

A New Planning System Can Help Balance Depot-Level Repair Budgets with Aircraft Readiness Goals

The U.S. Air Force does not have an effective way of allocating limited funding for depot-level repair across weapon systems and calculating the readiness implications of such allocations. Depot-level repair includes work on components that cannot be repaired at either the base or intermediate levels and components needed to support programmed depot maintenance. A 2001 review of planning and budgeting processes for depot-level repair found important disconnects, such as lack of information about how budgeting decisions affect operational readiness, inconsistent assumptions and processes between the organizations involved, and lack of clarity about how to track planning goals to the execution of repairs.

RAND Project AIR FORCE (PAF) addressed this problem by developing a methodology—the Closed-Loop Planning System—that estimates the effect of depot repair funding allocations on aircraft availability. The main features of the system are as follows:

- The system starts with a statement of readiness goals in terms of end-of-planning-period aircraft availability. The availability is defined as the percentage of all aircraft that are mission capable. Readiness goals can be set by unit, theater, aircraft type, and command.
- The methodology optimizes the mix of repairs to be planned for each shop to ensure, with high confidence, that the readiness goals can be achieved.
- The methodology optimizes within constraints (e.g., shop capacity or carcass limits) to meet the availability goals. Additional capacity in the form of overtime can be included in the optimization if necessary.
- The primary output is the budget necessary to achieve the readiness goals. If the budget is not satisfactory, the user can iterate the process by selecting units or aircraft to adjust readiness goals and then viewing the budget implications. It is also possible to program priorities for adjusting readiness goals to achieve a given budget level.
- Perhaps the most interesting use of the Closed-Loop Planning System is for making necessary trade-offs in readiness across aircraft types to achieve budgetary goals. The study illustrates this feature with a trade-off curve between F-15 C/Ds and the F-15 Es when the overall budget is kept constant.

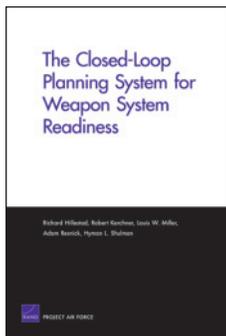
The study compares an approximate representation of a plan from the current Air Force Materiel Command planning system and the Closed-Loop Planning System. Holding readiness constant, the budget required for the closed-loop plan is about 6 percent less.

The Closed-Loop Planning System can be used for other areas, such as planning execution, tracking performance and replanning during the execution year, and planning how and when to overcome repair capacity limitations through the purchase of additional equipment, manpower, or overtime.

The Closed-Loop Planning System is meant to help Air Force planners make decisions about budgets for depot-level repair with a true understanding of the readiness consequences of those decisions. At a minimum, it should be integrated into the Spares Requirements Review Board process to help resolve depot-level repair budgeting issues. A broader goal would be to embed the closed-loop methodology directly within the Air Force Materiel Command planning process. ■

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 Closed-Loop Planning System for Weapon System Readiness*, by Richard Hillestad, Robert Kerchner, Louis W. Miller, Adam Resnick, and Hyman L. Shulman, MG-434-AF (available at <http://www.rand.org/pubs/monographs/MG434/>), 2006, 122 pp., ISBN: 978-0-8330-3864-7. 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 • Leiden, NL

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 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

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.