The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis.

This electronic document was made available from www.rand.org as a public service of the RAND Corporation.

Skip all front matter: Jump to Page 1

Support RAND

Purchase this document
Browse Reports & Bookstore
Make a charitable contribution

For More Information

Visit RAND at 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 electronic documents to a non-RAND website is prohibited. RAND electronic documents 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.
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.

The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. RAND’s publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

© Copyright 2012 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 website 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 2012 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
Summary

The purpose of this report is to evaluate the economic wisdom of the United States adopting policies that rely primarily on expendable weapons, such as cruise missiles, to conduct air-to-ground strike missions. We examine the historical use of air-to-ground attack by the U.S. military during and since the Vietnam War and examine when exclusive use of expendable methods would be cost-prohibitive compared to using reusable weapon platforms. This analysis focuses solely on cost and does not explore the range of capabilities of the different weapon systems. Thus, conclusions do not address strategies involving a mix of reusable penetrating aircraft and expendable munitions.

We analyzed campaigns in terms of two parameters: the average intensity of the conflict in average weapons delivered per day and the duration of the conflict in days.

Figure S.1 summarizes both the historical data and our simple model for the sum of development and procurement costs. The blue line is the cost indifference curve between conducting the campaign with long-range cruise missiles and conducting it with a new, 20,000-lb-payload reusable aircraft. The line goes up sharply on the left side of the table, which corresponds to relatively small campaigns. If the United States only has to prepare for small campaigns, the
development cost of a reusable platform is an unnecessary expense. A few missiles will suffice. On the right side of the chart, the indifference curve becomes flat. Whether exclusive reliance on expendable platforms is cost-prohibitive depends entirely on the length of the conflict. This reflects the fundamental fact that there is no point in buying a reusable platform if you are not going to reuse it. The conflict duration at which exclusive reliance on expendable platforms becomes prohibitive depends on a number of assumptions about the cost, availability, and utilization rates of weapon systems, but for any realistic possibilities, expendable platforms become costly for conflicts persisting on the order of ten days. Appendix A describes our baseline cost assumptions. Appendix C describes several alternative cost assumptions.

Note that each of the major conflicts in recent history depicted in Figure S.1 has lasted longer than ten days. This analysis assumes that a reusable platform will be designed, purchased, and used in only one conflict. In reality, U.S. planning should be based on the total number of days of conflict for which the United States needs to be prepared over the lifetime of a proposed reusable platform. Only if the United States is confident that all possible conflicts over the system lifetime can be ended in a total of less than about ten days is exclusive reliance on expendable assets prudent.

This conclusion does not imply that expendable assets are not an important part of a well-designed force mix. There are important operational advantages to having at least some expendable weapons that this report does not address.

However, if the United States wishes to maintain the capability to wage air war efficiently for more than a few days, reusable platforms are an important part of an efficient force mix. This implies that, if the United States has a requirement for a substantial long-range strike capability and if the existing bomber fleet will for some reason, such as age or survivability, not be able to meet that requirement in the future, the nation should take steps to have appropriate weapon systems available when needed. Defining appropriate weapon systems requires analysis of alternative strategies relying on mixes of currently available expendable and reusable platforms and/or new weapon systems.