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THE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING  
(Comments on the Report of the Special Study Group  
of the NSA Scientific Advisory Board)

1. Pursuant to the instructions of the Director, NSA, those components of the National Security Agency primarily concerned with research and development and processing activities in the COMINT field have studied the report "The Potentialities of COMINT for Strategic Warning" prepared by the Special Study Group of the NSA Scientific Advisory Board. The resulting comments and recommendations of the Office of Research and Development, Production and Personnel Division are included as Tab B, Tab C, and Tab D to this study. Tab A is a list of all the recommendations and suggestions of the Special Study Group together with the applicable comment of the various divisions and Deputy Chiefs of Staff.

2. The Special Study Group has presented an excellent study of the potentialities of COMINT for advance warning of a direct air attack. The findings of the Group indicate a high probability that COMINT could provide warning of Soviet intent to mount an attack against the U.S. This invaluable information would be in the hands of U.S. authorities from four to twelve weeks in advance of such attack. This has been proven by past experience. The reliability of this strategic warning would increase with the approach of the attack. Such strategic warning in conjunction with the tactical warning provided by the Air Defense Warning System will contribute greatly to our Continental Air Defense System

3. The Group has also made a thorough study of NSA potentials and has indicated ways in which it can be expanded. It is primarily upon this aspect of the report that this study is directed.

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4. The findings of the Special Study Group indicate that a vast majority of the problem areas isolated are either directly or indirectly related to the problem of employing and retaining competent personnel.

PROD has forcefully summarized its position in the following remark:

"The fact that most clearly emerges from our consideration of the Group's recommendations is that our technical planning is under much better control than is our capacity to implement plans developed. At every turn we are forced to compromise what is technically desirable with what can be performed with personnel available."

Personnel problems in a Department of Defense organization such as NSA must be considered from both the military and civilian viewpoints and although the cause and effect of such problems may be essentially similar, the remedial action in each case will not necessarily be the same. The following discussion treats the personnel problem in NSA:

a. MILITARY

- (1) I am personally convinced that every responsible individual in the Agency has made strenuous efforts to remedy our Service personnel dilemma. I am equally convinced that, due to circumstances beyond our control, little of material value has been accomplished in the past. Continued efforts in the same direction show little promise of improving the situation. I feel that if our efforts are channeled along lines as recommended in 2a and b below, we may eventually accomplish much in the way of a solution. Actually, the NSA service personnel problem is no different and probably no more serious than the personnel problem in every echelon within the Department of Defense. Every specialized activity needs technicians. The high personnel replacement and attrition rates are universally deplored. Many have attacked the problem unilaterally with the view that Headquarters A has a higher priority than Headquarters B. We unfortunately have frequently been guilty of this kind of logic.

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(2) I recommend to you that in the case of service personnel we redirect our attack to produce legislation such as the following, which will tend to lower attrition:

- (a) Offset the inducement to separate from the Service presented by the Servicemen's Readjustment Act of 1944, as amended (G.I.Bill). This can be accomplished by providing similar benefits to the serviceman while he is in the service. A system for formal education at government expense for high level type entrants (10-20%) who are needed as technicians throughout the services might be established. This could be entered upon prior to the commencement of the formal service career with the condition that the serviceman serve a specified tour of duty upon graduation. (Similar to the Navy's Holloway Plan).
- (b) Increasing or improving the family security guarantees to service personnel, especially in the medical, dental, and housing areas.

(3) Recent actions and pronouncements of the administration and the Office of the Secretary of Defense indicate that re-awareness of the attrition - retainability problem is developing at an accelerated rate. Leadership and support from NSA might well be timely and appreciated.

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- (4) If you concur in the abovesummary, I will re-orient the efforts of the NSA staff along the lines indicated and prepare suitable papers for transmission to the Secretary of Defense.

b. CIVILIAN

- (1) The problem of attracting and holding civilian technicians, while less critical than the service problem, is still serious. As in the military manpower problem, NSA is only one of the government activities which has recruiting and retainability problems. To date our attempts to improve the situation have been moderately successful, and current plans and programs in this field appear to promise additional benefits.
- (2) I recommend thatthese efforts continue. At the same time, NSA must appraise and initiate corrective action to defend against the conditions set forth below.
- (3) Changing basic economics, as they affect individuals, for several years have made the professional public servant (civil service) more and more vulnerable to the non-government labor market. In industry, personnel benefits such as Social Security, Group Medical Insurance, Retirement Plans, and educational and self-advancement opportunities have all received great attention in the past few years. Thus many of the personal security features which used to be unique to civil service workers

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are now widely available in industry. In the past many government workers preferred a moderate salary plus security features to high salary and big security risk which industry offered. Now private industry can and does offer both high salaries and the security guarantees.

- (4) The above condition is aggravated by other economic factors which, while transient in nature, are currently working to our disadvantage, particularly with regard to technical personnel. First on this list is full employment accompanied by high wages and heavy consumer markets.
- (5) Second is the enormous industrial expansion and the revolution in technology brought about by nuclear and electronic research and development. No one can estimate how many technicians this field will ultimately absorb. An added complication is the fact that World War II created a shortage of science and engineering students which has never been filled.
- (6) Finally, the trend toward earlier retirement is removing the more elderly technicians from the labor market at an earlier average age and in greater numbers each year.
- (7) The remedy for this situation as far as NSA is concerned is obviously high salaries for critical scientific and technical personnel. Unfortunately, the ceilings imposed

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upon this organization place serious restrictions on this kind of solution. There are, however, two alternatives which can in an indirect way alleviate the situation. The first of these is the utilization of contractual services with established institutions of high repute. NSA is currently using this device to good advantage. There is, however, a possibility that this activity could be increased. The second alternative is to sponsor a small private enterprise (or definite segment of a larger company). This is sometimes called a "captive corporation." Examples of this are the Sandia Corporation of the Atomic Energy Commission and the Rand Corporation as utilized by the Air Force. I conclude that the possibility of restoring and augmenting the professional and technical capacity of NSA through the use of a sponsored enterprise should be carefully considered. I therefore suggest you submit this problem to your Scientific Advisory Board for further study.

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~NSA STUDYTHE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING

(Report of the Special Study Group of the NSA Scientific Advisory Board)

INTRODUCTION

1. Pursuant to the instructions of the Director, National Security Agency, those components of the National Security Agency primarily concerned with research and development and processing activities in the COMINT field have studied the report "The Potentialities of COMINT for Strategic Warning" prepared by the Special Study Group of the NSA Scientific Advisory Board. The resulting comments and recommendations of the Office of Research and Development, Production and Personnel Division are included as Tab B, Tab C, and Tab D to this study.

2. The Special Study Group has presented an excellent study of the potentialities of COMINT for advance warning of a direct air attack. The findings of the Group indicate a probability that COMINT, especially through Special Intelligence, could provide warning of Soviet intent to mount an attack against the U.S. However, this probability can be realized only through an increase in the current level of effort. This invaluable information could be in the hands of U.S. authorities from four to twelve weeks in advance of such attack. The reliability of this strategic warning would increase with the approach of the attack. Such strategic warning in conjunction with the tactical warning provided by the Air Defense Warning System will contribute greatly to our Continental Air Defense System.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 1 OF 5 PAGES

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3. The Group has also made a thorough study of NSA potentials and has indicated ways in which it can be expanded. It is primarily upon this aspect of the report that this study is directed.

4. The Special Study Group has also studied the U.S. ELINT program from the early warning point of view and has indicated certain deficiencies in the existing program. The Joint Chiefs of Staff at the direction of the Secretary of Defense are now reviewing the ELINT program being conducted within the Department of Defense. In compliance with Secretary of Defense Memorandum which required the Director, NSA to advise with the Joint Chiefs of Staff on this matter, General Canine presented his concept of operating principles for ELINT to the Joint Chiefs of Staff. These principles, however, were not incorporated in the ELINT paper (Enclosure to J.C.S. 2010/74, 22 Jan 54) which the Joint Chiefs of Staff sent to the Secretary of Defense.

5. Following is a list of the contents of the Tabs to this study:

- a. Tab A - Recommendations of the Special Study Group (Listing of major specific recommendations together with pertinent NSA comment, and action required).
- b. Tab B - PROCD Comments on Report of Special Study Group.
- c. Tab C - R/D Comments on Report of Special Study Group.
- d. Tab D - PERS Comments on Report of Special Study Group.

#### CONCLUSIONS

6. The consensus of NSA opinion is in agreement with that of the Special Study Group, namely: that a complete COMINT picture (composed of

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 2 OF 5 PAGES

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information resulting from the decryption of enemy high-level cryptographic systems together with that produced from traffic analysis, low-level codes and ciphers, and plain text) is required to maximize the potentialities of COMINT as a source of strategic warning. This status of COMINT processing would increase the probability of but not guarantee detection and accurate prediction of a direct attack upon the United States.

7. The primary conclusion concerning the report of the Special Study Group, NSA Scientific Advisory Board is that insofar as the NSA COMINT effort is concerned, the fundamental NSA problem is personnel. As stated by PROD:

"The fact that most clearly emerges from our consideration of the Group's recommendations is that our technical planning is under much better control than is our capacity to implement plans developed. At every turn we are forced to compromise what is technically desirable with what can be performed with personnel available."

As stated by R/D:

"The above analysis shows clearly that an expansion of the scope of the research and development program to cope adequately with the requirements of the early warning problem is almost totally dependent on scientific personnel--the retention of current personnel and the hiring of a quantity of new personnel."

8. Solution of the problem of increasing (a) NSA capabilities, and (b) the effectiveness and efficiency of NSA activities is primarily centered in the solution of the NSA personnel problem.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 3 OF 5 PAGES

~~TOP SECRET FROTH~~

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9. Means must be found to retain experienced personnel and to attract additional high calibre personnel to NSA by the establishment of salary scales and working conditions more nearly comparable with those in industry.

10. Considerable improvement in the NSA personnel problem can be effected now by the establishment of personnel and management policies which will provide sufficient job satisfaction to offset deficiencies in terms of salary and job benefits. To this end such policies must insure:

a. Knowledgeable direction of technical activities by qualified supervisors.

b. Preservation of professional and personal integrity of employees.

11. In general, NSA technical plans and programs provide for practical expansion of NSA technical effort within the limits of existing facilities. There is, however, an urgent requirement for expanded research and development activities in the field of intercept equipment, methods, and techniques.

RECOMMENDATIONS:

12. A detailed analysis of the problem of hiring new scientific and analytic personnel and of retaining present personnel should be prepared by PERS in consultation with PROD and R/D. This analysis should serve to establish requirements in terms of salaries, working conditions, and job benefits, which must be met if NSA is to effectively compete with industry for the services of such personnel.

13. On the basis of this analysis, NSA objectives in the personnel field should be formulated, and an NSA personnel plan with supporting

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 4 OF 5 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~

programs (including such legislative programs as may be required) should be prepared by PERS.

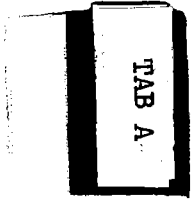
14. The COMINT career field now being formulated by PERS should be expedited to enable the Director to secure Service approval as soon as possible.

15. The tentative research and development program outlined on pages 2 through 9 of Tab C should be formalized by R/D and submitted through channels to the Director, NSA, for approval. In view of the long term nature of such a program, implementation should begin as soon as possible.

16. The NSA plan for active investigations in the field of VHF/UHF/SHF intercept which is now being prepared, should be implemented as soon as possible.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 5 OF 5 PAGES

~~TOP SECRET FROTH~~



~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~EO 3.3(h)(2)  
PL 86-36/50 USC 3605GENERAL RECOMMENDATIONS

1. RECOMMENDATION: (Page 2, paragraph 1) "Top priority should be accorded to solution of [REDACTED] and to their exploitation on a timely basis."

PROD COMMENT: Top priority is now being and has been given to the solution of [REDACTED]. A large proportion of the research talent available in NSA is assigned to direct support of high-level Russian problems. Two teams of specialists have completed a technical survey of problems to recommend new approaches and anticipate required strengths. PROD further notes that the Study Group did not investigate the possibility that non-Russian targets could contribute directly or indirectly to strategic warnings. PROD suggests that any planning or action in connection with further investigation of this problem should keep non-Russian targets in mind--particularly the Satellites.

DCS/P REMARKS: Top priority is being given to the solution of Russian high-level systems within NSA. The combined [REDACTED] effort concentrated on this problem highlights its importance in the eyes of both parties. The technical surveys contemplated by Drs. Shaw and Leibler are evidence that PROD and R/D are striving to improve their methods of attacking the problem. [REDACTED]

[REDACTED] PROD's point in stressing the importance of non-Russian traffic (particularly Satellite) is sound. The Director, NSA has recently submitted a memorandum to the Secretary of Defense stressing

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~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 1 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~

the need for 1065 additional civilian personnel to increase the effectiveness of the attack on the Soviet-Soviet Satellite program.

ACTION RECOMMENDED: PROD and R/D to continue in collaboration on the  and to expand the efforts of both divisions in this direction.

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 2 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~

2. RECOMMENDATION: (Page 2, paragraph 2) Traffic analysis activities should be expanded and organized to give maximum information available from the material intercepted.

PROD COMMENT: It is agreed that our capability to perform traffic analysis must be increased. This is being done by training and cross-training so that technicians will be familiar with all types of communications analysis rather than those aimed at specialized aspects. (This view of training and utilization of personnel is contrary to recommendations of the Group - See specific recommendations under Special Intelligence.) It is planned that teams study the T/A effort and make recommendations on new approaches, numbers of personnel required, and kinds of machinery.

DCS/P REMARKS: PROD considers that NSA capabilities in the field of T/A can be increased by continued specialized training of T/A personnel and by cross-training between T/A and C/A to produce technicians familiar with all the tools of communications analysis. PROD considers that this approach will result in an increase in NSA capabilities without an increase in numbers. A survey of the T/A effort is now underway in PROD. This will be completed early in 1954. It is anticipated that recommendations will be forthcoming outlining new approaches toward improvement of T/A activities in NSA. New promotion policies adopted subsequent to the report of the Special Study Group appear to be working well. It is felt that improvement also could be gained by better supervision. Many persons in supervisory positions cannot complete all their assigned work and at the same time closely supervise on-the-job training of novices.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 3 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~

Implementation of a COMINT career plan for the military services would improve this situation by retaining personnel who have become skilled. The military career problem, particularly in the officer category, is probably the most difficult aspect of the personnel problem. The objective of offering an attractive officer career program providing reasonable promotion rates from junior to senior grades appears at this time nearly impossible to attain. Such a program is probably not needed so urgently in the lower grades where promotion is fairly routine and reasonably certain. This is not the case however in the higher grades. Due to the difficulty of securing personnel legislation for NSA which would be acceptable to all three services, consideration might well be given to seeking authority which would permit the Director, NSA to make temporary "spot" promotions in the field grades independent of the normal promotion process. This system is currently being used with excellent results in the USAF Strategic Air Command. Spot promotion authority, if applied to the top enlisted grades might well improve the enlistment and re-enlistment rate.

ACTION RECOMMENDED: PROD to continue training activities and studies to improve T/A methods and procedures. These activities should include management training for supervisors. R/D to initiate a program of investigation aimed at producing new T/A techniques and at expediting T/A methods. PERS to examine feasibility and/or desirability of securing NSA authority to effect temporary "spot" promotions.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 4 OF 42 PAGES



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3. RECOMMENDATION: (Page 2, paragraph 3) Personnel policies should be revised to improve the selection, training, and retention of skilled personnel, both civilian and military, for COMINT activities. Strong recommendations should be made to Services and Civil Service Commission.

PROD COMMENTS: (General) Our main problem is a need for more and better personnel. An over-all study of personnel requirements of PROD is being conducted. Recommendations will be submitted to the General Priorities Committee; this report should be finished by the end of the year. Further stated: "...we are forced to compromise what is technically desirable with what can be performed with personnel available." We have not achieved a balance between work to be done and number of personnel to do it and we can most effectively use those personnel we have only if we are authorized more. Career possibilities for specialists (military) are not sufficiently attractive to draw and hold qualified personnel. This would require personnel action of the type to be achieved only with legal action.

R/D COMMENTS: (General) The expansion of scope of research and development to cope with early warning problems is totally dependent upon retention of current personnel and hiring of qualified new personnel. NSA cannot compete with industry for scientists in either pay or working conditions.

PERS COMMENTS: A psychometric testing program is being set up. Continual study is made of the reasons and causes for separation of civilian

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 5 OF 42 PAGES

~~TOP SECRET FROTH~~

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employees in order to hold separations to the minimum. Three Services must be encouraged by NSA in their efforts to develop and maintain a high percentage of repeaters in COMINT assignments.

DCS/A REMARKS: The Special Study Group has noted that in their discussions and briefings concerning the COMINT effort the most universally mentioned problem is that of expanding the number and improving the quality and proficiency of NSA civilian and military personnel. See DCS/P's comments on temporary promotions. (Para 2, Page 4)

a. Civilian - The problems of morale, career development, salary standards and working conditions have been the subject of considerable study and applied effort within NSA. There has been an upward trend in the NSA civilian salary scale and a continuing general improvement in NSA civilian career possibilities within the limits of the U.S. Civil Service System. The basic problem is that of hiring and retaining highly qualified technical personnel, since NSA cannot compete with industry in terms of salaries, working conditions and job benefits. In this respect NSA is suffering from inherent inadequacies in the Civil Service System. While these inadequacies of salary and job benefits are more strongly emphasized by the inability of NSA to hire and retain scientific and engineering personnel, they are also detrimental to hiring and retention of linguists and analysts. The only obvious correction for such inadequacies lies in special legislation. In view of the importance of NSA's contribution to the security of the U.S., it is felt that special legislation by the Congress

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 6 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~

(perhaps of a secret category) resulting in changes in Civil Service Regulations which would enable NSA to compete with industry on an equal footing is justified. Negotiations are underway with Psychological Research Association (a civilian concern) to establish a psychometric testing program for all civilian job applicants. This program will not only improve recruitment and placement of personnel, but will also provide a valuable tool in the evaluation of performance. PERS also conducts a continual study of the causes for separations of civilian employees. While many of these are due to pregnancy, movement of domicile to other areas, etc. a large number are due to low morale and better employment opportunities outside the Agency.

b. Military - Career possibilities in the field of COMINT are not sufficiently attractive to draw and hold qualified technical personnel. Much time is required to obtain background clearance and to properly train these personnel. As a result, at the time when a technician is fully trained and NSA is capitalizing on its investment in him, he is lost to the Service and there is little incentive for him to reenlist in the COMINT field. PERS is presently drawing up career ladders for both officers and enlisted men which will furnish greater opportunity for advancement and enhance the attractiveness of the COMINT field as a career. This action if approved, should contribute materially to the solution of the military personnel problem in NSA and the Cryptologic Services. PERS is, in addition, conducting a job survey which has as its objective the establishment of job

~~TOP SECRET CONTROL NO. P/P 54 176~~  
 COPY 3 OF 15 COPIES  
 PAGE 7 OF 42 PAGES

~~TOP SECRET FROTH~~

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descriptions common to MOS, AFSC, and SUJCO designations. The effect of this will be to properly place military personnel in positions commensurate with their abilities. This action would improve morale and efficiency greatly. The concept of preferential legislation providing for promotions in excess of the service quotas on a permanent basis solely for the benefit of military personnel engaged in COMINT activities would probably not be acceptable to any military service. However, authority to effect temporary promotions (officer and enlisted) as long as the individual concerned remains with the Agency might well provide the incentive for re-enlistments (in the case of enlisted personnel) and repeat tours in the case of officers.

ACTION RECOMMENDED: a. PERS to conduct a detailed study of the NSA personnel problem and to prepare a personnel plan and supporting programs based upon NSA objectives. The purpose of this study would be to point up personnel deficiencies and illustrate how these deficiencies impede the NSA effort. This would provide the basis for a request by the Director for special legislation to change Civil Service Codes.

b. PERS to expedite the preparation of the COMINT career ladder so that the Director can secure Service approval as soon as possible.

c. PERS to continue preparation of uniform job descriptions.

d. PERS to investigate feasibility of securing authority for the Director, NSA, to effect temporary promotions.

~~TOP SECRET CONTROL NO. P/P 54-176~~COPY 3 OF 15 COPIES  
PAGE 8 OF 42 PAGES~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~

SPECIFIC RECOMMENDATIONS

INTERCEPTION

4. RECOMMENDATION: (Page 10, Line 4) National Security Agency "should augment its scientific and engineering staff with a view to assisting the Services" in regard to technical matters relative to propagation phenomena in making determination as to antenna fields and placement of intercept positions.

PROD COMMENTS: Concur, but not at the expense of any existing functions of NSA until a complete study of all NSA functions can be made to weigh the relative value of this function with others.

R/D COMMENTS: R/D has retained an eminent consultant for advice about propagation matters.

PERS COMMENTS: None.

DCS/P REMARKS: The new NSA Intercept Deployment Plan (JCS 2010/68) takes these matters into consideration.

ACTION RECOMMENDED: Future deployment planners should take into account the recommendations contained in this document and avail themselves of the advice of R/D's consultant.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 9 OF 42 PAGES

~~TOP SECRET FROTH~~

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✓ 5. RECOMMENDATION: (page 11, line 5) Improvements are needed in the training and instruction of communications personnel and in operations of communications networks to insure against personnel failures.

R/D COMMENTS: R/D has made available on a full-time basis a high level engineer to assist COM on various technical matters.

DCS/P REMARKS: Here again the solution of the communication problem is dependent upon the personnel problem. Time is required to train personnel, thus decreasing the usable portion of the enlistee's term of service. Soon after they have attained sufficient skill to be valuable to NSA, their tour of duty expires and they are lost to the Service. An effective COMINT career plan would offer much greater inducement to re-enlist than exists at present.

✓ ACTION RECOMMENDED: Office of Communications to continue intensive training and instruction of communications personnel in operating procedures.

~~TOP SECRET CONTROL NUMBER P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 10 OF 42 PAGES

~~TOP SECRET FROTH~~

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6. RECOMMENDATION: (Page 13, paragraph 1) Traffic analysis furnished Air Defense Command should be quantified by development of indices and measures of activity of Soviet Air Force with graphic presentations thereof.

PROD COMMENTS: The quantification of T/A will be an aspect of our technical survey.

R/D COMMENTS: The question of the presentation of traffic analysis findings is a statistical one and is now being considered by the Mathematical Research Division of R/D.

DCS/P REMARKS: None

ACTION RECOMMENDED: PROD to continue Technical Survey toward quantification of T/A indices. R/D (Mathematical Research Division), to continue study of statistical aspects of quantification problem.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE II OF 42 PAGES

~~TOP SECRET FROTH~~

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7. RECOMMENDATION: (Page 13, paragraph 2) Studies (intensive and comprehensive) should be made of activities of the Soviet Air Force during large scale exercises.

PROD COMMENTS: Concur

R/D COMMENTS: None

DCS/P REMARKS: It is the opinion of DCS/P that this is being done as the occasion arises.

ACTION RECOMMENDED: PROD to continue intensive and comprehensive studies of Soviet Air Force large scale maneuvers.

~~TOP SECRET CONTROL NUMBER P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 12 OF 42 PAGES

~~TOP SECRET FROTH~~



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8. RECOMMENDATION: (Page 13, paragraph 3) Traffic analysis fusion effort in NSA should be decentralized to some extent by having traffic analysis units in operational areas and traffic analysis support at intercept stations (along lines established by the Air Force Security Service).

PROD COMMENT: Serious efforts must be made to increase basic reporting as close to source of traffic as possible. Competence of intercept operators must be improved by furnishing them basic traffic analysis techniques.

DCS/P REMARKS: The problem of basic T/A reporting and T/A fusion reporting has been under study for several years within NSA. Under existing NSA policy, the NSA reporting program requires the decentralization and the placing of the responsibility for first instance reporting upon those U.S. COMINT units nearest to and preferably at the points of interception of foreign communications. Full implementation of this program requires that the capabilities of intercept stations be improved, both by improving the background and training of operators and analysts, and by insuring the provision of adequate technical support to such activities. While considerable improvement is being made in the latter aspect, the inability to retain experienced service personnel greatly inhibits any programs to increase the background and training of service intercept operators and analysts. While it is unlikely to become a problem for some time, it should be noted that over-emphasis of decentralization may result in damage to the COMINT effort. Too great a concentration

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 14 COPIES  
 PAGE 13 OF 42 PAGES

~~TOP SECRET FROTH~~

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in forward stations could dilute and diffuse the traffic analysis product.

ACTION RECOMMENDED: PROD, in conjunction with NSA School, to expand cross-training program to provide T/A techniques to intercept operators.

NSA decentralization program to continue.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 14 OF 42 PAGES

~~TOP SECRET FROTH~~

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9. RECOMMENDATION: (Page 13, paragraph 4) A small research group should be established to carry out research and development on new methods of analysis.

R/D COMMENTS: An investigation of new methods of analysis and machine applicability is being undertaken. As study develops, additional personnel will be required. "If this effort is to continue without a decrease in the effort on the Russian problem, the Mathematical Division (R/D) will need three additional personnel at GS-11/12/13 level."

PROD COMMENTS: PROD does not recognize this as an R/D function. This action, already in effect within PROD, is clearly stated in the organizational manual as a responsibility of PROD (0641).

PERS COMMENTS: None

DCS/P REMARKS: As part of the survey of the entire technical effort in PROD, a survey of the T/A effort is being undertaken by teams of competent technicians. As in the case of the cryptanalytic effort, it is anticipated that recommendations will be forthcoming as to new approaches and the resources required to implement them. These surveys will be completed early in 1954.

ACTION RECOMMENDED: PROD to continue the efforts of the research teams to discover new methods of analysis, both T/A and C/A.

~~TOP SECRET CONTROL NUMBER P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 15 OF 42 PAGES

~~TOP SECRET FROTH~~

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10. RECOMMENDATION: (Page 13, Line 20) NSA should re-examine its selection, training, proficiency evaluation, and promotional procedures for T/A civilian personnel. Possible application of modern psychometric methods should be explored in connection with personnel selection.

PROD COMMENTS: Concur

R/D COMMENTS: None

PERS COMMENTS: Request has been submitted to LOG for contract with Psychological Research Associates to embark on psychometric testing program. Results will not only improve recruitment and placement, but also develop yardsticks with which performance can be evaluated.

DCS/A REMARKS: See remarks under 3, page 4. Psychometric testing program is expected to be in operation this year.

ACTION RECOMMENDED: PERS to continue efforts to build and put into use a psychometric testing program.

~~TOP SECRET CONTROL NUMBER P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 16 OF 42 PAGES

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11. RECOMMENDATION: (Page 14, line 1) Similar procedures (as in 10) should be employed for the evaluation of uniformed service personnel and consideration should be given to the establishment of a COMINT career field in the Army and Air Force.

PROD COMMENTS: None.

R/D COMMENTS: None.

PERS COMMENTS: Pre-survey classification program now underway in Offices of Analysis and Exploitation is establishing career ladders for both civilian and military personnel. Program has been prepared to accomplish TMB Project No. 3 (to develop uniform job descriptions applicable to members of cryptologic agencies). These two programs are expected to provide needed career fields.

DCS/A REMARKS: See remarks under 3, page 5.

ACTION RECOMMENDED: PERS to apply psychometric testing procedures, when developed, to all new personnel to insure better initial placement of individuals.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 17 OF 42 PAGES

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12. RECOMMENDATION: (Page 16, Paragraph 1) A firm policy should be established to control and regulate transfer of personnel familiar with high-level problems to other activities. High level effort requires augmentation by top-flight analysts.

PROD COMMENTS: Training and cross-training is being done so that technicians are familiar with all tools of communications analysis rather than those aimed only at specialized aspects of cryptanalysis and traffic analysis. This view of training and utilization of personnel which is applicable to and desirable in the entire field of COMINT is completely opposed to the recommendation by the Study Group that personnel be frozen on specific problems.

DCS/P REMARKS: PROD states that its view of the matter is completely opposed to the recommendations of the Special Study Group that personnel be frozen on specific problems. The Group recommended (page 16, para 1) "Because of the research character of the high-level problems, there has been a tendency to shift personnel to other areas promising more immediate results. The potentials of this source of intelligence are so great that a firm policy should be established to control and regulate the transfer of personnel familiar with these problems to other activities - - -". This recommendation, while highlighting the necessity for continuity on major problems, does not preclude cross training or career development programs, wherein there is a realistic and controlled movement of personnel

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 18 OF 22 PAGES

~~TOP SECRET FROTH~~

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with problems. This recommendation, along with other statements of the Special Study Group indicates the necessity for differentiating between that reassignment of personnel required to accomplish the objectives of cross training and career development programs, and that routine regularized movement of personnel characteristic of a rotation program per se. An additional factor to consider is that of temporary transfer for morale purposes from a problem where no success has been achieved for a long time. A defeatist attitude frequently results when personnel are frozen on a problem which has yielded no success.

ACTION RECOMMENDED: Transfer of personnel to accomplish the objectives of cross training and career development programs should continue. Continuity of effort on high-level research problems to be maintained within the limits of efficiency of the personnel.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 19 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~SPECIAL INTELLIGENCE

13. RECOMMENDATION: (Page 16, paragraph 2) NSA should increase its computing facilities and its staff of personnel skilled in programming. "The lack of programmers is the most serious deficiency at present and should be increased as promptly as possible." Use of outside programmers should be investigated, as well as increasing internal effort.

PROD COMMENT: The lack of programmers, cited by the Group as our most serious deficiency, is not really so great as our lack of a corps of technicians familiar both with cryptanalytic problems and machine capabilities. A group of specialists of this kind is needed to formulate problems and to supervise the work of those performing machine programming. A ratio of one formulator to four programmers, considered ideal, is not even approached in present practice. The lack of this type of personnel would be aggravated if our programming were farmed out on contract as the Group recommends. Although we are trying by intensive training programs to enhance the capabilities our technical personnel, the essential need with which we are not coping satisfactorily is an increase in the number of personnel who can be assigned to the high-level Russian problem.

R/D COMMENT: "Experience indicates that outside help on programming in general can be of very little help to NSA." Proposes that M.R. Division add another section whose primary function is to do programming research for existing and high speed computers.

DCS/P COMMENTS: If the Director's request for an increase of 1065 civilian personnel is granted, PROD's expressed shortage of analysts will be alleviated.

~~TOP SECRET CONTROL NO. P/P 54-176~~

~~TOP SECRET FROTH~~ COPIES OF 122 PAGES  
PAGE 20 OF 122



~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~

ACTION RECOMMENDED: No further action required at this time pending results of the above mentioned request for personnel ceiling increase.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 21 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~SPECIAL INTELLIGENCE

14. RECOMMENDATION: (Page 16, Paragraph 3) The possibilities of carrying out electronic developments outside the Agency should be investigated.

R/D COMMENTS: An increase of the research and development work done by contract is not a complete solution. The extent of this outside work is limited by the size of the NSA R/D organization which must supervise, evaluate, assess the requirements and do the preliminary research. The Office of R/D with its present personnel cannot efficiently administer R/D by contract exceeding \$13 million per year.

DCS/P REMARKS: This possibility has been thoroughly investigated. Contract work for R/D has been increased recently from 30 to 100 contracts. However, the volume of outside work can be increased only within certain limits. These limits are set by the number of R/D personnel available to supervise and evaluate the results of these contracts. While an increase in outside contracting may not afford a complete solution, it still provides the only possible means of effecting new electronic developments which are presently beyond NSA's capabilities.

ACTION RECOMMENDED: R/D to continue investigation of means to expand outside contracts for furthering electronic research and development.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 22 OF 42 PAGES

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15. RECOMMENDATION: (Page 21, line 2) "There is need for basic research on theory of COMINT and for development of methods and equipments which will permit most efficient exploitation of theoretical potential in field."

R/D COMMENT: R/D is aware of need for research in this field of the theory of communications but at present has no adequately trained personnel to perform this research. Attempts to recruit suitable personnel have been unsuccessful to date.

PROD COMMENTS: None.

PERS COMMENTS: None.

DCS/P REMARKS: Past failure to recruit suitable personnel can not be accepted as the reason for failure to meet the requirements of basic research and development of methods and equipment.

ACTION RECOMMENDED: R/D and PERS to continue vigorous recruitment efforts.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 23 OF 42 PAGES

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~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

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16. RECOMMENDATION: (Page 21, Line 6) The entire concept of military, diplomatic and commercial communication must be examined to reveal those aspects of enemy communications networks which are most vulnerable to COMINT activities. The intelligence gained should be weighed against the cost of obtaining it and the cost to the enemy of reducing its vulnerability.

R/D COMMENTS: Contractual studies in the fields of noise communications and survey by contract of the existing situation in the field of VHF/UHF/SHF are underway. So far as is known, no such complete study has been made in the past. Although the value of such a study as a very long term program is intuitively clear, the great diversity of intercept on the part of the various producing and consuming organizations is such as to make the establishment of the relative scale of interest necessary for such a study extremely difficult.

PROD COMMENTS: None.

PERS COMMENTS: None.

DCS/P REMARKS: An NSA plan for active investigation of VHF/UHF/SHF is now underway. It is expected to result in concrete recommendations for new equipment and techniques for attacking the problem. This program promises to be a very expensive one. A Special Intercept Problems Panel is being established within NSA to consider this type of problem.

ACTION RECOMMENDED: NSA plan to be completed and put into action as soon as possible. PROD to insure consideration of its problems by the Special Intercept Problems Panel.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 24 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

17. RECOMMENDATION: (Page 21, paragraph (1)) Developments along the following lines should be considered: antenna systems (multiple unit) and integral receiving facilities to permit operators to determine the direction of arrival of a signal immediately without reliance on a separate D/F.

PROD COMMENTS: None.

R/D COMMENTS: Developments are now underway with the cooperation of the Services to meet this very need.

DCS/P REMARKS: None.

ACTION RECOMMENDED: See 25.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 25 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

18. RECOMMENDATION: (Page 21, paragraph (ii)) Develop repeaters, receivers, antenna systems and techniques to improve signal reception above 30 mc.

R/D COMMENTS: Contractual studies in the fields of noise communications and a survey by contract of the existing situation in the field of VHF/UHF/SHF are underway.

DCS/P REMARKS: None.

ACTION RECOMMENDED: See 25.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 26 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

19. RECOMMENDATION: (Page 22, paragraph (iii)) Development should be continued on equipments for better utilization of immediate action voice communications including better receivers, better recording machinery, automatic time registering devices, better techniques of receiving and copying this traffic, and eventually automatic semantic processing equipment for use in traffic analysis and recovery of brevity codes.

R/D COMMENTS: A tentative program designed to meet the minimum requirements of the early warning mission has been drawn up. This program requires a number of skilled scientists and several man years of time.

DCS/P REMARKS: None.

ACTION RECOMMENDED: See 25.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 27 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

20. RECOMMENDATION: (Page 22, paragraph (iv)) Equipments for reception of noise modulated signals (such as NCMAC system) should receive attention.

R/D COMMENTS: Contract study on noise communication underway.

DCS/P REMARKS: None.

ACTION RECOMMENDED: See 25.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 28 OF 42 PAGES

~~TOP SECRET FROTH~~



~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

21. RECOMMENDATION: (Page 22, paragraph (v)) Development of equipments for detection and reception of [REDACTED]

[REDACTED] communications systems should continue.

R/D COMMENTS: Extension of [REDACTED] equipment to provide coverage in all applicable frequency ranges will require seven man years of effort.

DCS/P REMARKS: None.

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

ACTION RECOMMENDED: See 25

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 29 OF 32 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~RESEARCH AND DEVELOPMENT

22. RECOMMENDATION: (Page 22, paragraph (vi)) Installation and use of propagation measuring equipment to permit more efficient direction of intercept effort should be made.

R/D COMMENTS: It is R/D's belief that this subject is more appropriate for PROD comment. R/D activity must be limited to experimentation with the use of propagation measuring equipment, whereas the installation and use of such equipment to accomplish more efficient direction of the intercept effort is considered properly a PROD function and one for which this Office would not be appropriately manned.

PROD COMMENTS: Concur that this should be done. Possibility of carrying out this activity will be investigated.

DCS/P REMARKS: None.

ACTION RECOMMENDED: See 25.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 30 OF 42 PAGES

~~TOP SECRET FROTH~~

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23. RECOMMENDATION: (Page 22, paragraph (vii)) Inverse LORAN or other position measuring devices to produce position data on transmitters should be investigated.

R/D COMMENTS: Basic comment on this recommendation should come from PROD, however, investigation of inverse LORAN and similar position measuring devices will be undertaken when and if it appears to offer promise. In view of previous extensive investigations very little optimism is presently indicated.

PROD COMMENTS: PROD agrees that use of this sort of device should receive attention. Technical research teams will investigate this matter.

DCS/P REMARKS: None.

ACTION RECOMMENDED: See 25.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 31 OF 42 PAGES

~~TOP SECRET FROTH~~

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EO 3.3(h)(2)  
PL 86-36/50 USC 3605

RESEARCH AND DEVELOPMENT

24. RECOMMENDATION: (Page 22, paragraph (viii)) Efforts should continue on development of demultiplexing, unscrambling and position recording devices.

R/D COMMENTS: Development of  equipment to yield immediate traffic from ferret and SESP missions would require nineteen man years of effort.

DCS/P REMARKS: R/D and PROD should determine the relative worth of such equipment to permit comparative evaluation with other developmental effort.

ACTION RECOMMENDED: PROD and R/D to make an estimate of the relative value of this equipment as compared to the rest of the developmental program.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 32 OF 42 PAGES

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~EO 3.3(h)(2)  
PL 86-36/50 USC 3605RESEARCH AND DEVELOPMENT

25. RECOMMENDATION: (Page 22, paragraph (1x)) Effort should be continued on development of  devices for transmitters and operators, both voice and morse.

R/D COMMENTS: Development of more automatic methods in  operation will require nine man years of effort. A study of the use of  in the VHF/UHF range will take approximately eleven man years.

DCS/P REMARKS: The list of recommendations from 17 through 25 constitutes a tentative program for R/D action. R/D is at present formalizing these recommendations into a planned program.

ACTION RECOMMENDED: R/D to implement this program as fully as possible, consistent with NSA capabilities.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 33 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~EO 3.3(h)(2)  
PL 86-36/50 USC 3605RESEARCH AND DEVELOPMENT

26. RECOMMENDATION: (Page 22, line 24) Studies should be initiated to determine possible methods of solution for interception of USSR use of [ ] communications. Also studies should be initiated on [ ] interception.

PROD COMMENTS: None.

R/D COMMENTS: R/D is now preparing to give increased assistance to the Services on the Russian [ ] problem, particularly [ ]  
A broad study of the [ ] problem is now underway.

PERS COMMENTS: None.

DCS/P REMARKS: USAFSS with NSA concurrence has proposed a plan for the activation of three [ ] squadrons. This effort, if fully implemented, will provide 57 intercept positions.

ACTION RECOMMENDED: R/D to continue the study of the [ ]  
[ ] problem. PROD to insure that the Special Intercept Problems Panel gives consideration to this problem. NSA to continue active support of the [ ] plan.

TOP SECRET CONTROL NO. P/P 54-176  
COPY 3 OF 15 COPIES  
PAGE 34 OF 42 PAGES

~~TOP SECRET FROTH~~

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27. RECOMMENDATION: (Page 23, line 15) More high-level positions and opportunities for advancement should be established.

R/D COMMENTS: Solution of the early warning problem is considered to be primarily centered in the solution of the personnel problem. Under present restrictions, NSA cannot compete for the services of scientific graduates. If this over-all problem is of sufficient urgency, then means must be found whereby NSA can effectively compete with industry in terms of salary, working conditions and job benefits. The alternatives to increasing the local scientific staff are either:

(a) The subsidization of several industrial research organizations by essentially open-end contracts or

(b) Establishment of a captive corporation similar to the procedure followed by the Atomic Energy Commission. Both of these approaches would be extremely expensive and of a low degree of effectiveness in comparison to expanding the NSA staff and extending the regular contract program.

PROD COMMENTS: Concur.

PERS COMMENTS: Previous attempts to secure supergrades have so far produced only one GS-18. Budget for FY-55 includes funds for fourteen additional supergrades.

DCS/A REMARKS: See remarks under #3. It is felt that the alternatives of subsidizing industrial research organizations and establishing a captive company like the Sandia Corporation, are impractical for NSA. Notwithstanding

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 35 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~

the difficulty of competing with industry for skilled personnel, a vigorous recruiting program must be carried on.

ACTION RECOMMENDED: That the additional high level positions, if approved, be included in the over-all NSA personnel program recommended in 3 above. PERS and R/D to continue an intensified recruiting program and exploit every possibility of obtaining suitable personnel.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 30 OF 82 PAGES

~~TOP SECRET FROTH~~



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28. RECOMMENDATION: (Page 23, line 17) Scientists and engineers could be borrowed from industry and universities for limited periods of time.

PROD COMMENTS: Yes, and the existing program through the medium of the Scientific Advisory Board for the use of scientists and engineers borrowed from industries and universities for limited periods of time is adequate to cope with this recommendation. There is considerable question about the real usefulness of such a program if the periods of time that such individuals can be made available are relatively short.

R/D COMMENTS: R/D has underway a WAE program which in effect is carrying out this recommendation.

PERS COMMENTS: None.

DCS/A REMARKS: It is doubtful that this procedure would solve the problem of developing and maintaining a hard core of experienced technical personnel familiar with the NSA mission. The major advantage which might accrue from this procedure would be to increase the prestige of NSA in the eyes of those not familiar with NSA activities. The importance of the work of NSA implied by the association of well known scientists and engineers might serve to attract high calibre personnel to the Agency.

ACTION RECOMMENDED: Borrowing of scientists and engineers be utilized so far as is considered practical by NSA activities. In following this procedure, account should be taken of the limitations on the value of short term employment of such technicians.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 37 OF 42 PAGES

~~TOP SECRET FROTH~~

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29. RECOMMENDATION: (Page 24, line 6) In order to attract the interest of prospective analysts, the present recruitment policy of NSA should be restudied in the light of realistic security limitations.

PROD COMMENTS: None.

R/D COMMENTS: None.

PERS COMMENTS: This has been done. Civilian Personnel has received from AG a list of items which can be used by recruiters. The items are much more informative than anything previously available.

DCS/A REMARKS: None.

ACTION RECOMMENDED: PERS to continue their efforts with improved recruitment tools.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 38 OF 42 PAGES

~~TOP SECRET FROTH~~

~~TOP SECRET FROTH~~~~TOP SECRET FROTH~~PERSONNEL

31. RECOMMENDATION: (Page 24, line 12) Question of salary and promotion policy in NSA should be restudied to determine if it is conducive to a sound development of the T/A effort.

PROD COMMENTS: If the promotional salary scale which is set forth in the last page of the NSA-90 "Organization, Functions and Job Study" is adopted, it is probable that much of the present disparity as pertains to the T/A field salary-wise will be corrected. However this cannot be determined completely until such time as the present job survey is completed.

R/D COMMENTS: None.

PERS COMMENTS: The same might be said for cryptography and crypt-analysis as well. Current promotion policies (inaugurated subsequent to this special study) are working nicely. Salaries are perpetually under observation and are continually adjusted in line with position classification.

DCS/A REMARKS: See paragraph 3 above.

RECOMMENDED ACTION: No change is recommended in the newly established promotion policy.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
 COPY 3 OF 15 COPIES  
 PAGE 40 OF 42 PAGES

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32. RECOMMENDATION: (Page 25, line 1) Consideration should be given to the establishment of a service career field for military intercept operators in order to avoid the problem of re-enlistment and rotation.

PROD COMMENTS: None.

R/D COMMENTS: None.

PERS COMMENTS: Pre-survey classification program, now underway in Office of Analysis and Exploitation is establishing career ladders for both military and civilian personnel. Program has been prepared to accomplish TMB Project No. 3 (to develop uniform job descriptions applicable to members of cryptologic agencies). These two programs are expected to provide needed career fields.

DCS/A REMARKS: See remarks under 3.

RECOMMENDED ACTION: See paragraph 3 above.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 41 OF 42 PAGES

~~TOP SECRET FROTH~~

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33. RECOMMENDATION: (Page 25, line 4) Analytic support should be provided at the intercept site, either by indoctrination of intercept personnel with the rudiments of C/A and T/A, or by assignment of an analyst to the site.

PROD COMMENTS: Serious efforts must be made to increase basic reporting as close to the source of traffic as possible. This means that the competence of intercept stations must be improved both by improving the background and training of operators and by furnishing them basic T/A techniques. Career possibilities for enlisted specialists are not now sufficiently attractive to draw and hold the type of men required by the mission. Improvement of this situation will require personnel action of a type that can be achieved solely by special legislation.

DCS/A REMARKS: See remarks under 8. NSA technical support program provides for assignment of skilled NSA analysts to conduct on-the-job training and to provide technical advice at field processing centers.

ACTION RECOMMENDED: That the NSA technical support program be continued and expanded as rapidly as possible.

~~TOP SECRET CONTROL NO. P/P 54-176~~  
COPY 3 OF 15 COPIES  
PAGE 12 OF 42 PAGES

~~TOP SECRET FROTH~~

TAB B

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SUBJECT: Comments on Report of Special Study Group

TO: P/P

FROM: TECHDIR/PROD

DATE: 25 Nov 53

Attn: Mr. O. R. Kirby

References: (a) The Potentialities of COMINT for Strategic Warnings, a report prepared by Special Study Group of the NSA Scientific Advisory Board undated.

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

(b) Memo from the Chief of Staff same subject dtd 26 October 1953.

1. The special study by members of the Scientific Advisory Board is concerned only with COMINT potentialities for advance warning of a direct air attack. The Study Group was composed of people who are exceptionally well qualified in their own special fields. They have presented an excellent study of our potential and have indicated ways in which it can be expanded. It should be noted though that the Group did not investigate the possibility that non-Russian targets could contribute directly or indirectly to strategic warnings. This possibility is considered in O6 to be a quite likely one, particularly as regards COMINT derivable from the communications of Satellite countries. Any planning or action in connection with this investigation should ensure that non-Russian targets are kept in mind.

2. Reference b requires that PROD analyze steps 1 and 2 of the Summary, item Traffic Analysis of the Report, and item Special Intelligence of the Report. Since step 1 is concerned with special intelligence and step 2 with traffic analysis; the requirements will be met if PROD directs its comments to the Traffic Analysis and Special Intelligence portions of the Report.

3. With regard to Special Intelligence (step 1 of pg. 2 and pp. 15-17), top priority is now being and has been given to the solution of Russian high-level systems. A large proportion of the research talent available to the Agency is constantly assigned to the direct technical support of [redacted] problems. Two teams of qualified specialists recently completed a technical survey of these problems in order to recommend new approaches and to anticipate the strength required to effect them. The benefits of this survey are already being noted; a great deal more benefit is still to be derived.

Whenever those responsible for research require computational support, the need can usually be met from our present facilities though not always as quickly as might be desired. Some reserve of machine capability is available within the Agency, but it can be utilized only by going to multi-shift operations for which sufficient, trained personnel are not now available. Additional equipment which is required over and above present capability is under research or development. Here too additional personnel are needed.

The lack of programmers, cited by the Group as our most serious deficiency, is not nearly so great as our lack of a corps of technicians familiar both with cryptanalytic problems and machine capabilities. A group of specialists of this kind is needed to formulate problems and to supervise the work of those performing machine programming. A ratio of one formulator to four programmers, considered ideal, is not even approached in present practice. The lack of this type of personnel

~~TOP SECRET~~ TOP SECRET CONTROL NUMBER 87259-176  
COPIES 3 OF 7 COPIES  
PAGE 7 OF 3 PAGES

~~TOP SECRET FROTH~~

EO 3.3(h)(2)

PL 86-36/50 USC 3605

~~TOP SECRET FROTH~~SUBJECT: Comments on Report of Special Study Group  
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would be aggravated if our programming were farmed out on contract as the Group recommends. Although we are trying by intensive training programs to enhance the capabilities of our technical personnel, the essential need with which we are not coping satisfactorily is an increase in the number of personnel who can be assigned to the [ ] problem. What are we doing, and planning to do if increases in authorization are not granted, is to reallocate some of our effort (at the expense, of course, of processing in other directions) and to make maximum use of voluntary overtime.

4. The second large area in which improvement is recommended (step 2, pg. 2; pp. 12-14) is in Traffic Analysis, Low Level Codes and Ciphers, and Plain Text. It is agreed that our capability to perform traffic analysis must be increased. This is being done by training and by cross-training so that our technicians will be familiar with all of the tools of communications analysis rather than those aimed at only specialized aspects of cryptanalysis or traffic analysis. It is felt that only in this way can we increase our capabilities without increasing our numbers. This view of training and utilization of personnel which is applicable to and desirable in the entire field of COMINT is completely opposed to the recommendation by the Study Group that personnel be frozen on specific problems.

The survey of our attack on [ ] cited in paragraph 3 above is a first step toward surveying our entire technical effort. It is planned that teams composed of equally high-level people will study our traffic analytic effort. We can anticipate recommendations on new approaches and the number of people or the kinds of machinery required to implement them. These surveys will be completed early in 1954 and will point the way to what needs to be done in the direction of technical improvement.

Serious efforts must be made to increase basic reporting as close to the source of traffic as possible. This means that the competence of intercept stations must be improved both by improving the background and training of operators and furnishing them basic traffic analytic techniques. Career possibilities for enlisted specialists are not now sufficiently attractive to draw and hold the type of men required by the mission. Improvement of this situation will require personnel action of a type that can solely be achieved by special legislation.

5. From the foregoing discussion of the technical areas of interest it will be seen that the reallocation of effort recommended in paragraph 4a of reference b is constantly under way. Problems are kept under continuous review by line supervisors and staff officers to ensure that the allocation of our strength most closely meets intelligence requirements. Surveys, either formal or informal, maintain a balance for technical requirements.

6. Our main problem is clearly a need for more and better personnel. In consonance with the PROD aim to fulfill its technical and intelligence mission as fully as possible an overall study of the personnel requirements of PROD is being conducted. Recommendations based upon this study will be made by the General

~~TOP SECRET CONTROL NUMBER~~ 8/254-176

COPY 3 OF 15 COPIES

PAGE 2 OF 3 PAGES

~~TOP SECRET FROTH~~



~~TOP SECRET~~~~TOP SECRET FROTH~~SUBJECT: Comments on Report of Special Study Group  
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Processing Committee. This study with the support of our consumers will point up personnel deficiencies as required by paragraph 4b of reference b. It is expected that the task will be completed by the end of the year.

7. The fact that most clearly emerges from our consideration of the Group's recommendations is that our technical planning is under much better control than is our capability to implement plans developed. At every turn we are forced to compromise what is technically desirable with what can be performed with personnel available. The further we study the more it becomes clear that we have not achieved an efficient balance between work to be done and the number of hands to do it and that we can most effectively utilize the personnel we have only if we are authorized more.

A. SINKOV  
Technical Director  
Production

~~TOP SECRET CONTROL NUMBER~~ P/P 54-176  
COPY 3 OF 15 COPIES  
PAGE 3 OF 3 PAGES

~~TOP SECRET FROTH~~

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## Comments on Report of Special Study Group

P/P

TECHDIR/PROD

25 Nov 53

Attn: Mr. O. R. Kirby

- References: (a) The Potentialities of COMINT for Strategic Warnings, a report prepared by Special Study Group of the NSA Scientific Advisory Board undated.
- (b) Memo from the Chief of Staff same subject dtd 26 October 1953.

1. The special study by members of the Scientific Advisory Board is concerned only with COMINT potentialities for advance warning of a direct air attack. The Study Group was composed of people who are exceptionally well qualified in their own special fields. They have presented an excellent study of our potential and have indicated ways in which it can be expanded. It should be noted though that the Group did not investigate the possibility that non-Russian targets could contribute directly or indirectly to strategic warnings. This possibility is considered in O6 to be a quite likely one, particularly as regards COMINT derivable from the communications of Satellite countries. Any planning or action in connection with this investigation should ensure that non-Russian targets are kept in mind.

2. Reference b requires that PROD analyze steps 1 and 2 of the Summary, item Traffic Analysis of the Report, and item Special Intelligence of the Report. Since step 1 is concerned with special intelligence and step 2 with traffic analysis; the requirements will be met if PROD directs its comments to the Traffic Analysis and Special Intelligence portions of the Report.

3. With regard to Special Intelligence (step 1 of pg. 2 and pp. 15-17), top priority is now being and has been given to the solution of [redacted] systems. A large proportion of the research talent available to the Agency is constantly assigned to the direct technical support of [redacted] problems. Two teams of qualified specialists recently completed a technical survey of these problems in order to recommend new approaches and to anticipate the strength required to effect them. The benefits of this survey are already being noted; a great deal more benefit is still to be derived.

Whenever those responsible for research require computational support, the need can usually be met from our present facilities though not always as quickly as might be desired. Some reserve of machine capability is available within the Agency, but it can be utilized only by going to multi-shift operations for which sufficient, trained personnel are not now available. Additional equipment which is required over and above present capability is under research or development. Here too additional personnel are needed.

EO 3.3(h)(2)

PL 86-36/50 USC 3605

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EO 3.3(h)(2)  
PL 86-36/50 USC 3605SUBJECT: Comments on Report of Special Study Group  
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The lack of programmers, cited by the Group as our most serious deficiency, is not nearly so great as our lack of a corps of technicians familiar both with cryptanalytic problems and machine capabilities. A group of specialists of this kind is needed to formulate problems and to supervise the work of those performing machine programming. A ratio of one formulator to four programmers, considered ideal, is not even approached in present practice. The lack of this type of personnel would be aggravated if our programming were farmed out on contract as the Group recommends. Although we are trying by intensive training programs to enhance the capabilities of our technical personnel, the essential need with which we are not coping satisfactorily is an increase in the number of personnel who can be assigned to the [ ] problem. What we are doing, and planning to do if increases in authorization are not granted, is to reallocate some of our effort (at the expense, of course, of processing in other directions) and to make maximum use of voluntary overtime.

4. The second large area in which improvement is recommended (step 2, pg. 2; pp. 12-14) is in Traffic Analysis, Low Level Codes and Ciphers, and Plain Text. It is agreed that our capability to perform traffic analysis must be increased. This is being done by training and by cross-training so that our technicians will be familiar with all of the tools of communications analysis rather than those aimed at only specialized aspects of cryptanalysis or traffic analysis. It is felt that only in this way can we increase our capabilities without increasing our numbers. This view of training and utilization of personnel which is applicable to and desirable in the entire field of COMINT is completely opposed to the recommendation by the Study Group that personnel be frozen on specific problems.

The survey of our attack on [ ] cited in paragraph 3 above is a first step toward surveying our entire technical effort. It is planned that teams composed of equally high-level people will study our traffic analytic effort. We can anticipate recommendations on new approaches and the number of people or the kinds of machinery required to implement them. These surveys will be completed early in 1954 and will point the way to what needs to be done in the direction of technical improvement.

Serious efforts must be made to increase basic reporting as close to the source of traffic as possible. This means that the competence of intercept stations must be improved both by improving the background and training of operators and furnishing them basic traffic analytic techniques. Career possibilities for enlisted specialists are not now sufficiently attractive to draw and hold the type of men required by the mission. Improvement of this situation will require personnel action of a type that can solely be achieved by special legislation.

5. From the foregoing discussion of the technical areas of interest it will be seen that the reallocation of effort recommended in paragraph 4a of reference b is constantly under way. Problems are kept under continuous review by line supervisors and staff officers to ensure that the allocation of our strength most closely meets intelligence requirements. Surveys, either formal or informal, maintain a balance for technical requirements.

~~TOP SECRET~~SUBJECT: Comments on Report of Special Study Group  
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6. Our main problem is clearly a need for more and better personnel. In consonance with the PROD aim to fulfill its technical and intelligence mission as fully as possible an overall study of the personnel requirements of PROD is being conducted. Recommendations based upon this study will be made by the General Processing Committee. This study with the support of our consumers will point up personnel deficiencies as required by paragraph 4b of reference b. It is expected that the task will be completed by the end of the year.

7. The fact that most clearly emerges from our consideration of the Group's recommendations is that our technical planning is under much better control than is our capability to implement plans developed. At every turn we are forced to compromise what is technically desirable with what can be performed with personnel available. The further we study the more it becomes clear that we have not achieved an efficient balance between work to be done and the number of hands to do it and that we can most effectively utilize the personnel we have only if we are authorized more.

A. SINKOV  
Technical Director  
Production

~~PROD~~

SUBJECT: Additional Comments on Report of Special Study Group, NSASAB

TO: P/P

FROM: DD/PROD

DATE: 7 January 1954

1. PROD does not feel additional comments as requested on specific recommendations is either necessary or desirable. The idea of breaking down general recommendations into "bits and pieces" for specific comment may lead to unsound conclusions as in many instances these specific recommendations can only be commented on through inclusion of the whole.

2. However, PROD has endeavored to provide such comments pending the completion of the studies which PROD has previously indicated it will undertake. These comments are listed by Para number below:

I Recommendation: National Security Agency should augment its scientific and engineering staff with a view to assisting the Services in regard to technical matters relative to propagation phenomena in making determination as to antenna fields and placement of intercept positions.

PROD Comment: Yes, but not at the expense of any existing function of NSA until a complete study of all NSA functions can be made to weigh the relative value of this function with others.

III a. Recommendation: Traffic analysis furnished Air Defense Command should be quantified by development of indices and measures of activity of Soviet Air Force with graphic presentations thereof.

PROD Comment: The quantification of traffic analysis will be an aspect of our technical survey.

b. Recommendation: Studies (intensive and comprehensive) should be made of activities of the Soviet Air Force during large scale exercises.

PROD Comment: Naturally.

d. Recommendation: A small research group should be established to carry out research and development on new methods of analysis.

PROD Comment: PROD does not recognize this as an R/D function. This action, already in effect within PROD, is clearly stated in the organizational manual as a responsibility of PROD (0641).

e. Recommendation: NSA should re-examine its selection, training, proficiency evaluation and promotional procedures for T/A civilian personnel. Possible application of modern psychometric methods should be explored in connection with personnel selection.

PROD Comment: By all means.

VII a. Recommendation. More high-level positions and opportunities for advancement should be established.

PROD Comment: Without delay.

b. Recommendation: Scientists and engineers could be borrowed from industry and universities for limited periods of time.

PROD Comment: Yes, and the existing program through the medium of the Scientific Advisory Board for the use of scientists and engineers borrowed from industries and universities for limited periods of time is adequate to cope with this recommendation. There is considerable question about the real usefulness of such a program if the periods of time that such individuals can be made available are relatively short.

e. Recommendation: Question of salary and promotion policy in NSA should be restricted to determine if it is conclusive to a sound development of the T/A effort.

PROD Comment: If the promotional salary scale which is set forth in the last page of the NSA-90, "Organization, Functions and Job Study" is adopted, it is probable that much of the present disparity as pertains to the T/A field salary-wise, will be corrected. However, this cannot be determined completely until such time as the present job survey is completed.

ALFRED R. MARCY  
Colonel, US Army  
Deputy Director  
Production

TAB C

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

SECURITY CLASSIFICATION (If any)

**DISPOSITION FORM**~~FROTH~~  
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FILE NO.	SUBJECT		
30-File-139	Comments on Report of Special Study Group of NSASAB		
TO	FROM	R/D	DATE
C/S			20 NOV 53
THRU: P/P			S. Kullback/jth/60321
			COMMENT NO. 1

1. The Report entitled "The Potentialities of COMINT for Strategic Warning (Report of Special Study Group, NSA Scientific Advisory Board)" dated 26 Oct 53, has been carefully studied and the following analysis, comments, and proposed actions are based primarily on the research and development and item 3, Electronic Developments of the Special Intelligence, portions of the Report.

2. We agree in the main with the findings and conclusions of the Board. It is considered that present R&D activities and division of effort are consistent with the recommendations of the report, and that under existing personnel and budget limitations increased effort in the direction of any one of the recommendations can be made only at the cost of another or of existing activities. It is not recommended that current activities be curtailed.

3. As recognized by the Board the major obstacle to an expansion of the scope of the R&D effort is one of personnel. An increase in research and development work done by contract is not a complete solution. The extent of research and development which can be done efficiently by outside contract is definitely limited by the size of the NSA research and development organization which must supervise, evaluate, assess the requirements, and do the preliminary research in order that the overall program of internal and external research and development effort accomplish its mission. The Office of Research and Development with its present personnel cannot efficiently administer research and development by contract exceeding \$13 million per year exclusive of personnel, travel and purchase funds.

4. The major detailed emphasis in the Report is in the field of intercept equipments, methods, and techniques. Contractual studies in the fields of noise communications and a survey by contract of the existing situation in the field of VHF/UHF/SHF are already underway. Recommendations have been made to PROD and PROD has forwarded to P/P an indication of requirements to initiate active field investigations in [redacted] Contract negotiations are being undertaken for engineering models of [redacted] However, expanded activities in this field as indicated by the Report are needed.

The following tentative program shows the scope of increased research and development activity which would be required to fulfill the minimum requirements of the early warning mission. It is emphasized that this program is not a one or two year affair. Whereas some results would develop early, the entire

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S DATE: 20 Nov 53 COMSEFT NO. 1  
THRU: P/P FROM: R/D S. Kullback/jth/60321 (Cont'd)

program is of tremendous technical difficulty, requiring many novel techniques, and would require of the order of five to ten years for satisfactory completion.

Requirements are shown in terms of scientists per year. These figures can be translated into contract terms at the rate of \$20,000 per scientist. Under no circumstances can the entire labor requirement be met by contract. It is necessary to retain a competent staff at NSA for planning, initial cryptologic research and development, and for contract control.

INTERCEPT EQUIPMENT R&D

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>	
<u>RF Equipment</u>		
a. <u>Aural Studies:</u>	11	EO 3.3(h)(2) PL 86-36/50 USC 3605
(1) Determining noise levels in the Aural Zone		
<div style="border: 1px solid black; width: 300px; height: 100px; margin: 0 auto;"></div>		
b. <u>Direction Finding Equipment:</u>	15	
(1) Application of DF to the <div style="border: 1px solid black; display: inline-block; width: 150px; height: 15px;"></div> and		
(2) Extension of DF to include all frequencies of interest to NSA		
c. <u>Development of Intercept Equip. for</u> <div style="border: 1px solid black; display: inline-block; width: 150px; height: 15px;"></div>	14	
(1) Receiver requirements		
(2) Antennas		

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53

COMMENT NO. 1  
(Cont'd)

S. Kullback/jth/60321

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>
d. <u>Extension of the [ ] equipment:</u>	7
(1) Provide coverage in all applicable frequency ranges	
e. <u>RU [ ]</u>	2
(1) Modify or develop receivers	
f. <u>Extension of the Diversity Antenna Selector Switch:</u>	2
(1) A study of the applicability of "diversity reception" at [ ]	EO 3.3(h)(2) PL 86-36/50 USC 3605
g. <u>Multicoupler Development:</u>	6
(1) Interim development to meet Joint Military Characteristics	
(2) Long range development of an automatic or semi-automatic antenna distribution system	
h. <u>Training of engineers in Field Problems;</u>	5
(1) Five man years of operating in the field (1-2 months per man)	
i. <u>Coordination with the Services in investigation and solution of technical problems which now limit the effectiveness of field intercept stations:</u>	5

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TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53  
S. Kullback/jth/60321COMMENT NO. 1  
(Cont'd)

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>
(1) It is believed that five engineers would be required in maintaining the necessary liaison with services headquarters units and performing on the spot studies in the field units. It is believed that two men could be kept on nearly continuous travel duty at the field stations. The remaining three would require travel necessary to coordinate service headquarter affairs.	
j. <u>Employment of more automatic methods in <input type="checkbox"/> operation:</u>	9
(1) Contract to emphasize the aspects of the problem	
(2) Construction of equipment for performing automatic <input type="checkbox"/> matching	
k. <u>Study of the use of the <input type="checkbox"/> in VHF/UHF range:</u>	11
(1) Local study of the problem	
(2) Development of <input type="checkbox"/> equipment for VHF/UHF applications for fixed stations	
(3) Ruggedization of VHF/UHF <input type="checkbox"/> equipments	

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PL 86-36/50 USC 3605

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NEASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53  
S. Kullback/jth/60321COMMENT NO. 1  
(Cont'd)

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>
1. <u>Utilization of Correlation Techniques in RWE position fixing:</u>	10
(1) Study of requirements	
(2) Development of Experimental Model	
(3) Development of Engineering Model, 5 Service Test Models	
 <u>Terminal Equipment</u>	
a. <u>Improved Morse Operator Identification Equipment:</u>	6
This could, in conjunction with D/F and <input type="checkbox"/> provide an indication of the movements of a task force, or indicate a shift in personnel which would be a tip-off. For development of statistical techniques of analysis.	
b. <u>Development of effective wire-line and wire-carrier intercept equipment:</u>	8
Local study and development. Evaluation of current techniques and investigation of new techniques.	
c. <u>Development of traffic activity indicator for demultiplex equipments:</u>	1
Will provide immediate indication of sudden change in amount of traffic handled which might serve as tip-off. Local development and implementation.	
d. <u>Development of <input type="checkbox"/> equipment, to yield immediate traffic from Ferret and SESP missions:</u>	19

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53

COMMENT NO. 1

(continued)

S. Kullback/jth/60321

Scientific Personnel Requirement  
in man-years/yearTask DescriptionLocal development and contract guidance.  
Contract for development of engineering and service models.

- e. Research on analysis method and equipment for teletype operator identification, teletype equipment identification, and multiplex equipment identification: 3

Local study and development.

- f. Development of improved versions of current equipment which would provide a larger quantity of accurate traffic: 15

e.g. Improved demodulators,  
diversity combining units, etc.Recording Equipment

- a. Analytical Recorder: 11

Short running-time, wide-band graphic recorder for first attack on new systems of wide band intelligence channel type.

- b. Study of Wide Band Production Intercept Problem in anticipation of production requirements: 2

- c. (Operator Back-Up) General Purpose Intercept Recorder (Very Urgent): 20

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S FROM: R/D DATE: 20 Nov 53 COMMENT NO. 1  
THRU: P/P (continued)  
S. Kullback/jth/60321

Task Description

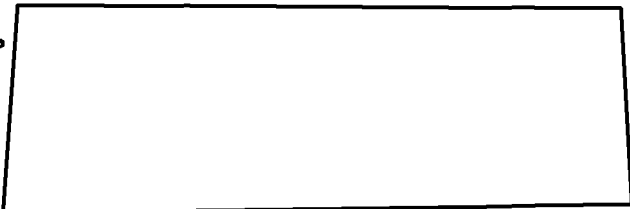
Scientific Personnel Requirement  
in man-years/year

d. Study of Application of Magnetic  
Recorders:

3

To routine Morse intercept including preliminary model work by adaptation of commercial devices.

e.



10

f. On-line Graphic Recorder:

12

Non-photographic device for  and collection of other intercept data on production basis.

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

g. Clock time system for Recording  
Time:

3

Includes time standard, time integrator, correction and calibration system. Also, read-out system for playback.

Signal Analysis

a. Speech:

14

Research, design, development, contract and processing

b. Signal Analysis:

4

7

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53 COMMENT NO. 1  
S. Kullback/jth/60321 (Cont'd)

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>
e. <u>Current Intelligence etc.</u> IBM sorting	4
d. VHF Study Work	4
Model Production	
To meet increased demands for model production.	36

5. On page 13, paragraphs 1 and 4 and in Appendix VI, pages 4 and 6 of the Report, the Board stresses the need for research in T/A to improve graphic presentation and to explore new methods of analysis and high speed machines. The question of the presentation of T/A findings is a statistical one and is now being considered by H. Edmundson and W. Jones of the Mathematical Research Division. An investigation of new methods of analysis and machine applicability to T/A is being undertaken by Miss V. L. Davis and D. Creecy of the Mathematical Research Division. As this study develops, additional personnel will be added as necessary. If this effort is to continue and expand without a decrease in the effort on the Russian problem, the Mathematical Research Division will need three additional people at the GS-11/12/13 level. On page 16, paragraph 2, the Report indicates a need for an increase in the programming effort for high speed computers. The report recommends getting outside help as well as increasing the internal programming effort. Experience indicates that outside help on programming in general can be of very little help to NSA. It is proposed that the Mathematical Research Division add a Section whose primary function will be to do programming research for existing and proposed high speed computers. There are four members of the Mathematical Research Division presently performing this function who will be lost to the Agency during the next twelve months because of their reassignment in the Military Service. This new Section should be headed by a GS-13 with five others at the GS-9/11/12 level. On pages 21 and 22 the Report states: "There is need for basic research on the theory of communication intelligence ....". R/D is aware of the need for research in this field of the theory of communications but has at present no adequately trained personnel to perform this research. Attempts to recruit suitable personnel have been unsuccessful to date.

6. At present the Mathematical Research Division is conducting a contract program with universities and individual consultants. We are in agreement with

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9/p 54-176

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53 COMMENT NO. 1  
S. Kullback/jth/60321 (Cont'd)

the Report that the internal personnel structure of the Mathematical Research Division should be improved. To this end a modification of the present structure will be proposed with a view to increasing the number of billets above the GS-11 level and decreasing the number below GS-11 in keeping with the Report, which on page 23 states, "the success of the National Security Agency R&D activities needed to keep pace with the COMINT requirements will depend very largely on the quality of research and development personnel which can be engaged in the effort."

7. The recommendations of the Board for increased research in mathematics and statistics for application to cryptanalysis and traffic analysis as reviewed in the preceding paragraphs will require about fifteen additional people at the level of GS-11 and above. By the transfer of eight people who are doing predominantly PROD rather than research work from NSA-343 to PROD and by changing several billets which are now below the GS-11 level to higher level, the actual increase can be held down to four new billets.

8. Continuous efforts are being made in line with the comments in the Report on page 16, paragraph 3, to follow and monitor outside activities either supported by NSA or being carried on by others. The Analytic Equipment Division is working on two approaches in order to solve the COMINT problem, namely:

a. General purpose computers and analytic equipment which can be used on all problems to some extent. The present program in this area is primarily a part of the external program and is considered adequate.

b. Special purpose analytic equipments constructed out of large basic building blocks using serial and parallel circuitry. An expansion of this activity to a rate as recommended by the Report would require approximately twenty engineers. It is questionable whether the type of activity in (b) because of its close working relationship with PROD personnel can be carried on by outside contract to any large extent.

9. In order to improve the efficiency of equipment, increase the operational speeds, reduce the maintenance required on all equipment, and provide maintenance personnel for continued operation, twenty additional people are needed. It is recommended that serious consideration be given to the possibility of contracting for this activity.

10. Our present engineering research program includes a small local effort to develop general purpose small logical blocks for use in the rapid construction of

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PAGE 9 OF 10 PAGES

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 Nov 53 COMMENT NO. 1  
S. Kullback/jth/60321(Cont'd)

special purpose equipment and to determine what devices can be used for this purpose with sufficient economy and reliability to permit construction of large equipment. To achieve a satisfactory group of units to meet this need by the end of FY 55 the Engineering Research Division would require two additional people locally and \$100,000 for contracts.

11. The above analysis shows clearly that an expansion of the scope of the research and development program to cope adequately with the requirements of the early warning problem is almost totally dependent on scientific personnel--the retention of current personnel and the hiring of a quantity of new personnel. By readjustments in the present organization and program, a minor amount of effort can be redirected toward the solution of this problem. The present R/D staff can handle approximately a 25% increase in its contracting program by a redirection of local effort. This increase is not of effective consequence in consideration of the magnitude of the overall problem and would bring undesirable pressure to bear on the individual scientists. Solution of the problem, therefore, is considered to be primarily centered in the solution of the personnel problem. Under present restrictions, NSA cannot compete for the services of young scientific graduates. If this overall problem is of sufficient urgency then means must be found whereby NSA can effectively compete with industry. Similarly, it is of extreme importance that NSA retain its senior scientists for guidance of the expanding program. Means must be found for competing with industry in terms of salaries, working conditions and job benefits. It is not considered to be the purpose of this paper to set forth a detailed analysis or recommendations pertaining to the personnel problem. Such an analysis will be prepared if the situation is considered sufficiently pressing to warrant the undertaking of the special measures which would be required. The alternatives to increasing the local scientific staff are either (a) the subsidization of several industrial research organizations by essentially open-end contracts in a manner similar to the recent ERA arrangement or (b) the establishment of a captive corporation similar to the procedure followed by the Atomic Energy Commission. Both of these approaches would be extremely expensive and of a low degree of effectiveness in comparison to expanding the local staff and subsequent extension of a regular contract program.

S. KULLBACK (Acting)  
Assistant Director  
Research and Development

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PAGE 10 OF 10 PAGES

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EO 3.3(h)(2)  
PL 86-36/50 USC 3605

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30-File-139

Comments on Report of Special Study Group of NSASAB

C/S

R/D

20 NOV 53

THRU: P/P ✓

S. Kullback/jth/60321

1. The Report entitled "The Potentialities of COMINT for Strategic Warning (Report of Special Study Group, NSA Scientific Advisory Board)" dated 26 Oct 53, has been carefully studied and the following analysis, comments, and proposed actions are based primarily on the research and development and item 3, Electronic Developments of the Special Intelligence, portions of the Report.

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4. The major detailed emphasis in the Report is in the field of intercept equipments, methods, and techniques. Contractual studies in the fields of noise communications and a survey by contract of the existing situation in the field of VHF/UHF/SHF are already underway. Recommendations have been made to PROD and PROD has forwarded to P/P an indication of requirements to initiate active field investigations in VHF/UHF/SHF intercept. Contract negotiations are being undertaken for engineering models of [redacted] equipment. However, expanded activities in this field as indicated by the Report are needed.

The following tentative program shows the scope of increased research and development activity which would be required to fulfill the minimum requirements of the early warning mission. It is emphasized that this program is not a one or two year affair. Whereas some results would develop early, the entire

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of DEASAB  
TO: C/S FROM: R/D DATE: 20 NOV 53 COMMENT NO. 1  
THRU: P/P S. Ballback/jth/60321 (Cont'd)

program is of tremendous technical difficulty, requiring many novel techniques, and would require of the order of five to ten years for satisfactory completion.

Requirements are shown in terms of scientists per year. These figures can be translated into contract terms at the rate of \$20,000 per scientist. Under no circumstances can the entire labor requirement be met by contract. It is necessary to retain a competent staff at NSA for planning, initial cryptologic research and development, and for contract control.

Intercept Equipment R&D

Scientific Personnel Requirement in man-years/year

Task Description

RF Equipment

a. Aural Studies: 11

- (1) Determining noise levels in the Aural Zone
- (2) Determine if intercepts can be made employing the inverse "Dun-embourgh effect" (This is now being considered on a small effort basis and was proposed by Dr. Wenzel)

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

b. Direction Finding Equipment: 15

- (1) Application of DF to the [redacted] equipment, and
- (2) Extension of DF to include all frequencies of interest to NSA

c. Development of Intercept Equip. for [redacted] 14

- (1) Receiver requirements
- (2) Antennas

FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 NOV 50 COMMENT NO. 1  
S. Kallback/jth/60321 (Cont'd)

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>
d. <u>Extension of the [redacted] equipment:</u>	7
(1) Provide coverage in all applicable frequency ranges	
e. <u>RU [redacted]</u>	2
(1) Modify or develop receivers	
f. <u>Extension of the Diversity Antenna Selector Switch:</u>	2
(1) A study of the applicability of "diversity reception" at UHF/VHF/SHF	
g. <u>Multicoupler Development:</u>	6
(1) Interim development to meet Joint Military Characteristics	
(2) Long range development of an automatic or semi-automatic antenna distribution system	
h. <u>Training of engineers in Field Problems:</u>	5
(1) Five man years of operating in the Field (1-2 months per man)	
i. <u>Coordination with the Services in investigation and solution of technical problems which now limit the effectiveness of field intercept stations:</u>	5

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 NOV 53 COMMENT NO. 1  
S.Kullback/jth/60321 (Cont'd)

Task Description

Scientific Personnel Requirement  
in man-years/year

- (1) It is believed that five engineers would be required in maintaining the necessary liaison with services headquarters units and performing on the spot studies in the field units. It is believed that two men could be kept on nearly continuous travel duty at the field stations. The remaining three would require travel necessary to coordinate service headquarter affairs.

j. Employment of more automatic methods in [ ] operation:

9

- (1) Contract to emphasize the aspects of the problem
- (2) Construction of equipment for performing automatic [ ] matching

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

k. Study of the use of the [ ] in VHF/UHF range:

11

- (1) Local study of the problem
- (2) Development of [ ] equipment for VHF/UHF applications for fixed stations
- (3) [ ] of VHF/UHF

FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 NOV 58 COMMENT NO. 1  
S.Kullback/jth/60321 (Cont'd)

Scientific Personnel Requirement  
in man-years/year

Task Description

- 1. Utilization of Correlation Techniques in RME position fixing: 10
  - (1) Study of requirements
  - (2) Development of Experimental Model
  - (3) Development of Engineering Model, 5 Service Test Models

Terminal Equipment

- a. Improved Morse Operator Identification Equipment: 6

This could, in conjunction with D/F and [ ] provide an indication of the movements of a task force, or indicate a shift in personnel which would be a tip-off. For development of statistical techniques of analysis.

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

- b. Development of effective wire-line and wire-carrier intercept equipment: 8

Local study and development. Evaluation of current techniques and investigation of new techniques.

- c. Development of traffic activity indicator for demultiplex equipments: 1

Will provide immediate indication of sudden change in amount of traffic handled which might serve as tip-off. Local development and implementation.

- d. Development of [ ] equipment, to yield immediate traffic from [ ] 19

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: F/P

FROM: R/D

DATE: 20 NOV 53 COMMENT NO. 1  
(continued)

S. Kullback/jth/60321

Task Description

Scientific Personnel Requirement  
in man-years/year

Local development and contract guidance.  
Contract for development of engineer-  
ing and service models.

- e. Research on analysis method and equipment for teletype operator identification, teletype equipment identification, and multiplex equipment identification: 3

Local study and development.

- f. Development of improved versions of current equipment which would provide a larger quantity of accurate traffic: 15

e.g. Improved demodulators,  
diversity combining units, etc.

Recording Equipment

- a. Analytical Recorder: 11  
Short running-time, wide-band graphic recorder for first attack on new systems of wide band intelligence channel type.
- b. Study of Wide Band Production Intercept Problem in anticipation of production requirements: 2
- c. (Operator Back-Up) General Purpose Intercept Recorder (Very Urgent): 10

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10	3	6
000	3	6
001	6	10

~~TOP SECRET - SECURITY INFORMATION~~

FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 NOV 53

COMMENT NO. 1  
(continued)

S.Kullback/jth/60321

Scientific Personnel Requirement  
in man-years/year

Task Description

d. Study of Application of Magnetic  
Recorders:

3

To routine Morse intercept including preliminary model work by adaptation of commercial devices.


e. 

10

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

f. On-line Graphic Recorder:

12

Non-photographic device for  and collection of other intercept data on production basis.

g. Clock time system for Recording  
Time:

8

Includes time standard, time integrator, correction and calibration system. Also, read-out system for playback.

Signal Analysis

a. Speech:

14

Research, design, development, contract and processing

b. Signal Analysis

4

7

3 6  
7 10

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB

TO: C/S  
THRU: P/P

FROM: R/D

DATE: 20 NOV 52 COMMENT NO. 1  
S.Kullback/jth/60321 (Cont'd)

<u>Task Description</u>	<u>Scientific Personnel Requirement in man-years/year</u>
c. <u>Current Intelligence etc.</u> <u>IBM sorting</u>	4
d. <u>VHF Study Work</u>	4
<u>Modal Production</u>	
To meet increased demands for modal production.	36

5. On page 13, paragraphs 1 and 4 and in Appendix VI, pages 4 and 6 of the Report, the Board stresses the need for research in T/A to improve graphic presentation and to explore new methods of analysis and high speed machines. The question of the presentation of T/A findings is a statistical one and is now being considered by H. Edmundson and W. Jones of the Mathematical Research Division. An investigation of new methods of analysis and machine applicability to T/A is being undertaken by Miss V. L. Davis and D. Greecy of the Mathematical Research Division. As this study develops, additional personnel will be added as necessary. If this effort is to continue and expand without a decrease in the effort on the Russian problem, the Mathematical Research Division will need three additional people at the GS-11/12/13 level. On page 16, paragraph 2, the Report indicates a need for an increase in the programming effort for high speed computers. The Report recommends getting outside help as well as increasing the internal programming effort. Experience indicates that outside help on programming in general can be of very little help to NSA. It is proposed that the Mathematical Research Division add a Section whose primary function will be to do programming research for existing and proposed high speed computers. There are four members of the Mathematical Research Division presently performing this function who will be lost to the Agency during the next twelve months because of their reassignment in the Military Service. This new Section should be headed by a GS-13 with five others at the GS-9/11/12 level. On pages 21 and 22 the Report states: "There is need for basic research on the theory of communication intelligence ....". R&D is aware of the need for research in this field of the theory of communications but has at present no adequately trained personnel to perform this research. Attempts to recruit suitable personnel have been unsuccessful to date.

6. At present the Mathematical Research Division is conducting a contract program with universities and individual consultants. We are in agreement with

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COMMENT NO. 1  
S. Kullback/jth/60321 (Cont'd)

the Report that the internal personnel structure of the Mathematical Research Division should be improved. To this end a modification of the present structure will be proposed with a view to increasing the number of billets above the GS-11 level and decreasing the number below GS-11 in keeping with the Report, which on page 23 states, "the success of the National Security Agency R&D activities needed to keep pace with the COMINT requirements will depend very largely on the quality of research and development personnel which can be engaged in the effort".

7. The recommendations of the Board for increased research in mathematics and statistics for application to cryptanalysis and traffic analysis as reviewed in the preceding paragraphs will require about fifteen additional people at the level of GS-11 and above. By the transfer of eight people who are doing predominantly PROD rather than research work from NSA-343 to PROD and by changing several billets which are now below the GS-11 level to higher level, the actual increase can be held down to four new billets.

8. Continuous efforts are being made in line with the comments in the Report on page 16, paragraph 3, to follow and monitor outside activities either supported by NSA or being carried on by others. The Analytic Equipment Division is working on two approaches in order to solve the COMINT problem, namely:

a. General purpose computers and analytic equipment which can be used on all problems to some extent. The present program in this area is primarily a part of the external program and is considered adequate.

b. Special purpose analytic equipments constructed out of large basic building blocks using serial and parallel circuitry. An expansion of this activity to a rate as recommended by the Report would require approximately twenty engineers. It is questionable whether the type of activity in (b) because of its close working relationship with PROD personnel can be carried on by outside contract to any large extent.

9. In order to improve the efficiency of equipment, increase the operational speeds, reduce the maintenance required on all equipment, and provide maintenance personnel for continued operation, twenty additional people are needed. It is recommended that serious consideration be given to the possibility of contracting for this activity.

10. Our present engineering research program includes a small local effort to develop general purpose small logical blocks for use in the rapid construction of

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FILE NO. 30-File-139 SUBJECT: Comments on Report of Special Study Group of NSASAB  
20 NOV 53

TO: C/S  
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DATE:

COMMENT NO. 1

S.Kullback/jth/60321 (Cont'd)

special purpose equipment and to determine what devices can be used for this purpose with sufficient economy and reliability to permit construction of large equipment. To achieve a satisfactory group of units to meet this need by the end of FY 55 the Engineering Research Division would require two additional people locally and \$100,000 for contracts.

11. The above analysis shows clearly that an expansion of the scope of the research and development program to cope adequately with the requirements of the early warning problem is almost totally dependent on scientific personnel--the retention of current personnel and the hiring of a quantity of new personnel. By readjustments in the present organization and program, a minor amount of effort can be redirected toward the solution of this problem. The present R/D staff can handle approximately a 25% increase in its contracting program by a redirection of local effort. This increase is not of effective consequence in consideration of the magnitude of the overall problem and would bring undesirable pressure to bear on the individual scientists. Solution of the problem, therefore, is considered to be primarily centered in the solution of the personnel problem. Under present restrictions, NSA cannot compete for the services of young scientific graduates. If this overall problem is of sufficient urgency then means must be found whereby NSA can effectively compete with industry. Similarly, it is of extreme importance that NSA retain its senior scientists for guidance of the expanding program. Means must be found for competing with industry in terms of salaries, working conditions and job benefits. It is not considered to be the purpose of this paper to set forth a detailed analysis or recommendations pertaining to the personnel problem. Such an analysis will be prepared if the situation is considered sufficiently pressing to warrant the undertaking of the special measures which would be required. The alternatives to increasing the local scientific staff are either (a) the subsidization of several industrial research organizations by essentially open-end contracts in a manner similar to the recent ERA arrangement or (b) the establishment of a captive corporation similar to the procedure followed by the Atomic Energy Commission. Both of these approaches would be extremely expensive and of a low degree of effectiveness in comparison to expanding the local staff and subsequent extension of a regular contract program.

S. KULLBACK (Acting)  
Assistant Director  
Research and Development

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10 10

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P/P

7 Jan 54

R/D

R/D Comments on NSASAB Recommendations

As requested in your Office Memorandum of 30 Dec 53, the following comments are submitted:

GENERAL RECOMMENDATIONS

I. No comment.

II. R&D is attempting, with the help of PROD, to initiate a program of investigation aimed at producing new techniques or at expediting present methods in traffic analysis.

III. No further comment.

SPECIFIC RECOMMENDATIONS

I. R&D has retained an eminent consultant for advice about propagation matters.

II. R&D has made available on a full time basis a high level engineer to assist COM on various technical matters.

III. a. No further comment.

b. No comment.

c. No comment.

d. No further comment.

e. No comment.

f. No comment.

IV. a. No comment.

b. No further comment.

c. No further comment.

V. a. In the R&D comment the word "the" before "field" should be changed to read "this".

~~TOP SECRET CONTROL NUMBER~~ P/54-176  
COPY 3 OF 15 COPIES  
PAGE 2 OF 2 PAGES

EO 3.3(h)(2)  
PL 86-36/50 USC 3605

~~TOP SECRET~~ ~~PROTH~~

b. R&D is now preparing to give increased assistance to the Services on the

[redacted] A broad study of the  
[redacted] problem is now under way.

c. So far as is known no such complete study has been made in the past. Although the value of such a study as a very long term program is intuitively clear, the great diversity of intercept on the part of the various producing and consuming organizations is such as to make the establishment of relative scale of interest necessary for such a study extremely difficult.

d. (1) Developments are now under way with the incorporation of the Services to meet this very need.

(2) No further comment.

(3) No further comment.

(4) No further comment.

(5) No further comment.

(6) It is R&D's belief that this subject is more appropriate for PROD comment than R&D.

(7) The basic comment on this recommendation should come from PROD.

(8) No further comment.

(9) No further comment.

VI. No comment.

VII. a. No further comment.

b. R&D has under way a WAE and consulting program which in effect is carrying out this recommendation.

c, d, e, f, g. No comment.

/s/ John J. Courtney, Jr.  
JOHN J. COURNEY, JR.  
Lt. Col., USAF  
Deputy Chief  
Office of Research & Development

Incl:

P/P Office Memo dtd 30 Dec 53, Subj:  
"Comments on Rpt of Spec Study Gp, NSA  
Scientific Advisory Board" w/incl

~~TOP SECRET CONTROL NO~~ P/254-176  
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PAGE 2 OF 2 PAGES

TAB D

~~TOP SECRET~~

P/P

7 Jan 54

PERS

Comments on Report of Special Study Group, NSA Scientific Advisory Board

1. Comments on GENERAL RECOMMENDATIONS.

III. Psychometric testing program is being set-up (see para VIId below). Continual study is made of reasons and causes for separation of civilian employees in order to hold separations to the minimum. Three military services must be encouraged by NSA in their efforts to develop and maintain a high percentage of repeaters in COMINT assignments.

2. Comments on SPECIFIC RECOMMENDATIONS.

IIIa. See paragraphs VII d and f below.

IIIIf. Pre-survey classification program now underway in Offices of Analysis and Exploitation are establishing career ladders for both civilian and military personnel. Program has been prepared to accomplish TMB Project No. 3. (to develop uniform job descriptions applicable to members of the cryptologic agencies.) These two programs are expected to provide needed career fields.

VIIa. Previous attempts to secure supergrades have so far produced only one GS-18. Budget for FY-55 includes funds for fourteen additional supergrades.

VIIc. This has been done. CIVPERS has received from AG list of items which can be used by recruiters. The items are much more informative than anything which has previously been available.

VIId. Request has been submitted to LOG for contract with Psychological Research Associates to embark on psychometric testing program. Results will not only improve recruitment and placement but also develop yardsticks with which performance can be evaluated.

VIIe. The same might be said for cryptography and cryptanalysis as well. Current promotion policies (inaugurated subsequent to this special study) are working nicely. Salaries are perpetually under observation and are continuously adjusted in line with position classification.

VIIIf. See paragraph IIIIf above.

/s/ Duncan Sinclair  
DUNCAN SINCLAIR  
Colonel, USA  
Chief, Personnel Division

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