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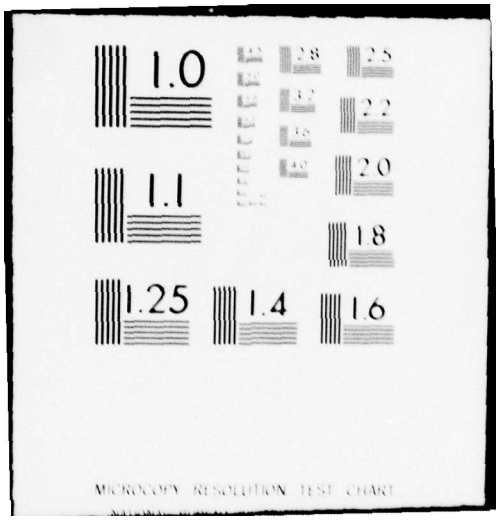
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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

EQUIPMENT REPLACEMENT PROBLEMS AT NAVY INDUSTRIALLY FUNDED (NIF) RESEARCH, DEVELOPMENT, TEST AND EVALUATION (RDT&E) ACTIVITIES

by

Donald Reid Bridges

December 1978

Thesis Advisor: L. Darbyshire

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Recent trends indicate a growing acceptance, even pressure, to expand the authority of managers by allowing the capitalization of equipment. Statements by the General Accounting Office, the Defense Audit Agency and the OSD Assistant General Counsel indicate that capitalization of equipment is indeed a valuable management tool.

The writer recommends that the Navy obtain authority to capitalize general purpose equipment at the NIF RDT&E activities, as a tool necessary for the accomplishment of their respective missions.

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Equipment Replacement Problems at Navy Industrially Funded (NIF) Research, Development, Test and Evaluation (RDT&E) Activities

by

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B.A., George Washington University, 1962

Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

For many years the Navy industrially funded (NIF) Research, Development, Test and Evaluation (RDT&E) activities have been forced to utilize appropriated funds as the primary resource for replacement of general purpose equipment. In recent years, the budget review process has been such that these funds have been drastically reduced, creating a management problem for the activities.

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The writer recommends that the Navy obtain authority to capitalize general purpose equipment at the NIF RDT&E activities, as a tool necessary for the accomplishment of their respective missions.

TABLE OF CONTENTS

I. INTRODUCTION

A. RESEARCH PROBLEM

1. Description of problem

The National Security Act of 1949 authorized the Secretary of Defense to establish working-capital (industrial) funds "in order to more effectively control and account for the cost of programs and work performed." Prior to the adoption of this Act the various Department of Defense activities operated under appropriations which did not provide for the identification of costs to programs. Industrial funds are designed for activities that provide services that can be charged to customers, primarily within the DOD, in a fashion similar to private industry operations. The Major objective is to charge the customer for all services associated with his programs, in order to provide more visibility as to the true cost of these programs. Through a commercial type accounting system the customers are billed for the major portion of costs incurred in support of his programs. This includes salaries, materials, travel, subcontracting, and maintenance costs. Certain other costs such as facilities, aircraft, rolling stock, and general purpose equipment are not charged to the customer. They are still provided by appropriations separate from the industrial funds.

Since 1949 many activities within the Navy have been converted to an industrial fund (NIF) accounting system. Included are the major activities that perform research, development, test and evaluation in warfare areas of primary interest to the

Department of the Navy. Many of the activities had their beginning around the end of the Second World War. Some of them even precede this era. The result is aging facilities which are becoming increasingly difficult to replace in the present political environment where the public is insisting on lower government expenditures.

2. Thesis objective

This thesis will concentrate on one area of the facilities problem, the replacement of aging general purpose equipment. A large portion of this equipment is purchased with funds provided under RDT&EN Program Element 65862N, Instrumentation and Material Support. As can be seen in Appendix A, this element finances special minor construction and facilities projects as well as general purpose equipment.

Equipment budgets are prepared by the individual NIF activities and submitted to their parent commands. These requirements are then integrated into program elements in the Navy budget. The review process through DOD and OMB generally results in reductions to these budget submissions. As can be seen in Appendix A, funding for the Director of Navy Labs under Program Element 65862N has been reduced from $15,797,000 in FY 1972 to $11,013,000 in FY 1977. Within this element there are special requirements that must be met prior to the allocation of funds for equipment. Examples of these requirements are: (1) facilities for the relocation of personnel in FY 1974 costing $3.1 million; and, (2) purchase of a computer costing $3.8 million in FY 1976. Once these special requirements are met, the balance that is left over is then available for

purchasing general purpose equipment. Although this element does not fund all of the activities' equipment requirements, it is a rather typical example of equipment funding patterns.

It is hypothesized that replacement of general purpose equipment at the NIF RDT&E activities has been controlled by the amount of dollars available rather than by a logical management decision-making process that would provide for the replacement of equipment as needed. Appendix A reflects funding for general purpose equipment at the DNL activities fluctuating from a high of $10.9 million in FY 1972 to a low of $3.4 million in FY 1976. These numbers are in actual dollars, not adjusted for inflation.

There has been considerable discussion over the years as to whether the industrial fund activities should be allowed to depreciate equipment and set up a reserve for replacement of aging equipment. Such authority would bring the industrial fund activities more in line with the accounting and management procedures practiced in the commercial world. The thesis will attempt to prove that aging equipment at the NIF RDT&E activities is approaching a critical point and that reliance upon appropriated funds for replacement is not optimal in the present funding environment. There are various solutions to the problem; however, the capitalization of equipment appears to be the best one, since it would conform to commercially accepted practices for the replacement of equipment. The capitalization of equipment will allow the amortization of equipment costs over its useful life and as a result reflect a better picture of actual program costs. The accumulation of a reserve will provide

local management with the funds required for the orderly replacement of aging general purpose equipment.

3. Approach

In order to properly research this problem, it was necessary to acquire a considerable amount of historical data. This was done through;

1. Interviews with knowledgeable personnel in the DOD:

2. A search of the legislation and regulations implementing industrial fund operations in the DOD; and,

3. A questionnaire to be filled out by activities that would provide a reasonable sample for developing a data base.

The introduction provides a rationale for the selection of the activities along with a description of their financial and management responsibilities to the Navy.

Chapter II provides the background related to equipment management and financing problems, with an emphasis on the dilemma faced by the activity management in providing equipment sufficient to perform its mission in an environment of shrinking dollars.

Chapter III provides input from the activities on the age and replacement rates of equipment, along with their suggestions for improvement of the system.

Chapter IV provides some opinions expressed by the General Accounting Office, and a description of the efforts of the Defense Communications Agency to acquire authority to capitalize equipment.

Chapter V is an analysis of the financial impact of capitalization on the activities.

Chapter VI arrives at the conclusion that the Navy should, in the light of recent successes by the Defense Communications Agency, and the opinions expressed by the Defense Audit Agency and the General Accounting Office, pursue obtaining the authority necessary for the NIF RDT&E activities to implement capitalization of equipment.

B. BACKGROUND

1. Selection of activities

There are approximately 38 Navy activities involved in Research, Development, Test and Evaluation of Navy and other DOD weapons and systems. Only 12 of the major activities are depicted here since they operate under the industrial fund. These 12 activities make up approximately 85% of the resources of the activities classified as RDT&E. [Ref. 1]

2. Financial Management Structure

On 8 May 1975 the Assistant Secretary of the Navy for Research and Development established a functional structure to facilitate improved financial management at RDT&E activities under the NIF financial system, with the objective of improving financial management at all levels within the RDT&E community. He designated the Comptroller of the Office of Naval Research/ Special Assistant (Financial Management) to the Assistant Secretary of the Navy (Research and Development) to chair a council made up of financial representatives of the 12 laboratories and the systems commands responsible for their management. This council was charged with the responsibility to act as a nucleus for policy and procedures interchange. [Ref. 2]

On 16 December 1977 the Secretary of the Navy established the Department of the Navy Industrial Fund Advisory Board to provide for a comprehensive review of the operation and management of the NIF. Membership included the Special Assistant (Financial Management), Assistant Secretary of the Navy (RE&S) [Ref. 37].

3. Organizational Relationships

The activities included in this thesis report to the Director of Navy Laboratories, the Naval Air Systems Command, the Office of Naval Research and the Naval Facilities Engineering Command. They include:

Director of Navy Laboratories:

- Naval Air Development Center (NADC), Warminster, Pa.
- Naval Coastal Systems Center (NCSC), Panama City, Fla.
- Naval Ocean Systems Center (NOSC), San Diego, Ca.
- David W. Taylor Naval Ship Research and Development Center (DTNSRDC), Bethesda, Md.
- Naval Surface Weapons Center (NSWC), White Oak, Md. and Dahlgren, Va.
- Naval Underwater Systems Center (NUSC), Newport, R.I.
- Naval Weapons Center (NWC), China Lake, Ca.

Naval Air Systems Command:

- Naval Air Propulsion Center (NAPC), Trenton, N.J.
- Naval Air Test Center (NATC), Patuxent River, Md.
- Pacific Missile Test Center (PMTC), Pt. Mugu, Ca.

Office of Naval Research:

Naval Research Laboratory (NRL), Washington, D.C.

Naval Facilities Engineering Command:

Civil Engineering Laboratory (CEL), Pt. Heuneme, Ca.

Appendix B /Ref. 17/ is an organization chart which provides the command relationships of these activities.

4. Mission Statements

The missions of these activities are to provide the Navy with scientific research and development, and to function as principal centers for air, surface and undersea warfare programs. Appendix C /Ref. 17/ provides a detailed statement of these missions. These activities have historically provided the Navy with an in-house capability of complementing and monitoring the R&D effort provided by private industry. In many cases they have expertise, facilities and equipment which are not available in the private sector.

5. Customers of NIF RDT&E activities

During Fiscal Year 1978 the Navy RDT&E NIF activities were responsible for a program of almost $1.9 billion. As can be seen in Appendix D /Ref. 17/, these activities perform 95% of their work for the Navy. The balance of the work is for other DOD agencies (3%) and non-DOD (2%). They work primarily with individual program managers within the systems commands on various RDT&E projects. They maintain a buyer/seller relationship similar to that of private industry.

As might be expected, the activities work primarily for the systems commands that have responsibilities in their

special mission areas. The Naval Air Systems Command is the primary customer for activities such as NADC, NWC, NAPC, NATC and PMTC, whose missions are air related. The Office of Naval Research and the Naval Electronics Systems Command are the primary sponsors of NRL. The Naval Sea Systems Command is a primary sponsor for activities such as NCSL, NOSC, DTNSRDC, NSWC, and NUSC whose missions are related to surface and undersea programs.

Although the majority of the funds that support these activities are from the RDT&EN appropriation (64%), a substantial amount of funds is received from the Procurement and O&MN appropriations, primarily for support and modification of systems already in production or in the fleet. Appendix E /Ref.1/ provides a detailed breakdown of such funding by activity.

6. Resources of NIF RDT&E Activities

These activities employ almost 30,000 civilians and 4,200 military personnel. Over 17,000 of the civilian personnel are considered professional scientists, engineers, and technicians. The balance are wage board, administrative and other support personnel. The average grade is a GS-10 with a salary of approximately $17,000 a year. The military personnel are primarily in command roles with the largest numbers associated with the operation of military functions such as air stations at NWC, NATC and PMTC. These activities occupy a land mass of almost 1.2 million acres; however, 1.1 million acres is associated with land ranges at NWC. These numbers do not include over the water range areas such as those

managed by PMTC. The value of the land and buildings occupied is approximately $1 billion at acquisition cost, which in most cases dates back some 30 years. Present, or replacement, value would be considerably higher. Appendices F, G, and H /Ref. 1/ provide additional details on the resources of these activities.

7. Navy Industrial Fund Financial System

The Navy Industrial Fund was established under the provisions of the National Security Act of 1949 (10 U.S. Code 2208) which authorized the Secretary of Defense to establish working capital funds and prescribe regulations governing the operations of the industrial fund activities /Ref. 4/. The regulations which govern the operations and accounting procedures of the industrial fund activities are contained in DOD Directive 7410.4 /Ref. 5/ and are further refined for the Navy activities in the Navy Comptroller Manual /Ref. 6/. The specific accounting procedures for the NIF RDT&E activities are contained in the Navy Industrial Fund Handbook, NAVSO P-3045 /Ref. 7/.

The primary advantages of the industrial-commercial (NIF) activity have been described as providing:

1. More effective means of determining costs for goods and services as a basis for billing customers.
2. More effective and flexible means for financing, budgeting, and accounting for operations.
3. Greater sense of responsibility and restraint in the ordering of goods and services based upon availability of funds.

4. More direct and rapid control of the quantity of support activities.
5. A more complete consumption-type budget and accounting structure by which costs of goods and services furnished may be budgeted and accounted for under the program or function for which they have an end use [Ref. 8, p. 206].

The Navy Industrial Fund accounting is a system of commercial accounting techniques adapted to the special requirements of the Federal government. NIF activities employ the double-enetry bookkeeping method and maintain a chart of accounts. The annual operating results are summarized in the conventional accounting format, a balance sheet, and an income statement. However, a NIF balance sheet cannot be interpreted in the same fashion as the balance sheet of a private firm. The most glaring difference is the absence of long-term capital assets and the omission of depreciation expense on income statements [Ref. 9].

II. EQUIPMENT MANAGEMENT

Two major problems have received attention recently in regard to management of equipment in the government laboratories.

The General Accounting Office and the General Services Administration have decided that the government laboratories are not properly managing the equipment that has already been acquired. As discussed later they have directed that procedures be instituted in order to better manage this equipment.

The second problem involves the decision process involved in the replacement and financing of the acquisition of equipment. This problem has received considerably less attention, perhaps because of the lack of funds available for the replacement of equipment.

A. LABORATORY EQUIPMENT MANAGEMENT POLICIES IN THE FEDERAL GOVERNMENT

There has been considerable interest over the years in the management of laboratory equipment by the Federal government. Many attempts have been made to improve said management.

The General Services Administration, in a ruling effective 5 July 1978, stated that "additional controls are established, to be observed by Federal agencies in the management of laboratory and research equipment in Federal laboratories. The additional requirements strengthen currently prescribed management practices and are intended to further promote the use of already owned equipment instead of the procurement of similar new equipment." [Ref. 107]. The ruling further states:

"Controls for use by Federal agencies in managing laboratory and research equipment in Federal laboratories have been prescribed in the Federal Property Management Regulations (FPMR) since November 1969. These controls, which are intended to promote the maximum use of equipment already owned instead of the purchase of similar new equipment, include the practice of inspection tours, or 'walk-through,' to identify idle and unneeded equipment available for reassignment and the establishment of equipment pools to foster the sharing of equipment.

"Follow up surveys conducted to measure efficiency in Federal laboratory equipment utilization led the GAO to conclude that the controls referenced above are not generally being employed in Federal laboratories or are not being employed effectively. In a report to the Congress entitled 'More Improvement Needed in Equipment Management Practices in Government Laboratories' (PSAD-76-37), the Comptroller General of the United States recommended specific additional controls for incorporation into the FPMR to strengthen the management practices currently prescribed. In brief, these additional controls included the following:

a. The establishment of teams of top management and scientific personnel to conduct laboratory walk-throughs and report their findings to the agency head;

b. The establishment of equipment pools in laboratories or the submission in writing to the agency head of the reasons why a pool is not needed;

c. The preparation of an annual report for submission to the agency head concerning the use and effectiveness of the pooling of equipment; and,

d. The periodic independent review by each agency of walk-through practices and equipment pool operations to determine their effectivensss."

The General Services Administration ruling /Ref. 10/ proceeds to implement in considerable detail the recommendations of the General Accounting Office /Ref. 11/.

Reference 11 recommended the establishment of management walk-throughs, equipment pools and elapsed-time meters to record equipment-operating time and indicate equipment use. The responses from the various agencies involved with the

program indicated a willingness to cooperate with the walk-through and equipment pool regulations, but expressed considerable doubt as to the value of the elapsed-time meters.

The success of such efforts is difficult, if not impossible, to evaluate. The level of "waste" or "mismanagement" must be evaluated in the light of the cost of executing micromanagement policies which are almost unenforceable, and in many cases wasteful themselves. Such regulations tend to create bureaucracies that suboptimize management within each laboratory. These regulations are an indictment of the management of the laboratories, as well as an admission of poor accountability on the part of the federal system.

B. EQUIPMENT MANAGEMENT PROBLEMS IN PRIVATE INDUSTRY

Private industry also is beginning to recognize a problem in the utilization as well as accounting for its equipment. One recent estimate gives a clue to its magnitude. According to President Thomas A. Maio of American Appraisal Co., the country's largest appraisal firm, up to 15% of industry's fixed assets have disappeared from company property but are still listed on balance sheets. Based on the estimated total of more than $750 billion that U.S. industry had invested in fixed assets in 1973, the last year for which figures are available, this means that as much as $112 billion worth may not exist. The companies themselves are mainly to blame for this situation, largely because of inadequate communications between the operating units that buy and use the assets and

the accounting departments that record and control their costs. Operating personnel aren't under much pressure to follow through from the purchase to the eventual disposal of every item. All kinds of property -- from typewriters to expensive electronic equipment to machine tools -- are sold, scrapped, destroyed or "cannibalized" every year without ever being reported to the accounting department. Technical people often tear assorted electronic devices apart and use the components to build completely new machines [Ref. 12]. These are problems that are also common to management at the NIF RDT&E activities.

C. EQUIPMENT FINANCING UNDER DOD WORKING CAPITAL FUNDS

The issue of capitalization and replacement of equipment at activities operating under working-capital (industrial) funds has been receiving attention since the enactment of the National Security Act of 1949. During the early 1960's the Accounting and General Counsel segments of the DOD Comptroller made efforts to implement the capitalization authority as they perceived existed under the Act. This effort was not concurred with by the Budget side of DOD.

Sec. 405 (c) of the National Security Act Amendments of 1949 states:

> "(c) Such funds shall be--
>
> "(1) charged, when appropriate, with the cost of stores, supplies, materials, and equipment procured or otherwise acquired, manufactured, repaired, issued, and consumed and of services rendered or work performed, including applicable administrative expenses; and
>
> "(2) reimbursed from available appropriations or otherwise credited for the cost of stores, supplies, materials, or equipment furnished and of services rendered or work performed, including applicable administrative expenses."

The codification of this law, Title 10, section 2208 of the U.S. Code, provides the following statement relative to Sec. 405:

> "(c) Working-capital funds shall be charged, when appropriate, with the cost of--
>
> "(1) supplies that are procured or otherwise acquired, manufactured, repaired, issued, or used; and
>
> "(2) services or work performed;
>
> including applicable administrative expenses, and be reimbursed from available appropriations or otherwise credited for those costs, including applicable administrative expenses and costs of using equipment."

The controversy over the intent of the Congress centers around the last five words "and costs of using equipment" inserted during the codification of the Act. In a memorandum dated 2 February 1960, Mr. Maurice H. Lanman, Jr., Assistant General Counsel (Fiscal Matters), recommended, among other things that these words be added to Section 2208. He further stated that:

> "Section 405 of the National Security Act of 1947, as amended, provides the authority for the establishment and operation of working capital funds (industrial funds and stock funds) in the Department of Defense, thereby enabling the businesslike operation of activities in the Department which most readily lend themselves to such an arrangement. .... The following quotation is contained in the House Report on the Department of Defense Appropriation Act, 1957:
>
> > 'The Committee * * * * endorses the principle that replacement of machinery and equipment, other than major capital items, consumed in producing material or services under industrial funding should be included in costs and recouped from customers.' * * * *
>
> The principle of authorizing a charge to the customer of a working capital fund for an increment of costs attributable to the use of machinery and equipment used in the performance of work or services is authorized and implemented in established working capital funds of government agencies." /Ref. 13/.

To reinforce this position, Mr. Daniel Borth, Deputy Assistant Secretary of Defense for Accounting and Audit, sent a memorandum dated 15 October 1962 to Mr. Joseph Hoover, Deputy Assistant Secretary of Defense for Programs and Budget stating the following:

> "This is to advise you that P.L. 87-651 provides, in part, authority for charging working capital funds with the cost of equipment and reimbursement from customer appropriations for the cost of using equipment.
>
> My staff is currently developing funded depreciation accounting procedures to implement the above provisions of P.L. 87-651."

A proposed DOD Instruction was prepared in 1963 which would have authorized and prescribed procedures for the procurement and production of equipment for use by industrial-fund activities, and authorized charging for equipment usage as an element of expense in performance of work and services [Ref. 14].

At this point the trail becomes cold. However, discussions with DOD personnel [Ref. 15] indicates that DASD Borth did endorse charging working capital funds for the costs of capital equipment. DASD Hoover was not at all receptive to the depreciation policy, and due to his personal influence the effort was abandoned.

Subsequent DOD guidance relative to general purpose equipment reiterates this philosophy. The DOD regulations governing industrial fund operations [Ref. 16] provides the following instructions:

> "Plant and equipment shall not be included as assets of the industrial fund, except as specifically authorized by the Assistant Secretary of Defense (Comptroller). However, memorandum accounts will be established in the industrial fund general ledger for such assets and the related reserve for depreciation.

"Except as provided above, costs of acquisitions or improvements of real property, machine tools and other plant and equipment, and any other investment type property for use in the operations of an industrial fund activity, shall be financed under appropriated funds."

These statements say in effect that the industrial fund activities should keep memorandum records of depreciation of equipment; but that they cannot charge this depreciation to their customers, nor can they purchase said equipment from the industrial fund. The DOD on accounting for research and development [Ref. 17] further implements this guidance with the following:

"Distribution of depreciation on investments to benefiting R&D projects is not a mandatory requirement since such distribution normally has no recurring management use. However, depreciation costs are required to be accounted for statistically at activities financed by industrial or service fund. Depreciation costs may be allocated to R&D projects when such allocation will serve a valid local management need. Allocation of depreciation should be made at installation level or other location where the best basis exists for equitable distribution of these costs. In any case, the investment accounts should be available for simulation of approximate depreciation costs if and when such information is required for such purposes as user charges or special analysis."

To this writer these provisions appear to conflict with the philosophy set forth under the objectives section of Reference 17, as follows:

"Specific objectives, when industrial funds are used, include the following:

"To furnish managers of industrial and commercial-type activities with modern management tools comparable to those utilized by efficient private enterprises engaged in similar types of activities;

"To provide an incentive for managers of industrial fund activities to improve cost estimating and cost control through use of cost standards by requiring a contractual relationship between producer and ordering agencies;

"Require ordering agencies to budget, control and account for the cost of all goods and services ordered, rather than allow them to obtain goods and services free. Conversely, at the industrial fund activity the objective shall be pursued of reducing the amount of goods and services not paid for from the industrial fund."

D. NAVY INTERNAL MANAGEMENT CONFLICTS

These regulations impede the managers of industrial fund activities in the prosecution of their missions, particularly in light of overall management responsibilities imposed by the military departments and the parent commands. The Secretary of the Navy has made the following policy statements regarding the management of Navy research and development laboratories [Ref. 18]:

"The military officer (or comparable civilian designee) ordered to command the laboratory by component authority will be responsible for overall management of the laboratory, and will exercise the usual functions of command including compliance with legal and regulatory requirements; liaison with other military activities as well as general supervision of the quality, timeliness, and effectiveness of the technical work and of the support services.

"It is the policy of the Navy that the facilities of its technical installations be of first quality, competitive with the facilities of other organizations where comparison is legitimate, and suitable to the pursuit of the mission of the installation."

The Chief of Naval Material has specifically levied management responsibilities, as follows [Ref. 19]:

"The commanding officer/commander and the technical director (CO/TD) of the laboratories/centers are personally responsible for the technical excellence of their activities' personnel and work. The matching of resources and workload within established/directed restraints of ceiling point, contracting levels, discretionary funding, facilities, etc., while producing quality products within budget and on time, is also a responsibility that rests with the CO/TD."

The laboratory/activity commander has been made responsible for overall management, including adequacy of the general purpose equipment that supports his mission. If the funding for equipment were sufficient to perform the mission, there would be no serious problems. However, as this thesis will demonstrate, there are problems with the levels of funding. The regulations governing the purchase of equipment have resulted in the fragmentation of management responsibilities.

E. SOURCES OF GENERAL PURPOSE EQUIPMENT FUNDING

General purpose equipment is that equipment which supports the overall RDT&E mission of the activity. It is considered separately from project equipment which, although they may be similar items of equipment, is purchased to support a particular project, and funded directly by the sponsor of that project. Another category of equipment which is not considered here relates to test and evaluation equipment, which is managed and funded by the Naval Air Systems Command. This equipment is primarily for the instrumentation of the ranges and test facilities of the test and evaluation activities. It is general purpose in that it supports the overall mission of the activities; however, due to its high cost, is financed by appropriated funds.

Starting with the FY 1980 budget, equipment costing less than $3,000 may be purchased as an expense item and charged to the overhead accounts of the individual activities [Ref. 20]. Prior to FY 1980 these equipment purchases on overhead were limited to $1,000.

Under special conditions the fast payback method of financing equipment purchases may be used. This method is limited to purchases up to $100,000 which may be charged as an expense type item to the industrial fund. There are two criteria for determining a fast payback investment: (1) the investment must produce "real" savings by reducing operating costs and (2) the anticipated savings for a two-year period must at least equal the investment cost [Ref. 21].

The balance of funding for equipment is split into many budget line items, primarily within the RDT&EN appropriation, and come from various sponsors, as portrayed in Appendix I. There are 12 different categories of general purpose equipment which are managed and funded by a combination of sponsors. All of these categories require individual budget justifications and in most cases require detail by each item of equipment. Historically, those categories managed and funded by the activities' parent command have retained flexibility in that funds could be reprogrammed from one category to another to meet the individual activity's requirements. As shown in Appendix I (col. 3) some categories of equipment are managed and approved by one systems command on a Navy-wide basis, but funded by the parent command. Still other categories (col. 4) are managed and funded on a Navy-wide basis by one systems command. A single activity can receive management control and funds for as many as 12 categories of general purpose equipment from as many as 6 different sponsors.

There is merit in having a single sponsor handle the procurement of specialized items of equipment, as NavAir does with

photo collateral equipment. They have the expertise to select the items of equipment and negotiate the best contracts to procure photo collateral equipment that meets the needs of the activities at the least cost. However, the issue that does not retain merit is that available funds, rather than local management needs, becomes the pacing factor in the decision as to which items will be purchased. This situation is essentially the case in all equipment categories.

II. NIF RDT&E ACTIVITY EQUIPMENT STATUS

In general, the responses to the questionnaire sent to the 12 NIF RDT&E activities were excellent. However, due to various levels of record keeping capabilities and in some cases misinterpretation of the request, there are inconsistencies which make a complete comparison of all 12 activities difficult. However, there are enough data to provide meaningful analysis.

A. EQUIPMENT REPLACEMENT

1. Aging of Equipment

With responses from 10 of the 12 activities, the items of equipment total over 67,000 with an original cost of $520 million. If the wholesale price index for general purpose machinery and equipment was applied to these costs (as was done by the Naval Research Laboratory in its submission), the replacement cost for this equipment would be $954 million. As can be seen in Appendix J: 21% of the equipment is 0-5 years old and would cost $131 million to replace; 30% of the equipment is 6-10 years old and would cost $304 million to replace; 25% of the equipment is 11-15 years old and would cost $264 million to replace; and, 24% of the equipment is over 15 years of age and would cost $255 million to replace. It can be concluded that less equipment was purchased during the last five years than during any five year period in the history of the activities. The trend becomes even more significant when one considers that the figures in Appendix J include only those items of equipment

still on the books of the activities.[1] It does not reflect equipment that has been removed from use during this time frame.

There are, of course, variations in the above trend between the ten activities. Appendix K demonstrates an increase in the level of equipment in the last five years at four activities. For the same period there was a decrease at six activities. The four increasing activities also show less equipment in the older age categories. This could be because they are better at locating fund sources for equipment. However, it could be that they are more aggressive in accounting for equipment, and removing old equipment from the books.

An even more interesting trend is reflected in Appendix L. The price paid for a piece of equipment (adjusted by the Consumer Price Index) has come down an average of 44% in the age category 0-5 years as compared with the age category 6-10 years. This trend is true in all of the 10 activities. There is no explanation offered; however, one could assume either: (1) a shift in equipment purchasing patterns; (2) an improved pricing structure due to state of the art advances in electronics; or, (3) increased leasing of higher priced equipment.

2. Replacement rates

The responses from 10 of the 12 activities indicate an average replacement rate for the last five years of less than

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[1]The figures in Appendix J include all equipment on the books of the NIF RDT&E activities. These include general purpose equipment, project equipment, and test and evaluation equipment, which is provided by NASC to NAPC, NATC, PMTC, and NWC to finance expensive range instrumentation equipment. The records are such that a breakdown of these types of equipment is not available without a time consuming search of the files.

2%. This percentage is arrived at by taking the ratio of the total plans for these 10 activities ($1.6 billion) to the replacement cost on Appendix J ($131 million ÷ 5 = $26 million). One activity made the following statement:

> " .... approximately $1.2 million are needed each year for replacement purchases. The Center has only approximately $15 to 20 thousand available annually for this purpose. As a result, project funds are used to supplement the available 6.5 funds."

Appendix M is an excerpt from a National Bureau of Standards (NBS) report which provides investment rates for equipment at selected private, federal, and foreign laboratories. The rates at private laboratories ranged from 4.4% to 14.3% of the annual budgets. The rates at federal laboratories ranged from 3.5% to 12.3% with a weighted average of 7.2%. The rates at foreign laboratories were from 7.5% to 22.4%. The data are not completely comparable since the NBS figures contain leased as well as purchased equipment, while the data from the Navy NIF RDT&E activities is based only on purchased equipment.

3. Backlogs of Equipment Requirements

Seven of the R&D type activities reported a backlog of equipment requirements of almost $26 million. The numbers are impressive, although they are probably somewhat subjective and should receive considerable evaluation prior to acceptance. However, the fact remains that there is a backlog and the replacement funds have not been forthcoming from the existing system. The primary comments from the activities revolved around the equipment being obsolete, difficult and expensive to service, and a need to upgrade capacity to meet future requirements for programs, as well as to lower costs to sponsors.

4. Maintenance of Equipment

The maintenance of aging equipment is a real problem; however, it is one that is difficult to evaluate in terms of dollars and cents. The Navy T&E Consolidated Long Range Plan of February 1978 stated:

> "A large percentage of Navy T&E facilities and equipment is being operated beyond its useful life. The consequence of continuing to operate aged facilities will be rising maintenance and operating costs and reduced technical capability."

The problems related to test and evaluation equipment certainly extend to general purpose equipment. Maintenance costs are easy for the activities to absorb since they are charged to the NIF. Purchase costs are exposed to Congressional review and become subject to arbitrary cuts without a thorough evaluation of activity needs. For many years the DOD has taken the path of least resistance. As a result the condition of equipment has reached the stage where some hard decisions must be made.

B. PRESENT ALTERNATIVES

1. Leasing of Equipment

Automatic data processing equipment and office machines appear to be the areas where leasing is most predominant. In many instances the activities felt that purchasing would be more economical than leasing. Appendix N compares the cost of purchasing a typical piece of equipment with the costs of leasing and of a lease/purchase contract. In comparison with leasing, purchasing becomes the most economical alternative if the equipment is to be retained for four years or more. The lease/

purchase contract is the most advantageous in comparison to straight leasing if the equipment is to be retained five years or more. The lease/purchase contract is, of course, more costly than outright purchase; however, it does allow the purchasing decision to be delayed until the end of the third year.

There are advantages to leasing. It can be less expensive in an era of fast changing technology. As can be seen in Appendix N, this particular piece of equipment would be cheaper to lease through the first 3 years of its life. It allows the activities flexibility to change equipment configurations due to changing requirements. Also, it allows them to take advantage of equipment capabilities that might need to be upgraded due to technological advances. Where there are uncertainties about, performance, leasing allows time to complete an evaluation prior to a major commitment of funds. Leasing should be a viable option left open to the management of the local activities, to be applied when circumstances warrant, not simply as an alternative to overcome a lack of appropriated funds. Again, we have the situation where the availability of funds determines the selection of an alternative, not a logical decision making process.

2. Fast Payback

As discussed earlier, fast payback [Ref. 21] can be used to purchase equipment that will reduce operating costs and pay for itself over a period of no more than two years. The NIF RDT&E activities have been taking advantage of this system. The seven CNM laboratories had projects totaling $604,655 approved

during FY 1977. For the first six months of FY 1978 projects totaling $994,262 were approved. The Navy Research Laboratory (under the Office of Naval Research) has invested a total of $182,400 over this period, with an estimated payoff of $153,700 annually in operating cost savings.

The responses of the activities were overwhelmingly in support of this program since it allows them to supplement the limited 6.5 funds with NIF funds to purchase investment items. However, they were almost unanimous in expressing the need to extend the payback period and increase the dollar level above the current $100,000 limitation.

One of the areas in which this method is used is in converting lease contracts to outright purchase. As can be seen in Appendix N, this particular piece of equipment would not qualify for fast payback until the end of the third year, where the cost of purchase ($15,129) would be less than two years' leasing costs ($10,920 X 2 = $21,840). The cost to the government would then become $54,147 (adjusted by 9% cost of money factor) at the end of three years. If the fast payback period had been 3 years, the decision could have been made to purchase the equipment at the outset with a cost of $44,759, a net saving to the government of $9,388 over the three year period.

Of course, the longer the payback period becomes, and the higher the limitation becomes, the closer we come to a system that resembles capitalization as practiced in private industry. Hopefully, the fast payback system can be considered a stepping stone in the right direction.

One major drawback to the fast payback system is the elaborate accounting requirements imposed by NAVCOMPT to prove, or disprove as the case may be, the savings that were projected by the purchase of an individual piece of equipment. Cost effectiveness is decreased by this additional workload.

3. Test and Evaluation Institutional Funding

Another drawback to the fast payback system is that NAVCOMPT has officially ruled that the test and evaluation (T&E) functions cannot participate in this system. NAVCOMPT specifically stated that all investments for T&E should be financed by the RDT&EN appropriation. This is in accordance with the basic philosophy under which T&E institutional funding was established, whereby such funding covers all overhead type costs. Due to the high cost of T&E it was felt that weapons systems would be more thoroughly evaluated prior to introduction into the Fleet if T&E costs to the sponsors were reduced to direct costs only.

The Navy has undertaken an intensive campaign to obtain appropriated funds for the upgrading of its deteriorating T&E facilities. The objective was to obtain additional funds, over and above the regular levels of funding, in order to bring the facilities up to minimum standards. Although the effort has been somewhat successful, the funding has not reached anticipated levels. In FY 1979, NASC requested $29 million. This number was reduced by NAVCOMPT to $15 million, and the final figure will probably be around $8.5 million.

C. ALTERNATIVES PROPOSED BY THE NIF RDT&E ACTIVITIES

The activities' responses indicate that aging general purpose equipment is a serious problem. The proposed solutions include: (1) more appropriated funds; (2) expansion of "fast payback" system; and, (3) capitalization of equipment. Some specific comments follow:

Navy Research Laboratory:

> "An alternative solution to the problem of inadequate funding for general purpose equipment would be to authorize financing of capital equipment under NIF with depreciation reflected in the operating costs of the industrially funded activities. This would place the NIF activities in a position of even greater comparability to private industry and produce truer operating cost data. From a practical viewpoint, it is probably unrealistic to expect that authority could be obtained to procure and depreciate all types of general purpose equipment regardless of value under NIF. However, even if some limited authority was established under such a procedure, it could make a significant contribution to solving the general purpose funding problem. For example, a minimal authorization level could be established initially under which NIF could finance procurement of general purpose equipment items with a unit cost of $10 thousand or less, with the value depreciated over the life of the equipment and reflected in the activity's overhead rates. Even such a limited authority would help to solve the funding problem. After a trial period, if the procedure proved meritorious, consideration could be given to expand the threshhold."

Naval Air Development Center:

> "In general, program sponsors, in the SYSCOMS are reluctant to procure general purpose equipment, since they feel that this is the responsibility of the RDT&E Center. The fast payback program has provided some relief in this area, but not enough to cause a significant impact."

Naval Underwater Systems Center:

> "There are two possible alternatives that could improve the situation
>
> (1) Allow the Industrial Fund to establish a reserve for depreciation account, and the charging of depreciation expense to the overhead account ....; or,

(2) Allow for the procurement of replacements for Class III equipment of the like kind to be purchased under the overhead account. Therefore, 6.5 money would only be used for first time procurement."

Naval Weapons Center:

"The most obvious solution to the problem of limited equipment funding, but also the most unrealistic, is for Congress to provide sufficient funds to eliminate deficiencies. A more promising solution might be to expand the usefulness of the fast payback program by modifying its restrictions as follows:

(1) Extend the permissible payback period to three or four years in normal cases, with perhaps a five year payback allowed in exceptional cases.

(2) Allow additional types of costs to be used in the economic analyses. The costs of such factors as delays, risks due to inadequate data, and inability to exploit promising new technology are difficult to quantify, but accepted techniques for estimating them are available."

Pacific Missile Test Center:

"Prolonging equipment life may work for vehicles and the like, but is not an answer for general purpose technical equipment, which must be kept abreast of rapidly changing technology. As an alternative it is suggested that serious consideration be made of an internal rental system, whereby fees paid by equipment users would cover maintenance and replacement of general purpose equipment. Such a system not only would provide replacement, but also a powerful financial incentive to retain only absolutely necessary equipments."

IV. CURRENT TRENDS TOWARD CAPITALIZATION

It should become obvious by this point that there are a multitude of fund sources and schemes being used within the Department of Defense, the Department of the Navy, and the activities themselves in order to perform what should be a relatively simple management function; i.e., supplying adequate general purpose equipment to support missions. Management is both top heavy and fragmented. It generates a plethora of paperwork and can be confusing as well as frustrating to the local activity management. It is time the Department of Defense implemented procedures that would both simplify the process and provide adequate management decision making authority and funding for the replacement of general purpose equipment. The most reasonable solution would appear to be the use of existing capitalization authority.

A. GENERAL ACCOUNTING OFFICE PRONOUNCEMENTS

Although the General Accounting Office has attacked the management of equipment at government laboratories [Ref. 11], it has subsequently recognized the problem of financing the replacement of equipment at DOD industrially funded activities [Ref. 22]. This report states, in part:

> "The arrangement of financing equipment for industrial fund activities with appropriated funds rather than with working capital has not been effective in stimulating the acquisition of equipment that would enhance productivity and, thus, help reduce costs. Two approaches are being tried that should help resolve this problem. One approach is to set aside a specific amount of appropriated money just for buying labor-saving equipment. The other provides for industrial funds to use working capital to buy

equipment costing up to $100,000 that will pay for itself in labor savings within 2 years.

"The three major factors in increasing productivity are: (1) harder or smarter work by the workforce, (2) more efficient management techniques, and (3) capital investment in labor-saving devices. The last item has historically been responsible for producing a high rate of productivity growth. However, until July 1975 money for buying capital equipment (items costing over $1,000) was separately provided to industrial funds from appropriated funds and not considered as part of the cost of operating the industrial fund. As such, these costs were not recovered because they were not included in the sales price to the Government customer.

"Defense officials did not previously give industrial fund managers the flexibility to buy major items of equipment with working capital for two basic reasons.

They believed that activities could obtain sufficient money to finance capital assets through appropriation financing.

They wanted to retain visibility and central control of such expenditures, primarily because the many sources of funds for capital improvements would fragment responsibility and control.

"This policy has not proven effective in stimulating the acquisition of equipment that would enhance productivity. One reason is that managers of industrial funds usually do not consider equipment costs to be a business expense because they do not have to recover the cost of buying and using such equipment from customers. Also the activities have experienced difficulty obtaining money through the appropriation process for buying modern equipment to make their operations more efficient and economical. A related constraint is the long leadtime involved -- up to 2 years -- from the time the opportunity for savings is recognized until money is obtained through the budget process. Additionally, and perhaps in part as a result of these conditions, managers have generally not aggressively searched for opportunities to apply labor-saving equipment and to effectively justify buying it."

The report continues by explaining the "fast payback" system, as follows:

"More recently, the Deputy Secretary of Defense directed the military departments to develop instructions and procedures by July 1, 1975, that would permit industrial funds to finance fast payback investments. .... (This has the

same effect as accelerated depreciation.) To demonstrate that use of this authority is cost efficient, the program also requires establishment of management controls over the use of the authority and accounting procedures to provide information on the actual results of these investments."

The report concludes that:

"Permitting industrial funds to finance equipment that will increase productivity appears to be a sound idea. However, it is too early to tell how effective it will be or to offer any further recommendations in this area. We offer a bit of caution though. Because many industrial funds have been operating with a marginal amount of working capital, they may not have enough money available to buy such equipment. Thus, to keep this innovation from becoming form rather than substance, Defense officials will need to insure that the activities have adequate working capital."

In another report [Ref. 23] the General Accounting Office has issued guidelines for accounting for automatic data processing costs. In the introduction to this report, the Comptroller General states:

" .... we believe this type of cost accounting is needed for all computer operations and we urge all agency heads to see that it is established in every computer activity in their agencies."

The report states certain principles, as follows:

"Computers, related equipment, and software should be considered long-lived assets subject to capitalization and depreciation in accordance with GAO's accounting principles and standards for Federal agencies. The investment costs should be recorded in the general ledger and in property records."

"Accounting for depreciation of ADP assets -- software, hardware, and facilities -- is required to obtain full reimbursement of costs and is important for management users, and others who need to know the full cost of ADP services."

B. DEFENSE COMMUNICATIONS AGENCY

The Defense Communications Agency (DCA) has for several years been attempting to obtain authority to capitalize improvements to the Defense Communications System (DCS) under its

industrial fund (CSIF). The DCS is a composite of DOD-owned and leased telecommunications subsystems and networks comprised of facilities, personnel, and material under the management control and operational direction of the DCA. It provides the long-haul, point-to-point, switched networks, and off base non-tactical telecommunications for DOD and certain other government agencies. In October 1975 the DCA published a study [Ref. 24] recommending that DCA procurement and operating resources be financed through the CSIF. At present the equipment procurement funds are provided by appropriations in the same fashion as equipment for the NIF RDT&E activities.

The Defense Audit Agency (DAA) has been reviewing the DCA request and issued an opinion (Appendix O) which favors approval of the request. In the cover letter Clement E. Roy, Deputy Director, stated:

> "We concluded that use of the fund for this purpose has some merit and could significantly enhance its usefulness to management. Accordingly, we recommend that you request the Assistant Secretary of Defense (Communications, Command, Control and Intelligence) (C^3I) to have the CSIF charter revised to authorize this procedure.
>
> "We also concluded that rapid technological changes, growing system requirements, and the present difficulties in controlling scarce resources warrant greater overall use of the **CSIF** as a mechanism to manage DCS resources. This appears to be the only way that resources, responsibility, and authority can be combined to provide accountability, the element most essential to assuring effective management."

In the report itself the problem of rapid growth of technology within the industry is considered a strong argument for, rather than against the DCA position.

"Making the users share the cost of equipment would promote a 'hard look' at equipment requirements before choosing a new technology to satisfy the requirement. The Congress emphasized this point in Conference Committee Report 95-565, August 8, 1977, which stated that:

> 'The Department of Defense should institute some type of user charge system for DSCS III. This user charge system should be designed to ensure that users will be aware of the true costs of satellite communications services and will only use such services as are truly required."

The most important point of the report is that DAA:

"was recently advised by the OSD Assistant General Counsel (Fiscal Matters) that the provisions of Section 2208, Title 10, United States Code, which pertain to working capital funds, do not prohibit the use of such funds to procure capital equipment."

The primary resistance to this plan has come from two sources: (1) DOD staff analysts, who are reluctant to change from the traditional manner of budgeting by appropriations; and (2) the users of the DCS who will be required to pay for the cost of equipment [Ref. 25]. The DAA opinion should be enough to overcome the resistance within the DOD staff. As to the financing of equipment by the users, these shifts in funding responsibility are ordinarily financed by appropriation transfers from losing agency to the gaining agency, thereby providing enough funds to the users to finance their responsibility under the DCA plan.

Since the DOD has taken so long to implement the authority under the National Security Act of 1949, it is felt that the DOD should officially notify the four Congressional committees that handle finances of its intent to proceed. Initial contacts with the House Appropriations Committee staff indicates that they are in favor of the DCA plan to capitalize equipment. No major Congressional problems are anticipated [Ref. 25].

Although the DAA decisions applies only to telecommunications gear, it should establish a precedent that would apply to all DOD activities that have a need to capitalize equipment.

V. FINANCIAL IMPACT OF CAPITALIZATION ON NIF RDT&E ACTIVITIES

Capitalization of equipment will, of course, increase the overhead rates of the NIF activities. This increase should be offset somewhat by a reduction in labor and maintenance costs to the customers. At present this reduction is nonquantifiable. Consequently, the following estimates are based solely on the increases being generated by the capitalization costs.

The impact on overhead rates is expressed by the following formula:

$$\frac{\text{Replacement Rate X Total Program}}{\text{Direct Labor Hours}}^{2} = \text{Increase to Overhead Rate}$$

The replacement rate is the pacing factor in this formula. One approach would be to look at the cost of equipment on the books and determine what rate is needed to replace it. Appendix J reflects a replacement cost of $699 million for all equipment that is fifteen years old or less. This averages out to $47 million a year. The total program for the 10 activities is almost $1.6 billion. The replacement rate would then be 2.9% per year. Since much of the equipment on the books was project funded, it is assumed that a rate of 2% would provide a reasonable level for the replacement of general purpose equipment. The direct labor hours for these 10 activities are approximately 25 million per year. The increase to the composite overhead

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[2]Total Program is defined as all funds expended by the activities during a fiscal year, including salaries, materials, contracts, equipment, fringe benefits, etc.

rates of the activities would then be:

$$\frac{.02 \text{ X } \$1,600}{25} = \$1.28 \text{ per hour}$$

Each change of 1/10% in the replacement rate would change the overhead rate by 6.4¢ per hour. Even if the replacement rate were the full 2.9%, the increase to the overhead rates would be less than $2.00 ($1.86 per hour).

Based on the 2% replacement rate, the new composite overhead rate of these activities would then become $14.47, an increase of 9.7% over the present rate of $13.19 per hour. This increased cost to the activities' customers would be at least partially offset by reduced funding requirements under PE 65862N, reduced overhead maintenance costs, and quite probably reduced direct costs due to the more efficient, upgraded equipment. Capitalization should also reduce the sometimes not so subtle pressures applied by the activities on the sponsors to provide equipment with project funds.

VI. CONCLUSIONS

Based on the data collected for this thesis, it is reasonable to summarize the problems as follows:

1. The equipment is becoming obsolete, and difficult as well as expensive to service. There is a need to upgrade quality and capability, which in turn would result in lower costs to sponsors.

2. There is a considerable backlog of equipment needs at the NIF RDT&E activities.

3. Less equipment has been purchased during the last five years than in any other five year period in the history of the activities. Almost half of the equipment is over 10 years in age.

4. Funds for the replacement of general purpose equipment (Program Element 65862N) have been decreasing during recent years. When inflation is taken into consideration, the value of these decreasing dollars becomes even lower.

5. Fragmentation of funding and management responsibility for equipment procurement makes life difficult for the managers of the individual activities. They are reduced to "shopping around" to find someone who will provide the needed equipment.

6. Equipment acquisition decisions are controlled by the amount and type of funds available, not by a logical management decision making process. Too often, needed equipment is leased when purchase would be the most economical decision.

7. The activity managers are faced with a serious conflict in that they are given the responsibility of providing support to the Navy RDT&E programs without the authority to provide proper tools for its personnel to perform the job.

A. ALTERNATIVE SOLUTIONS

In order to solve the problem one can consider the following alternatives:

1. Do Nothing

This, of course, is the easiest course of action for the bureaucracy; however, it would force the continuation of the present patchwork system whereby the activities must provide equipment from a combination of: (1) overhead for items under $3K; (2) 6.5 funds; (3) project funds; (4) fast payback system; and (5) continued maintenance on already obsolete and worn out equipment.

This alternative would do nothing to solve the problems and would perpetuate the deterioration of the equipment and consequently the capabilities of the activities.

2. Obtain more Appropriated Funds

The Navy conducted an intensive campaign to increase appropriated funding for the Test and Evaluation function (6.5 funds) with what some considered to be favorable results in light of the odds it was fighting. However, the funds available under this program in FY 1979 were only 29% of the amount requested by NASC. Congress looks upon 6.5 funding with a very negative attitude. Any additional efforts to significantly increase this funding are given almost no chance of success [Ref. 26 and 27].

3. Expand Existing Procedures

The activities could realize a significant increase in flexibility through the expansion of existing procedures, as follows:

1. Increase authority to purchase general purpose equipment as expense items on overhead to $10,000. Items in this price range are difficult to justify on the basis of the fast payback criteria. Also, the mass of paperwork required for approval simply is not a cost effective way of doing business.

2. Increase the dollar limit on fast payback from $100,000 to $250,000, and the time limit from 2 to 5 years. Many items can be justified on the basis of labor saving pay-offs, as well as on other economic bases. In many cases, however, the more expensive equipment cannot be justified within the two year time period. The present limitations are excluding those items of equipment that can be justified on the basis of long term cost savings to the government. The elaborate, after the fact, reporting procedures required to support this program should be modified extensively or done away with in order to make it more cost effective.

The above changes to existing procedures would go a long way toward solving the activities' problems; however, it can readily be seen that they are approaching the capitalization principle.

4. Provide for Capitalization of Equipment

Existing methods of acquiring equipment do not conform with accounting and costing procedures, as practiced in private

industry and as intended by the National Security Act of 1949. When appropriated funds are used, all charges go against current year operations. The users of the equipment (customers of the activities) are essentially getting a free ride in that they do not share in the cost of the equipment. When overhead or fast payback are used the projects are paying an unfair share of the cost, since they pay for the equipment in one year, even though the useful life would probably range from five to ten years. If the equipment were capitalized over its useful life, the customers of the activities would pay a more accurate and equitable charge for the benefits of using the equipment.

The General Accounting Office has been supportive of utilizing alternatives to appropriated funds for the financing of equipment. In reference 22 it states that the policy of utilizing appropriated funds:

> "has not proven effective in stimulating the acquisition of equipment that would enhance productivity. One reason is that managers of industrial funds usually do not consider equipment costs to be a business expense because they do not have to recover the cost of buying and using such equipment from customers."

In reference 23 the GAO recommends the capitalization of computers, related equipment and software.

The Defense Audit Agency has approved the request of the Defense Communications Agency to capitalize its equipment. The Congressional committee staffs appear to be looking on this proposal with favor.

Capitalization of equipment would help to solve the problem of replacement of aging equipment at the NIF RDT&E activities. It would also provide more accurate costing to

the beneficiaries of the equipment. Although there would be an increase in the overhead rates of the activities, offsetting savings to the Navy would be realized through: (1) elimination of appropriated funding from Program Element 65862N; (2) reductions in equipment purchased by project funds; (3) reduced maintenance on old equipment; and, (4) economies realized by utilization of more up to date equipment.

B. RECOMMENDATION

The barriers to capitalization are beginning to crumble. Consequently, it is recommended that the Navy pursue obtaining authority to capitalize equipment and set up reserves at each of the NIF RDT&E activities to allow for replacement. This procedure would be the best solution to the problem of replacing aging equipment. In light of the precedent established by the Defense Audit Agency decision, the time to act is now.

The Navy entrusts the managers of these activities with the responsibility to develop elaborate weapons systems that will become the backbone of the Navy of the future, along with responsibility for managing budgets totaling almost $2 billion. It only stands to reason that they should be entrusted with the authority to purchase and manage the equipment required to fulfill this responsibility.

APPENDIX A

Instrumentation and Material Support

Program Element 65862N

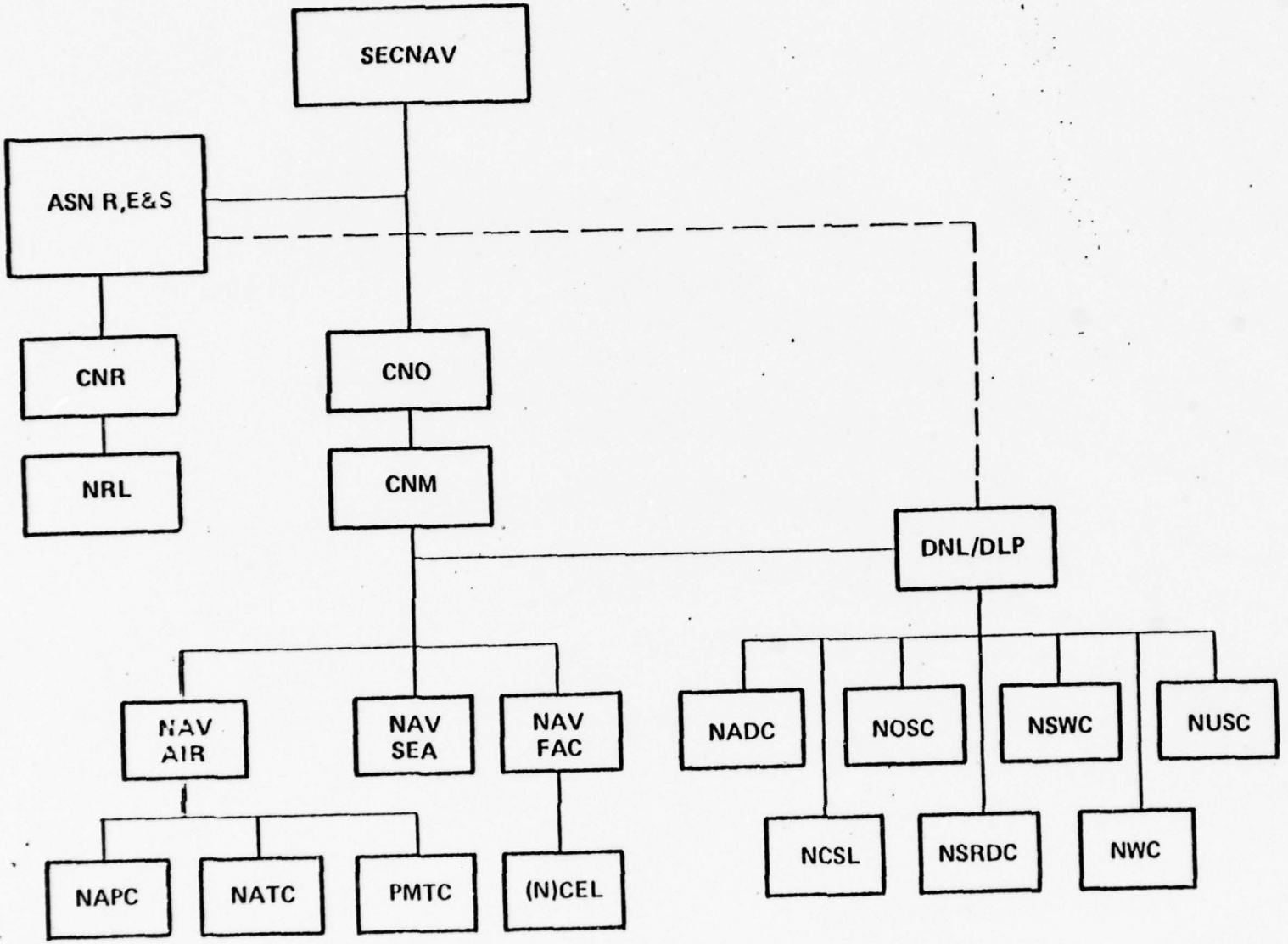
(thousands of dollars)

	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 1977
General Purpose Equipment	$10,877	$ 5,991	$ 5,177	$ 5,379	$ 3,449	$ 6,370
Special requirements for minor construction and facilities	4,920	7,639	8,492	6,322	7,210	4,643
Total	$15,797	$13,630	$13,669	$11,701	$10,659	$11,013

NOTE: These funds are for the 7 DNL activities only.

APPENDIX B

ORGANIZATIONAL COMMAND RELATIONSHIPS



APPENDIX C

RESEARCH AND DEVELOPMENT MISSION

CNM RESEARCH AND DEVELOPMENT LABORATORIES

NADC • To be the principal Navy RDT&E Center for naval aircraft systems less aircraft launched weapon systems.

NCSL • To be the principal Navy RDT&E Center for conducting RDT&E in support of naval missions and operations in coastal regions.

NOSC • To be the principal Navy RDT&E Center for command, control, ocean surveillance, surface and air-launched undersea weapon systems and supporting technologies.

DTNSRDC • To be the principal Navy RDT&E Center for naval vehicles and logistics.

NSWC • To be the principal Navy RDT&E Center for surface ship weapons systems, ordnance, and strategic systems support.

NUSC • To be the principal Navy RDT&E Center for submarine warfare weapon systems.

NWC • To be the principal Navy RDT&E Center for air warfare systems (except anti-submarine warfare systems) and missile weapon systems.

ONR LABORATORY

NRL • To conduct broad multi-disciplinary programs of scientific research and advanced technological development in new and improved materials, equipment, techniques, systems, and related operational procedures.

NAVFAC LABORATORY

(N)CEL • To be the principal Navy RDTE Center for shore and fixed surface and subsurface ocean facilities for the Navy and Marine Corps Construction Forces.

TEST AND EVALUATION MISSION

NASC TEST AND EVALUATION ACTIVITIES

NAPC • To provide complete technical and engineering support for air breathing propulsion systems, including their accessories and components, and fuels and lubricants, to the Naval Air Systems Command and the fleet by: managing and performing applied research and development leading to new propulsion systems; participating in the development and evaluation of new propulsion systems; conducting propulsion system tests and evaluation as necessary to ensure successful mission accomplishment and assisting in the determination of corrective action necessary for the resolution of operational service problems; and to perform such other functions and tests as directed by the Commander, Naval Air Systems Command.

NATC • To conduct test and evaluation of aircraft and weapons systems and their components.

PMTC • Perform development test and evaluation, development support, and follow-on engineering, logistic, and training support for naval weapons, weapons systems, and related devices, and to provide major range, technical, and base support for fleet users and other Department of Defense and government agencies.

APPENDIX D

FUNDING PLAN BY SPONSOR FISCAL YEAR 1978

(DOLLARS IN MILLIONS)

	NAVY							ARMY	AIR FORCE	OTHER DOD	NON DOD	GRAND TOTAL
	NAVAIR	NAVELEX	NAVSEA	ONR	DLP	OTHER NAVY	TOTAL NAVY					
LABORATORIES – CNM												
NADC	135.2	20.6	4.2	.4	5.3	44.4	210.1	–	–	.3	.8	211.2
NCSL	5.9	–	25.2	.1	3.2	9.0	43.1	–	1.5	.1	–	45.0
NOSC	12.3	57.5	47.3	6.2	16.4	51.4	191.1	–	–	8.2	6.2	205.5
DTNSRDC	2.2	2.8	63.7	.6	18.5	40.6	128.4	.1	.1	3.3	4.9	136.8
NSWC	11.9	7.5	96.4	5.0	21.4	117.5	259.7	1.7	3.6	7.5	5.3	277.8
NUSC	17.5	7.6	57.9	2.1	8.1	138.0	231.2	–	–	5.2	.7	237.1
NWC	111.9	1.4	17.1	.5	17.3	58.7	206.9	2.9	6.3	–	6.3	222.4
TOTAL CNM LABS	296.9	97.4	311.8	14.9	90.2	459.6	1,270.8	4.7	11.5	24.6	24.2	1,335.8
% OF TOTAL	22%	7%	24%	1%	7%	34%	95%	–%	1%	2%	2%	100%
ONR – NRL	9.5	53.5	11.6	46.7	16.8	37.7	175.8	.9	2.9	9.1	9.8	198.5
NAVFAC (N)CEL	–	.1	.6	.1	–	20.3	21.1	.2	–	.5	.8	22.6
SUB TOTAL LABS	306.4	151.0	324.0	61.7	107.0	517.6	1,467.7	5.8	14.4	34.2	34.8	1,556.9
T&E ACTIVITIES – NAVAIR												
NAPC	17.5	–	.3	–		1.1	18.9	.1	.1	–	–	19.1
NATC	88.0	2.8	–	–		10.4	101.2	.2	.2	.1	.5	102.2
PMTC	150.1	.6	5.5	1.7		35.7	193.6	.5	2.0	.2	.2	196.5
SUB TOTAL T&E	255.6	3.4	5.8	1.7		47.2	313.7	.8	2.3	.3	.7	317.8
GRAND TOTAL	562.0	154.4	329.8	63.4	107.0	564.8	1,781.4	6.6	16.7	34.5	35.5	1,874.7
% OF TOTAL	30%	8%	18%	3%	6%	30%	95%	–%	1%	2%	2%	100%

APPENDIX E

DISTRIBUTION OF FUNDING BY APPROPRIATION FISCAL YEAR 1978

(DOLLARS IN MILLIONS)

	RDTE,N	OTHER APPROPRIATIONS				GRAND TOTAL
		PROCURE-MENT	O&MN	OTHER	TOTAL	
LABORATORIES – CNM						
NADC	172.3	16.7	19.5	2.7	38.9	211.2
NCSL	33.1	2.5	4.2	5.2	11.9	45.0
NOSC	147.3	14.3	28.2	15.2	58.2	205.5
DTNSRDC	100.0	9.2	17.2	10.4	36.8	136.8
NSWC	181.4	43.3	29.8	23.3	96.4	277.8
NUSC	122.6	37.3	52.4	24.8	114.5	237.1
NWC	147.2	34.0	9.9	31.3	75.2	222.4
TOTAL CNM LABS	903.9	157.3	161.2	113.4	431.9	1,335.8
% OF TOTAL	68%	12%	12%	8%	32%	100%
ONR – NRL	135.9	1.1	22.9	38.6	62.6	198.5
NAVFAC (N)CEL	19.4	.3	1.1	1.8	3.2	22.6
SUB TOTAL LABS	1,059.2	158.7	185.2	153.8	497.7	1,556.9
T&E ACTIVITIES – NAVAIR						
NAPC	18.7	.1	.1	.2	.4	19.1
NATC	67.0	17.1	8.8	9.3	35.2	102.2
PMTC	94.6	52.2	34.7	15.0	101.9	196.5
TOTAL T&E	180.3	69.4	43.6	24.5	137.5	317.8
GRAND TOTAL	1,239.5	228.1	228.8	178.3	635.2	1,874.7
% OF TOTAL	64%	13%	13%	10%	36%	100%

APPENDIX F

RESOURCES FISCAL YEAR 1978

	PERSONNEL END-STRENGTH		LAND
	MILITARY	CIVILIAN	ACRES
LABORATORIES – CNM			
NADC	293	2,172	750
NCSL	113	641	682
NOSC	362	2,563	38,946
DTNSRDC	76	2,570	322
NSWC	125	4,763	5,380
NUSC	144	2,841	1,356
NWC	511	3,969	1,093,634
TOTAL CNM LABS	1,624	19,519	1,141,070
ONR – NRL	140	3,551	798
NAVFAC (N)CEL	16	292	30
SUB TOTAL LABS	1,780	23,362	1,141,898
T&E ACTIVITIES – NAVAIR			
NAPC	8	594	66
NATC	1,490	2,002	6,638
PMTC	956	4,007	27,068
TOTAL T&E	2,454	6,603	33,772
GRAND TOTAL	4,234	30,235	1,175,670

APPENDIX G

CIVILIAN PERSONNEL BY CATEGORY
AS OF 30 SEPTEMBER 1977 (FTP)

	CLASSIFIED				WAGE BOARD	GRAND TOTAL
	PROF. S&E	TECHN.	ADMIN.	SUB TOTAL		
LABORATORIES – CNM						
NADC	1,200	241	510	1,951	307	2,258
NCSL	286	72	161	519	126	645
NOSC	1,364	408	695	2,467	109	2,576
DTNSRDC	1,194	347	488	2,029	555	2,584
NSWC	2,180	714	1,088	3,982	952	4,934
NUSC	1,437	594	698	2,729	243	2,972
NWC	1,409	729	1,114	3,252	799	4,051
TOTAL CNM LABS	9,070	3,105	4,754	16,929	3,091	20,020
% OF CLASSIFIED	54%	18%	28%	100%	–	–
% OF TOTAL	45%	16%	24%	85%	15%	100%
ONR – NRL	1,404	641	623	2,668	633	3,301
NAVFAC (N)CEL	151	41	87	279	19	298
SUB TOTAL LABS	10,625	3,787	5,464	19,876	3,743	23,619
T&E ACTIVITIES – NAVAIR						
NAPC	155	47	114	316	291	607
NATC	371	297	821	1,489	725	2,214
PMTC	994	902	1,213	3,109	822	3,931
TOTAL T&E	1,520	1,246	2,148	4,914	1,838	6,752
GRAND TOTAL	12,145	5,033	7,612	24,790	5,581	30,371
% OF TOTAL	39%	16%	26%	81%	19%	100%

APPENDIX H

FACILITIES RESOURCES FISCAL YEAR 1978
(DOLLARS IN MILLIONS)

	PLANT VALUE LAND & BLDGS.			SQ. FT. OF BLDG. SPACE (IN THOUSANDS)			
	BLDG.	EQUIP.	TOTAL	LAB	ADMIN.	OTHER	TOTAL
LABORATORIES – CNM							
NADC	$ 28.4	$ 32.8	$ 61.2	833.0	43.0	451.0	1,327.0
NCSL	33.3	12.2	45.5	299.1	35.3	307.4	641.7
NOSC	70.9	118.0	188.9	977.1	219.7	475.4	1,672.2
DTNSRDC	71.0	48.5	119.5	388.5	192.8	1,405.9	1,987.2
NSWC	91.5	80.5	172.0	897.8	259.2	1,600.0	2,757.0
NUSC	37.7	43.3	81.0	909.2	118.8	798.4	1,826.4
NWC	228.2	91.8	32.0	101.0	357.6	5,735.2	6,193.8
SUB TOTAL CNM LABS	$ 561.0	$427.1	$ 988.1	4,405.7	1,226.3	10,773.3	16,405.3
ONR–NRL	$ 93.4	$ 41.0	$ 134.4	2,292.8	202.5	496.8	2,992.1
NAVFAC (N)CEL	$ 2.6	$ 2.5	$ 5.1	118.0	27.0	46.2	191.2
SUB TOTAL LABS	$ 657.0	$470.6	$1,127.6	6,816.5	1,455.8	11,316.3	19,588.6
T&E ACTIVITIES – NAVAIR							
NAPC	50.8	11.8	62.6	391.0	26.7	183.0	600.7
NATC	134.9	18.8	153.7	15.1	363.4	4,433.5	4,812.0
PMTC	152.1	130.2	282.3	908.9	372.7	3,389.0	4,770.6
SUB TOTAL T&E	$ 337.8	$160.8	$498.6	1,315.0	762.8	8,105.5	10,183.3
GRAND TOTAL	$ 994.8	$631.4	$1,626.2	8,131.5	2,218.6	19,421.8	29,771.9

APPENDIX I

Categories of General Purpose
Equipment by Management and
Funding Responsibilities

Equipment Category (1)	Funded and Managed by Parent Command (2)	Funded by Parent Command and Managed by Another Com (3)	Funded and Managed by Another Command (4)
Non-technical plant	X		
Communications	X		
Research	X		
Support	X		
MILCON Collateral		X	
Automatic Data Processing		X	
Medical and Dental		X	X
Air Conditioning		X	
Photo Collateral			X
Materials Handling			X
Personnel Support			X
Special Flight Test Instrumentation			X

APPENDIX J

Aging of Equipment

(10 of 12 activities reporting)

	Amount of Equipment	Percent of total
Age 0-5 years:		
Purchase price	$108 million	
Replacement cost	$131 million	14%
Number of items	14 thousand	21%
Age 6-10 years:		
Purchase price	$163 million	
Replacement cost	$304 million	32%
Number of items	20 thousand	30%
Age 11-15 years:		
Purchase price	$127 million	
Replacement cost	$264 million	27%
Number of items	17 thousand	25%
Age over 15 years:		
Purchase price	$122 million	
Replacement cost	$255 million	27%
Number of items	16 thousand	24%
Total equipment:		
Purchase price	$520 million	
Replacement cost	$954 million	100%
Number of items	67 thousand	100%

APPENDIX K

Aging of Equipment by Activity

Percent of Total Equipment
Items in Each Age Category

Age Category	Act. A	Act. B	Act. C	Act. D	Act. E	Act. F	Act. G	Act. H	Act. I	Act. J
0-5 years	32	10	28	17	45	38	7	34	23	27
6-10 years	21	27	72	25	24	24	35	27	31	29
11-15 years	19	32	0	31	18	19	28	25	24	24
over 15 years	28	31	0	27	13	19	30	14	22	20

APPENDIX L

Average Cost of a Piece of Equipment

Adjusted by Consumer Price Index for Inflation

(in thousands of dollars)

Age Category	Act. A	Act. B	Act. C	Act. D	Act. E	Act. F	Act. G	Act. H	Act. I	Act. J	Average of all Act.
0-5 years	$12	$ 8	$ 5	$ 7	$10	$ 9	$11	$10	$ 7	$13	$ 9
6-10 years	18	15	8	21	28	18	20	13	11	16	16
11-15 years	19	20	0	18	12	13	15	14	10	13	15
over 15 years	14	20	0	15	12	24	16	11	13	11	16

APPENDIX M

TABLE 7 - DESCRIPTION OF INDUSTRIAL LABORATORIES SURVEYED

Laboratory	Principal Product or Service
A	Glass
B	Electronics
C	Diversified Electrical and Mechanical Equipment
D	Major Public Utility
E	Eastern Not-for-profit Research
F	Steel
G	Chemicals
H	Motor Vehicles
I	Midwestern Not-for-profit Research
J	Western Not-for-profit Research

TABLE 8 - PERCENT OF INDUSTRIAL LABORATORY BUDGETS INVESTED IN EQUIPMENT

	1971 Study, data years:		1976 Study, data years:	
Laboratory (1)	1969	1970	1974	1975
A	10.0	9.8	9.3	4.2
B	11	7	7.8	9.6
C	10	10	6.8	8.1
D	8.5	8.5	---(2)	14.3
E	3	3	---	---
F (3)	---	---	---	---
G	---	---	5.8	3.4
H	---	---	6.1	2.5 (4)
I	---	---	4.9	---
J	---	---	4.4	---
NBS	1.7	2.1	5.6	6.9

Notes:

(1) Laboratories A-F are the same as appeared in the 1971 study; G-K have been added in this study.

(2) Laboratory D reported data only for 1975 as a matter of convenience, with the note that equipment funding has been nearly constant for several years. In 1975, 9.1% went for purchase and 5.2% for lease.

(3) Laboratory F is unable to provide data in this form for any year, owing to accounting procedures. In the 1971 study, this group estimated that approximately $4,000 was spent for equipment for professional employee.

(4) 1975 was an "off" year in the motor industry. To regain lost ground this company has budgeted 8.4 percent for equipment in 1976.

TABLE 9 - PERCENT OF GOVERNMENT
LABORATORY BUDGETS INVESTED IN EQUIPMENT

Laboratory (1)	1971 Study, data year: FY 1966	1976 Study, data years: FY 1974	FY 1975
1. Goddard Space Flight Center	13	3.8 (2)	3.6 (2)
2. Brookhaven National Laboratory	10	6.8	8.0
3. Naval Research Laboratory	9	9.0	7.2
4. Air Force Geophysics Lab: (3)	5	3.5	3.5
5. National Eye Institute	--	12.3	11.6
6. National Cancer Institute	--	6.1	5.9
7. Bureau of Mines	--	11.8	11.1
8. U.S. Geological Survey	--	5.3	6.4
9. National Bureau of Standards	3	5.6	6.9
Weighted Mean (4)	8.3	7.2	7.2

Notes:
(1) Laboratories 1-4 are the same as appeared in the 1971 study; 5-8 have been added as part of this study.
(2) Data for Goddard is not on the same basis as for the others. Obligations for contracts were not separately available. Approximately two-thirds of Goddard's outlay goes to contracts. If this could be properly reflected, the percent invested in equipment would be higher by about a factor of three, yielding an approximately 11 percent-level for equipment investment.
(3) Name changed from Cambridge Research Laboratory. Reorganization underway.
(4) NBS excluded. Goddard Space Flight Center also excluded because data are not presented on the same basis. Calculation based on sum of budgets and sum of equipment outlays for all other laboratories.

TABLE 10 - PERCENT OF NATIONAL
LABORATORY BUDGETS INVESTED IN EQUIPMENT

Laboratory	1974	1975
National Physical Laboratory (England)	22.4	16.0
National Research Council (Canada) (1)	9.1	8.3
Physikalisch-Technische Bundesanstalt (Germany)	14.9	14.0
Council for Scientific and Industrial Research (South Africa)	7.5	---
National Bureau of Standards (USA)	5.6	6.9

Notes:
(1) NRC is concerned that equipment spending rate is too low and that equipment is becoming increasingly obsolete.

APPENDIX N

Comparison of Alternative Methods
of Acquiring an IBM Office System
Six/450 (OS-6/450) Information Processor

	Costs							
	Year 1	Year 2	Year 3	3 Year Total	Year 4	4 Year Total	Year 5	5 Year Total
Purchase:								
Cost of purchasing	$30,258	$ -	$ -	$30,258	$ -	$30,258	$ -	$30,258
Maintenance contract	1,560	1,560	1,560	4,628	1,560	6,188	1,560	7,748
Total cost	$31,818	$1,560	$1,560	$34,886	$1,560	$36,446	$1,560	$38,006
Lease:								
Rental including maintenance	$10,920	$10,920	$10,920	$32,760	$10,920	$43,680	$10,920	$54,600
Lease/purchase:								
Rental including maintenance	$10,920	$10,920	$10,920	$32,760	-	$32,760	-	$32,760
Additional cost to purchase	-	-	15,129	15,129	-	15,129	-	15,129
Maintenance contract	-	-	-	-	1,560	1,560	1,560	3,120
Total cost	$10,920	$10,920	$26,049	$47,889	$1,560	$49,449	$1,560	$51,009

The following is a comparison of the above alternatives using 9% as the cost of money:

Purchase	$34,682	$39,503	$44,759	$44,759	$50,488	$50,488	$56,732	$56,732
Lease	$11,903	$24,877	$39,019	$39,019	$54,433	$54,433	$71,235	$71,235
Lease/purchase	$11,903	$24,877	$54,147	$54,147	$60,721	$60,721	$67,887	$67,887

DEFENSE AUDIT SERVICE
1300 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22209

REPORT
NO. 79-008

October 25, 1978

MEMORANDUM FOR DIRECTOR, DEFENSE COMMUNICATIONS AGENCY

SUBJECT: Report on the Review of the Communications Services Industrial Fund (Project 7IC-279)

At your request, we reviewed selected aspects of the management of the Communications Services Industrial Fund (CSIF). The overall objective was to determine the effectiveness with which the CSIF was used to manage resources of the Defense Communications System (DCS).

We gave particular attention to examining the feasibility of using the CSIF to finance capital equipment purchases. We concluded that use of the fund for this purpose has some merit and could significantly enhance its usefulness to management. Accordingly, we recommend that you request the Assistant Secretary of Defense (Communications, Command, Control and Intelligence) (C^3I)) to have the CSIF charter revised to authorize this procedure.

We also concluded that rapid technological changes, growing system requirements, and the present difficulties in controlling scarce resources warrant greater overall use of the CSIF as a mechanism to manage DCS resources. This appears to be the only way that resources, responsibility, and authority can be combined to provide accountability, the element most essential to assuring effective management. We therefore recommend that you take whatever action necessary to optimize the use of the CSIF for this purpose.

The enclosure contains the details of the review and the rationale supporting our recommendations. We discussed the contents of this report with the Comptroller, Defense Communications Agency, and his staff. No exceptions were taken to observations made or the recommendations. As this review was made at your request, a response is not required.

Clement E. Roy
Deputy Director

Enclosure

RESULTS OF THE REVIEW AND CONCLUSIONS

Use of the Industrial Fund To Finance Capital Equipment

BACKGROUND

The Communications Services Industrial Fund (CSIF) is used to finance common-user networks and other special order point-to-point circuitry of the Defense Communications System (DCS). The Defense Communications Agency (DCA) manages the fund and the Defense Commercial Communications Office (DECCO), a DCA field activity, operates the account. The CSIF has a corpus of about $20 million. The Agency estimated that revenue and expenses for FY 1978 would amount to about $425 million. Costs incurred by the CSIF are recouped through a DCS user-charge system operated by DECCO.

Current DoD policy generally precludes the use of industrial funds to finance and depreciate major items of Government-owned equipment. Equipment used within the DCS is financed by the Military Departments from their respective appropriations and is put in service without charge to the users. For example, the Defense Satellite Communications System (DSCS) space segment (satellites) is financed by the Air Force.

The Army finances the earth segment (ground terminals). DCA has contended that using the CSIF to centrally finance such major acquisitions would enable more effective management and control of DCS resources.

DISCUSSION

We agree with DCA that the CSIF should be used to finance most of the DCS capital equipment and operating costs that are presently funded by the Military Departments. We further believe that the CSIF can be expanded in its use as a management tool to more effectively control scarce resources. These conclusions are based on the following considerations:

Technological Change. The rapid growth of technology within the telecommunications industry has been a major argument against using CSIF to finance capital equipment. The logic has been that the users could be put in the undesirable position of having to reimburse CSIF for equipment that may be outdated and scheduled for replacement before it is fully paid for. In our opinion, this is a strong argument for,

rather than against the DCA position. Making the users share the cost of equipment would promote a "hard look" at equipment requirements before choosing a new technology to satisfy the requirement. The Congress emphasized this point in Conference Committee Report 95-565, August 8, 1977, which stated that:

> The Department of Defense should institute some type of user charge system for DSCS III. This user charge system should be designed to ensure that users will be aware of the true costs of satellite communications services and will only use such services as are truly required.

Current Developments. A precedent for procuring capital equipment through CSIF has already been established by the Fast Payback program. Although this program is restricted to items that cost between $1,000 and $100,000, and which can reduce operating costs within 2 years in an amount equal to the acquisition, installation, and transportation of the item, it has nevertheless been successful. As one example under this program, the CSIF was used to procure multiplex equipment that is used with leased circuits in the communications link between Stockton, California, and Wahiawa, Hawaii. Government ownership of this equipment provided the operational flexibility that enabled more efficient use of leased circuits. The result was a reduction in monthly lease costs from $100,855 to $36,270, for a monthly savings of $64,585. The cost of the multiplex equipment ($90,722) was recovered in about 45 days. Additional units are scheduled for installation.

Current DoD policy limits purchase of capital equipment to the Fast Payback program. However, we were recently advised by the OSD Assistant General Counsel (Fiscal Matters) that the provisions of Section 2208, Title 10, United States Code, which pertain to working capital funds, do not prohibit the use of such funds to procure capital equipment.

Use of Government-Owned Equipment/Facilities. The extent to which Government-owned facilities/equipment are used in the DCS to provide free service is, in our opinion, another reason why the cost of these facilities/equipment should be financed through the CSIF, and recovered by appropriate charges. We reviewed the use of AUTOVON circuits which are provided by Government-owned transmission systems (primarily overseas). We found that only 57 percent (8,014) of the 14,029 channel segments in use were assigned to the "owner" (the agency responsible for operation and maintenance of the transmission system). This means that the "owner" also had

to justify, budget, and pay for the remaining 43 percent (6,075) of the channels used by others. In some cases, these were non-DoD users. We believe that "nonowners" have no strong incentive to justify their requirements, or enforce discipline in the use of DCS services.

Equipment Outlays and Traffic Volume. Significant increases in proposed expenditures to replace and upgrade equipment, along with projected increases in traffic volume are other factors which we believe justify expanded use of the CSIP to finance DCS operations. Proposed expenditures for capital equipment for FY 1979 total about $133 million, but will rise to about $486 million for FY 1980 and $445 million for FY 1981. Satellite procurement accounts for the largest single item of expense in each budget. Despite their high cost, satellites are expendable and have a relatively short life which warrants stringent controls over the determination of requirements. Under current procedures these assets are placed in service without charge to the customer. This represents a subsidy which, in our opinion, renders ineffective any attempts to ensure satellite usage is restricted to minimim essential requirements.

With regard to growing traffic volume, the DCA 10-year plan (1980-1990) estimates that, over the 10-year period, AUTOVON busy hour voice traffic will nearly double. The number of voice subscriber terminals is expected to increase over 50 percent, and the rate of data transfer is expected to rise from 4,900 to 206,000 megabits per day.

However, reductions in military and civilian personnel strength, and closure of many installations in the era following Vietnam have not been matched by a decline in traffic volume as might be expected. In fact, the average daily busy hour traffic for AUTOVON, worldwide, has risen 30 percent in the FY 1971 - FY 1977 period. While it may be impossible to correlate personnel strength and AUTOVON usage, we believe the extent to which this inverse relationship has grown indicates a positive need for a control mechanism to ensure demands for increased usage are justified. At present, the system lacks such a mechanism.

Historical Considerations. The original Planning, Programming and Budgeting System developed in the early 1960's required a separate review for telecommunications because it was an item in most program elements. Under a Primary Action Officer, responsible directly to the Secretary of Defense, an

ad hoc review group, with membership from DDR&E, ASD staffs, JCS, DCA, NSA, and the then Bureau of the Budget, analyzed each program element containing any command, control, or telecommunications (CCT) resources. The reviews were conducted for only 3 years (1964-66).

The concept of this type of review was addressed by the Blue Ribbon Defense Panel in their 1970 Staff Report on Telecommunications. They considered these "corporate" reviews necessary ". . . to assure maximum capability at minimum cost from an overall Department of Defense mission point of view, rather than from individual MilDep points of view." In commenting on these reviews, their report states:

> To a considerable degree, 'zero-base' review was accomplished, resulting not only in a comprehensive DoD corporate knowledge of existing command, control and communications capabilities, worldwide, but also in a truly corporate visibility of costs therefor in terms of men, money and materials allocated to the CCT community.

Considering increased congressional awareness and interest in visibility of costs and requirements discipline, the use of the CSIF to reinstate a "corporate" approach has considerable merit.

Since 1970, numerous audit reports from the General Accounting Office (GAO), the Military Departments' audit services, and the Office of the Assistant Secretary of Defense (Comptroller) have addressed problems with organization and fragmented management of DoD communications services. The latest of these, issued by GAO on December 14, 1977, commented that the DCA data base of DCS resources is incomplete. GAO concluded that "the absence of information with which to evaluate the aggregate of individual requirements from a DoD systemwide viewpoint precludes coordinated control of communications."

SUMMARY

As manager of the DCS, the DCA is responsible for planning and engineering the system. The Military Departments are then tasked with implementing the plan. While DCA proposes a level of funding considered necessary for improving and operating the DCS, actual funding is done by the Military Departments who may choose to defer, delay, or not support particular projects. To illustrate, DCA in January 1977 proposed a FY 1979 DCS budget of $1,172 million. The Military Departments supported only $869 million.

APPENDIX O (Cont.)

We realize that competition for resources within the Military Departments has an influence on the support and priority given to outside tasks. However, when this tasking is delayed, deferred, or not supported, this provides DCA with ready excuses if the system does not perform to expectation, or planned capabilities are not attained. Resources, responsibility, and authority should be combined to provide accountability. Expansion of the CSIF into the area of capital equipment acquisitions or associated operating costs, and the resulting authority it would provide the DCS system manager, could help ensure better management of system resources.

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