

# Older Commercial Aircraft Have Relatively Stable Total Maintenance Costs

**T**he U.S. Air Force is operating some of its aircraft fleets for decades longer than originally intended. Although experience shows that older aircraft may develop age-related problems that require additional maintenance, the rate at which maintenance costs will rise is uncertain.

Analysis of experience in the commercial sector can provide additional insight to help Air Force planners forecast long-term maintenance costs. A 2004 Boeing study of commercial airframe maintenance costs suggested that such costs rise after about 10 to 14 years of service. However, a RAND Project AIR FORCE (PAF) study of total maintenance costs (including engine and overhead costs, not simply airframe maintenance) in the commercial sector suggests that such costs level off over time. Researchers concluded the following:

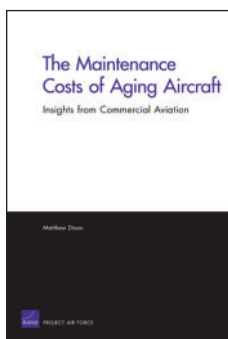
- Maintenance costs for young aircraft (0–6 years old) rise an estimated 17.6 percent annually, reflecting the rise in airline maintenance costs as aircraft come off warranty.
- Maintenance costs for mature aircraft (6–12 years old) rise an estimated 3.5 percent annually.
- Maintenance costs for older aircraft (12–25 years old) rise an estimated 0.7 percent annually—a statistically insignificant amount.

One reason for the difference between PAF's and Boeing's findings is that airframe maintenance and engine maintenance have different cost patterns. While rising in older aircraft, airframe maintenance makes up only about one-third of the total maintenance costs in the data analyzed; engine maintenance and overhead costs are flat for older commercial aircraft.

An important caveat on these findings is that U.S. commercial aircraft are generally retired by age 25, and their usage is very different from that of military aircraft. Hence, the PAF study's findings are not directly applicable to the Air Force's oldest fleets. However, they add additional insights that may be helpful when evaluated in the context of Air Force fleet experiences. ■

## RAND Research Areas

The Arts • Child Policy • Civil Justice • Education • Energy and Environment • Health and Health Care • International Affairs • National Security • Population and Aging • Public Safety • Science and Technology • Substance Abuse • Terrorism and Homeland Security • Transportation and Infrastructure • Workforce and Workplace



This product is part of the RAND Corporation research brief series. RAND research briefs present policy-oriented summaries of individual published, peer-reviewed documents or of a body of published work. This research brief describes work done for RAND Project AIR FORCE and documented in *The Maintenance Costs of Aging Aircraft: Insights from Commercial Aviation*, by Matthew Dixon, MG-486-AF (available at <http://www.rand.org/pubs/monographs/MG486/>), 2006, 108 pp., ISBN: 978-0-8330-3941-5. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

### RAND Offices

Santa Monica, CA • Washington, DC • Pittsburgh, PA • Jackson, MS • Doha, QA • Cambridge, UK

[www.rand.org](http://www.rand.org)



# PROJECT AIR FORCE

THE ARTS  
CHILD POLICY  
CIVIL JUSTICE  
EDUCATION  
ENERGY AND ENVIRONMENT  
HEALTH AND HEALTH CARE  
INTERNATIONAL AFFAIRS  
NATIONAL SECURITY  
POPULATION AND AGING  
PUBLIC SAFETY  
SCIENCE AND TECHNOLOGY  
SUBSTANCE ABUSE  
TERRORISM AND  
HOMELAND SECURITY  
TRANSPORTATION AND  
INFRASTRUCTURE  
WORKFORCE AND WORKPLACE

This PDF document was made available from [www.rand.org](http://www.rand.org) as a public service of the RAND Corporation.

This product is part of the RAND Corporation research brief series. RAND research briefs present policy-oriented summaries of individual published, peer-reviewed documents or of a body of published work.

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world.

---

## Support RAND

[Browse Books & Publications](#)

[Make a charitable contribution](#)

## For More Information

Visit RAND at [www.rand.org](http://www.rand.org)

Explore [RAND Project AIR FORCE](#)

View [document details](#)

## Limited Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law as indicated in a notice appearing later in this work. This electronic representation of RAND intellectual property is provided for non-commercial use only. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use.