REPORT TO THE CONGRESS

Economies Obtainable By Increasing Days At Sea Of Oceanographic Research And Survey Ships B-133188

Environmental Science Services Administration

Department of Commerce

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D C 20548

B-133188

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

This is our report on the economies obtainable by increasing days at sea of oceanographic research and survey ships of the Environmental Science Services Administration, Department of Commerce. 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).

Copies of this report are being sent to the Director, Bureau of the Budget, and to the Secretary of Commerce.

Comptroller General
of the United States

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LIST OF ABBREVIATIONS

ESSA	Environmental Science Services Administration
GAO	General Accounting Office
MSTS	Military Sea Transportation Service

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

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D I G E S T

WHY THE REVIEW WAS MADE

During a survey of Federal oceanographic activities, the General Accounting Office (GAO) noted that oceanographic research and survey ships operated by the Environmental Science Services Administration (ESSA) averaged much less time a year at sea than did similar research ships operated by the Military Sea Transportation Service (MSTS).

This review was undertaken by GAO to ascertain whether it would be economically feasible for ESSA to increase the use of its ships to a level similar to that being attained by MSTS.

FINDINGS AND CONCLUSIONS

ESSA's utilization of its oceanographic research and survey ships averaged from 112 to 182 days a year at sea while MSTS operated similar ships from 244 to 258 days a year at sea.

GAO concluded that it was feasible for ESSA to use its ships to a level similar to that of MSTS because of the similarities in the mission of the ships and their crews. ESSA, however, did not achieve that level because (1) it followed the practice of manning each of its ships with only one crew, which prevented ship operations when part of the crew was on leave or otherwise absent, and (2) its ships remained in port during the winter months because of adverse weather conditions in northern waters. (See p. 15.)

The Assistant Secretary of Commerce for Science and Technology informed GAO that the principal factors preventing fuller use of the ships were (1) personnel restrictions imposed by section 201 of Public Law 90-364 and (2) current budget restrictions. Section 201 of Public Law 90-364 was repealed on July 22, 1969.

GAO concluded that ESSA could operate its ships more days each year at sea if it were to

--Establish a manpower reserve similar to that maintained by MSTS. MSTS maintains, in addition to the basic crew needed to operate its ships, a 22-percent reserve for the purpose of replacing crew members who go on leave or are otherwise absent. (See p. 15.)

--Schedule available and necessary research and survey work in warm-water areas during winter months. (See p. 17.)

GAO believes that, if action were taken to increase ship use to a level similar to that achieved by MSTS, ESSA could either (1) obtain more efficient use of its present number of ships or (2) maintain its present level of program accomplishments with four fewer ships. GAO estimates that the savings in operating costs that could be achieved by using four fewer ships would be about $888,000 annually. (See p. 19.)

Furthermore, if ESSA were to attain a level of ship use similar to that of MSTS, ESSA's planned ship requirements could be reduced by seven ships, which could result in a saving of about $59.3 million in ship construction costs over a 10-year period. Also, GAO estimates that savings in ship operating costs will be achieved each year during the construction period and will total about $1.2 million annually when all ships are placed in operation.

RECOMMENDATIONS OR SUGGESTIONS

In view of the opportunity for increased utilization and the potential for significant savings, the Secretary of Commerce should require ESSA to establish a manpower reserve and to schedule work during winter months.

Also, ESSA should consider the opportunity for increasing the use of its ships when planning construction of additional ships.

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Department of Commerce and the National Council on Marine Resources and Engineering Development expressed complete agreement with the basic finding that ESSA's fleet should be more fully utilized.

The Assistant Secretary of Commerce stated that the length of ESSA's operating seasons would be increased as more resources become available He stated also that ESSA had decided to defer acquisition of new ships until the present fleet reached optimum utilization.

ESSA conducted a study of ship utilization subsequent to GAO's review. This study concluded that an increase in ship use to 250 days a year at sea would be economically feasible. In determining how the additional days at sea could be attained, ESSA considered alternative crew procedures--one being a manpower reserve.

MATTERS FOR CONSIDERATION BY THE CONGRESS

In view of (1) ESSA's plans to acquire additional vessels, (2) the expanded work in oceanography recommended by the Marine Sciences Council and the Marine Sciences Commission, and (3) the potential for achieving significant economies and/or more efficient accomplishment of ESSA's oceanographic activities, GAO believes that its findings and recommendations may be of interest to the congressional committees having legislative oversight responsibilities for the activities covered by the review.

CHAPTER 1

INTRODUCTION

The General Accounting Office has examined into the utilization of oceanographic research and survey ships operated by the Coast and Geodetic Survey, Environmental Science Services Administration, a constituent agency of the Department of Commerce. The scope of our review is described on page 28.

A review of the Survey's 1959 ship operating practices conducted by GAO resulted in a proposal that increased utilization of the Survey's fleet be considered (report to the Congress on "Review of Coast and Geodetic Survey," May 10, 1961, B-133188). At the time of our prior review, the Survey's ships had a field season of only 6 months. As a result of our proposal, the field season for four of the Survey's larger ships was extended to 9 months.

DEPARTMENT OF COMMERCE

The Department of Commerce was established by act of the Congress (5 U.S.C. 591) to foster, promote, and develop the foreign and domestic commerce, the manufacturing and shipping industries, and the transportation facilities of the United States. Related functions have been added to, or eliminated from, the Department's functions from time to time by legislation or Executive order.

The functions of the Department of Commerce in the field of science and technology are under the jurisdiction of an Assistant Secretary for Science and Technology. He exercises policy direction and general supervision over four constituent agencies of the Department, of which ESSA is the largest. The principal officials of the Department of Commerce responsible for administration of activities discussed in this report are shown in appendix V.

ESSA activities

ESSA was established on July 13, 1965, through the consolidation of the Survey and the Weather Bureau in

accordance with the provisions of Reorganization Plan No. 2 of 1965 (15 U.S.C. 311).

ESSA's mission is to describe, understand, and predict the state of the oceans, the state of the lower and upper atmosphere, and the size and shape of the earth, in order to further the safety and welfare of the public; enhance and improve the Nation's economy; and assist those Federal departments concerned with the national defense, the exploration of outer space, and the management of natural resources. ESSA consists of five major operating components: the Environmental Data Service, the Weather Bureau, the Research Laboratories, the Survey, and the National Environmental Satellite Center.

ESSA's oceanographic activities are conducted by the Survey and by the Research Laboratories and include oceanographic research and oceanographic surveys. Oceanographic research includes tidal and tsunami (tidal wave) investigations, air-sea and land-sea interaction studies, and research in marine geology. Oceanographic surveys consist of the measurement of tides and currents, hydrographic surveys (determining the depths of the water and the character of the sea bottom), and ocean mapping. The Survey's ships are used in performing oceanographic research and surveys conducted by the Research Laboratories and by the Survey that support the marine science activities of the Federal Government. The Survey's Office of Hydrography and Oceanography is responsible for operation and maintenance of the Survey's ships and for oceanographic surveys. The Atlantic and Pacific Oceanographic Laboratories, divisions of the Research Laboratories, conduct ESSA's oceanographic research programs. ESSA's oceanographic activities are financed by congressional appropriations. For fiscal year 1969 the estimated budget for these activities amounted to about $21.4 million.

As of June 1969, the Survey operated 14 oceanographic research and survey ships and had one, the "Researcher" under construction. One ship, the "Oceanographer," is depicted on page 6.

The research and survey ships have cost from $1.2 million to $10.4 million, are expensive to operate, and have a

USS Iowa

useful life of from 20 to 30 years. The principal facilities from which these ships operate are the Survey's Pacific and Atlantic Marine Centers located at Seattle, Washington, and Norfolk, Virginia. The following table describes the four classes and shows the number of ships operated and under construction by the Survey as of June 1969.

Class	Type	Number	Approximate length (feet)	Displacement (tons)	Capabilities	Average number in crew per ship
I	Ocean survey	4	300	2,800 to 3,959	All oceans, all climates, complete oceanographic and limited hydrographic capabilities	87
II	Medium survey	4	230	1,600 to 2,000	Reduced deep-ocean missions, hydrographic and limited oceanographic capability	83
III	Coastal survey	4	170	760 to 995	Primarily coastal waters, hydrographic, and limited oceanographic capability	36
IV	Auxiliary survey	3	100	214 to 363	Short periods at sea, limited hydrographic, and oceanographic capabilities	20

The marine science activities of the Government involve a number of governmental agencies in addition to ESSA. The functions and responsibilities of the most important of these organizations concerning oceanographic research and surveying are discussed in the following sections.

NATIONAL COUNCIL ON MARINE RESOURCES AND ENGINEERING DEVELOPMENT AND COMMISSION ON MARINE SCIENCE, ENGINEERING, AND RESOURCES

The National Council on Marine Resources and Engineering Development and the Commission on Marine Science, Engineering, and Resources were established by the Marine Resources and Engineering Development Act of 1966, approved June 17, 1966 (33 U.S.C. 1101). The general objectives of the act are to develop, encourage, and maintain a coordinated, comprehensive, and long-range national program in marine sciences for the benefit of mankind.

The Council, with the Vice President of the United States as Chairman, comprises the heads of the major Federal

departments and agencies having marine missions. It is organizationally located in the Executive Office of the President and, pursuant to the act, is charged with the planning and coordination of current marine programs and with advising and assisting the President.

The act requires that an annual report concerning the Government's marine science activities be transmitted by the President to the Congress. The most recent report, titled "Marine Science Affairs-A Year of Broadened Participation," was transmitted to the Congress on January 17, 1969.

The Commission was composed of members, appointed by the President early in 1967, who represented diverse interests and areas of the country. Pursuant to the act, the Commission was to (1) examine into the Nation's stake in the development, utilization, and preservation of our marine environment, (2) review all current and contemplated marine activities and assess their adequacy to achieve the national goals set forth in the act, (3) formulate, on the basis of its studies and assessment, a comprehensive, long-term, national program for marine affairs designed to meet present and future national needs in the most effective possible manner, and (4) recommend a plan of governmental organization best adapted to the support of the program and indicate the expected costs.

On January 9, 1969, the Commission presented its final report to the President and the Congress. The report, titled "Our Nation and the Sea-A Plan for National Action," contained many recommendations, the most significant being that a single National Oceanic and Atmospheric Agency should be established.

According to the provisions of the act, the Council was to expire 120 days after the submission of the final report by the Commission and the Commission was to expire 30 days after submission of its final report. The Commission ceased to exist as of February 1969. Public Law 90-242 of January 2, 1968, extended the life of the Council until June 30, 1969, and Public Law 91-15 of May 23, 1969, further extended the life of the Council until June 30, 1970.

MILITARY SEA TRANSPORTATION SERVICE

MSTS, established by the Secretary of Defense in August 1949 as part of the Department of the Navy is the only agency within the Department of Defense that provides ocean transportation for troops, dry cargo, and petroleum to points around the world where U.S. forces are on duty.

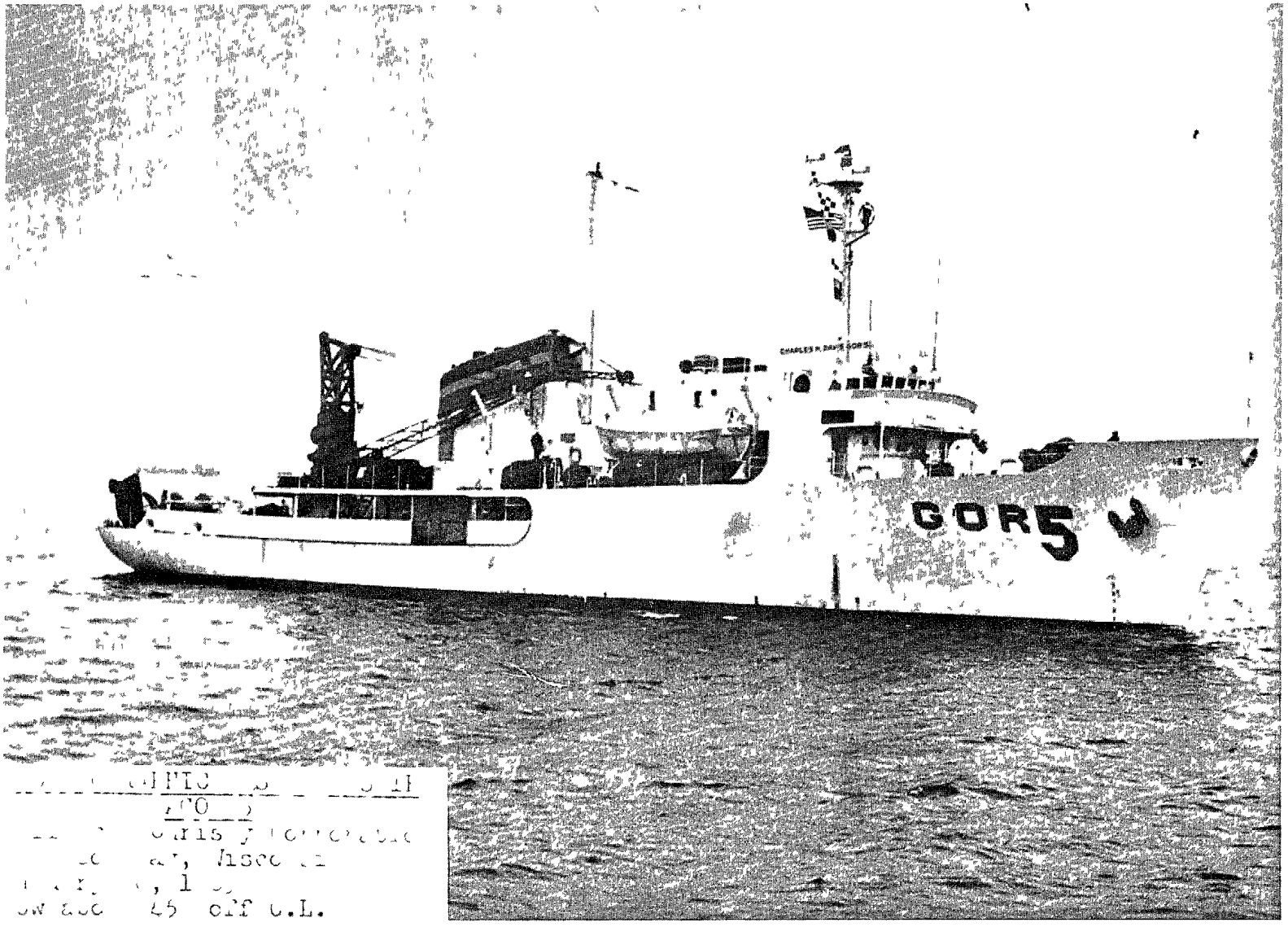
In addition to carrying out this logistics and supply mission using transport and cargo ships and tankers, MSTS operates about 40 specially designed project ships. These ships are operated in support of Navy organizations and other Government agencies engaged in oceanographic research and surveying and other scientific and space studies being carried out on the oceans of the world. The agencies and Navy organizations for which MSTS operates its ships include the National Science Foundation, National Aeronautics and Space Administration, Naval Research Laboratory, and U.S. Naval Oceanographic Office.

In July 1967, 11 oceanographic research and survey ships--one of which is depicted on page 11--were being operated by MSTS in support of U.S. Naval Oceanographic Office programs. These ships operated from the MSTS's Altantic Area Office, Brooklyn, New York, and its Pacific Area Office, San Francisco, California. The cost of operating these ships is financed from reimbursements received from sponsoring agencies and Navy organizations.

U.S. NAVAL OCEANOGRAPHIC OFFICE

The U.S. Naval Oceanographic Office, a field activity of the Oceanographer of the Navy, was established by the Congress (10 U.S.C. 7391) to provide oceanographic and navigational data and to perform or recommend related research, development, testing, and evaluation to the Department of the Navy. In addition, it implements the exchange of oceanographic, hydrographic, magnetic, geodetic, gravity, and cartographic material with other departments and agencies of the Government. The activities of the U.S. Naval Oceanographic Office are financed primarily from Navy appropriations.

Survey ships, under the technical guidance of the Oceanographer of the Navy, are operated by MSTS and by the Navy fleet commands. We were advised by an MSTS official that the survey ships operated by the Navy fleet commands were to be retired and that the replacement ships would be operated by MSTS.



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CHAPTER 2

OPPORTUNITY FOR INCREASED UTILIZATION OF OCEANOGRAPHIC RESEARCH AND SURVEY SHIPS

On the basis of our review, we have concluded that the Survey could achieve more efficient use of its oceanographic research and survey ships--increase the number of days a year at sea--by establishing a manpower reserve and by better scheduling work. The utilization of oceanographic research and survey ships operated by the Survey averaged from 112 to 182 days a year at sea.[1] During the same period the utilization of oceanographic research and survey ships operated by MSTS averaged from 244 to 258 days a year at sea.[2]

We believe that, because of the similarities in the missions of the ships and crews of the two agencies, the Survey could increase its ship utilization to a level similar to that attained by MSTS. If such increased utilization is attained, ESSA could either attain more efficient use of its existing ships--an additional 1,100 days a year at sea--at an increased cost of $2.5 million annually or maintain its present level of program accomplishment with four fewer ships and thereby achieve savings in ship operating costs of about $888,000 annually. Further, we estimate that, if the Survey were to implement plans to perform expanded programs assigned to it by the Marine Sciences Council, by

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[1] A ship was given credit for 1 day at sea when (1) the ship spent at sea 1 hour or more during a 24-hour period, (2) the ship was in port, but one of its launches was performing survey work, or (3) the crew was engaged in some type of survey support work, such as setting up position control stations, for 1 hour or more during a 24-hour period.

[2] A ship was given credit for 1 day at sea when the ship spent at sea 1 hour or more during a 24-hour period.

utilizing ships at a level similar to that attained by MSTS, the Survey's planned ship requirements could be reduced by seven ships and could result in savings of about $59.3 million in construction costs over a 10-year period. We estimate also that savings in ship operating costs will be achieved each year during the construction period and will total about 1.2 million annually when all ships are placed in operation.

Information on missions and crews of the Survey's and MSTS's ships, low utilization of the Survey's ships, and potential savings through increased utilization of the Survey's ships follows.

COMPARISON OF MISSIONS AND CREWS OF ESSA AND MSTS SHIPS

We believe that, because of the similarities in the missions of the ships and crews of the two agencies, the Survey, with implementation of a manpower reserve and better scheduling of work, could utilize its ships to a level similar to that of MSTS. We believe that the mission of the ships is basically the same, that is, to acquire data on the marine environment and perform oceanographic research and oceanographic surveys.

The Survey performs hydrographic surveys along the coastal waters of the United States, its territories, and possessions. These hydrographic surveys involve ascertaining bottom depths and locating physical obstructions which need to be identified to describe waterways for ship navigation. Although MSTS ships did not, at the time of our review, perform coastal surveys of this type, we were advised by both MSTS and U.S. Naval Oceanographic Office officials that MSTS planned to begin operating such ships in support of the U.S. Naval Oceanographic Office's hydrographic program.

The three MSTS auxiliary general survey ships are converted cargo ships and are larger than the rest of MSTS's oceanographic ships or the Survey's oceanographic ships. The MSTS's auxiliary general oceanographic research ships, however, are smaller than the Survey's oceanographic research ships. We noted that, although the sizes of the

ships differed, the smaller MSTS ships attained a higher level of utilization than the larger MSTS and Survey ships. In addition, all the ships of both agencies attain about the same number of days a month at sea but MSTS has a longer operating season than has ESSA.

The Survey's ships performing hydrographic surveys are considerably smaller than are its ships performing oceanographic research because the Survey's hydrographic surveys are restricted to coastal waters while oceanographic research is performed throughout the deep oceans. When performing hydrographic surveys, extensive use has to be made of launches because a large part of the area is too shallow for ship operations.

The crew members working on both the Survey's and MSTS's research and survey ships are civilians and receive about the same rate of pay. The crew members are represented by maritime unions and are governed by regulations issued by the Civil Service Commission. The MSTS's ships are operated under the direction of civilian officers, and the Survey's ships are operated under the direction of officers of ESSA's Commissioned Officer Corps who also are responsible for conducting the ships' survey operations. Research aboard the Survey's ships is carried out by civil service scientists from ESSA's Research Laboratories, as well as by commissioned officers. Technical direction over the research and survey activities which the MSTS's ships perform is provided by personnel from the U.S. Naval Oceanographic Office. According to MSTS and Survey officials, both agencies have major ship repairs and maintenance done under contracts with commercial firms.

LOW UTILIZATION OF THE SURVEY'S SHIPS

The Survey's ocean survey and medium survey ships were utilized an average of 179 and 167 days a year, respectively, over the 3-year period covered by our review, while MSTS ships of comparable type were utilized an average of 251 days a year. (See apps. I and II.) Although there appear to be no standards by which to establish the number of days a ship should spend at sea, our review indicated to us that the Survey's utilization of ships was low and resulted from the Survey's practice of assigning only one crew to each ship and from keeping its ships in port during the winter months.

We believe that the Survey could attain increased use of its ships by revising its manning practices and work schedules.

Manning practices

We were informed by MSTS officials that, in addition to the basic manning scale needed to operate its ships, a 22-percent reserve was maintained in a Receiving Branch of an Area Command for the purpose of replacing crew members who go on leave. This method enables the ships to continue operations at sea when part of the crew is on leave. Personnel detached from a ship for purposes of leave or some other reason are, in effect, reassigned to the Receiving Branch. Vacancies on shipboard are filled by reassignments from the Receiving Branch.

The use of a manpower reserve is feasible, according to MSTS officials, because (1) the tenure of employment of the civil service seaman is with the Area Command and not with a particular ship, (2) all the ships of the Area Command are home-ported in a common port, and (3) the Area Command has sufficient ships and has sufficient seamen to provide the flexibility inherently required by the manpower reserve. A Survey ship, however, has a basic manning scale which consists of only the ships' crew, and therefore a ship must remain in port when a part of its crew is not available because of leave or some other reason.

Survey and MSTS crew members, who are hired under Civil Service regulations, earn from 13 to 26 days of annual leave a year, depending on length of Federal service. Beginning in November 1966, shore leave has been earned at the rate of 1 day for each 15 days away from home port. Beginning in February 1966, Survey crew members could also earn compensatory leave, limited to 10 days a year. Compensatory leave is time off in lieu of cash payment for overtime. As a result of these leave provisions, the Survey's crew members, on the basis of a 9-month operating season, can earn between 13 and 54 days' leave a year, which could take from 17 to 76 calendar days to use.

According to MSTS officials, the use of the manpower reserve permits MSTS ships to operate about 11 months of the year with about 30 days of each year set aside for drydocking, during which time major repairs and maintenance to the ship are completed. Also, during the 11-month operating period, about 45 days are scheduled to be used for resupplying, refueling, and minor repairs. During the balance of the year--290 days, or 80 percent of the time--the ships are available for operations at sea.

During the period covered by our review, five oceanographic research and survey ships operated by MSTS for the U.S. Naval Oceanographic Office averaged 251 days a year at sea. This represents about 86 percent of the available time. We were advised by U.S. Naval Oceanographic Office officials that the difference between the 290-day availability period and the 251 days of use represented U.S. Naval Oceanographic Office in-port requirements, such as changing technical personnel and equipment. The U.S. Naval Oceanographic Office coordinates the use by Navy laboratories of the research ships as well as uses such ships itself.

At the time of our prior review of ship utilization, a study was made by the Survey in which one of the alternatives considered for increasing ship utilization was to increase the number of ship personnel by one third, and to use such personnel on a rotating basis. In addition, the Survey more recently gave consideration to the establishment of a manpower reserve in order to improve ship utilization. For example, an informal study made in 1967 concluded that a crew rotation policy on a "3 crews for 2 ships basis" would

increase utilization of the Survey's ships to about 10-1/2 months a year. We were informed by Survey officials, however, that no action had been taken because the Survey believed that the cost of establishing and maintaining a manpower reserve for crew rotation would be excessive.

We believe, however, that the use of a manpower reserve would be less expensive than to continue operating under the single-crew concept since fewer ships would be needed and, as a result, total direct operating costs would be less. This matter is discussed more fully on pages 19 and 20.

Scheduling of work

The Survey's fleet spends the winter months in port because, according to Survey officials, the ships' personnel cannot perform the survey work effectively in northern waters during this period. However, a substantial backlog of surveying work exists in warm-water areas in southern climates where these ships could operate during the winter months. We believe that improved scheduling of work would permit the Survey's fleet to operate for a longer period during the year. As previously discussed, the use of a manpower reserve permits MSTS ships to operate about 11 months of the year.

A large part of the Survey's effort during the period covered by our review, according to Survey officials, was in the performance of hydrographic surveys. These surveys are for producing and maintaining nautical charts and are performed in the coastal waters of the United States, its territories, and possessions. Since extensive use of small launches is required when performing hydrographic surveys, adverse weather conditions in northern waters prohibit this type of work during the winter months. We found, however, that there existed a backlog of hydrographic survey work in warm-water areas. In addition, the capabilities of the Survey's class I ships allow them to operate in all oceans and climates. Further, according to Survey officials, there are other programs and work on which the Survey's class I and II ships could be used in warm-water areas during the winter months, such as the Scientific Exploration and

Mapping Program, the relatively new Continental Shelf Mapping Program, and oceanographic research.

All the class I-type ships, including the newly designed class IA ships, are designed and equipped for oceanographic research. These ships are capable of performing surveys for the Scientific Exploration and Mapping Program and the Continental Shelf Mapping Program. The class II medium survey and class III coastal survey ships also have oceanographic, as well as hydrographic, capabilities. For example, according to a Survey official, the Survey is planning to use two class II ships, the "Fairweather" and the "Rainier," on the Continental Shelf Mapping Program. Also, during the period covered by our review, a class III ship, the "Peirce," based at the Atlantic Marine Center, was used on oceanographic research, as well as hydrographic work, along the Atlantic coast of the United States and in the Gulf of Mexico.

With regard to ship operations on the Atlantic coast, Survey officials stated that there was a considerable amount of hydrographic surveying, as well as Continental Shelf mapping, needed in southern waters that could be done during the winter months. Survey officials stated also that all their ships based on the east coast had the capability of traveling to the warm-water areas and that the maximum amount of time needed to reach those areas was 4 days. Survey officials stated further that the ships would be productive in traveling to these warm-water areas since they could perform oceanographic survey work en route. We were informed by Survey officials that, on the basis of the amount of work needed and the location of the work, all the ships on the east coast could be scheduled to operate up to 250 days a year at sea.

Of the Survey's west coast hydrographic operations, about 75 percent of the work is in Alaskan waters and the balance is along the Pacific coast of the United States and around the Hawaiian Islands. During the period covered by our review, the Survey had two class IV hydrographic survey ships, the "Patton" and "Lester Jones," operating from the Survey's Pacific Marine Center. These ships worked only 6 months a year and averaged 128 days a year at sea during calendar years 1964 through 1966. A Survey official

informed us that this was about the maximum utilization that could be obtained from class IV ships in the Alaska area because of their limited capabilities and weather restrictions. We were advised that the class IV ships could not be transferred to southern waters because of their small size and because of the lack of protected areas in which to dock during rough weather when traveling along the Pacific coast.

Both the "Patton" and the "Lester Jones" were retired in November 1967. The Survey, however, has included four class IV hydrographic survey ships in the 10-year plan for ship requirements prepared in February 1968. We were informed by Survey officials that these ships would probably be scheduled to work in Alaskan waters and that, because of the ships' limited capabilities and the weather restrictions, their operating periods and utilization would be about the same as those ships which recently had been retired.

With regard to the remaining ships on the west coast, Survey officials agreed that there are other programs in Pacific waters within reasonable traveling distance on which they could work during winter months. There are substantial amounts of surveying needed for the Continental Shelf Mapping Program, the Scientific Exploration and Mapping Program, and oceanographic research. In addition, there is a small amount of hydrographic surveying needed along the southern California coast.

Savings available through reduced operating costs

We believe that the Survey, by increasing the utilization of certain of its ships through the establishment of a manpower reserve[1] and improved work scheduling, could perform its present program level of operation with 11 instead of its present 15 ships. The table below illustrates that increased utilization of three class I, three class II, and two class III ships to an average level of 239, 223, and

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[1]For our computational purposes we assumed a manpower reserve of 25 percent, which approximates the MSTS reserve of 22 percent.

260 days a year at sea, respectively, will result in the Survey's obtaining from 11 ships, for each class, about the same total number of days at sea as is obtained from the present fleet of 15 ships.

Ships in fleet and under construction as of June 30, 1969			Number of ships required if utilization is increased	Number of days a year at sea	
Class	Type	Number		Average per ship in each class	Total for class of ship
I	Ocean survey	4		179[a]	716
			3	239	717
II	Medium survey	4		167[a]	668
			3	223	669
III	Coastal survey	4		130[a]	520
			2	260	520
IV	Auxiliary survey:				
	Circulatory	1	1	123[a]	123[b]
	Wire drag	2	2	123[a]	246[b]

[a]Average utilization obtained during calendar years 1964 through 1966.

[b]These ships will continue to operate at about the present level of utilization because of limited ship capabilities.

We estimate that the Survey could save about $888,000 annually in direct operating costs by reducing its requirements by four ships and increasing the utilization of its remaining ships to the levels shown above. The estimated savings were computed by deducting the estimated direct operating costs of 11 ships ($9,392,396), including the cost of a manpower reserve, from the estimated direct operating costs for 15 ships ($10,281,000) using a single crew for each ship. Estimated direct operating costs were computed on the basis of ESSA's fiscal year 1969 estimated ship operating costs.

Furthermore, the four ships that would not be needed could be made available to other Federal agencies involved in marine science activities. An official of the Office of the Oceanographer of the Navy advised us that the Navy could utilize these ships in its hydrographic and oceanographic activities, if they became available. On the other hand, if it is desired that ESSA retain and use the four ships, we

estimate that the Survey, at an additional $2.5 million annually in operating costs, could obtain an additional 1,100 days a year at sea with its existing 15 ships.

Potential savings obtainable on proposed programs

In February 1968 the Survey calculated the number of new ships required to meet its existing responsibilities and to undertake additional programs which may be assigned to it by the Marine Sciences Council. We found that the Survey's estimate was based on making the ships available for use 9 months a year, which, in most instances, is about the same level of operations that existed during the period covered by our review. Also, we were informed by Survey officials that the practice of assigning only one crew to each ship would be continued. We believe that the Survey could, through improved utilization policies and practices, fulfill whatever responsibilities are assigned to it with fewer ships than presently anticipated.

In July 1967 the Director of the Survey submitted a plan for new ship construction to ESSA. This plan outlined requirements for eight new ships, of which three would be replacements for existing ships. In February 1968 the Survey prepared a revised ship requirements plan which covered the 10-year period 1970 through 1979. We were informed by Survey officials that this plan reflected the Survey's increased efforts in oceanographic research as a result of proposed activities to be assigned by the Marine Sciences Council. The plan showed a requirement for 37 ships, but excluded two existing wire-drag ships. Of a total requirement for 39 ships, 14 were in the fleet and one was under construction as of June 30, 1969; three are planned to be leased; and 21 are planned to be constructed at a total estimated cost of $169 million.

In May 1968 ESSA reviewed and tentatively accepted the Survey's ship requirements plan, including a 10-year construction period, except that the stated specific period for acquisition of the ships was deleted.

We believe that, by increasing utilization of its ships through the establishment of a manpower reserve and improved

work scheduling, ESSA should be able to fulfill its current program responsibilities and undertake the possible future work with 29 instead of 36 ships, exclusive of the three ships to be leased. The following table illustrates that increased utilization of seven class I, eight class II, four class III ships and one class IV ship to an average level of 231, 209, 195, and 246 days a year at sea, respectively, will result in the Survey's obtaining from 29 ships, for each class, about the same total number of days at sea as would be obtained from the proposed fleet of 36 ships.

Class and type of ship	Ship requirements as determined by ESSA (note a)			Ships required if utilization is increased	Number of days a year at sea	
	Existing	Additional	Total		Average per ship	Total for class
Class I						
Oceanographic research and survey	4	5	9		179[b]	1,611
				7	231	1,617
Class II						
Oceanographic research and survey	2	3	5		167[b]	835
				4	209	836
Hydrographic survey	2	3	5		167[b]	835
				4	209	836
Class III						
Hydrographic survey	4	2	6		130[b]	780
				4	195	780
Class IV						
Hydrographic survey	0	4	4	4	123[c]	492
Oceanographic research	0	2	2	2	123[c]	246
Wire drag	2	0	2	2	123[c]	246
Circulatory survey	1	2	3		123[b]	369
				1	246[d]	246
	—	—	—	1	123[c]	123
Total	15	21[e]	36[e]	29		

[a]On the basis of operations of 9 months a year.

[b]Average utilization obtained during calendar years 1964-66.

[c]These ships will operate at present level of utilization due to limited capabilities.

[d]According to a Survey official, one circulatory ship could perform surveys on both the east coast and gulf coast using a manpower reserve.

[e]Does not include three ships to be leased.

As shown in the following table, ESSA could save an estimated $59.3 million in ship construction costs over a 10-year period by reducing its ship requirements by seven.

Type of ship	Estimated construction costs (note a) (millions)
Oceanographic research and survey (class IA)	$13.0
Oceanographic research and survey (class IA)	13.6
Oceanographic research and survey (class II)	7.0
Hydrographic survey (class II)	10.0
" " (" III)	6.6
" " (" III)	7.2
Circulatory survey (class IV)	1.9
Total	$59.3

[a]The seven ships are planned to be built over a 10-year period; therefore, the Survey's estimate is based on increasing construction costs anticipated during the period.

In addition, we estimate that ESSA could save about $1.2 million annually in direct operating costs by performing future programs with 29 ships spending an increased number of days at sea rather than with 36 ships maintaining the past average number of days at sea. We computed the savings of $1.2 million by deducting the estimated direct operating costs of 29 ships ($22.1 million), including the cost of a manpower reserve, from the estimated direct operating costs for 36 ships ($23.3 million) using a single crew for each ship. Estimated direct operating costs were computed on the basis of ESSA's fiscal year 1969 estimated ship operating costs. The estimated savings of $1.2 million annually in ship operating cost will not be an immediate savings but will, we believe, be achievable when the 29 ships (see table on p. 22) are placed in operation.

CHAPTER 3

AGENCY COMMENTS AND GAO EVALUATION AND RECOMMENDATIONS

During April 1969, we brought our findings to the attention of the Department of Commerce, the Department of Defense, and the National Council on Marine Resources and Engineering Development. We proposed that the Assistant Secretary of Commerce for Science and Technology establish a manpower reserve which would enable ESSA to schedule program work for an extended operating season. We proposed also that the need for the planned additional ships be reviewed and evaluated in view of the opportunity for increased utilization. The comments received from each of the three agencies concerning our findings and proposals have been considered in the preparation of this report, and the comments from the Department of Commerce and the National Council on Marine Resources and Engineering Development are included as appendixes.

On June 13, 1969, the Department of Commerce transmitted to us the comments, dated May 5, 1969, of the Assistant Secretary of Commerce for Science and Technology who expressed complete agreement with the basic finding of the report that ESSA's fleet should be more fully utilized. (See app. III.)

The Assistant Secretary stated that the policy of ESSA and its operating component, the Survey, was, and always had been, to increase the length of the operating seasons for all of its ships to the point of most efficient utilization. He stated also, however, that personnel restrictions imposed by Public Law 90-364 and current budgetary restraints had been the principal factors preventing fuller utilization of the ships. He pointed out that the ships had been kept at sea to the limit of available resources and that, as more resources become available, the length of the operating seasons would be increased to more nearly approach the number of days suggested by us. The Assistant Secretary advised us that ESSA had decided to defer the acquisition of new ships until the present fleet reached optimum utilization.

Section 201 of Public Law 90-364 directs that (1) full-time civilian positions not be filled when the number of such employees is greater than the number on June 30, 1966, (2) the number of temporary and part-time employees in any executive department or agency not exceed the personnel levels for any corresponding month during 1967, and (3) an executive department or agency replace only 75 percent of the vacancies caused by resignations, retirement, removal, or death.

Section 201 of Public Law 90-364 was repealed on July 22, 1969. The Department's comments recognize that a manpower reserve is an alternative that would enable the Survey to attain greater utilization of its ships than was experienced during the period covered by our review.

Although Survey studies have considered the use of a manpower reserve, we were advised by Department of Commerce and ESSA officials in April 1968 that the Survey had never requested funds for the establishment of a manpower reserve. It is possible that additional funds would not be required to establish a manpower reserve if, through increased utilization of each ship, as previously discussed, fewer ships were to perform the existing level of work.

The Assistant Secretary stated that the Department was concerned with the implication that four ships could be made available to other Federal agencies. He advised us that existing requirements for ship time to meet the mapping, charting, and research needs of ESSA far exceeded the capabilities of even the then-present fleet, if fully utilized.

We recognize that increased program requirements, if found necessary and authorized, would necessitate the utilization of the Survey's present fleet of 15 ships. If additional funds are made available, introduction of a manpower reserve would permit a greater level of effort from these 15 ships than could be obtained under ESSA's present manning practices and could therefore reduce the number of additional ships necessary to support increased program requirements. At ESSA's present level of programmed effort, however, we believe that ESSA, by increasing ship utilization through the introduction of a manpower reserve, should

accomplish its program with fewer ships and at substantial savings.

The Assistant Secretary expressed reservations concerning certain computations supporting our conclusion; specifically, that the increase in total variable costs resulting from increased days at sea could be computed by making a linear projection of ships' variable costs only. He stated that, according to an analysis of the Survey, successive increments in time at sea would eventually result in larger dollar penalties per unit of increase, that is, increased daily operating costs. He added that an optimum number of days at sea must be derived for the efficient use of each ship, depending on the type of operation performed and the geographic area of operation.

An ESSA study entitled "Analytical Study of Utilization of ESSA Fleet" was performed subsequent to our bringing the results of our review to the attention of ESSA officials in April 1968. This study was performed by ESSA as a supporting analysis for its 1970 budgetary submission to the Bureau of the Budget and concluded that an increase in utilization of the Survey's ships to 250 days a year at sea would be economically feasible, as well as yield additional productive days at sea. Alternative crew procedures, one of which is a manpower reserve of 19 percent, in order to obtain the additional days at sea were considered in the ESSA study. Our computations, based on the conclusions of this study, indicate that the Survey could obtain about 96 more days at sea with 11 ships operating with a manpower reserve than it could with 15 ships operating under the single-crew concept and, at the same time, could save about $851,000 annually in directing operating costs.

The conclusion arrived at in our draft report was that the Survey, by using a manpower reserve and by operating its ships, on the average, somewhat less than 250 days at sea would be able to attain as much utilization with 11 ships as it could attain with 15 ships under the single-crew concept and would save about $888,000 annually in direct operating costs. The estimated savings based on the ESSA study are less than those we computed because the ESSA study recommended a higher level of utilization, with a corresponding increase in operating costs, than did our

study. We believe that it is clearly evident that, in principle, the ESSA study supports our conclusion that substantial savings are available through the introduction of a manpower reserve.

The Executive Secretary of the National Council on Marine Resources and Engineering Development advised us by letter dated May 2, 1969 (see app. IV), that he fully concurred with the report's recommendations concerning a manpower reserve, increased ship utilization, and a review and evaluation of the need for additional ships. He indicated, however, that, in view of the important ocean exploration and survey programs of civilian agencies that were designed to respond to an array of unmet national needs, he disagreed that ESSA ships should be made available to other Federal agencies.

We are not recommending that ESSA's four ships be made available to other Federal agencies unless ESSA cannot effectively use the ships. We estimate that, if ESSA retains and uses the four ships, the Survey, at an additional $2.5 million annually in operating costs, could attain an additional 1,100 days a year at sea.

The Assistant Secretary of the Navy (Financial Management), in commenting on our draft report in June 1969, stated that, with a few exceptions, the facts being reported with respect to Navy policies, procedures, and operations were correct. The revisions suggested by the Department of Defense, to correct the factual errors and for purposes of clarification, have been made in this report.

RECOMMENDATIONS TO THE SECRETARY OF COMMERCE

We recommend that, in view of the opportunity for increased utilization and the potential for significant savings, the Secretary of Commerce require ESSA to establish a manpower reserve and schedule program work during winter months. We recommend also that ESSA consider the opportunity for increasing the use of its ships when planning construction of additional ships.

CHAPTER 4

SCOPE OF REVIEW

We examined into the utilization of research and survey ships operated by the Coast and Geodetic Survey and estimated the effect that increased utilization would have on the requirements for new ships. Our review was conducted at the headquarters of ESSA and of the Coast and Geodetic Survey located in Rockville, Maryland; at the Coast and Geodetic Survey's marine centers located in Norfolk and Seattle; at the headquarters of MSTS located in Washington, D.C.; and at the U.S. Naval Oceanographic Office located in Suitland, Maryland.

At these locations, we examined records pertaining to (1) the utilization of 14 ESSA and five MSTS research and survey ships for calendar years 1964 through 1966, (2) the past and estimated future operating costs for these ships, and (3) the practices and procedures followed by these agencies pertaining to ship operations. We also reviewed applicable legislation, regulations, agency instructions, and other data applicable to ship operations and discussed with appropriate agency officals matters pertinent to our review.

APPENDIXES

DAYS SPENT AT SEA

BY THE SURVEY'S SHIPS

DURING CALENDAR YEARS 1964-66

Type of ship	Name	Overall length (feet)	Days at sea (note a) 1964	1965	1966	Days a year at sea: Three-year average	Average per type of ship
Ocean survey	Surveyor (note b)	292	198	171	176	181 6)	179
Do	Pioneer	311	154	195	(c)	174 5)	
Medium survey	Pathfinder (note b)	229	161	179	188	176 0)	167
Do.	Explorer (note d)	220	174	173	128	158 3)	
Coastal survey	Hydrographer (note d)	165	161	141	106	136 0)	
Do	Peirce (note b)	163	159	147	131	145 6)	
Do	Whiting (note b)	163	128	143	150	140 3)	130
Do	Bowie (note d)	136	82	130	128	113 3)	
Do	Hodgson (note d)	136	123	100	114	112 3)	
Auxiliary survey	Patton (note d)	88	141	135	125	133 6)	
Do	Lester Jones (note d)	88	142	113	112	122 3)	
Do.	Marmer (note d)	107	114	111	126	117.0)	123
Do	Hilgard (note d)	66	107	135	121	121.0)	
Do	Wainwright (note d)	66	107	135	121	121 0)	

[a]See footnote 1 on page 12

[b]These ships were in the fleet as of June 30, 1968 The remaining ships have been decommissioned and replaced by new ships

[c]Decommissioned March 1, 1966.

[d]Decommissioned between January 1967 and June 1969.

APPENDIX II

DAYS SPENT AT SEA BY MSTS SHIPS

IN SUPPORT OF THE U.S. NAVAL OCEANOGRAPHIC OFFICE

DURING CALENDAR YEARS 1964-66

Type of ship	Name	Overall length (feet)	Days at sea (note a) 1964	1965	1966	Days a year at sea: Three year average per ship	Days a year at sea: Overall average
Auxiliary general survey	Bowditch	455	289	169	275	244.3	
	Dutton	455	148	300	308	252.0	
	Michelson	455	173	310	267	250.0	251
Auxiliary general oceanographic research	Gilliss	209	249	258	253	253.3	
	Davis	209	268	262	243	257.6	

[a]See footnote 2 on page 12.

THE ASSISTANT SECRETARY OF COMMERCE
WASHINGTON, D C. 20230

JUN 13 1969

Mr. Henry Eschwege
Associate Director
Civil Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege

This is in reply to your letter of April 4, 1969, requesting comments on a proposed report to the Congress on the "Opportunity for Increased Utilization of Research and Survey Ships, Environmental Science Services Administration, Department of Commerce".

We have reviewed the comments of the Assistant Secretary for Science and Technology and the Environmental Science Services Administration and believe that they are appropriately responsive to the matters discussed in the report.

Sincerely yours,

Larry A. Jobe

Enclosure

THE ASSISTANT SECRETARY OF COMMERCE
WASHINGTON, D C 20230

May 5, 1969

Honorable Henry Eschwege
Associate Director
U S General Accounting Office
Washington, D C 20548

Dear Mr Eschwege

The Secretary has asked me to reply to your letter of April 4, 1969 I appreciate the opportunity to review and comment on the draft GAO Report to the Congress entitled, "Opportunity for Increased Utilization of Research and Survey Ships--Environmental Science Services Administration, Department of Commerce " I am in complete agreement with the basic finding of the report that the fleet of the Environmental Science Services Administration (ESSA), operated by the Coast and Geodetic Survey (C&GS), should be more fully utilized This finding parallels that of a similar study, "Analytical Study of Utilization of ESSA Fleet," prepared by ESSA as a supporting analysis for its FY 1970 budgetary submission to the Bureau of the Budget

The policy of ESSA and its operating component, the C&GS, is and always has been to increase the length of the operating seasons for all its vessels to the point of most efficient utilization The augmentation of the crews or the recommended establishment of the manpower reserve proposed in your report to accomplish this goal are alternatives that have been recognized by ESSA Unfortunately, restrictions on funds and personnel since the acquisition of the new fleet have had serious impacts on our ability to implement plans for increased lengths of seasons The personnel restrictions imposed by Public Law 90-364 and the current budgetary restraints have been the principal factors preventing fuller utilization Nevertheless, I wish to emphasize that the vessels have been kept at sea to the limit of available resources and, as more resources become available, we intend further to increase the length of seasons more nearly to approach the number of days at sea suggested in your report Also, a decision has been made in ESSA to defer the acquisition of new ships until the present fleet approaches optimum utilization

Since ESSA/C&GS is making every effort efficiently to use its ships with available resources, I am concerned with the implication in the report

that four ships could be made available to other federal agencies Such an action, in our opinion, would be most detrimental to the programs for which these vessels have been provided by the Congress If resources are available for the use of these ships, we believe they should be used to support the operations for which the Congress intended them to be employed Existing requirements for ship time to meet the mapping, charting and research needs of ESSA far exceed the capabilities of even the present fleet, assuming full utilization Of the two million square miles for which we have the surveying and charting responsibility, only 1 2 million square miles have been completed to date The safety of life and property, the promotion of trade and commerce, and the economic development of our coastal regions depend upon ESSA ships' conducting surveys from which are derived essential products and services These needs are rapidly growing The recently released report of the President's Commission on Marine Science, Engineering and Resources has recommended a program of nautical charting to be accomplished by ESSA on a 50-year cycle that requires the equivalent of 16 Class II vessels operating at sea 200-220 days per year The program is necessary to insure up-to-date charts of all areas of moderate-to-heavy marine activity The Commission also recommended a comprehensive continental shelf mapping program to be accomplished by ESSA in support of federal agencies charged with management of marine resources and of industries engaged in resource development According to our analysis, it will require five equivalent Class I and Class II vessels operating 225 days per year at sea to complete this task within a 16-year time frame (A 10-year time frame was recommended by the Commission) In view of these growing requirements, as well as those of our research laboratories and the national program of ocean surveys, the withdrawal of ships from ESSA is considered not to be in the national interest

With further regard to the suggested number of days at sea that ESSA vessels could be operated in order to accomplish the same amount of work with fewer resources, we have reservations about the validity of some of the figures used to develop this conclusion, specifically, the assumption that the increase in total variable costs resulting from increased days at sea can be computed by making a linear projection of ships' variable costs only According to the analysis of the C&GS, successive increments in time at sea eventually result in larger dollar penalties per unit of increase, i e , increased daily operating costs An optimum number of days at sea must be derived for the efficient use of each ship, depending upon the type of operation performed and the geographic area of the operation The report did not address this important aspect of the problem

With these reservations, I believe that this report to the Congress will highlight a need by the Environmental Science Services Administration for additional resources more efficiently to utilize the valuable facilities that the Congress has provided I am enclosing for your information an internal document which is a more detailed reply to the Administrator of ESSA from the Coast and Geodetic Survey, the major line component responsible for operation of vessels in support of all ESSA programs The C&GS reply amplifies the points discussed herein

Sincerely yours,

Myron Tribus

Myron Tribus

Enclosure

EXECUTIVE OFFICE OF THE PRESIDENT
NATIONAL COUNCIL ON MARINE RESOURCES
AND ENGINEERING DEVELOPMENT
WASHINGTON 20500

EXECUTIVE SECRETARY

May 2, 1969

Dear Mr. Eschwege:

Thank you for the opportunity to comment on the draft Report to the Congress related to U. S. Coast and Geodetic Survey operations, "Opportunity for Increased Utilization of Research and Survey Ships." Optimal utilization of ocean research and survey ships is essential for carrying out the national policies set forth in the Marine Resources and Engineering Development Act of 1966. We appreciate the interest the General Accounting Office has taken in the broad and complex problems of oceanographic ship activities, an area of direct interest to the National Council on Marine Resources and Engineering Development.

I fully concur with the Report's recommendations to the Assistant Secretary of Commerce for Science and Technology concerning a manpower reserve, increased ship utilization, and review and reevaluation of the need for additional vessels. However, I should like to comment briefly on several related considerations.

The lack of an explicit Federal policy linking investment decisions to construct ships to a commitment of future resources for their full utilization is a basic issue that during the past decade has been addressed only within the Department of Defense. Curtailment of important ocean exploration and survey programs of civilian agencies which are designed to respond to an array of unmet national needs or transfer of currently underutilized ships from civilian to military control are not satisfactory substitutes for such a policy or lack of adequate funding in the immediate future. Should four Coast and Geodetic Survey ships be transfered to Navy control, for example, operational costs per day would not decrease and there would be attendant dislocations in both Navy and Coast and Geodetic Survey programs.

If use of the ocean's fishery and mineral resources is to increase significantly within the next several decades, then greater

effort must be made to survey and map large, unexplored ocean areas. To this end, initial steps have been taken within the national marine science program to intensify the bathymetric and geophysical mapping of U. S. continental shelves, primarily through efforts of the Coast and Geodetic Survey. Further acceleration of surveys of the bathymetry and geophysics of U. S. nearshore waters and continental shelves was recommended by the Commission on Marine Sciences, Engineering, and Resources to permit completion of this program within ten years. Regional underseas maps would thus be available earlier to aid beneficial use of U. S. continental margins, including establishing sound offshore leasing, regulatory, and conservation policies.

At the same time, improving the utilization of research and survey ships to accelerate coastal mapping requires additional funds and higher personnel ceilings for a manpower reserve. While the need for such funds to enhance productivity is widely recognized, the allocation of limited Federal resources has not permitted all improvements to be made that contribute to greater efficiency and should be made. Implementation of this study's recommendation will contribute to raising important ocean mapping and charting programs to higher levels of support and service.

To clarify the current status of the Council two additional statements might be added to the second complete paragraphs of page 6, namely "Public Law, 90-242 of January 2, 1968 extended the life of the Council until June 30, 1969. Legislation is being considered in the 91st Congress to continue the Council until June 30, 1970."

We welcome the contribution the report will make to understanding of important issues related to intensifying our marine science efforts and hope this excellent study will be broadly reviewed by the Congress.

Sincerely,

Edward Wenk, Jr.

Mr. Henry Eschwege
Associate Director
United States General Accounting Office
Washington, D. C. 20548

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

	Tenure of office	
	From	To
SECRETARY OF COMMERCE:		
Maurice H. Stans	Jan. 1969	Present
Cyrus R. Smith	Mar. 1968	Jan. 1969
Alexander B. Trowbridge	June 1967	Mar. 1968
Alexander B. Trowbridge (acting)	Feb. 1967	June 1967
John T. Connor	Jan. 1965	Jan. 1967
Luther H. Hodges	Jan. 1961	Jan. 1965
UNDER SECRETARY OF COMMERCE:		
Rocco C. Siciliano	Feb. 1969	Present
Joseph W. Bartlett	Aug. 1968	Jan. 1969
Howard J. Samuels	Nov. 1967	July 1968
J. Herbert Hollomon (acting)	Feb. 1967	Oct. 1967
Leroy Collins	July 1965	Oct. 1966
Franklin D. Roosevelt, Jr.	Mar. 1963	June 1965
ASSISTANT SECRETARY FOR SCIENCE AND TECHNOLOGY:		
Myron Tribus	Mar. 1969	Present
Allen V. Astin (acting)	Feb. 1969	Mar. 1969
John F. Kincaid	Oct. 1967	Feb. 1969
Allen V. Astin (acting)	July 1967	Sept. 1967
J. Herbert Hollomon	May 1962	July 1967

PRINCIPAL OFFICIALS OF

THE DEPARTMENT OF COMMERCE

RESPONSIBLE FOR THE ADMINISTRATION OF

ACTIVITIES

DISCUSSED IN THIS REPORT (continued)

	Tenure of office	
	From	To
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION (note a)		
ADMINISTRATOR:		
Robert M. White	July 1965	Present
DEPUTY ADMINISTRATOR:		
John W. Townsend, Jr.	July 1968	Present
Werner A. Baum	Jan. 1967	July 1968
Rear Adm. H. Arnold Karo	July 1965	Dec. 1966
COAST AND GEODETIC SURVEY (note b)		
DIRECTOR:		
Rear Adm. Don A. Jones	Sept. 1968	Present
Rear Adm. James C. Tison, Jr.	July 1965	Sept. 1965
Rear Adm. H. Arnold Karo	July 1955	July 1965

[a]Agency established effective July 1965 pursuant to Reorganization Plan No. 2.

[b]Agency became part of ESSA effective July 1965.

U S. GAO, Wash , D.C