



INSTITUTE FOR DEFENSE ANALYSES

Staffing for Cyberspace Operations: Summary of Analysis

Thomas H. Barth
Jerome J. Burke
Stanley A. Horowitz
Mark F. Kaye
Drew Miller
Linda Wu

August 2016

Approved for public release;
distribution is unlimited.

IDA Document NS D-8089

Log: H 16-000867



The Institute for Defense Analyses is a non-profit corporation that operates three federally funded research and development centers to provide objective analyses of national security issues, particularly those requiring scientific and technical expertise, and conduct related research on other national challenges.

About This Publication

This work was conducted by the Institute for Defense Analyses (IDA) under contract HQ0034-14-D-0001, Project AO-7-3686, "Staffing for Cyberspace Operations," for the Director, Acquisition Resources and Analyses, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) and the Director, Total Force Planning & Requirements, Office of the Assistant Secretary of Defense for Manpower & Reserve Affairs, Office of the Under Secretary of Defense for Personnel & Readiness. The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

Acknowledgments

Thank you to Sarah K. Burns, J. Katharine Burton, Nancy M. Huff, and John E. Whitley for performing technical review of this document.

Copyright Notice

© 2016 Institute for Defense Analyses
4850 Mark Center Drive, Alexandria, Virginia 22311-1882 • (703) 845-2000.

This material may be reproduced by or for the U.S. Government pursuant to the copyright license under the clause at DFARS 252.227-7013 (a)(16) [Jun 2013].

INSTITUTE FOR DEFENSE ANALYSES

IDA Document NS D-8089

**Staffing for Cyberspace Operations:
Summary of Analysis**

Thomas H. Barth
Jerome J. Burke
Stanley A. Horowitz
Mark F. Kaye
Drew Miller
Linda Wu

Background

Building a Cyber Mission Force (CMF) capable of carrying out cyberspace operations is currently a major force planning effort in the Department of Defense (DoD). Determining the appropriate total force mix, defined as the choice between military, civilian, and contractor performance of DoD activities, is a key component in this planning effort. Total force mix has long been an important area in defense manpower management, given that the wrong total force mix can put the mission at risk or result in inefficiencies that consume scarce defense resources. In the cyber arena, the problem is complicated by a lack of legal framework for determining which roles include direct participation in hostilities (DPH), and should, by law, be performed by military personnel. Faced with these challenges, the Director, Total Force Management, Office of the Under Secretary of Defense for Personnel and Readiness; the Deputy Director, Analysis and Integration, Office of the Secretary of Defense Cost Assessment and Program Evaluation; and the Director, Acquisition Resources and Analyses, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics asked the Institute for Defense Analyses (IDA) to assess the current and projected total force mix for the CMF and, if possible, suggest alternative staffing plans.

This document summarizes the key findings and recommendations of a full-length report containing classified information.¹ It is meant to make the key elements of the analysis accessible to a general audience.

Process

In general, manpower requirements can be classified into one of three categories:

- **Military Essential:** Military essentiality is governed by DoD Instruction DoDI 1100.22,² which identifies five criteria for designating a requirement as military essential: (1) military-unique knowledge or skills required; (2) military incumbency is required by law, Executive Order, treaty or international agreement (e.g., DPH); (3) military performance is required for command and control, risk mitigation, or esprit de corps; (4) military manpower is needed to provide for overseas and sea-to-shore rotation, career development, or wartime assignment; and (5) unusual working conditions or costs are not conducive to civilian employment.

¹ Thomas H. Barth et al., "(U) Staffing for Cyberspace Operations," IDA Paper P-5217 (Alexandria, VA: Institute for Defense Analyses). SECRET//NOFORN (forthcoming)

² Department of Defense Instruction (DoDI) 1100.22, *Policy and Procedures for Determining Workforce Mix*, April 12, 2010.

- **Inherently Governmental:** Inherently governmental is defined by the Federal Activities Inventory Reform Act of 1998 as “a function so intimately related to the public interest as to require performance by Federal Government employees.”
- **Non-Governmental Commercial Activity:** Activities that are not military essential or inherently governmental are considered commercial in nature.

Military essential requirements must be filled with military personnel. Any manpower requirement that does not meet these criteria shall be designated for civilian performance if the requirement is inherently governmental or subject to least-cost government civilian or contractor performance if the requirement is a non-governmental commercial activity. While these categories are defined in policy and statute, there is room for interpretation in determining which roles should fall into which category. These determinations should be made carefully. Using military personnel for roles that are not truly military essential can be costly, both financially (military personnel are generally more expensive than their civilian counterparts) and manpower-wise (military personnel performing non-military essential roles still count against the total authorized end-strength).

IDA’s research focused on studying the CMF mission to determine which roles should be considered military essential, inherently governmental, or commercial activities open to the least costly performance type (government civilian or contractor). To understand the CMF mission requirements, we studied existing DoD cyberspace strategies, doctrine, and current concepts of operation and employment for CMF. Additionally, the team conducted interviews with representatives from each of the Services along with representatives from United States Cyber Command (USCYBERCOM) to understand CMF concepts and individual Service staffing plans.

A central element of IDA’s methodology was determining what positions involve direct participation in cyber hostilities, which are deemed military essential. Criteria involving the intention to cause harm and the existence of a causal link between the actions of a billet holder and the infliction of damage were used. Upon this determination, the IDA research team developed an alternative force mix that satisfied the staffing criteria as economically as possible. The researchers calculated the full costs of military, government civilian, and contractor personnel for each Service’s current force mix and the IDA alternative.

Analysis

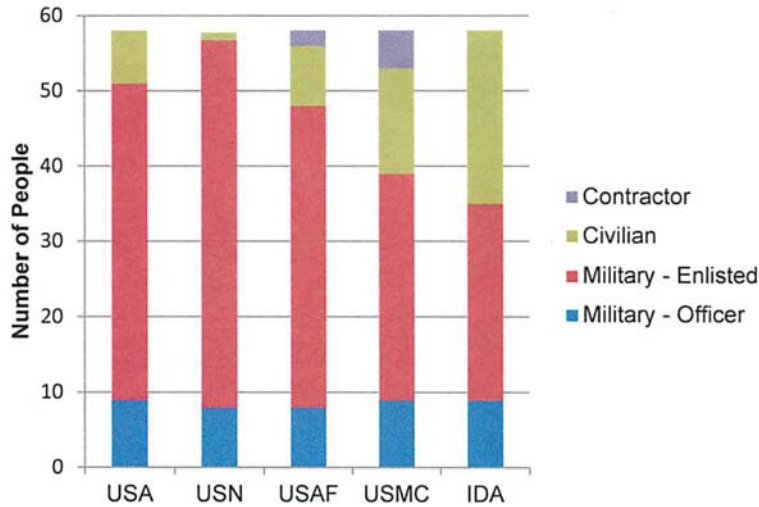
Staffing targets for CMF teams were identified in the Chairman of the Joint Chiefs of Staff's Action Memorandum to the Secretary of Defense (SecDef).³ IDA's analysis revealed that only the Army developed a staffing plan that strictly followed the military and civilian/contractor workforce mix recommended in the memorandum. The other three Services indicated in interviews that they viewed the Chairman's recommended workforce mix as planning guidance that they did not have to strictly follow. Their actual staffing plans reflected what they thought was the best force mix for their CMF teams based on their own analysis.

To develop a possible alternative staffing plan, IDA examined current cyberspace doctrine and concepts of operations and employment for the CMF. The team also interviewed representatives from each Service and USCYBERCOM. The staffing mixes employed by each Service for the five different CMF cyber teams are presented below along with the alternative staffing plan produced by the IDA analysis.⁴ The five different CMF teams (1) the National Mission Team, (2) the Combat Mission Team, (3) the National Support Team, (4) the Combat Support Team, and (5) the Cyber Protection Team. A description of the roles performed by each team can be found in the full-length report.

There are just under 60 personnel employed by each Service's National Mission Team. While all four Services utilized a similar share of military officers, the use of military enlisted, government civilians, and contractors varied. The Navy used the fewest civilians, while the United States Marine Corps (USMC) employed the most. IDA's alternative mix for the National Mission Team (shown in the figure below) featured the fewest military personnel (primarily through reducing the number of enlisted) and more government civilians.

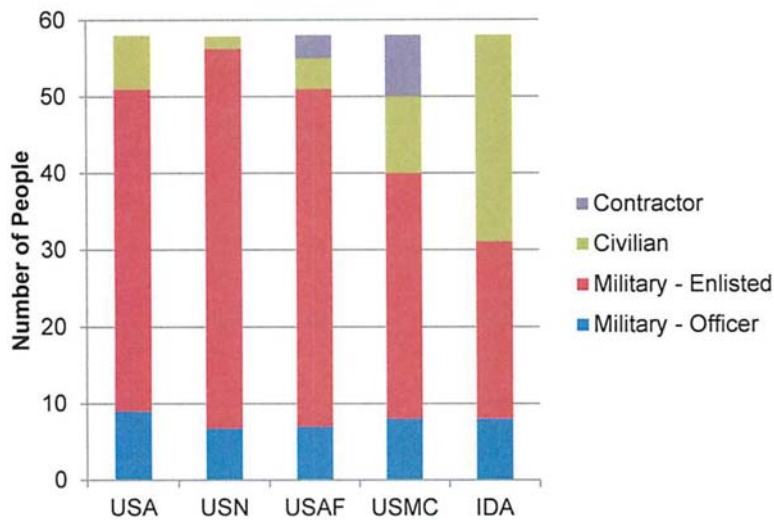
³ Chairman of the Joint Chiefs of Staff, Action Memorandum to the Secretary of Defense, *30 November 2012 JCS Tank on CYBERCOM Mission Manpower* (Washington, DC: Joint Staff, December 5, 2012). SECRET//NOFORN

⁴ While IDA did determine certain roles were non-governmental commercial activities, contractors are not featured in the IDA alternative CMF team force mixes, as they were found to be more costly than government civilians.



IDA National Mission Team Composition

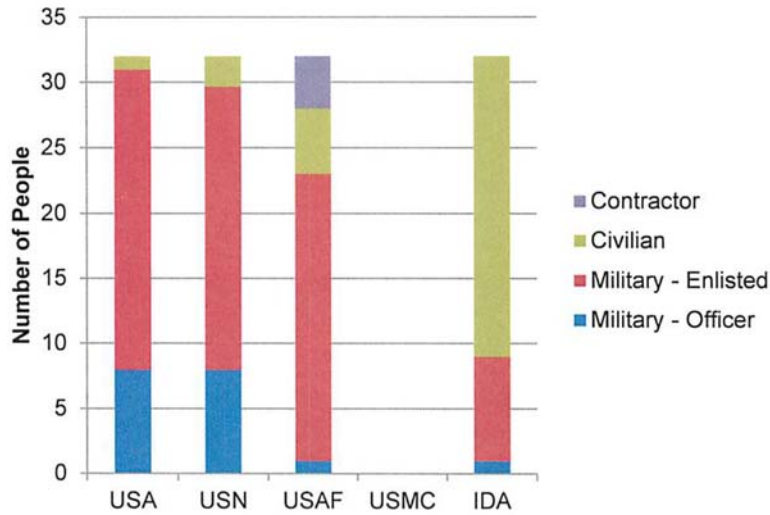
The Combat Mission Teams were also made up of approximately 60 personnel. As with the National Mission Teams, all four Services utilized a similar share of military officers. The use of military enlisted, civilians, and contractors varied (with the USMC again employing the most civilian-intensive mix). IDA’s alternative mix for the Combat Mission Team (shown in the figure below) featured the fewest military personnel (primarily through reducing the number of enlisted) and more civilians.



IDA Combat Mission Team Composition

The National Support Teams were smaller in size (just over 30 personnel). The Air Force used significantly fewer military personnel when compared to the Army and Navy (the USMC had no team). The IDA alternative (shown in the figure below) maintained a

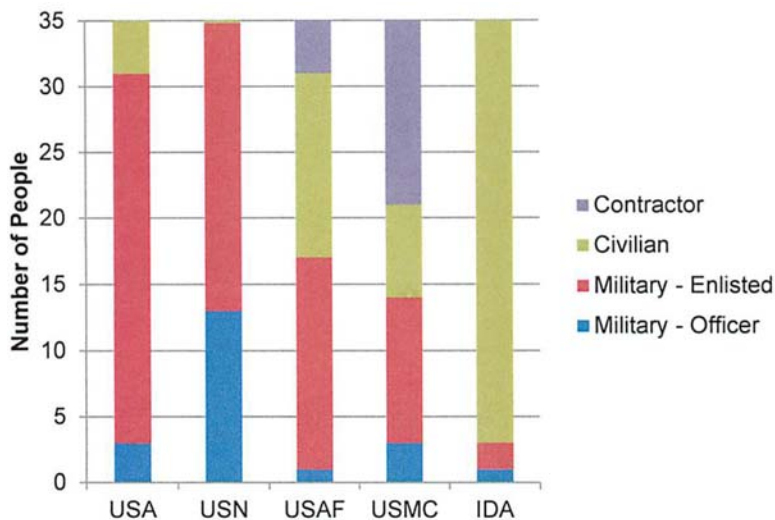
military officer mix similar to that of the Air Force, but greatly reduced enlisted personnel in favor of civilians.



Note: USMC does not have NSTs.

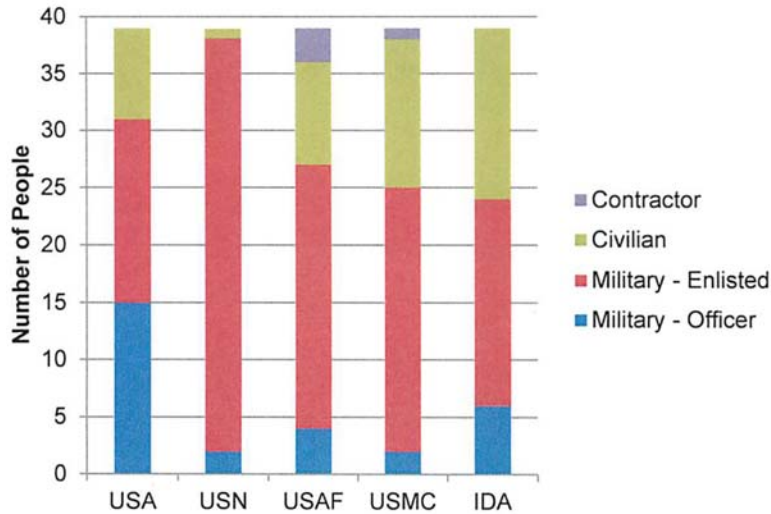
IDA National Support Team Composition

The Combat Support Teams were made up of approximately 35 personnel. The force mix employed by each Service varied greatly. The Army and Navy teams were primarily military (although they varied in their officer/enlisted mix with the Navy employing a much higher share of officers). The Air Force and USMC teams included a higher share of civilians and contractors, while the IDA alternative (shown in the figure below) employed the fewest military personnel.



IDA Combat Support Team Composition

The Cyber Protection Teams also varied by Service. The Army and Navy again had a more military-intensive mix than the Air Force or USMC, and the IDA mix (shown in the figure below) featured the highest civilian share.



IDA Cyber Protection Team Composition

To understand the budgetary implications of the various force mixes, we calculated the full cost of manpower for each Cyber Team using the total force mix employed by the Services (all Services combined) and the IDA alternative force mix (replacing each Service’s current mix with the IDA alternative). The costing was performed in accordance with guidance and cost elements laid out in DoDI 7041.04.⁵ The analysis revealed that the IDA staffing plan could save approximately \$130 million in manpower costs annually.

Approximately 95 percent of the manpower savings in the alternative staffing plan came from replacing more expensive officers, enlisted personnel, and contractors with less expensive government civilian employees. The remaining 5 percent of the manpower savings come from the use of different personnel grades.

Recommendations and Conclusions

The IDA CMF staffing analysis concluded that a more civilian-intensive force mix could save the DoD approximately \$130 million dollars annually while maintaining compliance with DoDI 1100.22. Below we discuss some potential caveats to this analysis and make two recommendations for improving the DoD’s ability to assess the optimal total force mix.

⁵ DoDI 7041.04, *Estimating and Comparing the Full Costs of Civilian and Active Duty Military Manpower and Contract Support*, July 3, 2013.

Develop a Legal Framework for Determining Combatants in Cyberspace Operations

As part of this analysis, the IDA team developed a protocol based on DPH to guide its determination of what billets require military personnel. This analysis was required because DoD currently lacks a legal framework for determining CMF work roles that are direct participants in *cyberspace* hostilities. This determination is critical because the United States is party to, or generally follows, international protocols concerning the laws of war (which would require billets directly participating in hostilities to be filled by military personnel). While the IDA-developed protocol provides a significant first step in this direction, further work and additional information will be required. In developing the legal framework, it would be prudent to examine any existing DoD/USCYBERCOM or other US government legal opinions on the topic of DPH.⁶ Additionally, a closer comparison of the position descriptions with the actual work to be performed would result in better factual information on the nature of the positions. This would provide Service manpower planners with a better framework to guide cyberspace operations workforce mix assessments, much like they now have for considering kinetic combat operations.

Evaluate CMF Team Effectiveness

The analysis presented here was primarily focused on determining the military essentiality of different job functions and the implied budgetary implications. Performance was not assessed as part of this research. During the research period, the Services had just started standing up their initial teams in the CMF; no team had yet reached full operating capability. In the future, performance data will be essential for evaluating the levels of expertise, experience, and continuity needed in a team's work roles for the team to successfully accomplish its mission. Knowing the necessary levels of expertise, experience, and continuity also informs other workforce mix factors such as government civilian and military rotation and career development requirements. A useful starting point for this analysis would be an examination of the National Security Agency's practices and experience in staffing similar activities. Once the performance and readiness requirements for the CMF are better understood, a more comprehensive workforce mix analysis, guided by the Department's principles for manpower management, should be conducted, to ensure DoD fields the most cost-effective CMF.

⁶ We did not have access to such US government legal positions for DPH or other legal matters relating to this research. This would most certainly be an area for detailed research and analysis.

References

- Barth, Thomas H., Jerome J. Burke, Mark F. Kaye, Drew Miller, Linda Wu, and Stanley A. Horowitz. "(U) Staffing for Cyberspace Operations." IDA Paper P-5217. Alexandria, VA: Institute for Defense Analyses. SECRET//NOFORN (forthcoming)
- Chairman of the Joint Chiefs of Staff. Action Memorandum to the Secretary of Defense. *30 November 2012 JCS Tank on CYBERCOM Mission Manpower*. Washington, DC: Joint Staff, December 5, 2012. SECRET//NOFORN
- Department of Defense Directive (DoDD) 1100.4, *Guidance for Manpower Management*. Paragraph 3.2 Requirements Determination. Washington, DC: Under Secretary of Defense for Personnel and Readiness, February 12, 2005.
- Department of Defense Instruction (DoDI) 1100.22. *Policy and Procedures for Determining Workforce Mix*, April 12, 2010.
- DoDI 7041.04. *Estimating and Comparing the Full Costs of Civilian and Active Duty Military Manpower and Contract Support*. July 3, 2013.

REPORT DOCUMENTATION PAGE

*Form Approved
OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY)		2. REPORT TYPE		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code)

