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Review Of In-House Laboratory Independent Research Program Of The Department Of Defense

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UNITED STATES
GENERAL ACCOUNTING OFFICE

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

DEFENSE DIVISION

B-164912

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Dear Mr. Secretary:

The General Accounting Office has made a review of the in-house laboratory independent research (ILIR) program of the Department of Defense. The purposes of our review were to determine whether (1) the objectives of the program, which was initiated Defense-wide in fiscal year 1963, still were valid, (2) the objectives of the program had been made clear to laboratory directors, and (3) the program as implemented was meeting these objectives.

In establishing the ILIR program, the Secretary of Defense stated its broad objective to be the strengthening of in-house laboratories. In our review we could not identify any subsequent guidance from the Department of Defense on how the services were to achieve this broad objective. Similarly the services were not provided with guidance which would have enabled them to evaluate the program results in the framework of this objective. Each of the services implemented the program in accordance with its interpretation of how the objective should be achieved.

We found that there were inconsistencies in the uses made by the services of funds provided through the ILIR program. The differences in the practices followed by the three services were significant enough for us to question whether all three could be attaining the program objective.

We are recommending that you define the objectives of the ILIR program, after considering the needs for, and the purposes served by, the program. Subsequent guidance to the services should set forth the broad uses which can be made of ILIR funds to meet these objectives.

The results of our review and our recommendations are set forth in greater detail in the summary which follows.

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Copies of this letter and summary are being sent today to the Chairmen of the House and Senate Committees on Government Operations, the House and Senate Committees on Appropriations, and the House and Senate Committees on Armed Services. Copies are also being sent to the Director, Office of Management and Budget and to the Secretaries of the Army, Navy, and Air Force.

Sincerely yours,

R.W. Gutmann

Acting Director, Defense Division

The Honorable
The Secretary of Defense

SUMMARY OF THE REVIEW BY

THE GENERAL ACCOUNTING OFFICE OF

IN-HOUSE LABORATORY INDEPENDENT RESEARCH PROGRAM

OF THE DEPARTMENT OF DEFENSE

INTRODUCTION

An in-house laboratory independent research (ILIR) program, also known as Laboratory Directors Funds, is carried out by each of the three military services. In addition, the Department of the Navy has supported an independent exploratory development (IED) program which began in fiscal year 1966.

Funds provided for ILIR and IED programs in recent years have been as follows:

	Fiscal year 1970	Fiscal year 1971 (estimated)
	(millions)	
Army	$11.0	$11.1
Navy:		
ILIR	13.6	13.1
IED	10.0	10.8
Air Force	4.3	5.0
Total	$38.9	$40.0

We examined into ILIR programs covering several years at selected laboratories in the three services. ILIR funds provided to these laboratories in fiscal year 1970 and 1971 were as follows:

	Fiscal year 1970 program	Fiscal year 1971 program
	(millions)	
Army Electronics Command Laboratories, Fort Monmouth, New Jersey	$1.0	$0.7
Naval Air Development Center Warminster, Pennsylvania	2.1	1.8

	Fiscal year 1970 program	Fiscal year 1971 program
	(millions)	
Air Force Systems Command Laboratories Wright-Patterson Air Force Base, Ohio	$1.0	$1.2
Air Force Cambridge Research Laboratories Hanscom Field, Bedford, Massachusetts	0.8	0.8

ORIGIN OF ILIR PROGRAM

On October 14, 1961, the Secretary of Defense expressed his profound concern for the maintenance of a vigorous program and for the highest morale within the laboratories throughout the Department of Defense (DOD). He therefore instructed the Director of Defense Research and Engineering, in conjunction with the military departments, to formulate and carry out a program of strengthening the in-house laboratories. One of the principles to be observed in achieving this objective was:

> "Depending upon the mission and nature of the work of the particular laboratory, a fraction of the annual laboratory budget shall be set aside for work judged by the laboratory director to be of promise or importance without need of prior approval or review at higher levels. The results of this work shall be reviewed by the Assistant Secretaries for Research and Development of the Military Departments."

THE BELL REPORT

In July 1961 the President requested the Director of the Bureau of the Budget (now the Office of Management and Budget) to make a review of Government contracting for research and development (R&D). The Secretary of Defense was one of seven principal participants of the study group chaired by the then Budget Director, Mr. David E. Bell.

In a report to the President on April 30, 1962 (commonly referred to as the Bell Report), the group noted that significant actions were taken to reverse the serious trend toward the reduction of the competence of Government research and development establishments. Particularly, attention was directed to the strong leadership being given within DOD in striving to raise the capabilities of the Department's Laboratories and other research and development facilities.

Nevertheless further major efforts were suggested to meet what the group saw as an important Government objective--maintaining first-class facilities and equipment to carry out in-house R&D work. The report stated that the Government should never lose a strong internal competence; the major steps to be taken should include ensuring that assignments to Government research facilities should be significant and challenging so as to attract and hold first-class personnel; managerial arrangements should be improved by delegating research laboratory directors more authority to make decisions relating to programs, personnel, funds, and other resources; and improvements should include:

> "*** providing the research laboratory director a discretionary allotment of funds, to be available for projects of his choosing, and for the results of which he is to be responsible."

IMPLEMENTATION OF ILIR PROGRAM

The three military departments were not furnished with further guidance by DOD regarding how they were to implement their ILIR programs. Each issued regulations on how it planned to carry out programs for strengthening its in-house laboratories by undertaking promising work of the laboratory directors' own choosing.

Army and Navy regulations followed the tenor of the Secretary's October 1961 memorandum and of the Bell Report by stating that the ILIR program provided flexibility through financial support to new work judged to be important or promising. The funds were to be used to attract and hold talented personnel and to strengthen the scientific and engineering competence of in-house laboratories.

Air Force guidelines did not stress strengthening the laboratories or improving the working environment to attract and hold first-class scientists and technicians. Air Force regulations did emphasize the flexibility afforded to the laboratory director by having funds available without the usual justification, review, and delay associated with the annual budget cycle.

Statement by DOD official

In 1968 the Deputy Director for Research and Technology, Office of the Director of Defense Research and Engineering, explained the purposes and expectations of ILIR funds to the Subcommittee on Science, Research and Development of the House Committee on Science and Astronautics. He stated that the intent, very similar to the contractors' independent R&D concept, was to keep technical organizations at the forefront of technology so that the best technically conceived systems and weapons would be achievable on a timely basis. Both concepts were held to be predicated on maintaining a high degree of independence and freedom of action at the performing level.

DIFFERENCES IN SERVICES' ILIR POLICIES AND PRACTICES

The ILIR programs of the Army and Air Force are reviewed and evaluated each year at the assistant secretary (R&D) level of the service. The results of the Navy programs are reviewed by the Director of Navy Laboratories. Reviews in DOD generally are limited to budgetary amounts and allocations of funds in the Office of the Director of Defense Research and Engineering.

The Secretary's memorandum of October 1961 did not define how the program objectives were to be achieved or measured, and we were not able to locate subsequent guidance from DOD. The success of the program generally was evidenced by the fact that the majority of ILIR-supported projects were considered by the services to be technical achievements; i.e., research accomplishments of a high order of excellence. DOD guidance had not made it clear whether technical achievements alone were sufficient to satisfy the reasons for which the program was initiated.

Many ILIR projects undoubtedly are new and promising ideas, the performance of which can be said to have contributed in some way to strengthening in-house laboratories. The differences in the practices followed by the three services were significant enough for us to question whether all three could be attaining the program objective.

We found that differences in the practices of the services occurred in the use of ILIR funds in at least three ways: (1) to augment the regularly assigned research program, (2) to support long-term efforts, and (3) to contract for research and purchase equipment not in support of ILIR projects.

Regular program augmentation

Army

Army regulations state that ILIR funds are in addition to the regularly assigned program funds and are for support of original work in problem areas within the mission assigned to the laboratory. The Deputy Assistant Secretary of the Army (R&D), during his evaluation of the 1963 program, commented that the use of ILIR funds to augment the projects of other programs was not desired because it would reduce the effectiveness of the program. This statement was reflected in an Army Materiel Command regulation, issued in 1964, which directed that ILIR funds not be used to supplement, or compensate for deficiencies in, regular funded programs. This regulation, however, subsequently was rescinded.

The Army Audit Agency reviewed the Army Materiel Command's R&D programs and reported, in February 1970, that ILIR expenditures had been made to augment projects included in the directed program. The Audit Agency concluded that this use did not meet the intended purpose of providing Army scientists and engineers with additional opportunities to maintain and increase their competence by doing original work in areas suiting their talents. The audit report referred to a memorandum from the Acting Deputy Assistant Secretary of the Army (R&D) on September 26, 1969, that described the ILIR program as one under which the laboratory director would have limited resources to fund projects that, although not in his directed program, he thought were worthwhile.

At the Army Electronics Command laboratories, we found that ILIR funds were used to augment mission research and development programs. Work financed with mission funds in one year was continued the next year with ILIR funds when mission funds were not available.

Navy

Navy policy states that its independent research (IR) funds are not to be diverted to compensate for funding deficiencies in other programs. At the Naval Air Development Center, we identified IR and IED projects which, by their

nature, could have been funded under regular R&D programs. For example, one long-term project, originally administered under the IR and IED program from fiscal year 1960 through 1966, was funded from fiscal year 1967 through 1971 under either IR and IED or mission programs, whichever had funds available. Of the total $2.1 million expended on this project, more than $1.1 million came from the IR and IED program; the remainder from mission program funds. Other long-term projects were funded annually on an irregular basis, depending on the availability of regular funds or IR and IED funds.

Air Force

Air Force regulations state that the fund is not to be used to augment, substantially or entirely, laboratory programs across the board to meet deficiencies in military construction, operation and maintenance, and laboratory equipment funds, even though these deficiencies may be identified clearly with specific selected projects. Air Force guidance does not cite originality as an element of the program. The Air Force Deputy for Laboratories informed us that ILIR funds had been used to supplement the directed program through contracted efforts and procurement of specialized equipment and facilities.

At Cambridge Research Laboratories, ILIR program objectives include the support of new or unique research ventures or the provision of equipment modifications or the procurements needed to conduct any newly conceived research efforts in-house. Cambridge officials stated that all ILIR projects supported Air Force research programs to some degree.

We noted that ILIR funds were used at Cambridge for projects which had been deleted from the regular program. The Laboratory Director stated that his understanding was that Air Force guidance did not preclude such usage. The Air Force Deputy for Laboratories, however, expressed the opinion that the ILIR program was not designed for efforts which had been rejected from a proposed directed program.

At the Wright-Patterson Air Force Base laboratories, officials stated that the ILIR program was not used to augment or supplement the regular program. We found, however, that the funds generally were used to minimize reprogramming or to bridge gaps in the directed program at the end of a fiscal year. Local laboratory directives stress this use of funds so as not to disrupt the regular program. Laboratory directors agreed that the type of effort undertaken was virtually indistinguishable from the regular program effort.

Conclusion

We believe that there is a need for guidance by DOD to the services as to whether the use of ILIR program funds for the augmentation of regular research programs of the laboratories or the commingling of funds of both programs on the same project meets the objectives of the program directed by the Secretary of Defense in October 1961. There is a further need to define an ILIR project to determine whether it can be similar to, or in support of, regularly programmed work or whether originality and uniqueness is a prerequisite of an ILIR project.

Long-term efforts

The Air Force regulation states that, if a task begun under the ILIR fund leads to continued large efforts, it must be transferred to the regular laboratory program at the appropriate time. The Air Force Deputy for Laboratories told us that he characterized the program as quick-response funding and that the transfer of continued efforts should occur promptly.

Army and Navy regulations are silent in regard to financing projects with ILIR funds over an extended period. At the Naval Air Development Center, five of the projects which we examined into were initiated and approved on the basis of work to be completed under a 5-year plan. On four of the five projects, the period of time spent ranged from 4 years to more than 10 years. The priority of work or urgency of completion did not appear to be significant factors for these projects as work was performed each year only to the extent that IR and IED funds and/or mission funds were available.

At the Army Electronics Command, we noted that a project which began as a short-term ILIR contract project in 1963 had been extended repeatedly for a period of more than 8 years. The Army Audit Agency took exception to the practice of long-term ILIR projects in its report of February 1970 on the Army Materiel Command's program.

The extended period over which projects were supported by ILIR funds, plus the commingling and use of mission and ILIR funds to the extent that each was available, indicated that in these instances the program was being used to compensate for funding deficiencies in other programs. This use appears not to have been compatible with those objectives which emphasize flexibility in the use of funds for promoting new concepts and ideas as opportunities arise.

Research contracted out and equipment purchased

The Navy policy does not support the use of IR and IED funds for outside contracts unless it is necessary to achieve the basic goals of the program. Army regulations direct that ILIR funds not be used to support outside or contract work except when required to support work being done in-house under the ILIR program. At the Army Electronics Command, however, we found instances when ILIR funds had been used to contract for support of regular research or to purchase primarily general research equipment. The Army Audit Agency reported that it had found that Army laboratories used ILIR funds to purchase support equipment not peculiar to independent research.

At the Cambridge and Wright-Patterson laboratories, the Air Force used its ILIR funds exclusively to contract out for research or to purchase equipment or supplies in support of research. The funds were used in this way because all salary costs of Air Force in-house scientists and engineers were funded in other program elements and because salary costs of in-house personnel working on ILIR work were not absorbed by ILIR projects.

The Air Force Deputy for Laboratories informed us that in-house work had a broad interpretation in the Air Force and included efforts by in-house scientists and engineers

in planning and guiding contractors in accomplishing contract research. He also stated that funding sources other than ILIR were available for improving the competence of Air Force laboratories.

CONCLUSIONS

The independent in-house research program actually is a small part of each participating laboratory's total research effort. At the laboratories we visited, the ILIR program, in nearly all instances, represented about 2 percent of the total laboratory program. We were informed that considerable time and effort was expended on formulating, reporting, reviewing, and justifying this small segment. Most laboratory officials we interviewed informed us that they did not consider this procedure burdensome. In fact, some welcomed the chance to present and justify their program personally at the assistant secretary level.

We believe that the emphasis and visibility given to this effort warrants establishment of clear direction regarding the aims of the program. The services had not been furnished with formal written guidance by the Secretary of Defense or the Director of Defense Research and Engineering subsequent to October 1961. Each service had implemented the program to satisfy its interpretation of the ILIR program objectives. We found that there had been considerable differences, both written and unwritten, as to these objectives.

Some laboratory officials we talked to considered "strengthening of in-house laboratories" to be an unmeasurable goal. Most officials supported the program, although, in the opinion of one, it should either be expanded to be worthwhile or be eliminated entirely. Most were satisfied that funding a project believed to be of importance to the laboratory or service mission satisfied ILIR goals. Some stated the view that the published criteria were so general that the laboratory director could justify almost any project as meeting the objectives and purposes, although in some cases local guidance was more stringent.

We found that no criteria had come from DOD for measuring or evaluating the results of the ILIR program. Laboratory officials judge their own success on the basis of technical achievements of individual projects. ILIR projects are reported, and accomplishments are reviewed critically as a consideration in determining future funding. The more significant achievements often are reported to the Congress in budget presentations.

In selecting projects, we noted that some laboratory directors believed that a certain number of high-risk projects should be undertaken in the ILIR program and therefore some failures could occur. This approach appears to bolster the general impression that the most beneficial use of the program is for "targets of opportunity" funding, even when there may not be technical achievements to confirm the wisdom of the selection.

Because we found that ILIR funds were being used to augment regular mission program funds, to minimize reprogramming of the funds, and to bridge budgetary gaps in directed program funds, we believe that a reevaluation of the program objectives is warranted. In the 10 years since inception of the ILIR program, conditions have changed and, in turn, the needs that the program was established to meet may have changed.

When the program was initiated, there was a shortage of qualified personnel in Government in-house organizations. The 1962 Bell Report stated that one of the purposes of such a fund was to attract and retain top-flight scientists and engineers in competition with private industry. We were informed by officials of the Army Electronics Command that there was a sufficient number of qualified scientists and engineers in the various research and development fields.

According to a September 1970 report from the Office of the Director of Defense Research and Engineering:

> "*** the achievement of salary comparability with private industry and the broader application of authority to match salary offers of competitors has permitted Defense laboratories to become more competitive in recruitment. There has been significant improvement in their ability to attract first-class people to leadership positions by more rapid promotion and by the infusion of fresh blood from industry and the universities."

As for the charge that in 1961 Government laboratories did not offer scientists and engineers an environment of significant and challenging assignments, the same report pointed out that DOD laboratories seemed to be involved in

almost the entire spectrum of research, development, test, and evaluation activities and that the broad-ranging facilities required to carry out sophisticated R&D in support of defense and space activities had given new dimensions and properties to the word "laboratory."

Therefore the program, rather than being a tool to cope with problems which no longer exist, seems to offer the laboratory director a chance to perform innovative, highly promising research of his own choosing without having to go through the procedure of formal approval and subsequent funding. If this is the program objective, we believe that it should be so stated for policy implementation by the services.

RECOMMENDATIONS

We recommend that you define the objectives of the ILIR program, after considering the needs for and the purposes served by the program in the climate of conditions under which directors of in-house laboratories currently obtain resources and conduct operations. Your consideration should include the need for a statement of the broad uses which may be made of ILIR funds in fulfilling program objectives, as well as the need for evaluative criteria to determine whether the projects which are undertaken have met these objectives.

Because of the inconsistent views of various representatives of the services as to whether ILIR program objectives can be met by using funds for work performed outside the laboratory or for purchasing equipment that does not support an ILIR project, we believe that guidance from the Secretary of Defense is desirable.

In our opinion, the total of all direct costs incurred on ILIR projects should be disclosed. The annual reports to the Assistant Secretary should include the salaries of researchers working on ILIR projects and other costs funded from other sources, as well as those costs funded directly from the ILIR program element. This would enable the Secretary to compare ILIR projects with other research efforts.