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REPORT TO THE CONGRESS



BY THE COMPTROLLER GENERAL OF THE UNITED STATES

UNITED STATES GENERAL ACCOUNTING OFFICE

JUL 7 1976



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Economies Available Through Consolidating Or Collocating Government Land-Based, High Frequency Communications Facilities

Office of Telecommunications Policy
Departments of Defense and Transportation

Various U.S. Government organizations operate and maintain communications stations whose functions include high frequency communications service. Some Government-owned, high frequency radio facilities have been consolidated or collocated resulting in savings to the Government. Although efforts within some organizations are continuing, the potential for further Government-wide savings exists.

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

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

This report discusses the economies available through consolidating or collocating Government land-based, high frequency communications facilities.

This review examines the potential for consolidating or collocating Government facilities because various Government organizations separately operate high frequency communications facilities in geographical proximity to each other throughout the world.

Our review was made 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 Directors of the Office of Telecommunications Policy and Office of Management and Budget; the Secretaries of Commerce, Defense, and Transportation; the Secretaries of the Army, Navy, and Air Force; the Chairman, Federal Communications Commission; and the Administrator, Energy Research and Development Administration.

A handwritten signature in black ink, reading "James A. Stacks".

Comptroller General
of the United States

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ABBREVIATIONS

DCS	Defense Communications System
DOD	Department of Defense
FAA	Federal Aviation Administration
GAO	General Accounting Office
HF	High Frequency
MEP	Management Engineering Plan
NCS	National Communications System
OTP	Office of Telecommunications Policy
SPP	Subsystem Project Plan

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

ECONOMIES AVAILABLE THROUGH
CONSOLIDATING OR COLLOCATING
GOVERNMENT LAND-BASED,
HIGH FREQUENCY COMMUNICATIONS
FACILITIES
Office of Telecommunications
Policy
Departments of Defense and
Transportation

D I G E S T

Various U.S. Government military and civilian agencies operate and maintain communications stations throughout the world. Some of these stations provide high frequency service--long-distance communications with aircraft in flight, with ships at sea, and between land-based stations.

The total number of stations providing high frequency service and their operating costs were not readily available. However, the estimated annual operating costs for 38 stations, whose functions include high frequency service, operated and maintained by the Air Force, Navy, Coast Guard, and Federal Aviation Administration exceeded \$45 million. (See pp. 3 and 4.)

The Office of Telecommunications Policy has established a Government-wide, communications-planning process broken down by functional areas. However, this does not specifically address high frequency planning or how high frequency is used in each of the functional areas. GAO believes that the Office should provide guidance and a plan for managing high frequency facilities on a Government-wide basis. (See pp. 17 and 18.)

Communications satellites are being used increasingly in lieu of high frequency as the primary means for long-distance communications. Government officials indicate that high frequency radio stations most likely will be retained in a backup role for emergencies. Planning for future use of high frequency service is in a state of flux. (See p. 17.)

Sometimes various Government agencies operate and maintain high frequency stations within the same geographical area. Such concentrations provide a potential for Government-wide consolidations or collocations to achieve savings. GAO recognizes that, in planning such consolidations or collocations, each station's communications requirements must be considered. (See ch. 4.)

Some intraorganizational and interorganizational Government-owned, high frequency facilities have been consolidated or collocated and savings have been achieved. Some efforts within organizations are continuing, but the potential for further Government-wide consolidation or collocation still exists. (See pp. 6 to 8 and 14 and 15.)

Some plans used in consolidating or collocating high frequency facilities contained mathematical errors, inaccurate and inadequate supporting documentation, and showed a lack of coordination. It is possible that inaccurate, misleading information and poor coordination has resulted in poor decisions. (See ch. 3.)

The Departments of Defense and Transportation and the Office of Telecommunications Policy agreed in principle with GAO's position. The Office stated that the objectives could be achieved by the Office's review of agency plans and assessment of agency performance. The Department of Defense stated that the National Communications System staff might be a more appropriate entity than the Office to lead the effort. (See app. I, II, and III.)

GAO believes that the Office, as the Government-wide communications policy entity, should develop the plan and guidance because its leadership would be more acceptable to all agencies concerned. (See p. 20.)

GAO recommends that the Director, Office of Telecommunications Policy:

- Provide guidance and initiate and coordinate a plan, in conjunction with

all Government high frequency users,
for consolidating or collocating high
frequency facilities worldwide where
operationally and economically feasible.

--Stress the need for accuracy, complete-
ness, and appropriate supporting docu-
mentation in planning efforts. (See
p. 21.)

CHAPTER 1

INTRODUCTION

High frequency (HF) radio uses that part of the radio frequency spectrum (range of frequencies) with transmission characteristics permitting communications over long distances. HF radio is used for such purposes as overseas radio telephone circuits, air traffic control, and maritime communications on a worldwide basis.

RADIO FREQUENCY

Radio frequency is measured by the number of radio waves (cycles) per second, commonly referred to as hertz (Hz). Multiples of these radio frequencies are expressed as follows.

--1,000 Hz = 1 kilohertz (kHz).

--1,000,000 Hz = 1 megahertz (MHz).

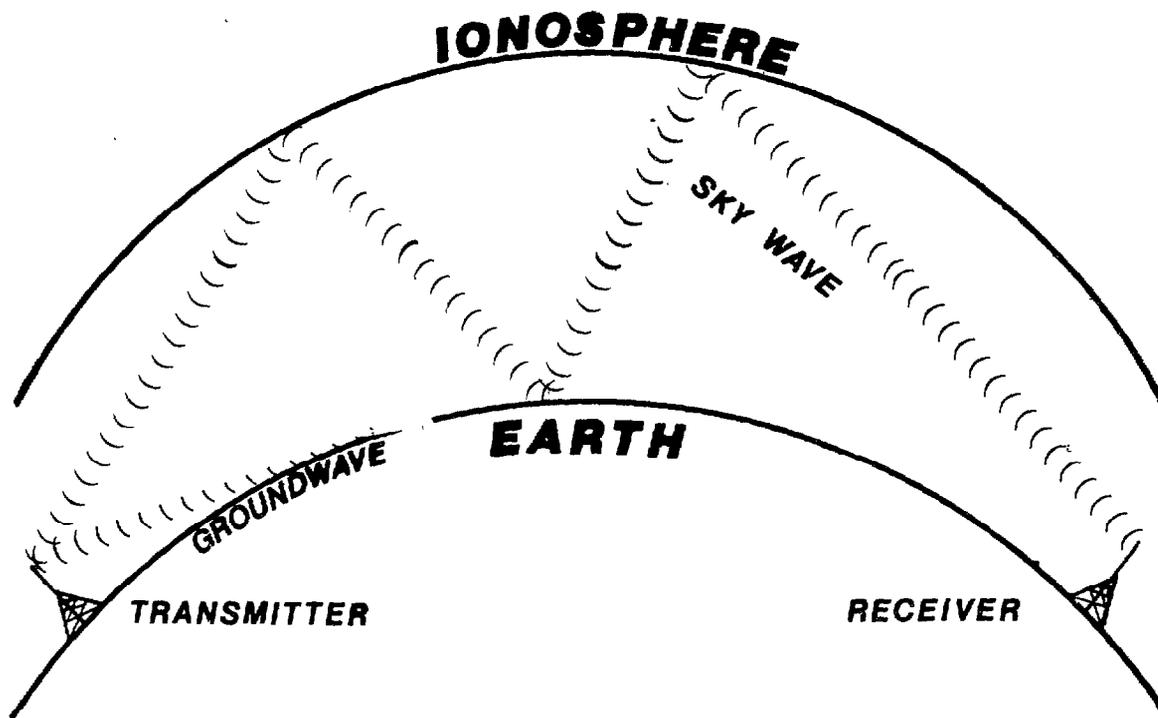
--1,000,000,000 Hz = 1 gigahertz (GHz).

--1,000,000,000,000 Hz = 1 terahertz (THz).

The frequency range of 3 to 30 MHz is designated as HF.

HF RADIO TRANSMISSION

HF radio transmissions travel as groundwaves and skywaves. The groundwaves tend to fade out at short distances whereas the skywaves are reflected one or more times from the ionosphere--that part of the Earth's atmosphere containing free electrically charged particles--whose density varies with time of day, season, and solar activity. Knowledge of the effects from the ionospheric variations is necessary for efficient and economical HF radio operations. Several organizations throughout the world prepare forecasts available to users on ionospheric disturbances.



FREQUENCY ASSIGNMENTS

In allocating and assigning radio frequencies, efforts are made to achieve efficient use of limited spectrum space; therefore, the same frequencies are assigned many times around the world. Due to this multiple assignment of the same frequencies and the HF transmission characteristics, there is the possibility of interference among users. To avoid such interference, frequency management is guided by international and national agreements.

Each national government authorizes the use of frequencies in accordance with plans cooperatively developed by the International Telecommunications Union and its 145 members. Under this plan the assignment of frequencies in the HF spectrum by each nation is reported to the International Frequency Registration Board in Geneva, Switzerland, an agency of the International Telecommunications Union. The Federal Communications Commission does the reporting for the United States.

Frequency assignment and use in the United States and its territories by non-Government and Government users is regulated by the Federal Communications Commission and the Office of Telecommunications Policy, respectively. 60

LAND-BASED HF RADIO STATIONS

Land-based HF radio stations 1/ are located worldwide to provide long-distance, two-way communications links and broadcast communications supporting civil and military aircraft in flight, ships at sea, and between land-based stations.

HF radio stations operate on one or more frequencies. The number of frequencies assigned to each station depends on the number of missions it supports, such as air traffic control, maritime operations, or command and control.

Basically, land-based HF radio stations are either "split site" or "transceiver site" operations.

A split site, which is normally a major station, consists of (1) a communications relay center--location where transmission, receipt, and delivery of messages is done; (2) a technical control facility--location where technical performance of communications signals between terminals is monitored; (3) a transmitter facility--location where the transmitter radios and antennas are sited; and (4) a receiver facility--location where the receiver radios and antennas are sited. The transmitter and receiver facilities are normally separated by about 10 to 20 miles to reduce signal interference; however, these sites are interconnected to the relay center and control facility by cable or microwave equipment.

A transceiver site consists of a radio that can alternately transmit or receive using a dual-purpose antenna. Equipment is normally situated at a single location.

ORGANIZATIONAL RESPONSIBILITIES

Various U.S. Government agencies operate and maintain
5,6 HF land-based radio stations worldwide. The Navy, Air 1, 35
7,8 Force, Federal Aviation Administration (FAA), and Coast 30, 164

1/For the purposes of this report, HF radio station refers to the equipment--such as transmitter, receiver, and associated antenna--and personnel necessary to provide HF communications.

Guard operate and maintain over 50 communications stations whose various functions include HF services. The estimated annual operating costs for 38 of these stations exceeds \$45 million. The total number of HF stations and their operating costs were not readily available.

4 The Army has essentially phased out its use of HF stations at fixed locations. However, the Army does maintain an HF network for special ammunition storage sites in Europe and Korea.

The Navy operates and maintains about 25 naval communications stations worldwide. These communications stations operate under the Naval Telecommunications Command. Their purpose is to manage, operate, and maintain facilities, systems, and equipment necessary to provide communications (including HF) for the command, operational control, and administration of the naval establishment. For seven of these stations the fiscal year 1974 operating and maintenance costs were \$20.8 million.

The Air Force Communications Service operates and maintains 16 aeronautical stations worldwide. The purpose of aeronautical stations is to provide two-way communications (including HF) primarily between military aircraft and ground stations supporting air traffic control, command and control, and special purpose communications requirements. Annual operation and maintenance costs for these stations are estimated at \$18.1 million. In addition, other major Air Force commands--Strategic Air Command, Pacific Air Forces, U.S. Air Forces in Europe--manage HF radio stations to provide communications for command and control.

FAA is responsible for controlling air traffic in the United States, in territories and possessions, and over the adjacent waters. FAA's HF radio stations are used to provide communications for air traffic control, broadcast and exchange of meteorological information, and forwarding general communications from aircraft. FAA operates and maintains nine such HF radio stations and purchases additional HF communications services at five locations from Aeronautical Radio Incorporated--an organization established to provide communications for commercial airlines. Estimated annual charges to maintenance costs 1/ (operational costs not readily available) for the nine HF radio stations are \$1.8 million. Aeronautical Radio Incorporated charges are:

1/FAA maintenance costs include maintenance personnel salaries, power, ground and plant maintenance, and logistic support.

<u>Fiscal Year</u>	<u>Messages Processed</u>	<u>Cost per Message</u>	<u>Total</u>
74	357,413	\$3.25	\$1,161,592
75	346,771	\$3.25	\$1,127,005
76 (estimated)	468,540	\$4.41	\$2,066,261

The Coast Guard operates and maintains 6 major HF radio stations and offers communications service to 18 Government agencies. They have configured their communications system for (1) command and control of Coast Guard forces; (2) satisfying the maritime community's needs; (3) compatibility with the Navy; and (4) supporting other Government agencies, such as the National Oceanic and Atmospheric Administration, National Weather Service, and Military Sealift Command. Operational and maintenance costs for the six HF radio stations were \$4.8 million in fiscal year 1975. The Department of Commerce (National Weather Service), the Federal Communications Commission, and the Energy Research and Development Administration (formerly Atomic Energy Commission) also operate HF radio stations.

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CHAPTER 2

BENEFITS OF CONSOLIDATING OR COLLOCATING

HF RADIO STATIONS HAVE BEEN RECOGNIZED

Government organizations involved have recognized the benefits of consolidating 1/ or collocating 2/ HF radio stations. Some consolidations or collocations have been achieved, resulting in savings on both an intraorganizational and interorganizational basis. However, better planning of proposed consolidations and collocations is needed and further opportunities for such actions exist.

Where two or more Government-owned, HF stations are in close geographical proximity or where separate facilities can be controlled from a central location, it is possible to achieve savings through consolidating or collocating such stations--radio frequency assignments and other operating considerations permitting. Thus, one station may be able to absorb the entire function of a second station with a saving of most costs of operating and maintaining the second station. Or it may be feasible to consolidate only parts of the station, such as the transmitter facilities, the receiver facilities, or the relay center function.

In some situations it may be feasible to only collocate the facilities or part of the facilities of two or more stations. Thus, collocated facilities could result in savings from use of consolidated support services, such as security, medical, and food service. Government organizations involved have recognized the benefits of consolidation or collocation.

CONSOLIDATION OR COLLOCATION WITHIN INDIVIDUAL GOVERNMENT ORGANIZATIONS

Various organizations within the Departments of Defense (DOD) and Transportation started internal HF radio station consolidation or collocation programs before or during our

1/Consolidation--providing personnel and equipment at one site, under a single manager, to perform the operations previously conducted at two or more sites.

2/Collocation--placing personnel and facilities side-by-side at a common location under separate management organizations.

review. Some of these programs have achieved savings to the Government.

The Commander, Naval Telecommunications Command, established a task group in 1973 to assess proposed realignment (including consolidation and/or collocation) actions scheduled through fiscal year 1975 and to assist the Command's consultant in developing plans for realignment of naval telecommunications beyond 1975. Delays in this program have been encountered due to the slippage 1/ of the fleet satellite program, foreign political reasons, and testing of Navy facilities in the Pacific.

At the time we started our review of HF radio stations, Air Force officials stated that there was no ongoing program for consolidating or collocating its HF radio stations. We advised the Air Force that there appeared to be potential for some consolidation or collocation of such stations. Subsequently, the Air Force Chief of Staff directed the Air Force Communications Service to develop specific plans for consolidating or collocating HF radio stations wherever feasible.

The Air Force's initial efforts in 1975 resulted in eliminating the four stations of the Tactical Air Command's HF Command and Control Network (Coronet Claymore) and consolidating their operational requirements into the Air Force Communications Service's Aeronautical Stations. 2/ This consolidation provided the Tactical Air Command with a capability to control their aircraft worldwide. According to the Air Force, this consolidation saves \$672,000 annually in personnel and utility costs. Further Air Force efforts are in progress to consolidate or collocate HF radio stations of the various Air Force commands located worldwide.

Coast Guard officials stated that they have continuous programs to upgrade, consolidate, or eliminate HF radio stations that would improve their communications services. For example, in 1976 the Coast Guard completed consolidation of HF radio stations on the east coast of the United States. The incurred implementation costs for this consolidation

1/According to present estimates the scheduled launch date has slipped about 2 years.

2/See page 4 for description of Air Force Communications Service's Aeronautical Stations.

amounted to \$4.7 million less than the costs estimated to upgrade the HF radio stations if consolidation had not been accomplished. The annual savings from this HF consolidation could not be readily identified due to Coast Guard accounting procedures.

The Coast Guard is presently reviewing its communications stations in Alaska and the Caribbean for potential consolidation or elimination. Also, the Coast Guard has been assigned responsibility for coordinating the planning efforts of the Government Maritime Communications Working Group to consolidate HF resources required for (1) broadcasting marine weather information and (2) supporting Military Sealift Command and U.S. Navy high-frequency, continuous-wave requirements.

Federal Aviation Administration officials said that they are continuously conducting programs to reduce or eliminate their HF radio stations. Presently, FAA is planning to reduce service at three HF radio stations and eliminate three other stations because, in its opinion, operational requirements either are nonexistent or can be fulfilled by other means.

CONSOLIDATION OR COLLOCATION BETWEEN INDIVIDUAL GOVERNMENT ORGANIZATIONS

Within DOD, the Navy and the Air Force have collocated some of their HF receiver facilities on Hawaii and collocation is taking place on Guam.

Some interdepartmental consolidation or collocation has also been achieved. The Navy and the Coast Guard have consolidated or collocated their HF facilities in Alaska (Adak), Virginia (Portsmouth), and on Guam and Hawaii. Also, the Air Force Space and Missile Test Center's HF transmitter and receiver facilities are consolidated with FAA in Hawaii.

Nevertheless, improvement in consolidation and collocation planning is needed (see ch. 3) and further opportunities exist (see ch. 4).

CHAPTER 3
NEED FOR IMPROVING CONSOLIDATION
OR COLLOCATION PLANS
WITHIN DOD

The Department of Defense conducted worldwide studies which resulted in plans for consolidating or collocating HF radio stations in selected geographical areas. These plans were inaccurately prepared, contained information which could have been misleading, and were poorly coordinated. In addition, the plans for Oahu and Guam did not include all HF facilities; therefore, total potential savings were not addressed.

In 1968 the Secretary of Defense directed that a comprehensive worldwide study be conducted of the Defense Communications System (DCS) and non-DCS HF communications facilities. As a result, a study group was established in 1969 to consider all DOD's fixed (nonmobile) HF radio stations. The group concluded that savings were available by consolidating or collocating some HF radio stations. Accordingly, the Deputy Secretary of Defense requested that a number of actions be carried out to accomplish the phaseout and the consolidating or collocating of certain HF radio stations worldwide. Included were the DOD HF radio facilities on Hawaii and Guam.

In 1970 the Joint Chiefs of Staff directed the Chief of Naval Operations, in cooperation with the Air Force and Marine Corps, to develop plans for consolidating or collocating DOD's HF radio stations in Hawaii (Oahu) and Guam. The Navy's plans were identified as Management Engineering Plan (MEP) 1-71 for Oahu and MEP 2-71 for Guam. These plans only addressed the Naval Communications Station, the Marine Corps Air Station, and the Air Force Aeronautical Station, on Oahu and the Naval Communications Station and the Air Force Aeronautical Station on Guam. Other stations on these islands were not considered. (See p. 12.)

Consolidation and collocation alternatives for transmitters and receivers were presented in each plan. Although both plans indicated that savings could be realized under each of various alternative configurations, the Chief of Naval Operations recommended that implementation be deferred pending the development of the fleet satellite program (first launch is estimated to be in late 1977) which was expected to reduce HF facility requirements.

Subsequently, DOD realized that the fleet satellite program would not have a significant effect on HF receiving facilities, but recognized with the exception of certain Marine Corps facilities it would affect transmitting facilities. The Navy, in 1972, was requested to submit Subsystem Project Plan (SPP) 2-73 and SPP 3-73 for Oahu and Guam, respectively. The SPP for Oahu considered four alternatives developed under the MEP. These alternatives were consolidating Marine Corps transmitters and receivers at the Naval Communications Station and consolidating and collocating Air Force receivers at the Naval Communications Station. The Guam SPP only considered those alternatives developed under the MEP that addressed either consolidating or collocating Air Force receivers at the Naval Communications Station.

The MEPs and SPPs for both Hawaii and Guam contained inaccurate and misleading information and were inadequately coordinated. DOD could not locate some supporting records used to develop these plans. Also, DOD personnel could not explain some of the inaccurate and misleading information. In reviewing the information contained in the plans we found (1) inconsistencies in the number of personnel used in the economic analysis, (2) inaccurate implementation costs, and (3) a lack of Navy and Air Force coordination to implement collocation of their receiver facilities on Guam.

In both plans for Oahu (MEP 1-71 and SPP 2-73) the alternative for consolidating Air Force and Marine Corps receivers at the Naval Communications Station indicated a need for 16 additional Navy personnel to support the consolidated operation. At the time of the MEP, the Air Force and Marine Corps had 35 people doing tasks which were to be absorbed by the Navy's 16 additional people. At the time of the SPP, the Air Force and Marine Corps only had 20 people because certain tasks had been eliminated. However, the Navy still estimated a need for 16 additional people. It seems apparent that the estimated savings were erroneously understated since the reduced tasks to be absorbed also should have been reflected in reduced Navy personnel requirements.

Another alternative identified in SPP 2-73 (Oahu) (consolidation of Marine Corps receivers and collocation of Air Force receivers at the Naval Communications Station) proposed an Air Force reduction of 12 persons. However, during this period the Air Force authorization documents

identified no more than 10 positions. Thus, the computed savings for personnel appear to be overstated.

Implementation costs projected in the Oahu MEP 1-71 for the alternative to consolidate Air Force and Marine Corps HF receivers at the Naval Communications Station and the alternative to consolidate Marine Corps receivers and collocate Air Force receivers at the Naval Communications Station were each shown to be \$736,000. The implementation costs for the same alternatives in SPP 2-73 were each shown to be \$528,000. According to the Navy's plans, the implementation costs for SPP 2-73 were computed by deleting the operation and maintenance costs (\$38,000) for the Kwajelein and Eniwetok DCS HF circuits from the MEP implementation costs (\$736,000), leaving \$698,000, and increasing this amount by a factor of 12 percent. Obviously, this does not compute to \$528,000 and documentation was not available to determine implementation costs. Further, it does not seem logical that the implementation costs for consolidation would be the same as implementation costs for collocation. The alternative to consolidate Marine Corps receivers and collocate Air Force receivers at the Naval Communications Station was selected for implementation. However, due to the erroneous computation, the net cost benefits of the alternatives were not accurately estimated and DOD may have been misled in making this decision.

Marine Corps requirements to consolidate its HF receivers at the Naval Communications Station on Oahu specified six receivers. However, in MEP 1-71 and SPP 2-73 the Navy proposed 15 receivers--relocate 7 from the Marine Corps Air Station to the Naval Communications Station and purchase 8 additional receivers--to support Marine Corps requirements. Although consolidation of Marine Corps receivers at the Naval Communications Station was implemented, it appears that the Navy proposed more HF receivers than necessary; therefore, the implementation costs were erroneously overstated and an accurate economic analysis was not projected.

There was poor coordination between the Navy and Air Force for collocating the Air Force receiver facility at the Naval Communications Station on Guam. Navy plans MEP 2-71 and SPP 3-73 showed that existing Navy receiver antennas could meet both Navy and Air Force requirements and no additional receiver antennas would be required. In December 1974 the Air Force submitted its collocation plan to the Navy and the Navy concurred with the plan. However, in February 1975 the Air Force implementation survey disclosed that one Air Force requirement could not be satisfied. On the basis of its previous successful

experience, the Air Force believed that this requirement could be satisfied by the modification of one antenna and requested such modification. The Navy refused on the basis of its previous unsuccessful modification attempts. As a result of this poor coordination, the collocation is still in progress and the Air Force is planning to provide a suitable antenna at a cost of at least \$50,000.

Not all HF facilities on Oahu and Guam were considered in the plans. For example, the plans excluded (1) facilities consisting of only HF transceiver equipment, (2) the Air Force Space and Missile Test Center's HF transmitting and receiving facilities which are consolidated with FAA HF facilities in Hawaii, and (3) FAA's HF facilities on Guam. Therefore, the total savings obtainable through consolidating or collocating Government HF facilities on Oahu and Guam were not addressed or achieved.

It is possible that inaccurate, misleading information and lack of adequate coordination, as illustrated above, has resulted in poor decisions.

CHAPTER 4
FURTHER CONSOLIDATION OR COLLOCATION
OF HF FACILITIES
SHOULD BE ADDRESSED UNDER
CENTRALIZED MANAGEMENT

Although there have been some reductions in the number of separately operated HF stations, the Government continues to operate concentrations of such facilities in some geographical areas. Efforts to consolidate or collocate these facilities should be continued to achieve present and future benefits to the Government. Such efforts have not been addressed under the Government-wide communications planning program the Office of Telecommunications Policy initiated in 1973.

GEOGRAPHICAL CONCENTRATIONS
OF GOVERNMENT HF FACILITIES

Geographical concentrations of separately operated and maintained HF facilities provide a potential for further consolidations or collocations within the Government.

Various Government organizations continue to operate and maintain HF facilities worldwide. We did not attempt to identify the locations of all such facilities. However, during this review we identified the following geographical concentrations of Government operated and maintained HF facilities.

<u>Location</u>	<u>Stations with HF facilities</u>
Alaska	Naval Communications Station, Adak Air Force Aeronautical Station, Elmendorf AFB Coast Guard Communications Station, Adak (collocated at the Naval Communications Station) Coast Guard Communications Station, Kodiak FAA's HF radio stations, Anchorage and Cold Bay

<u>Location</u>	<u>Stations with HF facilities</u>
California	Naval Communications Station, San Francisco Air Force Aeronautical Station, McClellan AFB Coast Guard Communications Station, San Francisco FAA's HF radio station, Oakland
Guam	Naval Communications Station Air Force Aeronautical Station (receiver facilities are to be collocated at the Naval Communications Station--see p. 8) and the collocated Pacific Air Forces' transceiver facilities Coast Guard Communications Station (collocated at the Naval Communications Station) Strategic Air Command's transceiver site FAA's HF radio station
Hawaii	Naval Communications Station Air Force Aeronautical Station (receiver facilities are collocated at the Naval Communications Station --see p. 8.) Coast Guard Communications Station (collocated at the Naval Communications Station) Pacific Air Forces' transceiver site Strategic Air Command's transceiver site FAA's weather stations and consolidated transmitting and receiving facilities which support the Air Force Space and Missile Test Center
Maryland/Virginia	Air Force Aeronautical Station, Andrews AFB, MD. Naval Communications Station, Norfolk, VA. Coast Guard Communications Station, Portsmouth, VA (Receiver facilities are collocated at the Naval Communications Station.)

<u>Location</u>	<u>Stations with HF facilities</u>
Panama Canal Zone	Naval Communications Station Air Force Aeronautical Station FAA's HF radio station
Philippine Islands	Naval Communications Station Air Force Aeronautical Station Pacific Air Forces' transceiver site

These concentrations of Government facilities indicate potential consolidations or collocations. Also, such potential can be evidenced by the fact that some of the above facilities were considered as candidates for consolidations or collocations but were never pursued for various reasons. Considerations included (1) consolidating or collocating the Air Force Aeronautical Station transmitter facilities with the Naval Communications Stations in Hawaii and on Guam, (2) consolidating or collocating the Federal Aviation Administration's HF radio station with Naval Communications Station on Guam, and (3) having the Air Force assume FAA's air traffic control functions, including HF communications on Guam.

The Navy's plans for Hawaii and Guam (see pp. 9 and 10) considered consolidating or collocating the Air Force Aeronautical Stations' transmitter facilities into or with the Naval Communications Stations' transmitter facilities. These plans showed that the implementation costs for consolidation or collocation could be recovered through operating cost savings over several years. However, the Navy did not submit any recommendations due to the pending development of the fleet satellite program and the Department of Defense has not directed the Navy to further study consolidating or collocating these transmitter facilities. We were told that formal plans to evaluate the impact of satellites on HF facilities (planned use of HF facilities during transitional phase, deletion of HF facilities, or retention of HF facilities as backup emergency communications facilities) could not be developed until the Fleet Satellite Program became operational.

As early as 1966, the Navy proposed consolidating Navy and FAA HF facilities on Guam. At that time, FAA rejected the proposal because it was uneconomical and failed to enhance efficiency. Again in 1970, the Navy proposed that savings in operating and maintenance costs might be realized through some consolidation of military and FAA HF

facilities on Guam. FAA rejected the Navy's proposal for consolidation as not being in the best interests of FAA in fulfilling its operational commitments. However, FAA was willing to consider collocation to avoid constructing a new building for its HF transmitters. However, due to a delay in completing the study for Navy and Air Force consolidation or collocation of HF facilities on Guam and the deteriorating conditions of FAA's transmitter building, FAA terminated further consideration for collocation. Ultimately, FAA moved to other Government buildings.

Early in 1970 the Air Force proposed to FAA that the Air Force assume responsibility for air traffic control functions, including the HF communications, performed by FAA on Guam. FAA rejected this proposal on the basis of (1) the potential degradation of service resulting from Air Force personnel turnover and insufficient training to meet FAA standards and (2) FAA's planned program to conduct the Guam air traffic control responsibilities from Hawaii. FAA officials stated that, although air traffic control would be conducted from Hawaii, the HF radio station on Guam would remain operational with FAA personnel.

WHY CONTINUED CONSOLIDATION OR COLLOCATION EFFORTS ARE NEEDED

There is a continuing need to pursue consolidating or collocating Government HF facilities, at least where geographical concentrations exist, because of the potential savings to the Government, similarity of services provided through HF facilities, need for communications compatibility in wartime or emergency conditions, and the future role of HF communications.

Consolidating HF facilities within the Air Force and Coast Guard have resulted in savings to the Government. For example, the Air Force reduced its operating costs and the Coast Guard avoided costs that would have been required to modernize its HF facilities. (See pp. 7 and 8.)

Military and civilian operated HF stations located in the same geographical area provide similar HF services. The International Civil Aviation Organization requires the reporting of air traffic control information--such as position reports and route and altitude changes--to the responsible air traffic control center and forwarding of such information into the worldwide Aeronautical Fixed Telecommunications Network for international dissemination. For aircraft

in flight, these requirements are fulfilled by relaying the information through radio operators in the Air Force Aeronautical Stations and FAA's HF radio stations or Aeronautical Radio Incorporated HF Stations, which operate on separately assigned frequencies. For example, the Air Force Aeronautical Station, Elmendorf AFB, Alaska, and FAA's HF radio station, Anchorage, Alaska, support military and civilian aircraft flying over the northern Pacific Ocean by relaying the air traffic control information they receive from the aircraft to FAA's air traffic control center in Anchorage and into the Aeronautical Fixed Telecommunications Network. Although international regulations require operation of both military- and civilian-assigned frequencies, we found no indication that such frequencies could not be operated in consolidated or collocated facilities.

There is a need for communication compatibility in wartime or national emergency conditions. For example, the Coast Guard operates under the Navy during wartime. Presently the Navy and Coast Guard operate their own HF facilities at some separate locations to serve maritime operations and for exercising command and control over their own forces. To assure that effective communications would be available during wartime or national emergencies, the Coast Guard recognizes that it must maintain compatibility with Navy communications techniques and equipment. Such compatibility can be more readily maintained where HF facilities are consolidated or collocated.

In the future, Government organizations are planning to use satellites for the long-distance communications presently being provided through HF radio stations. Government officials indicate that when satellites become the primary means used for long-distance communications, HF radio stations will most likely be retained in a backup role for emergency purposes. For these HF radio stations retained for primary or backup, long-distance communications in their present or reduced capacity, the Government's interests--maintaining operable equipment and career personnel to provide effective communications--would appear to be best served through consolidating or collocating such facilities as may be consistent with mission requirements.

HF COMMUNICATIONS NOT
ADDRESSED GOVERNMENT WIDE

Government-wide planning that was established to maximize benefits within the Government has not addressed HF communications or facilities.

The only centralized management over Government-wide, HF facilities noted during our review was OTP's October 1973 issuance of Circular Number 12 which set forth policies and procedures for a coordinated Government communications planning program. The objectives established for this program were to (1) promote more effective use of technology, resources, and services; (2) permit better evaluation of existing and planned facilities; (3) help achieve optimum coordination, compatibility, and resource sharing; and (4) promote economy within the Government. To accomplish this Government planning, the circular divided communications into five areas--national security, transportation, environment, law enforcement, and common-user.

Each of these areas involves HF communications. Therefore, any HF communications planning within these areas should be accomplished on a Government-wide basis and coordinated among the agencies responsible for each area to insure that no unnecessary duplication exists.

OTP officials stated that HF communications have not been specifically addressed in the Government-wide communications planning efforts.

CHAPTER 5

AGENCY COMMENTS AND OUR EVALUATION

We discussed our findings with and requested comments on our proposed report from the Department of Transportation, the Office of Telecommunications Policy, and the Department of Defense. We proposed that OTP provide guidance and initiate and coordinate a plan, in conjunction with all government HF users, for consolidating or collocating HF stations where feasible. Also, we proposed that the guidance stress the need for accuracy, completeness, and appropriate supporting documentation in planning efforts.

The Assistant Secretary for Administration, Department of Transportation, stated that the Department concurred in principle with our report. (See app. I.) He stated that studies have been made on possible economies to be achieved by consolidating HF facilities and the subject is under continual review as operational requirements change. He also stated that in many instances HF operations are not the sole mission of a station, and the total mission must be considered in evaluating the consolidation of facilities. The Department of Transportation also suggested a number of changes or additions to facts and statements made in our proposed report. Where appropriate, such changes and additions have been incorporated in this final report.

We recognize the HF planning efforts being conducted within the Department of Transportation (see p. 8); however, we believe these efforts and future studies should be conducted on a much broader scale internally and externally to achieve maximum economic benefits to the Government.

We recognize also that HF operations are not the sole mission of a station, but we believe that such HF facilities, in many instances, could be consolidated or collocated without affecting the stations' missions.

The Acting Assistant Director for Government Communications, OTP, agreed that there may be opportunities for further consolidation of HF facilities and said OTP will provide guidance and initiate efforts to improve planning for consolidations or collocations. He believes that with additional emphasis on the considerable efforts already underway through periodic reviews of agencies' plans and periodic progress assessment, OTP can achieve our purpose. (See app. II.)

We doubt that OTP's increased surveillance of individual agency efforts will achieve our purpose. We believe there is a need for OTP to establish Government-wide policy and planning for consolidating and collocating HF facilities considering other communications problems, such as the transition to satellites and the lack of coordination within and among Government agencies.

The Director, Telecommunications and Command and Control Systems, said that DOD concurred in general with our conclusion that all HF facilities in a geographical area should be considered for consolidation or collocation regardless of department affiliation. He said that this is subject to a case-by-case study of operational requirements of the HF facilities and their interrelationship from a total communications system standpoint. He added that DOD is keenly interested in reducing operational costs wherever practicable. He stated that although DOD had no objection to having OTP take the lead in this matter, DOD believed that the National Communications System (NCS) might be a more appropriate entity. The NCS was established in 1963 to coordinate communications planning of the Federal Government, but OTP's Circular No. 12 has placed some limits on the scope of NCS planning. He also stated that the existing DOD directives and guidance were adequate for planning and documentation efforts, that any prior problems had been a matter of individual application, and that this matter would receive much greater effort in the future. (See app. III.)

We agree that operational requirements of HF facilities and their interrelationships from a total system standpoint must be considered on a case-by-case basis. Concerning the NCS being more appropriate than OTP as the lead entity, we believe that OTP, as the Government-wide communications policy organization, should develop the proposed plan and guidance. We believe this would be more acceptable to all Government agencies than would directives from NCS because DOD manages the NCS, controls most of its assets, and thus dominates it. DOD directives and guidance are constructive efforts to improve in this area; however, we believe that planning could be improved if thorough economic analyses were required in each case.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Benefits to the Government have already been achieved through consolidating or collocating Government-owned HF facilities, and such programs are being continued on a limited scale. However, we believe that there is need for improvement in the planning process and the documentation thereof, particularly within the Department of Defense, to insure that the best decisions are made.

We also believe that greater benefits to the Government are available through interdepartmental planning on a Government-wide basis. The Office of Telecommunications Policy's Circular No. 12 establishes procedures and objectives for such centralized planning. We agree with the OTP objectives but believe that consolidating or collocating HF stations should be specifically addressed as a subject of Government-wide planning.

We recognize that the HF radio situation is in a state of flux because of the transition to satellites for future long-distance communications. Inasmuch as HF radio facilities will most likely be retained for backup emergency purposes, the Government's interest could be best served by consolidating or collocating these HF facilities. Although it may not be feasible to consolidate or collocate HF facilities in every case, we believe that all HF facilities concentrated in a geographic area should be considered regardless of future use or departmental affiliation to attain optimum benefits to the Government.

RECOMMENDATIONS

We recommend that the Director, OTP, provide guidance, and initiate and coordinate a plan in conjunction with all Government HF users, for consolidating or collocating HF facilities worldwide where operationally and economically feasible.

We further recommend that such guidance stress the need for accuracy, completeness, and appropriate supporting documentation in planning efforts.

CHAPTER 7

SCOPE OF REVIEW

Management responsibility for land-based HF radio stations and their operating networks is vested in various Government agencies. Our efforts were directed toward those land-based HF radio stations that had potential for consolidation or collocation. The stations were operated by the Department of Defense--Navy, Air Force, and Marine Corps--and the Department of Transportation--Federal Aviation Administration and Coast Guard. Our review was conducted at:

- The Naval Telecommunications Command, Washington, D.C.
- Air Force Communications Service, Richards-Gebaur AFB, Missouri.
- Strategic Air Command, Offutt AFB, Nebraska.
- U.S. civil and military agencies in Hawaii, Guam, and Japan.
- U.S. military agencies in Europe.
- Department of Transportation, Washington, D.C.



OFFICE OF THE SECRETARY OF TRANSPORTATION

WASHINGTON, D.C. 20590

ASSISTANT SECRETARY
FOR ADMINISTRATION

April 9, 1976

Mr. Henry Eschwege
 Director
 Resources and Economic Development
 Division
 U. S. General Accounting Office
 Washington, D. C. 20548

Dear Mr. Eschwege:

This is in response to your letter of February 9, 1976, requesting our comments on the General Accounting Office's (GAO) draft report on consolidation or collocation of Government land based high frequency (HF) communication facilities.

The report states that benefits to the Government have already been achieved through the consolidation or collocation of Government-owned HF facilities, and that such programs are being continued by some departments. The GAO believes that greater benefits are available through interdepartmental planning on a Government-wide basis. The GAO recommends that (1) the Office of Telecommunications Policy provide guidance and initiate and coordinate a plan, in conjunction with all Government HF users, for consolidation or collocation of HF stations where feasible, and (2) such guidance should stress the need for accuracy, completeness, and appropriate supporting documentation in planning efforts.

The Department of Transportation concurs in principle with the conclusions and recommendations of the report. However, we do wish to point out that in several instances there are implications that the Department has not diligently pursued possible facility consolidations. In all cases, studies have been made and are continuing to be made on possible economies to be achieved by consolidation of HF facilities. For some facilities, studies were discontinued when the point was reached where it was found that the disadvantages outweighed the advantages. However, the subject is under continual review as operational requirements change. It should also be noted that in many cases HF operations are not the sole mission of a station, and its total mission must be considered in evaluating the consolidation of facilities.

I have enclosed two copies of the Department's reply. (See GAO note below.)

Sincerely,

A handwritten signature in black ink, which appears to read "William S. Heffelfinger".

William S. Heffelfinger

Enclosure
 (two copies)

GAO note: Enclosure omitted because suggested changes, where appropriate, have been incorporated in this report. (See p. 19.)

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

April 20, 1976

ASSISTANT DIRECTOR

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

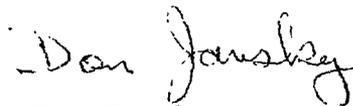
Dear Mr. Shafer:

Thank you for providing an opportunity for us to review and comment on your draft report to the Congress, entitled "Economies Available Through Consolidation or Collocation of Government Land Based High Frequency Communications Facilities." The Office of Telecommunications Policy agrees that there may be opportunities for consolidation of HF radio stations beyond that which has already been effected.

We view the present HF radio situation as being in a state of flux as more emphasis is placed on communication satellites as the primary means for long haul service. Thus, for the present and the foreseeable future, the HF radio situation is in a state of transition, dependent upon the success or failure of other programs. In this context, the planning for the consolidation or collocation of HF sites may be a somewhat narrow aspect of a much larger problem.

In consonance with its responsibilities for telecommunication planning and coordination, OTP will provide guidance and initiate efforts to improve planning for the consolidation or collocation of HF radio stations among the Federal agencies concerned. However, as noted in the GAO report, there are already considerable consolidation and planning efforts underway. We believe that the purpose of the GAO report can be achieved by OTP placing additional emphasis on these efforts through the conduct of periodic reviews of the agencies' plans and periodic assessment of the progress toward consolidation within the affected agencies. Appropriate reporting requirements will be instituted subject to the publication of the GAO report.

Sincerely,



Don Jansky
Acting Assistant Director for
Government Communications

APPENDIX III



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

9 APR 1976

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 February 9, 1976, which forwarded the GAO Draft Report, "Economies Available Through Consolidation or Collocation of Government Land Based High Frequency Communications Facilities," 941064 (OSD Case #4282).

We concur in general with the report and the conclusion that all high frequency stations concentrated in a geographical area should be considered for consolidation or collocation regardless of departmental affiliation to attain optimum benefits to the government. This is subject, however, to a case-by-case study of the operational requirements of the high frequency radio facilities involved and their interrelationships from a total communications system standpoint.

While we have no objection to having the Office of Telecommunications Policy (OTP), Executive Office of the President, take the lead in this case, we believe the National Communications System (NCS) might be a more appropriate organization to accomplish studies aimed at high frequency facility consolidations or collocations. The NCS was established by the President in 1963 to coordinate communications planning of the major Departments and Agencies of the Federal Government. OTP Circular No. 12 has placed some limits on the scope of the NCS' resource planning which is now restricted to DoD, Department of State and the Central Intelligence Agency. Consequently, if the NCS is selected, OTP would have to expand the resource planning responsibilities of the NCS to include all government agencies having significant high frequency radio resources.

With regard to your comments on the need for improved planning and documentation, we believe that the existing DoD directives and guidance are adequate for the purposes and any prior problems in this respect probably have been a matter of individual applications. You can be assured that this aspect will receive much greater attention during the ensuing study effort.

Finally, I wish to emphasize that DoD is keenly interested in reducing operational costs wherever practical and will continue to support programs to identify and implement cost reductions.

Sincerely,


Acting Director

PRINCIPAL OFFICIALS RESPONSIBLEFOR ADMINISTERING ACTIVITIESDISCUSSED IN THIS REPORT

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
<u>DEPARTMENT OF DEFENSE</u>		
SECRETARY OF DEFENSE:		
Donald L. Rumsfeld	Dec. 1975	Present
James R. Schlesinger	June 1973	Nov. 1975
William P. Clements, Jr. (acting)	May 1973	June 1973
Elliot L. Richardson	Jan. 1973	Apr. 1973
Melvin R. Laird	Jan. 1969	Jan. 1973
Clark M. Clifford	Mar. 1968	Jan. 1969
Robert S. McNamara	Jan. 1961	Feb. 1968
OFFICE OF DIRECTOR, TELECOMMUNICATIONS AND COMMAND AND CONTROL SYSTEMS (note a):		
Richard Schriver	Jan. 1976	Present
Thomas C. Reed	Feb. 1974	Jan. 1976
David L. Solomon (acting)	Sept. 1973	Jan. 1974
Dr. Eberhardt Rechtin	Feb. 1972	Sept. 1973
David L. Solomon (acting)	Sept. 1971	Feb. 1972
Louis A. deRosa	May 1970	Sept. 1971
CHAIRMAN, JOINT CHIEFS OF STAFF:		
Gen. George S. Brown, USAF	July 1974	Present
Adm. Thomas H. Moorer, USN	July 1970	July 1974
Gen. Earle G. Wheeler, USA	July 1964	July 1970
SECRETARY OF THE ARMY:		
Martin R. Hoffmann	Nov. 1975	Present
Howard H. Callaway	June 1973	Oct. 1975
Robert F. Froehlke	July 1971	May. 1973
Stanley R. Resor	July 1965	June 1971
SECRETARY OF THE NAVY:		
J. William Middendorf	Apr. 1974	Present
John W. Warner	May 1972	Apr. 1974
John J. Chafee	Jan. 1969	Apr. 1972
Paul R. Ignatius	Sept. 1967	Jan. 1969
Charles F. Baird (acting)	Aug. 1967	Sept. 1967

Tenure of office	
<u>From</u>	<u>To</u>

DEPARTMENT OF DEFENSE (continued)

SECRETARY OF THE NAVY:

Robert H. B. Baldwin (acting)	July 1967	Aug. 1967
Paul H. Nitze	Nov. 1963	June 1967

CHIEF NAVAL OPERATIONS:

Adm. J. L. Holloway, III	July 1974	Present
Adm. Elmo R. Zumwalt, Jr.	July 1970	July 1974
Adm. Thomas H. Moorer	Aug. 1967	June 1970
Adm. David L. McDonald	Aug. 1963	July 1967

COMMANDANT OF THE MARINE CORPS:

Gen. Louis H. Wilson	July 1975	Present
Gen. Robert E. Cushman	Jan. 1972	June 1975
Gen. Leonard H. Chapman	Jan. 1968	Dec. 1971
Gen. Wallace M. Green, Jr.	Jan. 1964	Dec. 1967

SECRETARY OF THE AIR FORCE:

Thomas C. Reed	Jan. 1976	Present
John L. McLucas	July 1973	Dec. 1975
Dr. Robert C. Seamans, Jr.	Jan. 1969	May 1973
Dr. Harold Brown	Oct. 1965	Jan. 1969

CHIEF OF STAFF, AIR FORCE:

Gen. David C. Jones	July 1974	Present
Gen. George S. Brown	Aug. 1973	June 1974
Gen. John D. Ryan	Aug. 1969	July 1973
Gen. John P. McConnell	Feb. 1965	July 1969

DEPARTMENT OF TRANSPORTATION

SECRETARY OF TRANSPORTATION:

William T. Coleman, Jr.	Mar. 1975	Present
Claude S. Brinegar	Feb. 1973	Feb. 1975
John A. Volpe	Jan. 1969	Jan. 1973
Alan S. Boyd	Dec. 1968	Jan. 1969

COMMANDANT, U.S. COAST GUARD:

Adm. Owen W. Siler	June 1974	Present
Adm. Chester R. Bender	Apr. 1970	May 1974
Adm. Willard J. Smith	June 1966	Mar. 1970

DEPARTMENT OF TRANSPORTATION (continued)

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
ADMINISTRATOR, FEDERAL AVIATION		
ADMINISTRATION:		
John L. McLucas	Dec. 1975	Present
James E. Dow (acting)	Apr. 1975	Nov. 1975
Alexander P. Butterfield	Apr. 1973	Mar. 1975
John J. Schaffer	Mar. 1969	Mar. 1973
David D. Thomas (acting)	Aug. 1968	Feb. 1969
Gen. William F. McKee	July 1965	July 1968

OFFICE OF TELECOMMUNICATIONS POLICY

DIRECTOR:		
John M. Eger (acting)	Sept. 1974	Present
Clay T. Whitehead	Sept. 1970	Sept. 1974

a/This position was created in 1970 as Assistant to the Secretary of Defense for Telecommunications. In January, 1972 it was changed to Assistant Secretary of Defense (Telecommunications) and in January 1974 it was changed to its present title.

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