



NATIONAL DEFENSE RESEARCH INSTITUTE

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.

[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

Explore [RAND National Defense
Research Institute](#)

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 monograph series. RAND monographs present major research findings that address the challenges facing the public and private sectors. All RAND monographs undergo rigorous peer review to ensure high standards for research quality and objectivity.

Small Ships in Theater Security Cooperation

Robert W. Button
Irv Blickstein
Laurence Smallman
David Newton
Michele A. Poole
Michael Nixon

Prepared for the United States Navy

Approved for public release; distribution unlimited



RAND

NATIONAL DEFENSE RESEARCH INSTITUTE

The research described in this report was prepared for the United States Navy. The research was conducted in the RAND National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Combatant Commands, the Department of the Navy, the Marine Corps, the defense agencies, and the defense Intelligence Community under Contract W74V8H-06-C-0002.

Library of Congress Cataloging-in-Publication Data

Small ships in the war on terror / Robert W. Button ... [et al.].

p. cm.

Includes bibliographical references.

ISBN 978-0-8330-4400-6 (pbk.)

1. Gunboats. 2. War on Terrorism, 2001–3. United States—Military policy.

I. Button, Robert.

V880.S53 2008

623.825'80973—dc22

2007051919

Top Photo: PC-1 Cyclone. Courtesy of the U.S. Navy.

Bottom Photo: Siyu Primary School dedication ceremony speech is given by

Capt. Larry Flint, USN, on behalf of Rear Admiral Richard Hunt,

Combined Joint Task Force-Horn of Africa, CJTF-HOA.

Courtesy of the U.S. Navy.

Photo by Chief Mass Communication Specialist Paul Del Signore

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 2008 RAND Corporation

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2008 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 U.S. Navy is considering the potential capability of small ships to contribute to TSC activities in the War on Terror and other identified tasks. The RAND Corporation's objective was to establish characteristics appropriate for small ships in this context. RAND was directed to focus its analysis on TSC operations in sub-Saharan Africa, with 21 countries of interest to the U.S. Navy identified.

In addressing this problem, RAND analysts found several questions that must first be answered, including the following:

- What is a suitable concept of operations for a small ship to be used in TSC? What other ship missions would relate to TSC missions?
- What additional missions should a small ship be prepared to conduct in order to obtain cooperation from potential partner nations?
- What tasks are required by the above missions? What capabilities are required to conduct these tasks? What ship characteristics are needed to provide these capabilities?
- What is the nature of the U.S. Navy's interest in foreign navies, and how would a small ship interact with these navies?
- What are the environmental constraints on ship characteristics? Do sea state considerations in regions of interest put a lower bound on vessel size? How do sea state considerations affect the concept of employment?

- What types of ships do other countries use in their TSC programs, and what candidate ships are available commercially? What can be said about cost?

Three general classes of vessels suitable for use as a small ship in TSC are identified in this report. Differing primarily in size and level of support required, they are the

- **Nearshore patrol vessel.** These vessels displace fewer than 100 tons. They require logistic and operational support, including the following: hotel services; refueling, rearmament, and re-supply; additional small vessel rotational crews; maintenance facilities and support; feed of situational awareness;¹ and provision of additional command, control, communications, computers, and intelligence (C4I) support.² *A specialized mothership would be required for these vessels.*
- **Coastal patrol vessel.** These vessels displace 300–700 tons. They require some logistic and operational support, including the following: regular refueling and re-supply; some situational awareness; and tailored C4I support. *These vessels would benefit from a mothership of opportunity.*
- **Offshore patrol vessel.** These vessels displace approximately 1,500 tons. They would benefit from some logistic and operational support, including the following: occasional refueling and re-supply; some situational awareness; and tailored C4I support. *These vessels require no mothership.*

These ship classes, their requirements based upon a task evaluation, and evaluations of the ship classes were arrived at using a “strategies-

¹ A nearshore patrol vessel, particularly one envisaged as a cheap, simple solution suitable for use by partner nations, would not have the systems or personnel needed to compile a sophisticated operational picture. The support vessel (or shore facility) would need to do this.

² Again, a very small vessel will not have adequate personnel to undertake wide area command and control or sufficient space to accommodate enhanced communications and intelligence equipment.

to-tasks” methodology. The strategies-to-tasks methodology identifies the tasks needed to achieve specific military objectives, starting with the National Military Strategy and cascading down through national military objectives, campaign objectives, operational objectives, operational tasks, functions, and, finally, operational systems.³ This assessment of ship characteristics stops short of defining ship systems.

The nearshore patrol vessel is the smallest and least-expensive vessel with greatest access to shallow waters and minor ports. The low unit procurement cost would be offset for the U.S. Navy, however, by the need for a dedicated, specialized mothership to support this vessel. The nearshore patrol vessel has the worst habitability, would be the least survivable in rough seas or because of enemy action, and would be the least-capable vessel. Finally, while it is an attractive entry-level vessel to some nations, potential partner nations are now buying larger vessels.

The coastal patrol vessel is also a small vessel with good access to shallow waters and minor ports. Increased size gives this vessel numerous operational advantages over the nearshore vessel, including better survivability, greater endurance, and improved habitability. Coastal patrol vessels would not need a specialized mothership and could be supported by a suitable vessel of opportunity, although such a ship might not provide as much support as a specialized mothership. The larger size of the coastal patrol vessel would enable it to work more comfortably with the relatively larger vessels (over 1,000 tons) now being purchased by potential partner nations.

The offshore patrol vessel is the largest of the vessels considered in this study. It would have the greatest independence of operation and is the most capable and versatile vessel, able to undertake long patrols. In size, it is the most comparable to the larger vessels being purchased by potential partner nations. With these advantages comes increased cost, however. A fixed budget would allow fewer to be purchased, potentially reducing regional presence.

³ See David E. Thaler, *Strategies to Tasks: A Framework for Linking Means and Ends*, Santa Monica, Calif.: RAND Corporation, MR-300-AF, 1993, for a more thorough treatment of the methodology.

Study Team Observations

In this quick survey report on small ships, the RAND team did not draw definitive conclusions; rather, we present several observations for the U.S. Navy to consider in a more definitive study of the small ships phenomenon and their employment in the War on Terror. First, the U.S. Navy needs to give more consideration to the constabulary needs of potential partner nations in order to gain the increased access it needs to undertake TSC (and, potentially, operations in support of the War on Terror).

Second, whatever small vessel is chosen, success in TSC will greatly depend on the qualities of the crew. Small ship personnel will need to be specialized (with language training, for example) and they will require stability in their assignments to assure adequate time in theater and to prevent untimely personnel rotations. In this way, they will stand a better chance of building long-term relationships with the navies of partner nations. We recommend that the crews of these vessels be specially selected, with skills akin to those of special operations forces teams, and that they be given specific training to improve their abilities in constabulary and TSC tasks.

Third, while specialized motherships offer advantages in terms of operational suitability, they also have the disadvantage of needing to be procured through a formal acquisition process that could delay the implementation of the small vessel concept. In addition, such vessels might have limited utility in wider combat operations and would represent significant additional cost to the U.S. Navy.

Fourth, there is value in quantity. Having many of these small ships would be more beneficial to the U.S. Navy's concept of a vessel for the War on Terror than fewer. A squadron of five ships, for example, could support each other and provide the necessary intelligence and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) meshing that a larger ship alone could not.

Fifth, most countries of interest are gravitating toward larger rather than smaller ships. If the U.S. Navy wants to operate with those navies in the future, a comparable ship should be considered. If the

U.S. Navy wishes to sell such a ship through the U.S. Department of State's Foreign Military Sales program, the larger ship again seems to be of more interest to potential partner nations (based on their recent ship procurements).

Sixth, while motherships (i.e., Navy combatants especially configured to support one or more small ships) offer advantages, they are costly and potentially vulnerable because they probably could not access the same ports as the ships they are designed to support.

Finally, the study team does not recommend the nearshore patrol vessel. Considerations of fuel, stores, and crew fatigue give it the least endurance of the three potential solutions. Crew fatigue will be exacerbated by the small crew size (approximately ten persons), which will also require steady crew rotation and the need for multiple crews in theater. It has the worst habitability, especially in difficult sea states, and is least survivable in terms of both seakeeping and vulnerability to small arms fire. It was seen as least capable of performing the overall constabulary and TSC missions, and would be most dependent on a dedicated mothership for capability.

This study is a preliminary analysis of new or changing missions that the U.S. Navy may face as it attempts to partner with maritime nations beyond those with which it has enjoyed longstanding relationships. It was not possible in this small study to be as definitive in our research and analysis as we might desire. Additionally, the U.S. Navy may wish to test and develop our concept of employment, looking at issues such as how to get the small vessels into a theater and support them once deployed. Other key steps might include determining the force structure of the mothership (number and type) and the small vessels. Finally, small vessels may be able to contribute to missions beyond those of constabulary and TSC.

Next Steps for the U.S. Navy

We suggest that the U.S. Navy validate and further develop a concept of employment for the small ships. The concept of employment should consider:

- how the small ship reaches the theater of interest
- how the small ship is supported in theater, including
 - the potential use of contractor logistic support
 - new manning options, including longer tours for crew
 - the concept of the mothership and its use, including cost, basing rights, load lists, etc.
 - the possibility of partner nation support, including the potential advantage of working in-country with a host nation and the potential disadvantage to force protection
 - issues of force structure, including the merits of squadrons for combined operations and the issue of support if the ships are not homeported or based in a host nation.

Finally, the potential roles for a small ship outside the TSC world should be examined.

Epilogue

Shortly after this analysis was briefed out to the U.S. Navy, the service was tasked to examine the PC-1 Cyclone Class as a small ship for use in TSC.⁴ For use in TSC, the PC-1 was to be given an updated propulsion system and improved command and control for greater connectivity. A non-stabilized 25-mm gun was to be replaced by a stabilized 25-mm gun. The PC-1 displaces 331 tons, placing it toward the low end of the notional coastal patrol vessel band (300–700 tons).

At the U.S. Navy's request, the RAND study team conducted a short follow-on study of the PC-1 using data on these updates and improvements. We found that the PC-1 would be somewhat less capable than the notional coastal patrol vessel used in this study, but that mothership support would render it fully capable. This result was accepted for use by the U.S. Navy.

⁴ The U.S. Navy transferred most ships of the PC-1 Cyclone Class to the U.S. Coast Guard in 2000. The U.S. Coast Gaurd then redesignated them the PC-179 Class.