



# 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.

[Jump down to document](#) ▼

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

[Purchase this document](#)

[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. Unauthorized posting of RAND PDFs to a non-RAND Web site is prohibited. RAND PDFs are protected under copyright law. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use. For information on reprint and linking permissions, please see [RAND Permissions](#).

This product is part of the RAND Corporation technical report series. Reports may include research findings on a specific topic that is limited in scope; present discussions of the methodology employed in research; provide literature reviews, survey instruments, modeling exercises, guidelines for practitioners and research professionals, and supporting documentation; or deliver preliminary findings. All RAND reports undergo rigorous peer review to ensure that they meet high standards for research quality and objectivity.

# TECHNICAL R E P O R T

## United States Air Force Aircraft Fleet Retention Trends A Historical Analysis

Timothy L. Ramey, Edward G. Keating

Prepared for the United States Air Force

Approved for public release; distribution unlimited



RAND PROJECT AIR FORCE

The research described in this report was sponsored by the United States Air Force under Contract FA7014-06-C-0001. Further information may be obtained from the Strategic Planning Division, Directorate of Plans, Hq USAF.

**Library of Congress Cataloging-in-Publication Data**

Ramey, Timothy L., 1951–

United States Air Force aircraft fleet retention trends : a historical analysis / Timothy L. Ramey,

Edward G. Keating.

p. cm.

Includes bibliographical references.

ISBN 978-0-8330-4794-6 (pbk. : alk. paper)

1. United States. Air Force—Equipment—History. 2. Airplanes, Military—United States—Design and construction—History. I. Keating, Edward G. (Edward Geoffrey), 1965– II. Title.

UG1243.R363 2009

358.4'183—dc22

2009044164

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.

© Copyright 2009 RAND Corporation

Permission is given to duplicate this document for personal use only, as long as it is unaltered and complete. Copies may not be duplicated for commercial purposes. Unauthorized posting of RAND documents to a non-RAND Web site is prohibited. RAND documents are protected under copyright law. For information on reprint and linking permissions, please visit the RAND permissions page (<http://www.rand.org/publications/permissions.html>).

Published 2009 by the RAND Corporation  
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138  
1200 South Hayes Street, Arlington, VA 22202-5050  
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665  
RAND URL: <http://www.rand.org>  
To order RAND documents or to obtain additional information, contact  
Distribution Services: Telephone: (310) 451-7002;  
Fax: (310) 451-6915; Email: [order@rand.org](mailto:order@rand.org)

## Summary

---

In this report, we review the history of the Air Force and its predecessor organizations and find that, since the founding of the Air Force in 1947, the service has routinely had fleets of aircraft with older designs than it had ever operated previously.

In the report, we do not directly examine the age of Air Force aircraft. Instead, we analyze the age of aircraft designs in use by the Air Force. In general, Air Force aircraft have been only a few years younger than the designs from which they were manufactured.

### Historical Sources

The primary sources for this historical analysis are two reports published in 1998 by the Air Force Historical Agency: *USAF Active Flying, Space, and Missile Squadrons as of 1 October 1995* and *Active Air Force Wings as of 1 October 1995*.

Using these reports, we look across active wings and squadrons to identify the first year in which any active wing or squadron reported operating a specific aircraft design. In a similar manner, we identify the last year in which a given aircraft design was reported as being operated by any active wing or squadron. The data do not cover Air Force Reserve or Air National Guard units. (See pp. 3–4.)

The historical reports show a ramp-up in the number of aircraft designs in operation in the late 1910s into the 1920s, as military aviation took hold. Since roughly 1930, there have generally been 30–40 different aircraft designs in operation at any one time. (See pp. 5–6.)

In the early years of military aviation and during World War II, a large number of aircraft designs were introduced and many designs were retired. The last large-scale introduction of new designs was during the Vietnam War. Since then, the Air Force's fleet of aircraft has been generally stable, with a few design introductions and retirements in a typical year. (See pp 5–6.)

### Patterns in Aircraft Design Age

There have been nearly consistent increases in maximum, median, and mean operated aircraft design age. There has also been a long-term increase in the dispersion of ages of aircraft designs in operation. (See pp. 7–8.)

This analysis finds that the age of aircraft designs in their last year of operation has trended up. Designs survived roughly five years in the earliest years of the Air Force. Designs

retired in the 1990s, by contrast, had been in operation an average of roughly 20 years. The growth in retirement ages is relatively consistent and constant. (See pp. 10–12.)

The periods with the most introductions of new designs (1916–1920 and 1941–1945) also had the highest percentage of introductions that were operated for five or fewer years. During periods with many introductions, substantial experimentation appears to have been occurring. By contrast, more-recent periods have seen longer-lasting designs and relatively fewer short-lived designs. (See pp. 11–12.)

This report shows that, since the end of World War II and the formation of the Air Force as an independent military service, there has been a pronounced trend for the Air Force to keep aircraft designs in operation for ever-longer periods. Our results do not speak to why or how this pattern of aging has occurred. They do suggest, however, that the pattern is both consistent and persistent. Therefore, while the mean age of aircraft designs currently in operation is at an all-time high, the same statement could have been made at most times throughout the history of the Air Force. By and large, the Air Force has operated an ever-aging portfolio of aircraft designs. (See pp. 15–16.)