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DSB 210/4
FINAL

Report of the Task Group on

STRUCTURE OF SCIENTIFIC AND ENGINEERING ADVICE

IN THE OFFICES OF
THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
AND THE SECRETARY OF DEFENSE

DEFENSE SCIENCE BOARD
Office of the Director of
Defense Research and Engineering

29 SEPTEMBER 1960

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OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON 25, D. C.

28 October 1960

TO: THE SECRETARY OF DEFENSE

THROUGH: THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

The Defense Science Board respectfully submits its report on "Structure of Scientific and Engineering Advice in the Offices of the Director of Defense Research and Engineering and the Secretary of Defense." The findings and recommendations of the report are especially the work of an ad hoc Task Group of the Executive Committee comprised of Dr. Elmer W. Engstrom, Chairman, Dr. Robert W. Cairns and Dr. L. Eugene Root.

The Task Group was organized in May and submitted its initial report on 8 September to the Defense Science Board, having worked through the summer on the problem. As stated in the report, it met with the principal research and development officials of the Department of Defense individually in the course of the study. These meetings, together with independent study and exchange of correspondence, amounted to at least a fortnight of effort for each member of the Task Group. The Board discussed the report at its Seventeenth Meeting on 28-29 September, approving it with the charge that the Task Group offer to work with the Director of Defense Research and Engineering to assist in its implementation.

We deem these carefully considered recommendations provide for an effective coupling of the scientific and engineering talent available throughout the country with the administration of the relevant activities of the Department of Defense. They are designed to match the structure of advice with the present role and organization of the

Office of the Director of Defense Research and Engineering; we are convinced that their orderly adoption will assist the Director in carrying out his mission.

We--the Defense Science Board and its Executive Committee, and especially the Task Group on the Structure of Advice--stand ready to assist in implementing the recommendations of this Report.

Respectfully submitted,

H P Robertson

H. P. Robertson, Chairman
DEFENSE SCIENCE BOARD

Enclosure:
DSB 210/4, Final Report of
DSB Task Group on Structure of Advice

OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON 25, D. C.

20 October 1960

Dear Dr. Robertson:

The Task Group on Structure of Advice, having completed its study, herewith submits its final report. Dr. Cairns and Dr. Root have worked diligently with me to edit this document in accordance with the sense of the Seventeenth Meeting of the Board.

As stated in the introduction of the report, we met with the principal research and development officials of the Department of Defense individually in the course of this study. The report thus reflects their private opinions but as interpreted by the Task Group. I feel that this is a significant factor since we are responsible for the technical programs of important communications, chemical and missile industrial activities and are particularly alert to sensitive tensions in the administration of large research and engineering activities in the defense complex. The sum of our opinion is thus not biased by a "politic" conservatism.

The Task Group submitted its initial report on 8 September after having met as a group on 1, 18, 19 and 28 July, and 11 August. These meetings, together with independent study and exchange of correspondence, amounted to at least a fortnight of effort for each of us spread over the period. We have reconsidered the language of this report and have made the changes necessary to remove semantic misunderstanding. To the best of our ability it reflects the view of the Board.

Respectfully submitted,

E W Engstrom

Elmer W. Engstrom, Chairman
Defense Science Board Task
Group on Structure of Advice

Enclosure:
DSB 210/4, Final Report of
DSB Task Group on Structure
of Advice

Dr. H. P. Robertson, Chairman
Defense Science Board
Room 3E-1027, The Pentagon
Washington 25, D. C.

INTRODUCTION

A task group of the Defense Science Board has completed its study of the advisory services that compose the structure of scientific and engineering advice to the Office of the Director of Defense Research and Engineering and the Secretary of Defense.

During the course of the study the Assistant Directors responsible for the Operational Systems Offices as well as the Directors of the respective Technical Offices were interviewed. Discussions were also carried on with the Deputy Directors, and the recommendations growing out of the study were discussed with Dr. Herbert F. York, Director of Defense Research and Engineering.

Conversations were also held with Richard S. Morse, Director of Research and Development, Department of the Army; James H. Wakelin, Jr., Assistant Secretary of the Navy (Research and Development); and Courtland D. Perkins, Assistant Secretary of the Air Force (Research and Development).

Interviews and discussions ranged beyond the structure of advice to other aspects of the Office of the Director of Defense Research and Engineering. Problems of research management were evident as a natural result of the development and growth of the Office of the Director of Defense Research and Engineering. Also, the continual growth in strength of "in-house" capabilities was noted. The task group feels that this growing strength should be encouraged and continued. This "in-house" strength was not available at the time the current elaborate structure of advisory groups was established.

The task group also kept in contact with Rear Admiral John B. Colwell, who has been carrying on a "within-house" study of the structure of advice in the Office of the Director of Defense Research and Engineering.

Throughout the study the task group had the full cooperation and helpful counsel of Lawson M. McKenzie, Executive Secretary, Defense Science Board.

Mr. E. Schulz assisted the task group during the interviewing and in the preparation of this report. His counsel and guidance were available throughout the study.

RECOMMENDATIONS

The task group recommends that the following steps be taken:

1. The Defense Science Board should concern itself with policy matters in the area of long-range planning. It should render advice to the Secretary of Defense and to the Director of Defense Research and Engineering in areas useful to their Offices as to specific systems and weapons only down to such details as fulfill the requirements of these Offices.

The Board should also concern itself with the pressing and complex problems of research management facing the Director of Defense Research and Engineering and his staff. The approach of the Board to these problems should be in terms of policy development and principles to be followed.

The Defense Science Board should report at the level of the Secretary of Defense. The Secretary of Defense should invite individuals to serve as members-at-large on the Board upon the recommendation of the Director of Defense Research and Engineering. As indicated earlier, however, the Board should be primarily concerned with policy matters in the Office of the Director of Defense Research and Engineering.

The task group believes that the structure of advice of the Defense Science Board should also be available to the Joint Chiefs of Staff and, additionally, that linkage be provided by representation at meetings of the Board for liaison of a designee of the Joint Chiefs of Staff as appointed by the Secretary of Defense.

The Defense Science Board should consist of:

(1) The Chairman or designee of each of the following advisory bodies:

a. Army Scientific Advisory Panel

b. Naval Research Advisory Committee

c. Air Force Scientific Advisory Board

d. Scientific Advisory Committee on Ballistic Missiles, Office of the Director of Defense Research and Engineering

e. The President's Science Advisory Committee

f. General Advisory Committee of the Atomic Energy Commission.

(2) In view of the common interest in the subject matter, the following or their designee:

a. The President of the National Academy of Sciences

b. The Administrator of the National Aeronautics and Space Administration

c. The Director of the National Science Foundation

d. The Director of the National Bureau of Standards

(3) Not more than twenty members-at-large who shall serve a term not to exceed four years, with terminal date of 31 December.

Individuals selected as members-at-large should bring to their position the broad background necessary to represent the interests of the respective Offices of the Director of Defense Research and Engineering as well as an over-all research and engineering viewpoint. Particular members-at-large will be assigned the responsibility for keeping in touch with and being informed on the progress and problems of the individual Directors of these Offices. It shall be the responsibility of these individuals to take initiative in advising the Director of Defense Research and Engineering and the Chairman of the Defense Science Board regarding needed action.

The task group recommends that members-at-large should not be eligible for reappointment until one year has elapsed. This procedure will assure new blood and fresh viewpoints being fed into the Defense Science Board. The Chairman and Vice Chairman may be exceptions to this rule.

The Secretary of Defense should designate the Chairman and Vice Chairman of the Board from the above membership upon the recommendation of the Director of Defense Research and Engineering.

The Defense Science Board should establish an Executive Committee as a working group to deal with and to act upon problems and projects submitted to the Board or originated by the Board. The Executive Committee should work in close contact with the Office of the Director of Defense Research and Engineering and be sensitive to the needs of this Office and of the Secretary of Defense. The Executive Committee should report on its actions at each meeting of the Board.

The membership of the Executive Committee should include the Chairman and Vice Chairman of the Defense Science Board and six additional members drawn from the membership of the Board. These six members of the Executive Committee should be appointed, and an Executive Secretary provided together with such supporting staff as is needed, by the Director of Defense Research and Engineering upon the recommendation of or with the concurrence of the Chairman of the Defense Science Board. The Director of

Defense Research and Engineering and his Deputy Directors should be invited to the meetings of the Executive Committee. At the discretion of the Chairman, the designee of the Joint Chiefs of Staff may be invited to certain meetings of the Executive Committee.

The Defense Science Board should meet regularly three times each year during the months of January, May and September. The Executive Committee should meet during the day or evening prior to each meeting of the Board. In addition, the Executive Committee should meet regularly once each month during the months of March, July and November. The Executive Committee should be subject to call of the Chairman for meetings, as needed, during other months of the year.

2. Advisory functions in the Office of the Director of Defense Research and Engineering requiring outside personnel on a voluntary basis, with certain exceptions specified later in this report, should be performed on an ad hoc basis with panels and groups or individuals drawn from a list of consultants. There are presently approximately 600 consultants to the Director of Defense Research and Engineering. This present group of consultants should be reviewed in relationship to the current needs and to the functions of the Operational Systems Offices and the Technical Offices. Appropriate procedures should be established for the selection of consultants and annual review of their performance prior to reappointment on an annual basis. There should also be established an approval procedure for the appointment of individual consultants or ad hoc groups to assure that the problems assigned cannot be handled on an "in-house" basis and that the assignment is promptly terminated when recommendations on the assigned problem have been received. This review and approval procedure should be carried out by the Director of Defense Research and Engineering or his designee.

The task group suggests that consideration be given to the appointment from the total list of advisory members of a limited group of senior consultants. For example, one such senior consultant might be designated for each Office or each major field of interest to be called upon by the Office Directors or the Assistant Directors as required. This procedure will provide each of them with an outstanding scientist who is broadly acquainted with qualified people in his specialized field. The senior consultant would be a continuing point of contact to whom the Director of the Office would turn for guidance in the establishment of an ad hoc group or for information regarding knowledge that might be available in industry or in universities. It is important that coupling be continued between those in the Office of the Director of Defense Research and Engineering and those on the outside in a position to give advice.

When the need for a task force to handle a particular problem is recognized by the Defense Science Board, or within the Office of the Director of Defense Research and Engineering, the selection and assignment on an ad hoc basis should, whenever appropriate, be made through the existing Offices in the Defense Research and Engineering organization. The responsibility for selecting and working with such ad hoc task forces should, wherever appropriate, be placed with the existing Technical and Operational Systems

Offices. Adequate secretariat should be provided by the Office of the Director of Defense Research and Engineering in order that the work of the ad hoc groups be effective. It is recognized that for certain of its functions, the Defense Science Board will establish, by direct action, ad hoc groups to carry forward its responsibilities. To further facilitate the work of ad hoc groups, a small working fund should be established to enhance administrative and technical support on a pro tem basis as may be required in the performance of their duties.

All existing advisory panels, steering groups and other continuing advisory organizations in the Office of the Director of Defense Research and Engineering should be dismissed when current assignments are completed. The task group recognizes that there may be exceptions to the elimination of standing advisory panels or groups in those instances where the group acts as an extension of a Technical Office or an Operational Systems Office. During the course of the study, it was evident that those groups concerned with materials, electronic components, and the sciences have become an integral part of the Offices they serve. With respect to the Office of Science, the task group understands steps are under way to consolidate into a single group the three existing panels concerned with the medical sciences, the general sciences and the social sciences. The task group endorses this approach. The groups concerned with materials, electronic components and the sciences should be considered as exceptions to the recommended elimination of the existing advisory groups. The task group encourages the continued use of the Materials Advisory Board and any other similar group currently rendering service upon request from the Director of Defense Research and Engineering. Any Advisory Panel or group to be continued in operation as an extension of either a Technical Office or an Operational Systems Office or their equivalent, should require the approval of the Director of Defense Research and Engineering or his designee.

3. The task group in the course of its interviews recognized the need for the establishment of a position of Executive Deputy Director. This position should be given responsibility for the over-all direction of the Technical Offices, thereby relieving the Director of Defense Research and Engineering of day-by-day supervision of these Offices. The individual assigned to this position should be responsible for assuring that an effective pattern of research management is developed within the Technical Offices. He should see that these Offices properly serve the Operational Systems Offices. He should review the need for ad hoc task groups and individual consultants required by the individual Technical Offices. He should approve the continuance of advisory panels where they serve as an extension of the Technical Offices, as in the instances noted above in the fields of materials, electronic components and the sciences. He should make certain that the respective Technical Offices take full advantage of the "in-house" capabilities, as for example the Research and Engineering Support Group of the Institute for Defense Analyses. He should also act for the Director of Defense Research and Engineering to approve task force and ad hoc groups advising the Operational Systems Offices and to assure

that sound methods of research management are followed in these Offices. This position will serve to relieve the Director of Defense Research and Engineering of day-by-day supervision and enable him to devote the necessary time to his relationships and obligations within the Department of Defense and elsewhere in the Government of the United States.

CONCLUSION

During the course of its interviews, the task group recognized the organizational evolution that has taken place as the Office of the Director of Defense Research and Engineering has assumed its proper position within the Department of Defense. The need for effective relationships between the long existing Technical Offices and the recently established Operational Systems Offices was also recognized. The advisory panels with a long history of supporting the Technical Offices were reviewed against the use of ad hoc task forces by the Operational Systems Offices. The impact of the President's Science Advisory Committee on the Office of the Director of Defense Research and Engineering was obvious and the need for clarification in relationships was equally obvious.

The structure of advice that has grown up over recent years in the Office of the Director of Defense Research and Engineering, in the various Armed Services, and at the level of the President of the United States through his Science Advisory Committee has resulted in some uncertainty of operation and more seriously poses problems of confusing interrelationships.

The task group recognized the need for linkage running in both directions from the Defense Research and Engineering organization through the Armed Services and the Joint Chiefs of Staff as well as to the Secretary of Defense and the President of the United States. The Defense Science Board has the broad responsibility of advising the Secretary of Defense and his Director of Defense Research and Engineering on over-all research and engineering and of providing long-range guidance in these areas to the Armed Services. The Board can have a major effect on both policy and the decision-making process in the research and engineering area of the Department of Defense.

At a lower level the establishment of an Executive Deputy Director within the Office of the Director of Defense Research and Engineering can provide a similar linkage between the respective Offices in this organization.

The research management problems recognized within the Office of the Director of Defense Research and Engineering range across the entire Department of Defense and throughout the respective Armed Services. The matter of assuring balance between advancing technology and the development of systems thinking is only a single illustration. The planning, organization and control aspects as well as the political, military and psychological aspects of interpersonal relationships are exceedingly complex problems, especially in the research and engineering area.

As the work of the task group progressed, the members became increasingly conscious of the management problems inherent in the Office of the Director of Defense Research and Engineering. The structure of advice, to be

effective, must fit into a fairly well defined organization structure with clearly stated responsibilities accompanied by both necessary authority to fulfill these responsibilities and established accountability. Manpower, financial control and other research management activities become more difficult if the organization structure is inadequate.

On 23 December 1958 the Board submitted a memorandum to the Secretary of Defense through the Assistant Secretary for Research and Engineering containing six suggestions for more effective management of research and engineering.* The task group strongly reasserts these principles as sound and a proper basis for its structure of advice. The memorandum of 23 December 1958 is incorporated, by reference, into this report.

Finally, the redirection of the Defense Science Board's attention to both management and scientific problems is aimed at balancing between equally important and complex matters benefiting from its counsel.

E. W. Engstrom, Chairman

R. W. Cairns

L. Eugene Root

*DSB 210/3, "Improving the Effectiveness of Military Research and Development, both in Time and Quality."