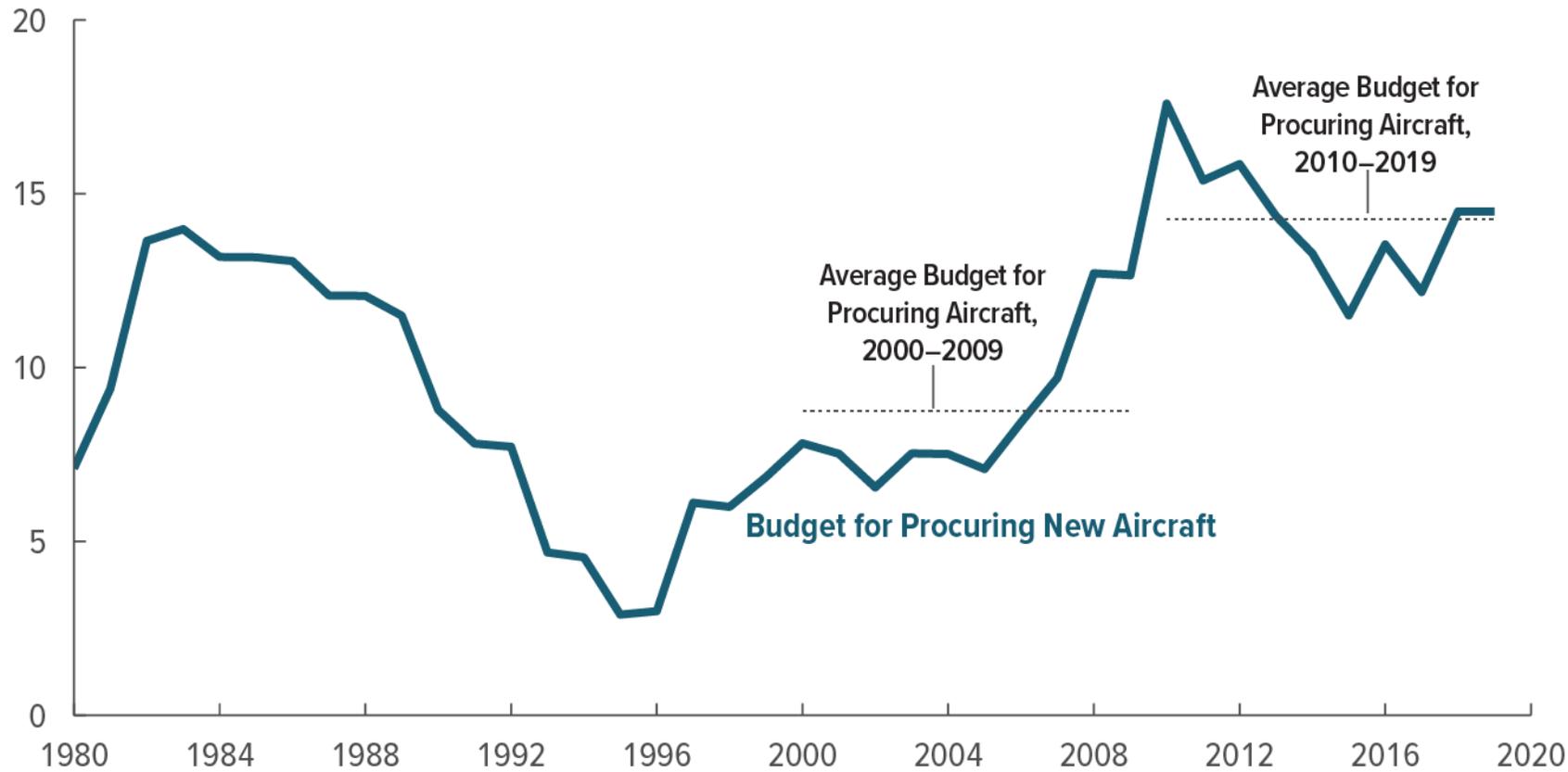
The Department of the Navy's Fleet Was Relatively New in 2018



The Department of the Navy's average budgets for procuring aircraft were about 60 percent greater from 2010 through 2019 (\$14 billion) than they were from 2000 through 2009 (\$9 billion).

The Department of the Navy Received Larger Budgets for Procuring New Aircraft in the 2010s Than in the 2000s

Billions of 2018 Dollars



Outline

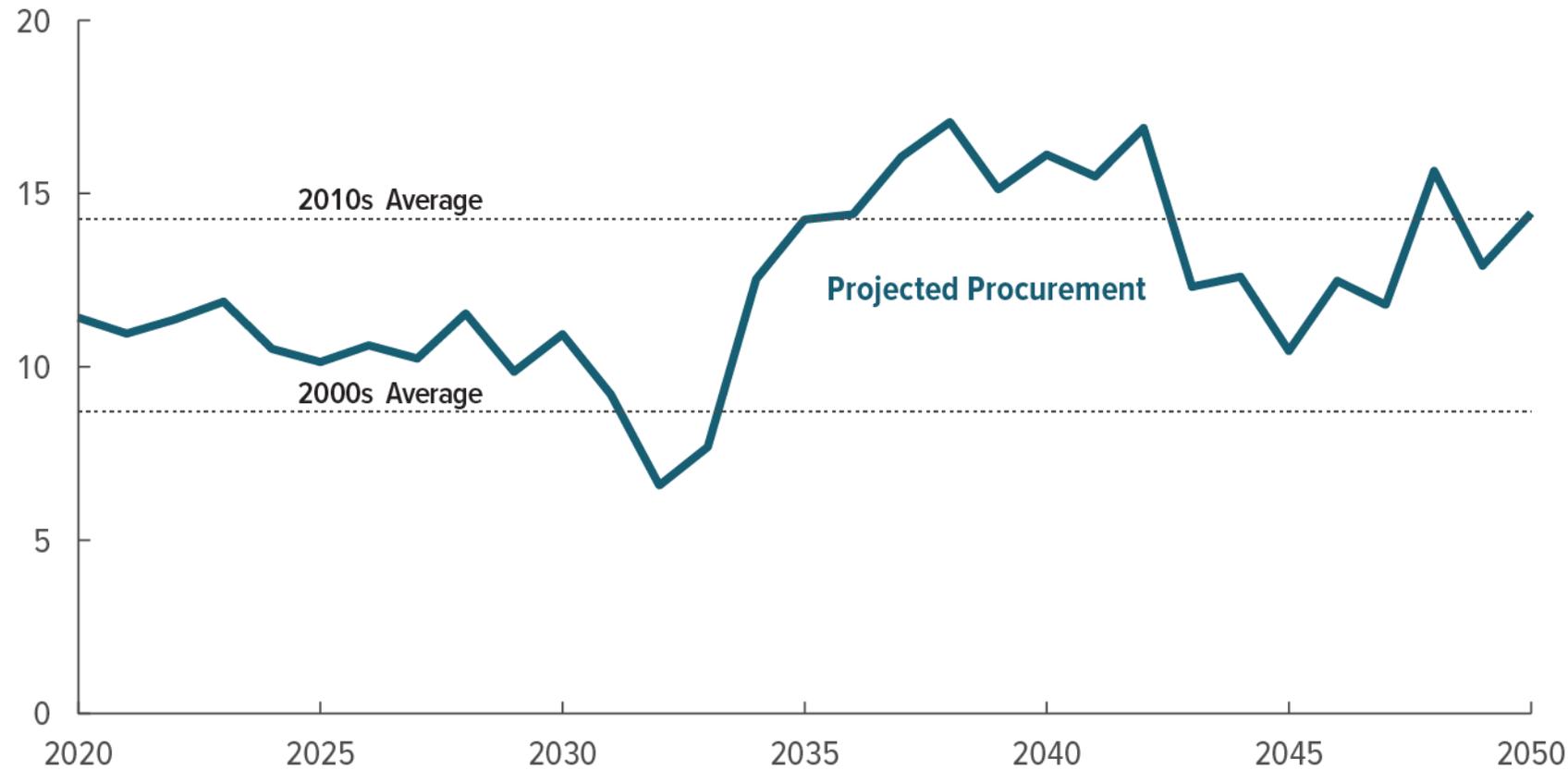
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CBO projects that the costs of replacing aircraft in the current fleet would average about \$12 billion from 2020 to 2050.

However, purchases over that period would go through several different phases and experience year-to-year variations similar to those observed in the 2000s and 2010s.

CBO Projects That Future Costs for Procuring New Aircraft From 2020 to 2050 Would Be Similar to Those in the 2010s

Billions of 2018 Dollars



Outline

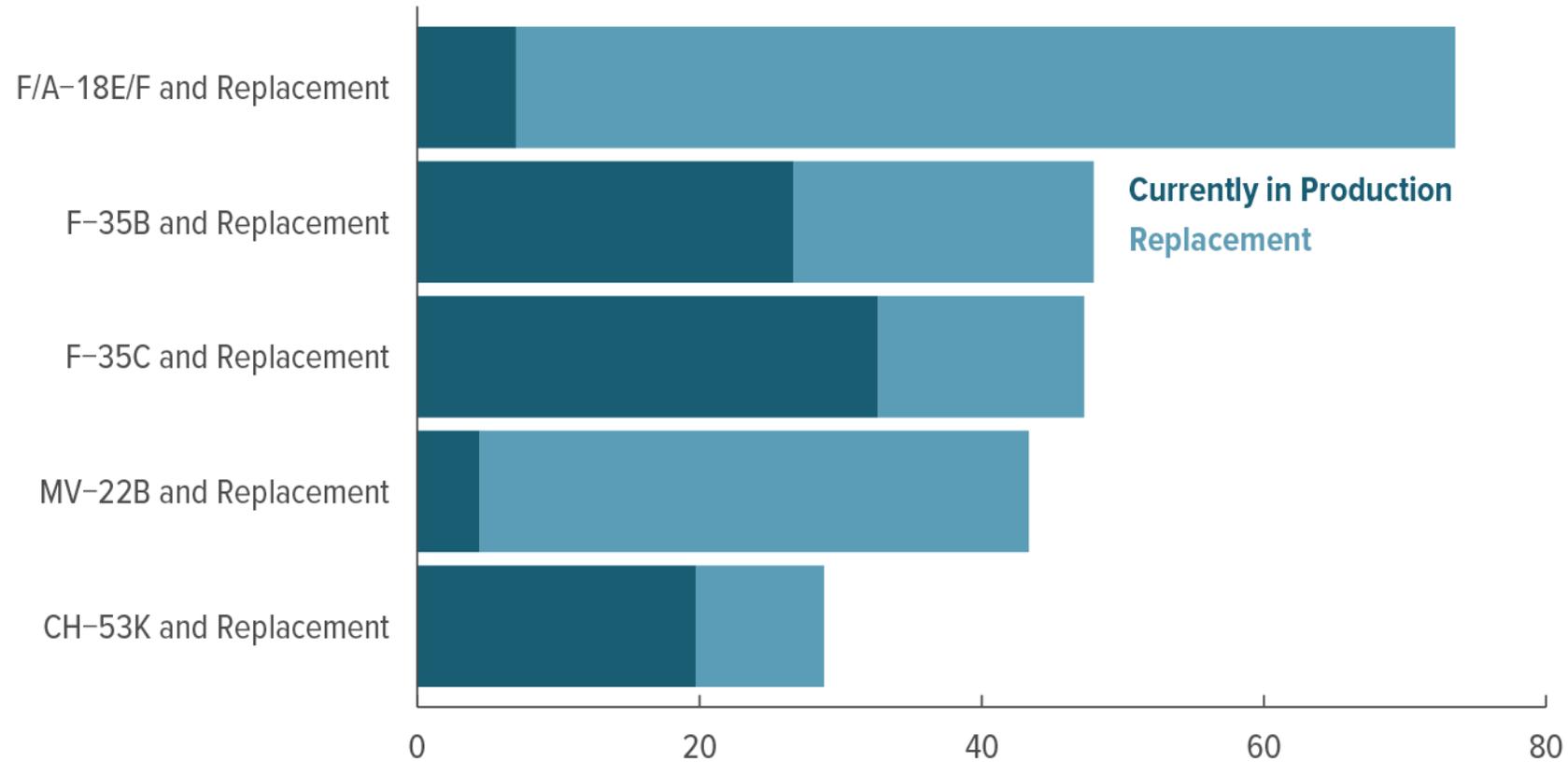
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Although the Navy and the Marine Corps operate about 60 models of aircraft, a small number of high-performance or otherwise technologically advanced aircraft account for a preponderance of the cost of new aircraft in CBO's projections.

The two most costly categories are fighter/attack aircraft and the Marine Corps' combat rotorcraft (helicopters and tiltrotors), which together make up more than 80 percent of the costs that CBO projects for 2020 through 2050.

Fighter Jets Dominate the Department of the Navy's Aviation Procurement Costs From 2020 to 2050

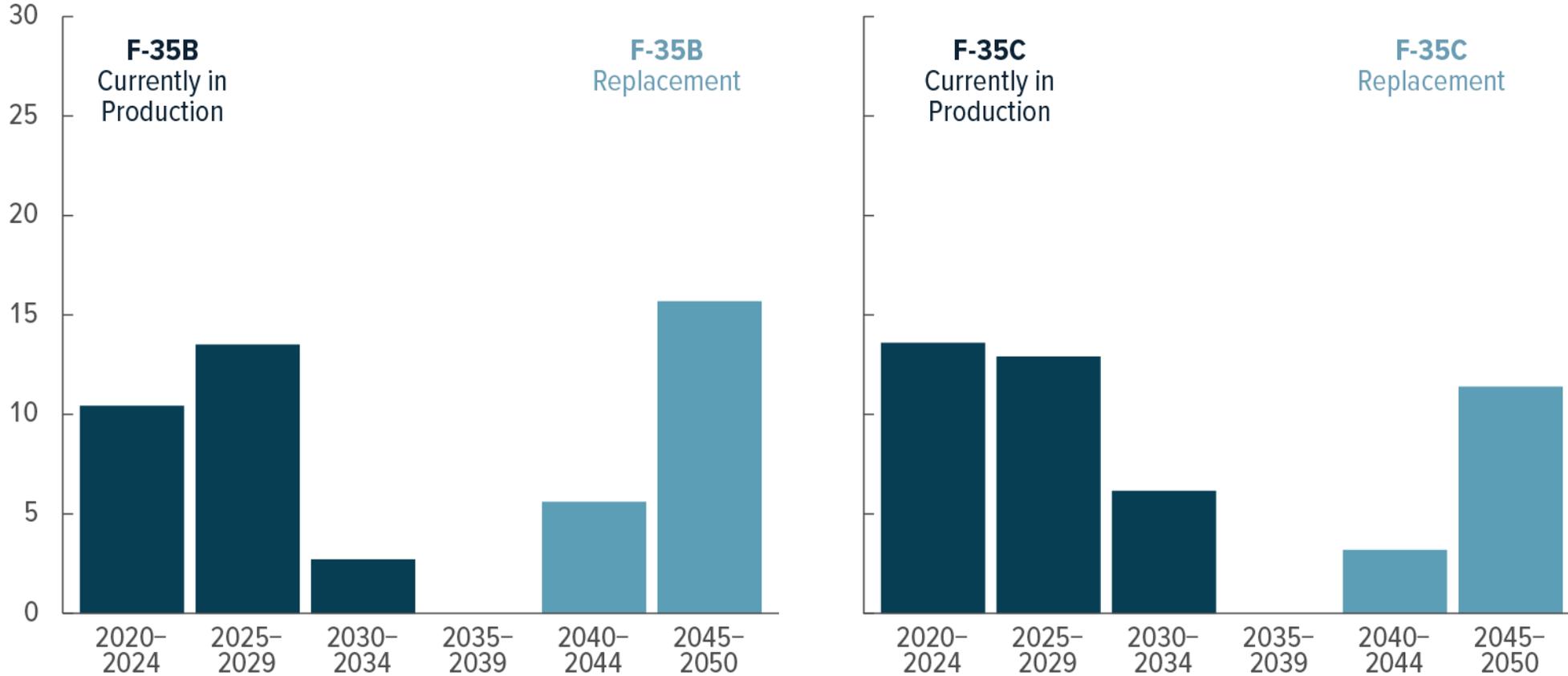
Billions of 2018 Dollars



The Department of the Navy is in the process of replacing more than half of its fighter/attack aircraft (the F/A-18A-D Hornets and AV-8B Harriers) with new F-35B/Cs.

The Department of the Navy Will Continue to Procure F-35Bs and F-35Cs and Then Eventually Replace Them

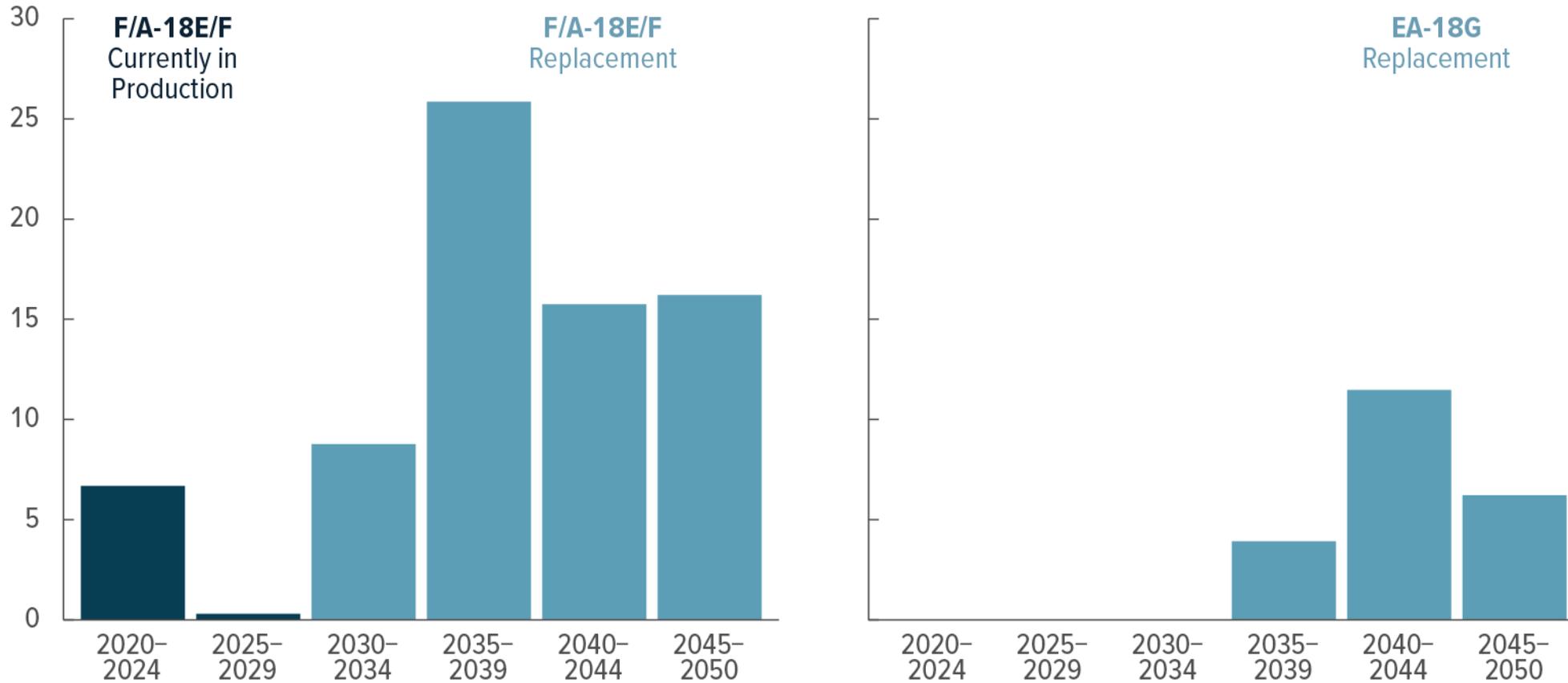
Billions of 2018 Dollars



Another group of about 500 fighter/attack aircraft—the F/A-18E/F Super Hornets—are expected to reach the end of their service life beginning in the early to mid-2030s.

The F/A-18E/F Replacement Program Could Be Costly

Billions of 2018 Dollars



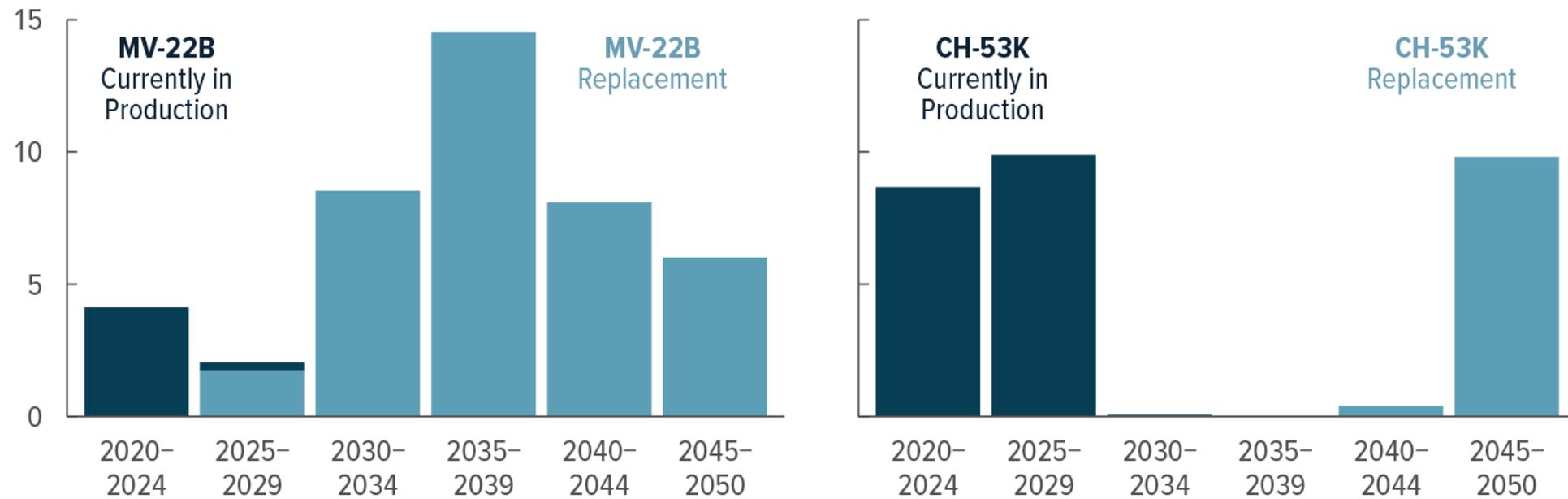
Today's fleet of Marine Corps combat rotorcraft consists of four types of aircraft. As of June 2018, those included 288 MV-22B tiltrotors (for medium lift), 149 UH-1Y utility helicopters (for light lift and light-attack missions), 161 AH-1W/Z helicopters (for attack and escort missions), and 142 CH-53E helicopters (for heavy lift).

The MV-22Bs, UH-1Ys, and AH-1Zs are mostly new and are not scheduled to be replaced until the 2030s and 2040s.

However, the Marine Corps is just beginning to replace its CH-53Es with the new CH-53K.

MV-22Bs and CH-53Ks Will Eventually Be Replaced

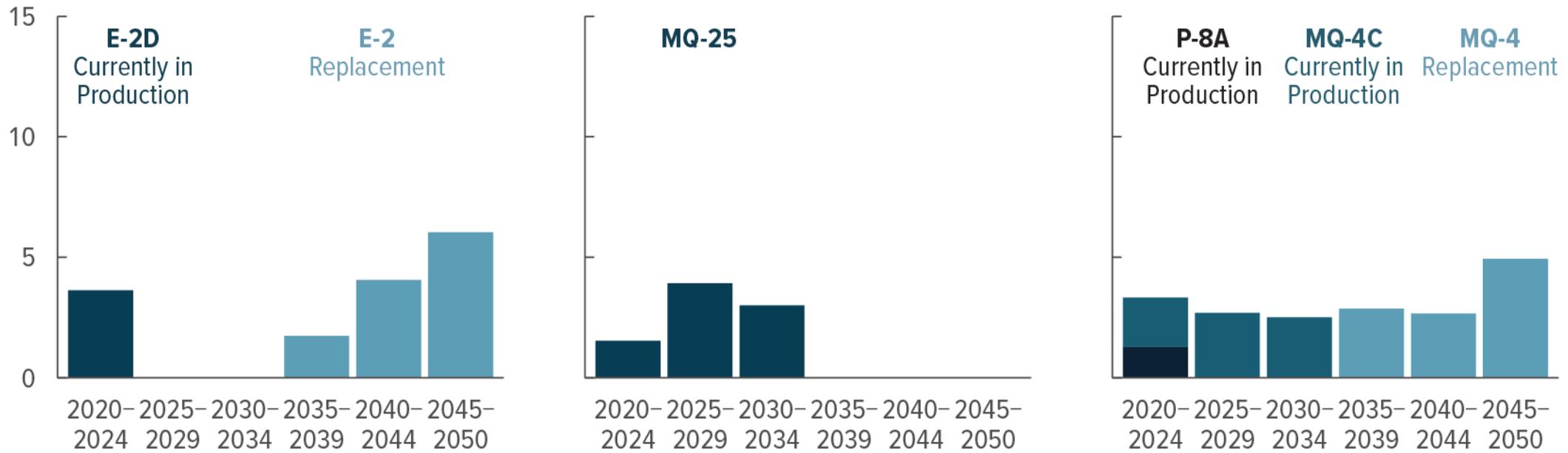
Billions of 2018 Dollars



Although some surveillance aircraft are expensive, there are fewer such aircraft than in the fighter/attack category; consequently, the projected procurement total is smaller.

E-2Ds and MQ-4s Will Eventually Be Replaced, and MQ-25s Will Be the Department of Defense's First Unmanned Refueling Aircraft

Billions of 2018 Dollars



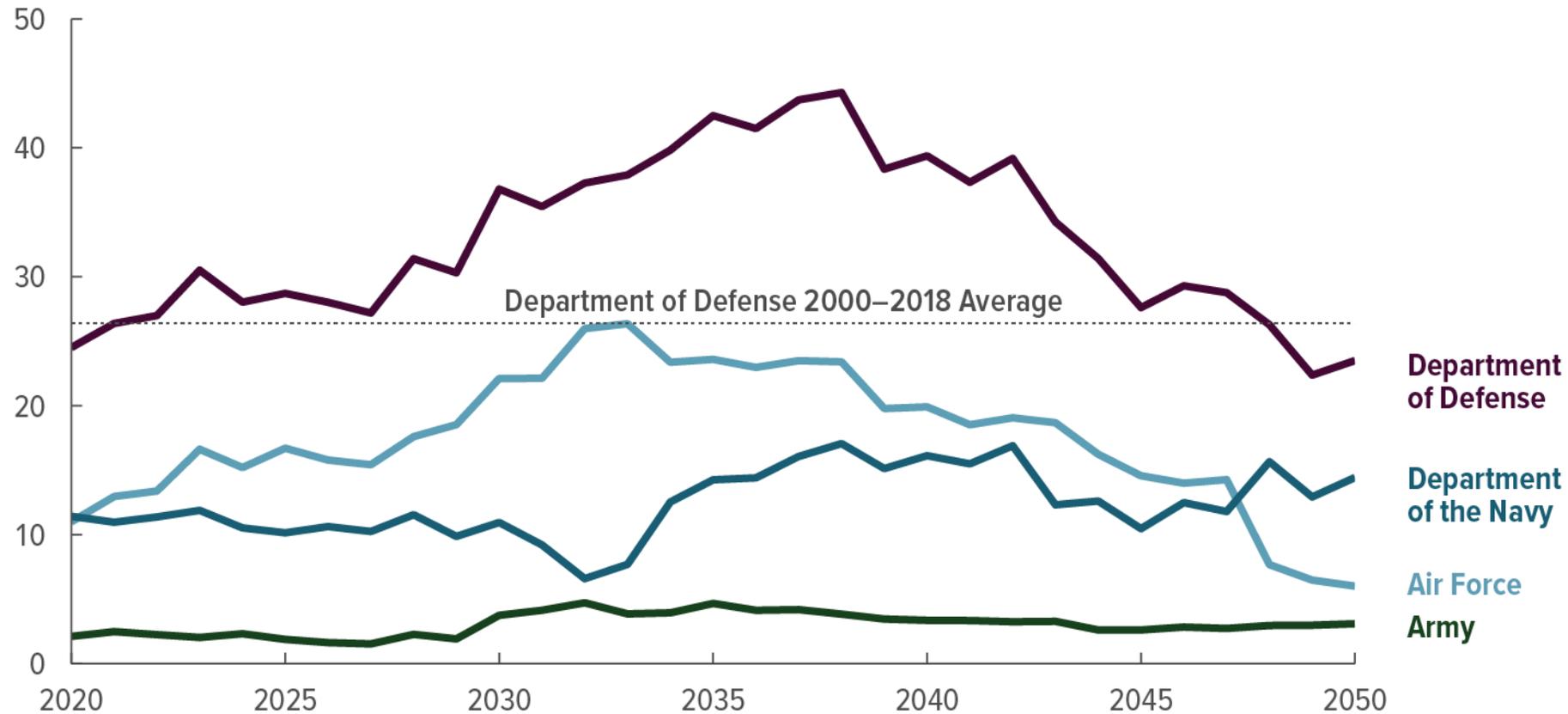
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Projected procurement costs for the Department of the Navy's new aircraft are between those for the Army and the Air Force.

CBO Projects Increased Procurement Costs for the Department of Defense's Aircraft, Driven by the Air Force's Procurement Costs

Billions of 2018 Dollars



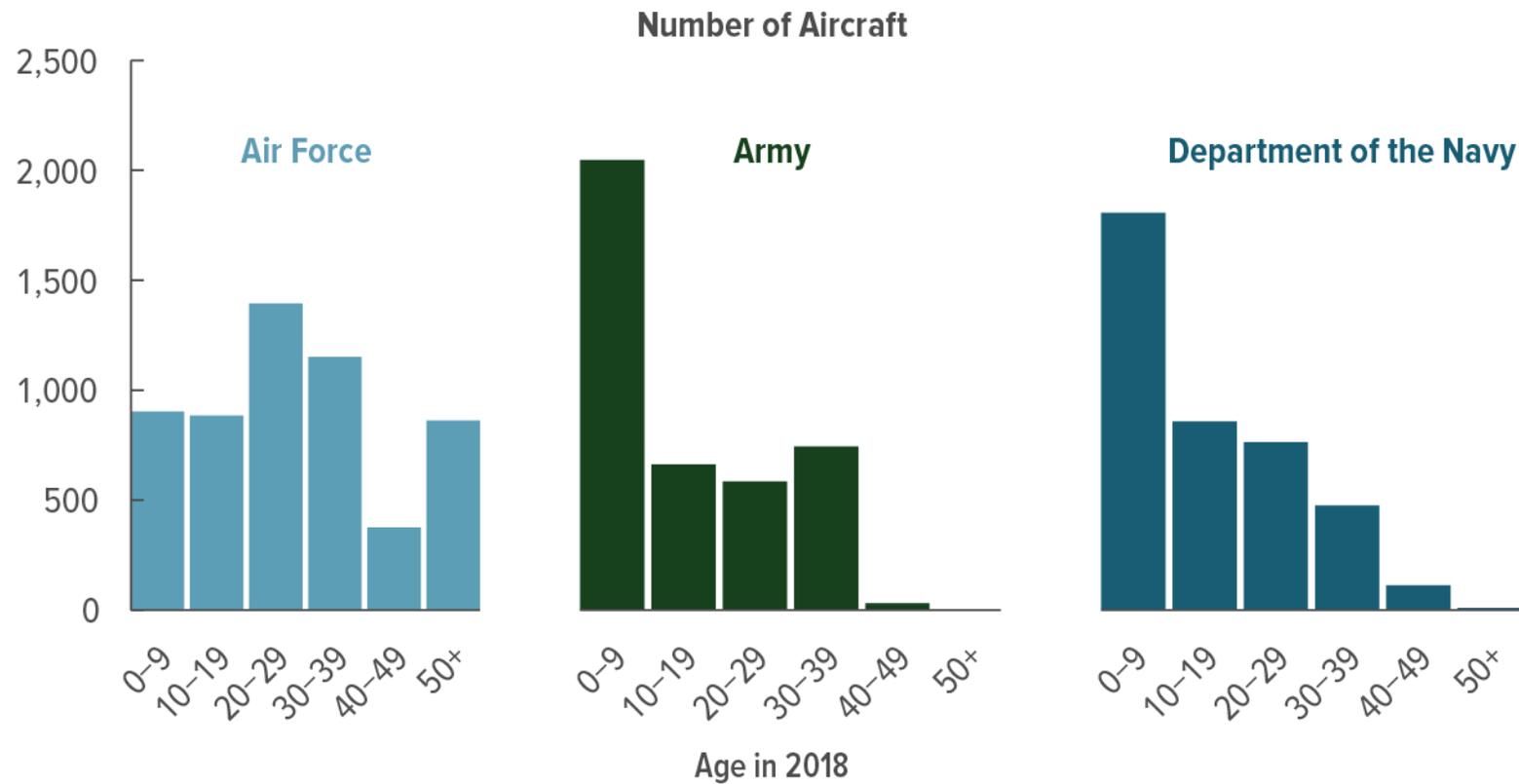
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CBO's Estimates of the Retirement Age and Per-Unit Replacement Cost of Selected Aircraft

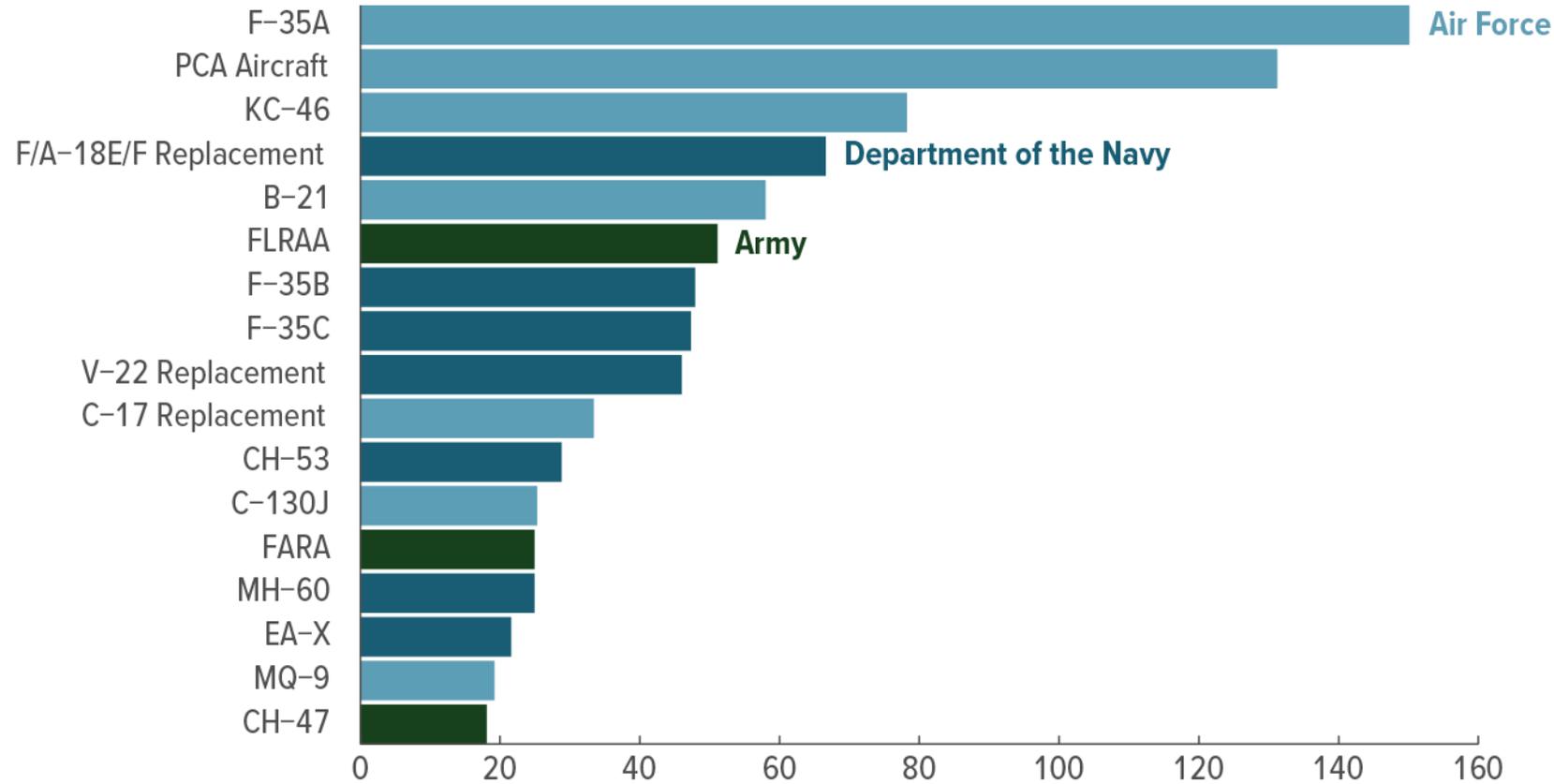
Aircraft	Maximum Age	Average Replacement Cost (Millions of 2018 dollars)	Assumptions
Fighter/Attack			
F-35B/C	30	195	Assume a more advanced aircraft. Procurement starts in 2041.
F/A-18 E/F	30	149	Assume a more advanced aircraft. Procurement starts in 2032.
EA-18G	30	135	Assume a more advanced aircraft. Procurement starts in 2030.
Helicopter and Tiltrotor			
AH-1Z	25	75	Assume an aircraft similar to the Army's FLRAA. Procurement starts in 2030.
CH-53K	25	120	Assume an aircraft similar to current model. Procurement starts in 2042.
MH-60R/S	25	52	Assume an aircraft similar to current model. Procurement starts in 2027.
MV-22B	25	109	Assume an aircraft similar to current model. Procurement starts in 2030.
Surveillance/Communication			
E-2D	25	206	Assume a more advanced aircraft. Procurement starts in 2035.
P-8A	50	334	Assume a more advanced aircraft. Procurement starts in 2058.

The Air Force Operates Much Older Aircraft Than the Other Services Operate



Fighter Aircraft Dominate the Department of Defense's Future Aircraft Procurement Costs

Billions of 2018 Dollars



Assumptions

- To project the annual costs of procuring aircraft, CBO developed an **annual aircraft retirement schedule** based on plans published by the Department of the Navy (when available) or on the historical ages at which aircraft retire.

- Given that retirement schedule, CBO projected the **annual procurement costs** associated with replacing aircraft one-for-one when they retire, allowing the cost of aircraft to change over time because of the effects of learning and scale.
 - **Learning** refers to the gains in efficiency that accrue over the duration of an aircraft's production as workers gain familiarity with a particular aircraft model.

 - **Scale** refers to the production efficiencies that are made possible when additional quantities of aircraft of the same type are built simultaneously or in close succession at a given facility.

Uncertainty

As with any 30-year budget projections, CBO's estimates are subject to several sources of uncertainty.

- In particular, the size and composition of the naval aviation force may change in unanticipated ways as a result of advances in technology, budgetary constraints, or changes in the national security environment.
- Even at the individual aircraft level, paths different from those projected by CBO could be adopted. For example, specific plans for replacing the F/A-18E/F fighters, MV-22B tiltrotors, and eventually, the F-35B/C fighters in production today have not yet been developed. Policymakers could decide to replace those aircraft with more or less expensive options than CBO assumed or to not replace them at all.

Notes

- The 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.
- To allow comparisons with earlier reports in CBO's series on long-term aviation costs, all costs are expressed in 2018 dollars.
- To remove the effects of inflation, CBO adjusted costs with either the gross domestic product price index from the Bureau of Economic Analysis or CBO's projection of that index.