

ARMY LIBRARY
LAW SECTION



REPORT TO THE CONGRESS



Substantial Staff And Cost Reductions Possible At Military Telecommunications Centers Through Use Of Uniform Staffing Standards

(Comprehensive)

Department of Defense

B-146864

*BY THE COMPTROLLER GENERAL
OF THE UNITED STATES*

LCD-74-120

770409/087422

JAN. 7, 1975



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-146864

To the Speaker of the House of Representatives
and the President pro tempore of the Senate

This is our report on the substantial staff and cost reductions possible at military telecommunications centers through use of uniform staffing standards.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Director, Office of Telecommunications Policy; the Secretary of Defense; and the Secretaries of the Army, Navy, and Air Force.

A handwritten signature in cursive script that reads "James B. Aerts".

Comptroller General
of the United States

C o n t e n t s

	<u>Page</u>
DIGEST	i
CHAPTER	
1 INTRODUCTION	1
2 NEED FOR IMPROVED TELECOMMUNICATIONS CENTER STAFFING STANDARDS	3
Military staffing standards	3
Department of the Army	3
Department of the Navy	4
Department of the Air Force	5
Weaknesses of military staffing standards	6
Development of composite staffing standard used by GAO	7
Application of composite staffing standard used by GAO	8
3 AUTOMATED EQUIPMENT HAS NOT RESULTED IN ACHIEVABLE STAFFING LEVELS	12
4 CONCLUSIONS, RECOMMENDATIONS, AND AGENCY COMMENTS	14
Conclusions	14
Recommendations	14
Agency comments	15
5 SCOPE OF REVIEW	16
APPENDIX	
I Letter dated October 1, 1974, from the Director, Telecommunications and Command and Control Systems, to GAO	17
II Principal officials of the Department of Defense responsible for the administra- tion of activities discussed in this report	19

ABBREVIATIONS

ADC	Aerospace Defense Command
AFCS	Air Force Communications Service
AUTODIN	Automatic Digital Network
DQD	Department of Defense
OCR	optical character reader
OSD	Office of the Secretary of Defense
SAC	Strategic Air Command
USACC	U.S. Army Communications Command

*COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS*

**SUBSTANTIAL STAFF AND COST
REDUCTIONS POSSIBLE AT
MILITARY TELECOMMUNICATIONS
CENTERS THROUGH USE OF
UNIFORM STAFFING STANDARDS**
Department of Defense

D I G E S T

WHY THE REVIEW WAS MADE

The Department of Defense (DOD) operates the Automatic Digital Network (AUTODIN) to transmit and receive digital messages between some 900 telecommunications centers worldwide, excluding those operated by intelligence organizations. (See pp. 1 and 2.)

These centers are staffed with an estimated 20,000 military and civilian employees whose salaries and related benefits cost the Government about \$200 million annually. (See p. 2.)

GAO made this review because of continuing congressional interest in the management and operation of telecommunications systems and the significant cost of staffing the centers.

FINDINGS AND CONCLUSIONS

The Office of the Secretary of Defense has not issued specific guidance or instructions for staffing of DOD telecommunications centers.

Military departments or subordinate commands, however, have established their own criteria which, in many instances, are not conducive to determining proper staffing requirements. (See p. 14.)

Most land-based, nonmobile military telecommunications centers have operational functions--message

handling, message distribution, message relay, and traffic analysis--similar enough to permit application of a uniform staffing standard. (See pp. 1 and 7.)

GAO constructed a composite message-handling and traffic analysis standard for application to the traffic workload at centers where the operational functions are considered to be done manually. (See pp. 8 and 12.)

Using the composite standard and the related number of onboard personnel, centers--represented by GAO's statistical sample--were in the aggregate overstaffed. By projecting the sample results to the universe, GAO estimates that net overstaffing totaled about 2,170. (See p. 9.)

Monetary impact of this overstaffing is \$21.7 million each year in increased communications center operating costs. Such costs and personnel could be applied to improve combat effectiveness within the military departments. (See pp. 3 and 9.)

Included in the sample were seven centers each having one or more optical character readers--automated equipment--which are supposed to reduce manual operator functions. (See p. 12.)

GAO's study indicates that introducing automated equipment into these centers has not resulted in

the staffing reductions that could be achieved. (See p. 13.)

Potential cost reductions shown in this report emphasize the need for management to direct its attention toward developing and maintaining adequate and current staffing standards for operating telecommunications centers. (See p. 14.)

RECOMMENDATIONS

The Secretary of Defense or his designee, such as the Director, Telecommunications and Command and Control Systems, should

- develop uniform DOD telecommunications center staffing standards;
- update the standards, as necessary, to encompass evolving telecommunications automation advances; and
- insure that staffing levels are consistent with the standards. (See p. 14.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Office of the Secretary of Defense concurred with GAO's recommendations and advised GAO that it had formed an ad hoc committee to determine appropriate standards and to address the impact of current and planned telecommunications automation programs. GAO plans to evaluate DOD's actions at a future date. (See p. 15.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

This report provides information on the potential for staffing reductions in a particular support function, military telecommunications centers.

It may be of interest to the Congress because of increasing personnel costs and budgetary constraints and because of specific congressional direction to reduce support forces in Europe and DOD civilian personnel worldwide.

CHAPTER 1

INTRODUCTION

The Department of Defense (DOD) operates the Automatic Digital Network (AUTODIN) to transmit and receive digital messages¹ between military telecommunications centers throughout the world. The operating functions associated with these centers can generally be divided into four categories.

1. Message handling--receiving, processing, and transmitting classified and unclassified messages.
2. Message relay--retransmitting incoming messages to another destination without altering the message content.
3. Message distribution--reproducing messages and disseminating them to addressees.
4. Traffic analysis (methods and results)--monitoring quality control procedures, compiling statistics for performance analysis, maintaining communications publications in current status, and providing routing information.

The equipment used to accomplish these functions includes paper tape and card punches, card readers, optical character readers, and most important--terminals. Terminals are input/output devices which range from slow-speed teletype machines to high-speed digital information processors: a telecommunications center may have one or more terminals. Depending upon the type of terminal, messages are transmitted using punched paper tape, data cards, or magnetic tape.

¹Any thought or idea expressed and prepared in discrete symbols suitable for transmission by telecommunications. This includes data defined as a representation of facts, concepts, or instructions in a manner suitable for communication, interpretation, or processing.

Information was not readily available on the total number of military telecommunications centers. As an alternative, we identified about 1,500 AUTODIN terminals. Excluding intelligence agencies, the North Atlantic Treaty Organization, and civil agencies, 885⁽¹⁾ military terminals remained in our universe. Projections, based on our sample of 329 AUTODIN terminals, indicate there are about 835 land-based, nonmobile military telecommunications centers. We estimate that these centers are staffed with about 20,000 military and civilian employees at an annual manpower cost of about \$200 million.

¹After sample selection we identified 49 additional terminals representing an estimated 48 centers. However, to maintain statistical reliability in this review, we excluded these from our calculations.

CHAPTER 2

NEED FOR IMPROVED TELECOMMUNICATIONS CENTER STAFFING STANDARDS

Most standards used to determine telecommunications center staffing levels are inappropriate or inadequate. As a result, we estimate that about 2,170 more personnel than needed were assigned to operate AUTODIN terminals. This overstaffing resulted in increased annual manpower costs of about \$21.7 million associated with the operation of telecommunications centers. Such costs and personnel could be applied to improve combat effectiveness within the military departments.

MILITARY STAFFING STANDARDS

The Office of the Secretary of Defense (OSD) has not issued specific guidance or instructions for staffing DOD telecommunications centers. Therefore, military departments or subordinate commands have established their own criteria for staffing centers. Criteria in effect during our review are discussed below.

Department of the Army

Before July 1973, several Army commands were responsible for operating and setting staffing levels for their centers. Each command used manpower survey teams to periodically set staffing levels. As of July 1973, the responsibility for most centers was assigned to the U.S. Army Communications Command (USACC). Since then, the USACC manpower survey team has been responsible for periodic manpower surveys at most Army AUTODIN centers. Individual centers can have authorized staffing levels revised between surveys by submitting supporting data for headquarters approval.

The Army has five approved staffing standards for their centers and terminals. Three of the standards specify a fixed number of operators, but the standard varies depending upon terminal type. The fourth standard bases staffing upon the number of teletype machines used during the peak

workload shift. The remaining standard applies a variable¹ factor to total message groups (five printed characters plus a space) sent and received.

USACC has recently developed center staffing standards through work sampling. These standards apply fixed factors to punched paper tape messages and the number of cards sent and received. As of February 1974, they had not been approved by the Department of the Army; consequently, USACC was using the above-described Army standards.

Department of the Navy

Each major Navy command operates and determines staffing levels for its telecommunications centers. For guidance, the Office of the Chief of Naval Operations issued the "Staffing Criteria Manual for Activities Ashore (OPNAVINST 5310.5A)." This manual, which was canceled in February 1974, contained a standard which applied a variable factor to the total number of messages sent or received each week. Navy manpower representatives said each center used this standard, locally developed standards, or specific justifications to determine staffing needs. These needs were submitted to command level for approval.

Manpower survey teams, under the Office of the Chief of Naval Operations, visited shore installations to set staffing levels, including those for telecommunications centers. However, due to limited coverage provided by such teams, this practice was discontinued in July 1973.

The Navy adopted the "Shore Requirements, Standards and Manpower Planning System," when the staffing criteria manual was canceled. Under this system the Navy survey teams participate in developing staffing standards for various functional areas, such as telecommunications.

¹As used in this report, variable means that the graduated staffing is not directly proportional to the increases in workload.

The Marine Corps, which determines staffing levels for its own centers, does not have formal standards. Each base commander, in cooperation with the telecommunications officer, determines the number of permanent telecommunications positions. Permanent personnel are supplemented under the Fleet Marine Force Personnel Assistance Program. Under this program, tenant organizations provide personnel to support various base functions, such as telecommunications centers. These assistance personnel are assigned until their units are deployed or transferred from the host installation. The base commander and base telecommunications officer determine the number of such personnel required for a center.

Department of the Air Force

Although some Air Force telecommunications centers are operated by the Strategic Air Command (SAC), Aerospace Defense Command (ADC), or the Air Force Security Service¹, the majority are operated by the Air Force Communications Service (AFCS) .

AFCS, with the assistance of Air Force Management Engineering Program personnel, developed and are using a work-center staffing standard for centers operating on a continuous 24-hours a day, 7-days a week basis. This standard was developed using work-sampling studies made at 40 Air Force centers and generally accepted operations research techniques. It incorporates the following scientifically identified and weighted workload elements: (1) narrative messages sent, (2) data card messages² sent, (3) magnetic tape reels sent, (4) service messages³ sent, (5) indirect

¹Intelligence activity was excluded from this review.

²Information contained on a group of data processing type cards which constitutes a complete message consisting of address, text, and ending.

³A message or message part transmitted at the recipient's request to clarify garbled words or lines, confirm a text, or furnish reruns. A service message is also used to reroute a message, initiate tracer action for a lost message, or provide disposition instructions for an originated operational message.

man-hour requirement index, (6) major headquarters base communication support index, and (7) major headquarters command/control support index.

Before May 1973, **SAC'S** telecommunications center staffing standard was based upon messages transmitted and received. Based on a **SAC** Management Engineering Team review and recommendation, in May 1973 **SAC** adopted the **AFCS** standard,

ADC uses various standards and methods to set center staffing levels. These include (1) applying fixed factors to either the total number of narrative, card, service, and relay messages sent or the total number sent and received, (2) setting a fixed level of six or seven operators, and (3) using onsite manpower survey teams.

WEAKNESSES OF MILITARY STAFFING STANDARDS

Several inherent weaknesses in the standards are:

- The Army, Navy, and **ADC** individually apply one factor to messages both sent and received. This is inappropriate for setting staffing levels because it takes less time to process messages received than messages sent. Consequently, centers having a high ratio of messages received to messages sent would have staffing advantages over centers with a low ratio.
- The Army and **ADC** set staffing at fixed levels and do not consider workload differences for some terminals and centers. Analysis of center operations by **USACC**, **AFCS**, and **SAC** have shown there is a direct and virtually linear relationship between workload and necessary manpower.
- A standard based on the number of data cards sent or received, as used by **USACC**, is not a good staff requirement indicator because the same manual operations are performed on each message, regardless of the number of cards. Because the difference in processing time for long and short data card messages is minimal, centers sending or receiving long data card messages would have a staffing advantage over those processing short messages.

- A standard, as used by the Army, based on the number of teletype machines in operation during the peak workload shift does not necessarily allow for differences in amount of machine use. For example, a teletype machine used only 10 percent of the time would receive the same staffing as one used 90 percent of the time. An Army manpower survey team member told us the standard was written *so* vaguely that two survey teams using the same standard would likely assign different staffing to the same center.
- Standards, as used by ADC, which assign equal weight to each message type (narrative, card, service, and relay) sent or sent and received, can yield staffing that is disproportionate to the work involved. This is because the time required to process each message type varies greatly.
- The absence of Marine Corps standards and the subjective nature of **local** staffing determinations are likely to result in staffing inconsistencies. For example, the center at the Fleet Marine Force Atlantic, Norfolk, Virginia, has a smaller workload than the Marine Corps Air Station, Kaneohe, Hawaii; yet **as** of June 30, 1973, Norfolk **had** 37 operators and Kaneohe had 29.

DEVELOPMENT OF COMPOSITE
STAFFING STANDARD USED BY GAO

Most land-based, nonmobile military telecommunications centers have sufficiently similar operational functions to permit application of a uniform staffing standard which considers various message types. A uniform standard which properly reflects workload provides a means for equitably distributing staffing among centers and readily identifying requirement changes.

GAO constructed a composite standard¹ which used (1) elements of the AFCS standard applicable to message-handling functions, (2) a factor for traffic analysis taken from USACC's staffing standard, and (3) a factor for miscellaneous functions, such as courier duty, facsimile operations, and guard duty, not covered by either of the above standards.

Although we did not make a detailed analysis of the data used in developing the AFCS standard, we used it because it has been (1) developed using approved operations research techniques, (2) successfully applied in 1972 and 1973 to AFCS's centers without reducing the quality of service, and (3) independently reviewed and accepted by SAC. In addition, we used USACC's factor to provide additional man-hours for the traffic analysis function because the AFCS standard did not specifically provide for this function.

The composite standard should yield sufficient personnel to operate most military telecommunications centers. This does not necessarily mean that the standard yields the minimum number of operators needed or that further economies do not exist.

APPLICATION OF COMPOSITE STAFFING STANDARD USED BY GAO

We selected, from a stratified universe of 885 military AUTODIN terminals, a random sample of 351 terminals. (See p. 10.) Sample terminals located at military installations, worldwide, were sent questionnaires requesting telecommunications center identification, workload statistics, and staffing information. The sample excluded questionnaires concerning 22 terminals because they were classified, incomplete, or not returned. The 329 terminals remaining in the sample were sufficient to maintain a 95-percent confidence level. GAO staffs verified questionnaire data at 62 sample terminals, or 19 percent of the sample. Comparison of the reported and verified data disclosed a negligible error rate.

¹This standard does not include factors for the message relay and distribution functions. (See p. 1.) In determining a sufficient number of personnel for these functions, we generally accepted the estimate reported by the center.

Telecommunications center identification information on the questionnaires showed that the sample terminals were in 312 centers. Within our sample of 312 centers, 225 carried out normal communications functions on a continuous basis. The remaining 87 centers either did not operate continuously or carried out unusual functions, such as major relay and ship-to-shore communications. For statistical projection reliability, we assigned zero overstaffing or understaffing to these 87 centers.

We applied the composite staffing standard to workload data and compared these results with the reported number of onboard personnel as of June 30, 1973,¹ for those centers operating on a continuous basis. Individually, centers were either understaffed or overstaffed; however, the total net effect for the 312 centers was an overstaffing of 1,083 personnel. Prorating this net overstaffing among the terminals within the centers showed that 996⁽²⁾ personnel were attributable to the sample terminals.

Projecting the sample terminal results by military organization strata to the terminal universe disclosed a net overstaffing of 2,173 personnel, plus or minus 530. Monetarily this represents increased annual manpower costs of \$21.7 million to operate these terminals. This amount is based on DOD's annual manpower cost estimate of \$10,000 a man. Reallocating the excess personnel and attendant costs could enhance the combat effectiveness of military departments.

The following schedule summarizes the net overstaffing and understaffing by strata.

¹Authorized military staffing exceeded the onboard staffing of 5,053 by 1,803, or 36 percent, for operating functions at centers within the sample.

²The difference between 1,083 and 996 operators represented overstaffing and understaffing attributable to nonsample terminals colocated with sample terminals.

Strata	Universe		Sample				
	Number of terminals	Number of terminals	Number of centers represented by terminals	Actual staffing	Required staffing computed by GAO	Difference	Projected over-staffing and under-staffing
Army	224	108	106	1,436	918	518	1,163
Navy	221	92	87	1,700	1,361	339	813
Marine Corps	29	14	13	338	194	144	299
AFCS	297	68	63	639	668	-29	-125
SAC	55	25	21	200	218	-18	-40
ADC	15	10	10	142	100	42	63
Other Air Force	<u>24</u>	<u>12</u>	<u>12</u>	<u>25</u>	<u>25</u>	<u>-</u>	<u>-</u>
Total	<u>885</u>	<u>329</u>	<u>312</u>	<u>4,480</u>	<u>3,484</u>	<u>996</u>	<u>2,173</u>

b

The staffing levels established by the composite standard were discussed with center officials at terminals **GAO** visited. **Many** of them acknowledged that their centers could operate effectively within the parameters of the standard.

CHAPTER 3

AUTOMATED EQUIPMENT HAS NOT RESULTED

IN ACHIEVABLE STAFFING LEVELS

DOD told us that a major justification for telecommunications center automation was reducing required staffing. However, our review indicated that use of automated equipment did not materially affect the onboard staffing levels.

Seven telecommunications centers in our sample had one or more optical character readers (OCRs). An OCR is a light-sensitive device used to identify and translate printed matter into electrical signals. These signals are then automatically fed into a telecommunications terminal and transmitted. In non-OCR centers, printed matter is manually translated, fed into the terminal, and transmitted. Thus staffing levels at centers using automatic devices should be lower than at centers manually preparing terminal input.

To get some measure of the staffing status at the seven centers, we applied the composite standard--in lieu of developing a new standard for automated centers--to the workload data of each. Comparing these results with onboard staffing for each center showed overstaffing as follows:

<u>Military service</u>	<u>Telecommunications center (note a)</u>	<u>Staffing</u>		
		<u>Actual</u>	<u>GAO computed</u>	<u>Over-staffing</u>
Army	Fort Shafter, Hawaii	103	32	71
	Vaihingen, Germany	81	28	53
	Fort Huachuca, Arizona	34	31	3
Navy	Atlantic Fleet, Norfolk, Virginia	62	44	18
	Pacific Fleet Command Center, Hawaii	41	39	2
	Camp H. M. Smith, Hawaii	74	40	34
	Crystal Plaza, Washington, D. C.	<u>56</u>	<u>41</u>	<u>15</u>
	Total	<u>451</u>	<u>255</u>	<u>196</u>

^aWe included sample terminals at these centers in the computations discussed in chapter 2.

The above comparisons demonstrate that introducing automated equipment into the centers apparently has not resulted in the achievable staffing reductions. The standards used in the above computations are based on manual processing times. Less processing time would be expected in automated centers; therefore, staffing standards need to be revised or developed as automated centers evolve.

CHAPTER 4

RECOMMENDATIONS AND AGENCY COMMENTS

CONCLUSIONS

Without specific guidance or instructions from OSD, each military department or command developed different staffing criteria. These standards are inappropriate because they lack uniformity and do not establish equitable staffing levels among centers. However, a similarity of operating functions among centers exists which lends itself to the development of uniform staffing criteria.

We recognize that any standard ultimately developed may differ from the composite standard used in this report. However, we believe that the potential cost reductions shown in this report emphasize the need for management to direct its attention toward developing and maintaining adequate current staffing standards applicable to the four functional categories--message handling, relay, distribution, and traffic analysis--of operating telecommunications centers.

Although this report concerns centers with normal communications functions operating on a continuous basis, we believe that standards can be developed for centers (1) operated by and for military intelligence activities and (2) operated on a less-than-continuous basis.

RECOMMENDATIONS

We recommend that the Secretary of Defense or his designee, such as the Director, Telecommunications and Command and Control Systems,

- develop uniform DOD telecommunications center staffing standards;
- update the standards, as necessary, to encompass evolving telecommunications automation advances; and
- insure that staffing levels are consistent with the standards.

AGENCY COMMENTS

We brought our findings, conclusions, and recommendations to the attention of the Secretary of Defense on July 23, 1974. OSD said that it agreed with our recommendations and planned to form a committee to develop staffing standards. (see app. I.) Subsequently, OSD told us that this committee established an approach to study the development of a DOD staffing standard implementation plan, which it anticipates will be completed by May 1975.

We have no further recommendations at this time but intend to evaluate DOD's actions at a future date.

CHAPTER 5

SCOPE OF REVIEW

We made our review at the office of the Director, Telecommunications and Command and Control Systems, Washington, D. C.; Defense Communications Agency, Washington, D. C.; Air Force Communications Service, Richards-Gebaur Air Force Base, Missouri; U.S. Army Communications Command, Fort Huachuca, Arizona; Naval Telecommunications Command, Washington, D.C.; and over 60 other military locations, worldwide.

At these locations we obtained data, examined records, and interviewed military telecommunications officials regarding DOD telecommunications management, staffing standards, and workload.

We sent questionnaires to telecommunications terminals on workload data for the period January through June 1973 and on other descriptive data concerning the terminals and centers. We received questionnaires from 312 centers, representing 329 terminals, and we analyzed the data using a computer.



OFFICE OF THE SECRETARY OF DEFENSE
DIRECTOR, TELECOMMUNICATIONS AND
COMMAND AND CONTROL SYSTEMS
WASHINGTON, D.C. 20301

1 - OCT 1974

Mr. Fred J. Shafer
Director, Logistics and
Communications Division
General Accounting Office
Washington, D. C. 20548

Dear Mr. Shafer:

This responds to your letter to the Secretary of Defense, dated July 23, 1974, which forwarded the GAO Draft Report, "Staff Reductions Possible at Military Telecommunications Centers Through the Use of Uniform Staffing Standards," (Code 941015).

We concur with your recommendations to (1) develop uniform DoD telecommunications center staffing standards; (2) update these, as necessary, to encompass evolving telecommunications automation advances; and (3) ensure that staffing levels are in accordance with standards. It is planned to form and convene an ad hoc committee by early October, which will include representation from the military departments, for the purpose of determining appropriate standards as well as to address the impact of current and planned telecommunications automation programs. This committee will be chaired by Mr. Nathaniel M. Cavallini of my staff.

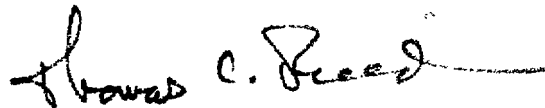
As a departure point, it is planned to use the Air Force staffing standard as the base line consideration and take other Service factors into account in order to develop standards which will apply to the majority of DoD telecommunications centers. Once this is accomplished, the standards will be applied diligently to the DoD telecommunications centers manning levels in existence at that time and appropriate adjustments will be made. In this connection, it should be noted that since your review of the on-board strength as of June 30, 1973, reductions have been achieved, particularly in the case of the Army where in 1973 an unusual over-strength posture situation was created by the rapid personnel withdrawal from Southeast Asia. In addition, during the study effort period it is anticipated that the

APPENDIX I

military departments will continue to make adjustments based on individual reviews already underway.

It is anticipated that the general study approach and a target schedule will be developed at the first meeting. We will be pleased to inform you of our progress at that time.

Sincerely,

A handwritten signature in black ink that reads "Thomas C. Reed". The signature is written in a cursive style with a long horizontal line extending to the right.

Thomas C. Reed

PRINCIPAL OFFICIALS OF THE
DEPARTMENT OF DEFENSE
RESPONSIBLE FOR THE ADMINISTRATION
OF ACTIVITIES DISCUSSED IN THIS REPORT

Tenure of office

From TO

DEPARTMENT OF DEFENSE

SECRETARY OF DEFENSE:

James R. Schlesinger	June 1973	Present
William P. Clements, Jr. (acting)	May 1973	June 1973
Elliot L. Richardson	Jan. 1973	Apr. 1973

DIRECTOR, TELECOMMUNICATIONS AND

COMMAND AND CONTROL SYSTEMS (note a):

Thomas C. Reed	Feb. 1974	Present
David L. Solomon (acting)	Sept. 1973	Jan. 1974
Dr. Eberhardt Rechtin	Feb. 1972	Sept. 1973

DEPARTMENT OF THE ARMY

SECRETARY OF THE ARMY:

Howard H. Callaway	May 1973	Present
Robert F. Froehlke	July 1971	May 1973

DEPARTMENT OF THE NAVY

SECRETARY OF THE NAVY:

J. William Middendorf II	Apr. 1974	Present
John W. Warner	May 1972	Apr. 1974

APPENDIX II

Tenure of office

From To

DEPARTMENT OF THE AIR FORCE

SECRETARY OF THE AIR FORCE:

John L. McLucas	July 1973	Present
Dr. Robert C. Seamans, Jr.	Jan. 1969	May 1973

^aTitle was Assistant Secretary of Defense (Telecommunications) from January 1972 to January 1974.