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NATIONAL SECURITY AGENCY
CENTRAL SECURITY SERVICE
FORT GEORGE G. MEADE, MARYLAND 20755-6000

FOIA Case: 69538A
23 December 2013

This responds to your Freedom of Information Act (FOIA) request of 23 December 2012, which was received by this office on 31 December 2012, for "The Potentialities of COMINT for Strategic Warning, (aka The Robertson Report) dated 1953." A copy of your request is enclosed. Your request has been processed under the FOIA and the document you requested is enclosed. Certain information, however, has been deleted from the enclosure.

Some of the information deleted from the document was found to be currently and properly classified in accordance with Executive Order 13526. This information meets the criteria for classification as set forth in (c) of Section 1.4 and remains classified TOP SECRET as provided in Section 1.2 of the Executive Order. The information is classified because its disclosure could reasonably be expected to cause exceptionally grave damage to the national security. The information is exempt from automatic declassification in accordance with Sections 3.3(b)(1) and 3.3(b)(6) of E.O. 13526. Because the information is currently and properly classified, it is exempt from disclosure pursuant to the first exemption of the FOIA (5 U.S.C. Section 552(b)(1)).

In addition, this Agency is authorized by various statutes to protect certain information concerning its activities. We have determined that such information exists in this document. Accordingly, those portions are exempt from disclosure pursuant to the third exemption of the FOIA, which provides for the withholding of information specifically protected from disclosure by statute. The specific statute applicable in this case is Section 6, Public Law 86-36 (50 U.S. Code 3605, formerly 50 U.S. Code 402 note).

The Initial Denial Authority for NSA information is the Associate Director for Policy and Records, David J. Sherman. Since these deletions may be construed as a partial denial of your request, you are hereby advised of this Agency's appeal procedures. Any person denied access to information may file an appeal to the NSA/CSS Freedom of Information Act Appeal Authority. The

appeal must be postmarked no later than 60 calendar days from the date of the initial denial letter. The appeal shall be in writing addressed to the NSA/CSS FOIA Appeal Authority (DJ4), National Security Agency, 9800 Savage Road STE 6248, Fort George G. Meade, MD 20755-6248. The appeal shall reference the initial denial of access and shall contain, in sufficient detail and particularity, the grounds upon which the requester believes release of the information is required. The NSA/CSS Appeal Authority will endeavor to respond to the appeal within 20 working days after receipt, absent any unusual circumstances.

The Department of Defense (DOD) has asked that we protect information pursuant to 5 U.S.C. 552 (b)(1) as properly classified in accordance with E.O. 13526, Sections 3.3(b)(1), 3.3(b)(5), and 3.3(b)6). Those deletions have been marked with the code OGA (Other Government Agency). Any appeal of the denial of DOD information should be directed to that agency.

Sincerely,

for Sally A. Nicholson

PAMELA N. PHILLIPS
Chief
FOIA/PA Office

Encls:
a/s

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COMINT//MB

Box 6825

CHRONOLOGICAL SUMMARY

ROBERTSON REPORT

PLANS & POLICY DIVISION

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REGISTERED PUBLICATION # 5 - 53
dtd 20 October 1953

THE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING

72 Pages

~~Bk 61 927~~

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THE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING

NSA Registered Publication number 2-54

National Security Agency

DATED
20 Oct 1953

Prepared by

Special Study Group
of the
NSA Scientific Advisory Board

cover

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THE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING 50

THE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING

SUMMARY

This study evaluates Communications Intelligence (COMINT) as a means of obtaining strategic warning of Soviet intentions to attack the continental United States.

[redacted] The reliability of this strategic warning would increase with the approach of the attack, with first indications appearing 4 to 12 weeks prior to the attack.

This potentiality can be fully realized only with an increase in the current level of effort. However, significant improvement can be effected by more intensive exploitation of the present COMINT program.

It is recognized that COMINT cannot with certainty provide the tactical warning obtainable from an Air Defense Warning System. The effectiveness of our Continental Air Defense System will, however, be greatly increased if provided with reliable strategic warning. The significance of adequate warning to our survival cannot be overestimated; this is particularly true with respect to conservation of our retaliatory forces and the preservation of our population.

In order to utilize fully the potentialities of COMINT as a source of strategic warning, it is essential that operational plans and evaluation of our Continental Air Defense consider as an integral part the impact of the warning COMINT can provide.

Further, to maximize the potentialities of COMINT for giving strategic warning, it is necessary that the following steps be taken:

1. Top priority should be accorded to the solution of high-level Soviet cryptographic systems and to their exploitation on a timely basis.

2. Traffic analysis activities should be expanded and organized to give the maximum information obtainable from the material intercepted. In particular, it should be more effectively quantified through the development of indices or measures of activities, graphically presented to show changes in time. Field personnel should be sufficiently indoctrinated, within realistic security limitations, in the details of traffic analysis which can be used to develop strategic warning.

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 the Services and the Civil Service Commission to effect these changes.

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THE POTENTIALITIES OF COMINT FOR STRATEGIC WARNING

INTRODUCTION

During the past few years, the Defense Establishment and, through it, the American People have become increasingly aware of the potentialities of the USSR for mounting a direct atomic attack against the US. This awareness has resulted in increasing official and popular interest in building up an air defense system capable of at least blunting, if not withstanding, a possible Soviet air attack against the continental US. In response to this interest, there has been a succession of high-level reports on the air defense problem (~~WSEG, LINCOLN, EAST RIVER, Kelly, Edwards and Bull Reports~~) whose conclusions leave no doubt that a surprise atomic attack on the US would result in carnage, devastation, psychological shock, and curtailment of our retaliatory ability on a scale difficult to estimate, or even to comprehend in terms of any previous experience.

The degree of success obtained by the enemy in an air attack depends sharply on the timeliness of warning received. Accordingly, the provision of early warning is the first essential element for an effective air defense system. The system in being has, built into it, radar and ground observer warning nets which could at best give early warning of less than an hour at US perimeter targets. The future systems under consideration, involving radar chains at various northerly latitudes in Alaska, Canada, Greenland, and seaward extensions, may give a distant early warning up to four or six hours. Some such early warning chains must be developed for tactical purposes, but their greatest usefulness for deployment and neutralizing operations occurs only after hostile action has commenced.

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Extension of the reliable warning period to two or four days would provide time for the complete deployment of our offensive and defensive forces, which would increase the chance of turning the enemy's operation before its mission had been accomplished and might even induce the enemy to abandon the attack (see Appendices II and III).

Such strategic warning is not obtainable from the early warning component of an air defense system; the previous studies of these systems have, perhaps appropriately, been based upon the assumption that no earlier warning will be available. For such warning we must, therefore, turn to other sources of intelligence--and most of these previous studies have, in fact, laid great stress, in terms of US readiness, on the value of intelligence. ~~The strongest expression of this need is that contained in the Bull Report, which~~ One report, in fact, considers the pay-off so great as to warrant any possible attack on the problem, regardless of its cost in funds and manpower.

The sources of strategic warning can be broken down into overt, covert and signals sources. [redacted] The traditional overt and covert sources must be vigorously cultivated in the face of the increasing difficulties created by Soviet security measures, but to place reliance on them as the sole source of timely indicator intelligence would be to court disaster.

Since the beginning of World War I, the extensive use of radio has been an essential part of military and governmental communications and operations. All countries must use radio for communication with their ships and aircraft. The USSR, because of its great distances, and consequent difficulties of constructing an adequate system of land lines, uses and will

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(b)(3)-18 USC 798
(b)(3)-P.L. 86-36

continue to use radio for the transmission of a considerable volume of internal communications. Thus we are given the opportunity to penetrate the frontiers and to share the secrets of the Soviet Government.

The value of Signal Intelligence during World War II can scarcely be overestimated. Through the decryption of high-level German and Japanese messages, we were able to penetrate the enemy lines, enter ministries and military headquarters, and secure advance knowledge of operational plans. The spectacular effectivness of communications intelligence has been ~~thoroughly covered by the [illegible] Report and in [illegible] effectiveness~~ aptly epitomized in the following passage from General Marshall's letter of 25 September 1944 to Governor Dewey:

> "The conduct of General Eisenhower's campaign and of all operations in the Pacific are closely related in conception and timing to the information we secretly obtain through these intercepted codes. They contribute greatly to the victory and tremendously to the saving in American lives, both in the conduct of current operations and in looking toward the early termination of the war".

While these past achievements bring us no firm assurance of corresponding successes in future operations, we do find in them promise that a corresponding ability to decrypt enemy radio messages will result in intelligence of inestimable value. Signal Intelligence, above all COMINT, is the most promising source of strategic warning of an impending attack on the US; for the complexity of the process of preparing the forces for such an attack makes it practically impossible to avoid the use of radio communications and other electronic signals at all points in the process.

The interception and timely evaluation of these signals will then constitute indicators for strategic warning. The evaluation of such warning indicators must be made against a background plan, whether tacit or explicit; this assumed enemy plan should be based on intelligence from all sources, including information on our own operations or on operations simulating possible enemy alternatives. The present Air Defense Command program dealing with indications of an air attack on the US is set up along these lines. Possible indicators are displayed on an Indications Board, and relevent intelligence items are filtered into the board as a function of time and the degree of criticality. The significance of the whole array is then brought out by a comparison of this complex of realized indicators with the postulated plan or plans

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On a national scale, indications of hostilities against the US are monitored by the Watch Committee, set up on an all-source basis, under the Intelligence Advisory Committee (IAC). A proposal to use the Watch Committee as a central monitor and clearing house for all indications intelligence has been advanced by Air Defense Command, and a survey of procedures for disseminating such intelligence to those responsible for decisions is at present under way under the sponsorship of the IAC.

In accordance with the request of the Director, NSA (see Appendix I), this Report of the Special Study Group examines in some detail the present and future potentialities of COMINT as contributing to the strategic warning of an impending attack on the US. The Group, conscious of its limitations in time and talent, has confined itself primarily to a

consideration of indicators of a direct air attack on the continental US. It is well aware that these indicators are but part of a larger system of indicators of impending hostilities against the interests of the US, including attacks against its possessions and forces overseas or against its allies and other friendly nations. The Group's investigations have in some instances taken it into these matters, and some of its findings and recommendations will apply in this broader setting. Similarly, its investigations have taken it into some matters beyond the purview of the National Security Agency, because these have in some cases a bearing on the better utilization of COMINT in the indicator problem, the Group has thought it appropriate to bring its findings to the attention of the Director within the framework of this Report. Instances of this are to be found in the discussions on ELINT, on organization and use of the Indications Board, and on the Watch Committee.

The Group has studied the contribution which COMINT can or could make to the warning of an impending attack on the US. Its findings and recommendations on various facets of this problem are presented in the following sections of the Report. These conclusions are supported by the material presented in the Appendices to the Report, which are referenced in the appropriate places.

FINDINGS AND RECOMMENDATIONS

INDICATORS

Ref. Appendix IV

Since the effectiveness of COMINT as a source of warning depends upon the speed and accuracy of the recognition and communication of that warning, the Study Group necessarily included in its survey some investigation of the present arrangements, within the various US Intelligence agencies, for detecting hostile intentions. A detailed assessment of those arrangements would be outside the terms of reference of this Report.

The Group has studied the indicators which have been proposed by various competent agencies and commands as significant to the strategic warning of the initiation of hostilities against the US. Most relevant to the present problem of detecting moves associated with a direct air attack on the US is the Indications Board maintained by the Intelligence Directorate of Air Defense Command (ADC) at Ent Air Force Base, Colorado Springs, Colorado.

Behind these efforts is a philosophy which holds that atleast some of the steps required before the initiation of hostilities are detectable by

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the processes of intelligence. The Group believes that, among these processes, COMINT has the highest warning potential. This finding is bolstered by the following theoretical arguments:

(i) A military move of any appreciable scale requires the coordinated action of many persons, usually several hundred thousand.

(ii) The task of achieving the necessary degree of coordination requires that many messages be passed.

(iii) The space over which the coordination is required and the time during which the action must be prepared demand the use of radio communication for a reasonable fraction of the total communication.

(iv) A reasonable fraction of the radio communication carried out in support of the move can be intercepted.

(v) Of the traffic which can be intercepted, some fraction can be decrypted, read in plain text, or subjected to exhaustive traffic analysis.

The Group accepts this philosophy. It further supports the ADC proposal that the Watch Committee, under the Intelligence Advisory Committee, be used as a central monitor and clearing house for all indications intelligence.

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INTERCEPTION

Expansion of intercept facilities is being undertaken. Geographical limitations require that the antenna fields and placement of intercept positions be examined with close regard to highly technical matters relating to propagation phenomena. Therefore, the National Security Agency should augment its scientific and engineering staff with a view to assisting the Services in these matters.

There are many interception problems which require strong effort in research and development; recommendations thereon are contained in the Section on Research and Development.

COMMUNICATIONS

Ref. Appendix V

A communication system, no matter how good, cannot guarantee the timely receipt of warning information. A study of the present system shows that the longest delays in the system arise from human failure to assess a warning signal properly in the field and from human slowness in carrying papers from one basket to another. Improvements are needed in the training and instruction of communications personnel and in operations of the entire communications network to insure against personnel failures. The planned communication system will remove some of the possibilities of failure at message centers and will cut the delays within analysis and evaluation units very considerably.

Planned electrical communication facilities are adequate for the small volume of traffic involved in warning. However, severe jamming of radio circuits incident to hostilities would probably render those circuits largely inoperable. Alternate radio links and cable facilities are being expanded. This will tend to offset the threat of jamming.

TRAFFIC ANALYSIS, LOW-LEVEL CODES AND CIPHERS, AND PLAIN TEXT

Ref- Appendix VI

Traffic analysis (T/A) is a methodology by which COMINT is derived from the analysis of traffic volumes, operator chatter, and message externals. The COMINT derived from T/A is collated with that recovered from low-level codes and ciphers, plain text messages, and voice communications in an operation known as "T/A Fusion". [redacted]

[redacted]

Traffic analysis is a source from which some information can be derived at all times and is very necessary in supporting C/A work on high-level cryptographic systems. It guides interception and assists in the categorization and ordering of raw traffic and the identification of cryptographic systems.

At the tactical level, it has been firmly established by the experience of World War II and Korea that T/A Fusion plays a basic role in close support of air, sea, and land fighting units.

Because of the crucial importance of all information [redacted] and our heavy dependence on T/A Fusion at the present time, it is important to organize our T/A Fusion effort so as to provide maximum

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information on a timely basis from material now being intercepted. To this end, the Group makes the following recommendations:

1. That the COMINT resulting from T/A Fusion now being used as the main basis for [redacted] be more effectively quantified through the development of indices or measures of activity [redacted] and be graphically presented to show changes in time.

2. That special intensive and comprehensive studies be made of the activities [redacted]

3. That the T/A Fusion effort in the National Security Agency be decentralized to some extent by establishing T/A units in operational areas and providing some T/A support at intercept stations, along lines now established by the Air Force Security Service.

4. That a small research group be established to carry out research and development on new methods of analysis, including adaptation of certain problems to high speed machines.

We also suggest that the National Security Agency re-examine its selection, training, proficiency evaluation, and promotional procedures for T/A civilian personnel and that modern psychometric methods be explored in connection with personnel selection procedures. Similar procedures should be explored for selection, training, and proficiency

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evaluation of Service personnel, and consideration should be given to the establishment of a career service in communications intelligence in the Air Force and Army along lines which now exist in the Navy.

(See page 23)

SPECIAL INTELLIGENCE

Ref. Appendix VII

"Special Intelligence" is COMINT derived from decryption of high-level cryptographic systems. Potentially, it is the most important and the most reliable source of indicators of hostile intention.

During World War II, Special Intelligence was the unique source of advance knowledge of the strategic plans of the enemy. It was the timeliest, most complete, and most reliable source of intelligence on his Order of Battle, intentions, and capabilities. From the end of the

[redacted]

The Group considers that (i) the [redacted] is a matter of the highest priority for obtaining strategic warning; and (ii) although the problems involved may be more

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In particular, the following matters require immediate attention:

1. Continuity of Effort: 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. The staff on these problems requires augmentation by several top-flight analysts.

2. Computational Support: In spite of the fact that the National Security Agency maintains an extensive computing establishment, there is still a lack of computing facilities and skilled programmers. The lack of programmers is the most serious deficiency at the present time, and the number of such persons on the NSA Staff should be increased as promptly as practicable. In addition, the possibility of utilizing cleared and indoctrinated personnel skilled in the art of programming who may be available outside the National Security Agency should be investigated.

3. Electronic Developments: The requirements of Special Intelligence in connection with high-speed computing devices are unique. In view of the difficulty of maintaining a skilled engineering staff at the National Security Agency, the possibilities of carrying out electronic developments outside the Agency should be investigated. It is the opinion of the Group that there are many problems in connection with the development of general purpose analytic equipment which remain to be solved. The complications of programming bear witness to the fact that the general purpose electronic computers are probably not the best

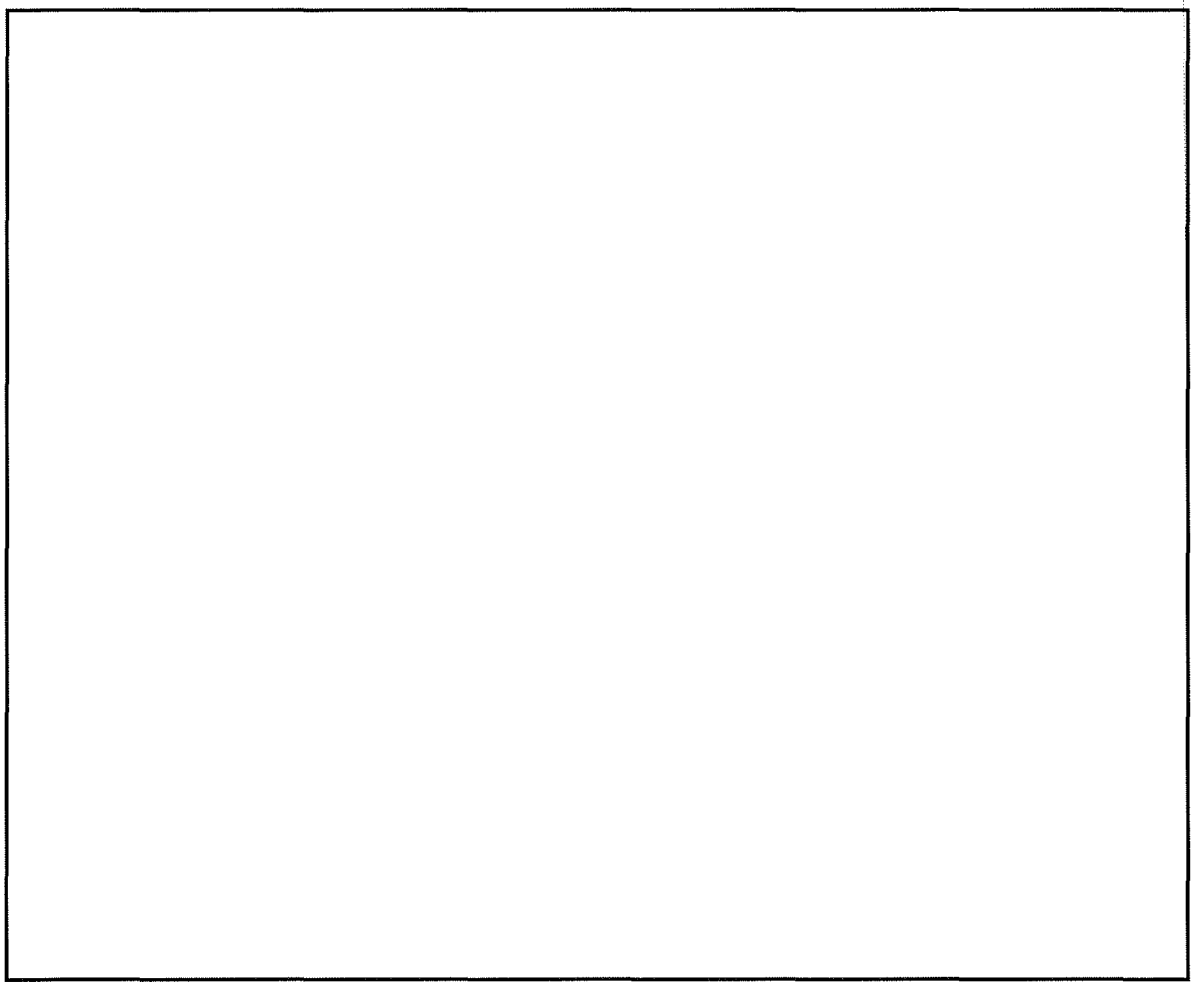
type of equipment for attacking these problems. Additional high-speed analytic equipment should be developed and made available as needed.

It appears that the potentials of Special Intelligence, particularly with regard to strategic warning, warrant a research and development program of more extensive scope than is presently being carried out by the National Security Agency.

ELECTRONICS INTELLIGENCE (ELINT)

Ref. Appendix VIII

ELINT--knowledge resulting from the interception and analysis of foreign non-communications electromagnetic radiations--can be used along with other collateral material in the evaluation of COMINT information on enemy intentions, but the degree of coordination among the Services and with the COMINT effort is at present unsatisfactory from a warning standpoint. ELINT is based on the detection, reception, and analysis of radio signals which do not reduce to literal text. ELINT



[redacted]

ELINT facilities are now equipped to report their results by electrical communication; but, as in the case of many other intelligence sources, the speed of communication depends on the training and instruction of field personnel and on a continuous direction of their efforts to obtain the types of information which are desired.

ELINT facilities which are in operation or planned by the Services cover most of the usable areas at present. Deficiencies in the ELINT program from the warning standpoint are:

1. There is inadequate control of ELINT operations. ELINT work within each theater of operations should be centrally directed on a basis of adequate, all-source intelligence so that the maximum amount of useful information could be received.

2. The channels by which ELINT information is reported are tangled and in many cases too slow for the delivery of short term warnings.

3. The evaluation of ELINT information which would apply to long term warnings is divided within the US between an Air Force Activity and a joint Army-Navy Electronic Evaluation Group (ANEEG). The exchange of information between these groups imposes a needless delay on any warning which comes from detailed evaluation.

[redacted]

[redacted]

5. ELINT equipment now in use is inadequate in many respects.

6. Present ELINT operations do not take advantage of the possibilities of "anomalous" propagation mechanism which can be predicted from geography, weather and ionosphere measurements.

RESEARCH AND DEVELOPMENT

In addition to the obviously needed research and development toward better cryptanalysis and more effective traffic analysis, there is a need for basic research on the theory of communication intelligence and for the development of methods and equipments which will permit the most efficient exploitation of the theoretical potential of the field.

In particular, the entire concept of military, diplomatic, communication must be examined to reveal those aspects of the communication networks which are most susceptible to communication intelligence activities and to relate the value of intelligence gained through exploitation of these aspects to the cost of exploitation and to the cost to the enemy of security measures which would reduce their vulnerability. In brief, our eventual COMINT activity should be aimed at the transmissions which an enemy must subject to our scrutiny in order to carry out his own operations. In the absence of the general theoretical research which is needed, it is possible to conjecture that developments along some of the following lines will prove valuable in future COMINT operations:

(i) Antenna systems and integral receiving facilities to permit intercept operators to determine the direction of arrival of a signal immediately at the time of its reception without reliance on a separate direction finder and intermediate communications system. Multiple unit antennas should be considered for this function.

(ii) Repeaters, receivers, antenna systems, and techniques to improve the range and quality of communication signal reception at frequencies above 30 mc.

(iii) Equipments for better utilization of immediate action voice communications, including better receivers, better audio 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 in recovery of brevity codes.

(iv) Equipments for reception of noise modulated communication signals (such as those represented in the NOMAC system development under Project LINCOLN).

(v) Equipments for detection and reception of [redacted] pulse, and frequency dispersal communication systems.

(vi) Installation and use of propagation measuring equipment to permit more efficient direction of intercept effort.

(vii) Inverse LORAN, or other position measuring devices to produce position data on transmitters.

(viii) Continued development of demultiplexing, [redacted] and precision recording devices for use in breaking out messages sent over multiplex and [redacted] channels.

(ix) Continued development of fingerprinting devices for transmitters and operators, both voice and Morse.

There are definite indications that [redacted] The extension of [redacted] is in progress. Interception of these types of communications presents an extremely complex problem. Studies should be initiated to determine possible methods of solution.

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PERSONNEL

Ref. Appendix IX

Throughout all discussions and briefings in which the Group has participated, no single problem has been more widely discussed than that of improving the quality and proficiency of personnel now engaged in the COMINT effort. The attention of the Group has been especially drawn to personnel problems related to three important groups: research and development personnel, analytic personnel, and interception personnel. The following comments are confined primarily to problems relating to these groups.

The success of the National Security Agency in research and development activity needed to keep pace with COMINT requirements will depend very largely on the quality of research and development personnel which can be engaged in the effort. At the present time, the salary scale at NSA is not adequate to compete with industry, nor are the working conditions and scientific prestige factors sufficient at NSA to compete with universities. Establishment of more high level positions and opportunities for advancement may help correct the situation; but other measures should be explored, such as borrowing scientists and engineers from industry and universities for limited periods of time. A good part of the development needs of NSA can probably be met through contracts; but, even so, NSA must have a strong core of research and development personnel to do the research and to recognize and formulate requirements for equipment, machines, etc.

The second crucial group of COMINT personnel are the analysts: cryptanalysts and traffic analysts, of NSA and the Services. The civilian

components of these groups provide the basic continuity of analytic effort. The principal problem facing NSA and The Services as far as this group is concerned is that of attracting and recruiting highly competent personnel. The Group is of the opinion that NSA would do well to re-examine its recruitment, selection, training, and proficiency evaluation procedures for analysts. 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. The use of modern psychometric methods in close cooperation with leading NSA analysts can be expected to improve the selection procedures. The problem of holding good analysts depends to a large extent on a sound salary and promotion policy. Such a policy will also provide effective supervisory personnel. The Group questions whether salary and promotion policy in NSA is as favorable to a sound development of T/A effort as it is in the case of C/A, especially in view of our present heavy dependence on COMINT derived from T/A.

The third important group of personnel in the COMINT effort are the intercept operators, who at present are almost entirely military. The main problem concerning this group is that created by the usual enlistment and rotation policies. These policies do not permit the intercept operator time to build up enough familiarity with the material intercepted at his site to be effective in interpreting and recognizing the significance of it. This situation is highly relevant to the problem of picking up clues of an impending attack. The Group suggests that, partially to meet this difficulty, consideration be given to the

establishment of a service career in COMINT to encourage longer periods of service. Such a plan not only would help solve some of the intercept operator difficulties but also would provide highly qualified officers for supervision. Consideration should also be given to the provision of some analytic support at the intercept site either by indoctrination of intercept personnel with rudiments of cryptanalysis and traffic analysis, or by assignment of an analyst to the site.

I - THE SPECIAL STUDY GROUP

In its meeting of 11-12 June 1953, the National Security Agency Scientific Advisory Board (NSASAB) discussed the problem of evaluating the contribution which COMINT can or could make to the warning of an impending attack on the US. The Board raised the question of whether the Director, NSA, might consider it desirable to request the Advisory Board to inaugurate a study of this problem.

In a letter of 26 June 1953 to Professor Stewart S. Cairns, Chairman of the NSASAB, Lieutenant General Ralph J. Canine, Director, NSA, made the following statement:

> "My purpose of writing you now is to indicate not only that I would very much like to have the Board undertake such a study but also that I hope it could be initiated at once and will be glad to place immediately at the disposal of the Board whatever facilities, personnel and records the Board deems necessary or useful for conducting the study and for producing the final report thereon as soon as practicable."

General Canine suggested that Dr. H. P. Robertson serve as Chairman of the Special Study Group.

The following individuals comprise the membership of the Group:

*Dr. H. P. Robertson, Professor of Mathematical Physics, California Institute of Technology, Chairman

*Dr. Samuel S. Wilks, Professor of Mathematical Statistics, Princeton University

*Dr. Howard T. Engstrom, Vice-President, Remington-Rand Corporation

Dr. Richard C. Raymond, Member, Electronics Division, Rand Corporation

*Mr. John C. McPherson, Vice-President, International Business Machines Corporation

Mr. M. Dean Post, Staff Assistant, Assistant Secretary of Defense for Research and Development

Mr. Charles S. Weaver, Staff Assistant, Assistant Secretary of Defense for Research and Development

[Those marked with an asterisk are members of the NSASAB.]

The Group was assisted by Mr. William F. Friedman, Executive Secretary of the NSASAB, his assistant, 1/Lt. Irving I McDonald, Jr., USAF, and Miss Carolyn J. Fox.

On several occasions, the Group received special assistance from the following persons:

Mr. Ralph L. Clark, CIA
RADM William Goggins, USN (Ret.), ERA
Capt. Wilfred J. Holmes, USN (Ret.)
Col. James L. Weeks, USAF, NSA
Col. Gordon W. Wildes, USAF, USAFSS

In the drafting of the Report, valuable assistance was rendered the Group by Professor S. S. Cairns, Mr. J. Z. Millar, Dr. L. T. E. Thompson, all of the NSASAB.

AGENDA OF ACTIVITIES OF SPECIAL STUDY GROUP

27 June 1951

Washington, D.C.

Assembly of Group for discussion and planning proposed activities of Group.

28 July 1953

Washington, D.C.

Briefing on role of intelligence in US air defense systems.	Directorate of Intelligence, Headquarters, USAF

29 July 1953

Brooks Air Force Base, San Antonio, Texas

Summary of COMINT capability to provide advance warning.	Commander, USAFSS
USAFSS Organization and Operations	Deputy Chief of Staff/ Operations, USAFSS
Traffic Analysis	Analysis Control Division, USAFSS
USAFSS ELINT program	Chief, Implementation Division, USAFSS
Intelligence Requirements and Dissemination	Chief, Current Reporting and Requirements Branch, USAFSS
Communications	Command Communications Office, USAFSS

30 July 1953

Ent Air Force Base, Colorado Springs, Colorado

Philosophy of intelligence requirements for air defense	Directorate of Intelligence, ADC
Summary of air defense of continental US	Directorate of Intelligence, ADC
Mission, operations, and capabilities of anti-aircraft weapons systems.	Army Anti-Aircraft Command
Discussion of intelligence indicators system	Director of Intelligence, ADC

31 July 1953

Offutt Air Force Base, Omaha, Nebraska

Discussion of COMINT and collateral intelligence	Director of Intelligence, SAC
Location and identification of targets	Target Materials Division, Directorate of Intelligence, SAC
Philosophy of intelligence requirements for strategic operations	Air Estimates Division, Directorate of Intelligence, SAC
Communications	Director of Communications, SAC

1 August 1953

Headquarters, Central Air Defense Force, Kansas City, Missouri

The role of COMINT in the Korean War	Commander, Central Air Defense Force

3 August 1953

Washington, D.C.

General discussion session of Group to plan future activities.

4 August 1953

Washington, D.C.

Discussion of COMINT capabilities and potentialities	CIA

5 August 1953

Washington, D.C.

Individual studies by members of the Group on specific problems.

6 August 1953

Washington, D.C.

Organization and function of the Watch Committee	Special Research Branch, G-2, Department of the Army
Discussion of COMINT activities of the US Navy	Operational Intelligence Section, Department of the Navy

7 August 1953

Washington, D.C.

General discussion and planning session of Group.

1-10 September 1953

Washington, D.C.

General session of Group for further studies and preparation of report.

II - THE THREAT

The Soviet Union has at present the capability to launch an effective large scale atomic air attack against the North American continent and, in particular, against all major targets within the US, including population and industrial centers and military bases. The magnitude of the Soviet threat through 1955 will not be governed by their delivery systems but rather by the size of their atomic stockpile and, further, by that portion of the stockpile which they would allocate for use against targets in the US. In addition, the magnitude of the threat would increase if the Soviets realize their capability of developing BW agents which might be employed in a large scale air attack against the US.

Weapons

~~(RD)~~ The Joint Atomic Energy Intelligence Committee estimates that the Soviet atomic stockpile in mid-1953 would contain approximately 120 atomic weapons. Accordingly, they estimate that this stockpile will increase to approximately 300 by 1955. However, in view of the uncertainty concerning the production of fissionable materials, the number of atomic weapons may be as low as 200 or as high as 600.

Apart from the fact that the Soviets conducted a thermonuclear test in August 1953, there is no intelligence information which would indicate that the Soviets are stockpiling weapons of this type.

Delivery Systems

The Soviet Long Range Air Force has at its disposal approximately 1000 medium bombers of the TU-4 type (US B-29) which are capable of reaching

II

all targets in the US on a one-way mission from bases in the USSR. By 1955, the number of available TU-4's will increase to about 1100. Further, it is believed that, by 1955, this force will be augmented by approximately 180 heavy bombers having twice the range of the TU-4. These heavy bombers will most likely be capable of reaching all targets within the US from Soviet bases on a two-way mission carrying atomic weapons.

Employment of long range aircraft is the most likely means at the Soviets' disposal of carrying out a mass attack on the US. They do have the capability of developing guided missiles of the V-1 type carrying an atomic warhead and launching them against coastal targets from submarines or surface vessels. In considering the Soviet air threat to the continental US such a possibility cannot be overlooked. In particular, in the case of a surprise attack, it would appear that they would use all the means at their disposal to make the initial strike as devestating as possible.

III - NORTH AMERICAN CONTINENTAL AIR DEFENSE

Active defense forces participating in the air defense of the North American continent include the United States Air Defense Command, the Royal Canadian Air Force Air Defense Command, and the Alaskan Air Defense Command. These forces function as independent commands and not as one integrated air defense system.

Advance warning is the first essential element for an effective air defense system. Recent Ad Hoc Committees which studied the continental air defense problem for the National Security Council and the Secretary of Defense have noted, without exception, the tremendous value of more complete intelligence to provide advance warning and the potential impact of such warning on continental defense.

The Group feels that, if intelligence could effectively and reliably give a warning of 3 to 6 days of an impending attack on our nation, the significance would be of tremendous magnitude. In fact, warning of this nature would permit mobilization which, if known to the enemy, might induce him to cease his preparations for an attack.

Some notion of the value of such warning can be gained from the data in the accompanying table which have been obtained from Armed Forces estimates.

III

Significance of Early Warning

Warning Time	Significance
Days: 3 to 6	Would permit full scale deployment of SAC Forces for an immediate counterattack.
Hours: 6	Approximately 90% of all serviceable SAC aircraft can be dispersed.
6	Approximately 100% of Naval Forces in commission in harbor can be dispersed.
5 to 8	Between 600 and 1000 interceptors could be made available to ADC from other units.
4	Approximately 90% of merchant vessels in commission in harbor can be dispersed.
3 to 4	Approximately 50% of Naval Forces in commission in harbors can be dispersed.
3	Approximately 50% of serviceable SAC aircraft can be dispersed.
3	Most all civil air traffic can be grounded.
3	Navigation aids can be turned off.
2½	Air Defense Command can commit all serviceable ADC interceptors.
1	Civilian casualties reduced by about 50%.

At present, warning is provided by radar and ground observers. The United States Air Force is now operating 71 radars in the US and southern Canada which perform surveillance and control functions. The radar network gives about 30 minutes warning for US perimeter targets on large aircraft of the B-29 type flying between 10,000 and 30,000 feet. The ground observers corps is at present the only effective means of detecting low flying aircraft (below 5000 feet). However, thus far it has not been possible to make reliable use of the ground observers.

Available weapons consist of fighters and antiaircraft artillery. At present, Air Defense Command has 53 interceptor squadrons based in the US of which 15% have all-weather capability. Offensive armament for these aircraft consists in fixed forward firing aircraft guns. Anti-aircraft weapons are deployed to assist in the defense of 22 critical targets in the US. There are a total of 57 AAA battalions in place which include 52 gun battalions (90 mm and 120 mm) and 5 automatic weapons battalions (40 mm).

Our present air defense system has a kill probability of between 0 and 15% depending upon the pattern of attack.

Present planned programs are geared to reach maximum effectiveness by the end of 1955. The present radar network will be augmented with additional equipment to eliminate perimeter gaps. In addition, an early warning line is planned which would extend from Alaska down the Alaskan highway and across Canada approximately at the 54th parallel to the Hudson Bay, thence across Quebec to the Atlantic Ocean. Extensions of this system are planned in both the Atlantic and Pacific Oceans for approximately 500 miles using picket ships and airborne early warning aircraft. In addition, an early warning line may be established in the far north as recommended by Project LINCOLN. By 1955, the air defense weapons system will be greatly improved and strengthened. It is planned that the fighter forces will be increased to 57 squadrons (25 aircraft per squadron) of all-weather fighters equipped with collision course fired rockets and based in the US. Antiaircraft point defenses will be greatly strengthened by converting a number of the gun battalions with NIKE guided missiles. By the end of 1955, antiaircraft defenses will include 20 gun battalions, 42 NIKE

battalions, and 14 Skysweeper automatic weapons battalions deployed to assist in the defense of 22 critical targets.

As noted in the statement of the threat (Appendix II), the Soviets have the capability of developing V-1 type missiles carrying atomic warheads and launching them from surface vessels and/or submarines against coastal targets. Our most effective means to counter such an attack is to locate and destroy the launching vessels. Detection at present is accomplished by radar, Sonar, or visual, all of which have definite range limitations. A shore-based sound surveillance system is now being evaluated which will give approximate position data on engine driven vessels cruising at normal speed at ranges up to 300 miles. A network based on this type of equipment planned to be operational in the 1956-58 period will greatly increase our capability in countering such an attack.

With these improvements, minimum available warning time is expected to be increased to 2 hours or more for perimeter targets, and the system as a whole should provide kill probability of approximately 50% under all weather conditions. As an order of magnitude, the funding required over the next several years to attain our presently planned air defense system will be at the rate of approximately $5 billion per year. Cumulative investment through FY 1960 will be about $40 billion. The number of full-time active service personnel will increase from approximately 120,000at present to approximately 180,000 by 1957.

In reviewing our present and planned active air defense systems effectiveness in conjunction with intelligence, it can only be concluded that the Soviet threat is increasing to the extent that the number of

atomic bombs which they can put on a target by the end of 1955 will be the same as, or greater than, the number which they could effectively deliver today even with the increased air defense capability outlined above.

IV - INDICATOR SYSTEMS

The nature of the threat has been stated in Appendix II, which describes the area of capability of the USSR. These facts are available from examination of intelligence. The all-important unanswered question remaining is the time such an attack will be executed. The only means of obtaining strategic warning is through intelligence.

For this purpose, various indicator systems have been organized in an effort to predict Soviet intentions. The systems most relevant to Continental Air Defense are those of the Watch Committee and Air Defense Command.

The Air Defense Command has established an indications system using a graphic display to assist in the orderly evaluation of indications of hostile air attack on the US. The Watch Committee maintains a continuous indications evaluation of all events world-wide which bear on the imminence of general hostilities and related world events.

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OGA
JS

The most serious deficiency of all the indicator systems is the lack of coordination and exchange of information on a timely basis. The existence of such separate but related efforts, as presently constituted, throughout the world involves much duplication of the evaluation effort—in many cases by people not fully competent and with divergent results. Indications efforts as now organized are producing results less reliable than the security of the nation requires and the commanders concerned deserve.

IV

The coordination, standardization and systematic inter-relationship of this effort would overcome many of the present shortcomings, particularly from the standpoint of the Air Defense Command. It is believed that a small group should be created representing the Intelligence Advisory Committee, operating on a full-time basis (24 hours a day), and responsible for the over-all coordination and direction of related indications systems. More effective utilization of intelligence can be achieved only by such central coordination and direction. In particular, the following are some of the principles which are believed essential:

(i) An agreed list of indicators and sub-indicators world-wide in scope.

(ii) Assignment of indicators for evaluation to specific participating agencies or sub-agencies according to primacy of interest or competence.

(iii) Provision to furnish these same agencies with indications evaluation on all other indicators which are pertinent to their own warning problem but for which they do not have primacy of interest or full competence in evaluation.

(iv) Timely, secure, and dependable communications.

(v) Standardized methodology and display systems, more effectively quantified through the development of indices or measures of activities, graphically presented to show changes in time.

(vi) Formulation of normative enemy plans against which the imminence of hostilities can be measured.

Additionally, it is particularly important that this group be kept informed on military and political maneuvers of the US which could produce Soviet reactions that might otherwise be misinterpreted.

Care must be exercised that our evaluation of indications be focussed on significant actions which the enemy must take in preparing for particular military operations. [redacted] (b)(1) PGA

[redacted]

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The Canadian Government has an active interest in the problem of strategic warning of an attack on North America. There is at present under preparation, in the Joint Intelligence Bureau, an all-source report on a "Surprise Attack on North America," to which the Communications Research Branch has contributed on the COMINT aspects. Discussion with the Director, CRB, has indicated that these conclusions, based upon traffic analysis, plain text and presently exploitable codes and ciphers, are consistent with those arrived at in this Report.

In the United Kingdom, the Joint Intelligence Committee has prepared an evaluation of an over-all indications system, on an all-source basis. In brief, this study describes a few, selected indicators associated with specific types of activities and indicates the probability of obtaining information through overt, covert, and COMINT sources.

Significant improvement of our indications systems can be achieved by closer coordination with both British and Canadian efforts. We strongly believe that it will not be possible to effect such coordination until a coherent indications system has been firmly established in the US.

V - COMMUNICATIONS

Timely warning of impending air attack depends greatly upon rapid, accurate communications.

Rapid electrical communication facilities serve the COMINT organization in three general ways:

(i) Delivery of intelligence information.

(ii) Collection of raw intercept material.

(iii) Intra-station exchange of technical material.

We are interested in the first two functions.

The communication process is generally considered to include everything between the handing of a message to the message center and the handing of the message to the designated recipient. Thus, the time for handling a message includes: encryption, routing, transmission, decryption, reproduction and messenger service. The alacrity with which the process is performed is determined by the precedence set by the originator. The highest precedence is assigned to a FLASH message, which is handled before all others except those of the same precedence.

Delivery of Intelligence Information

An item of intelligence information worthy of FLASH or other high precedence designation may originate at any of the following places:

Intercept station

Field command evaluation group - field analysis group

Central evaluation group - central analysis group

At present, such a despatch can be delivered to the most distant addressee within one hour. Where extra-continental circuits are not involved, the time may be less than ten minutes. It is the opinion of the Group that these times are adequate.

Collection of Raw Intercept Material

The recovery or the recognition of an important item of intelligence information may occur at stations to which raw intercept material is transmitted. There are two of these: the field command evaluation group - field analysis group and the central evaluation group - central analysis group. At present, all the locally intercepted raw material is sent to the allied field group. About 20% is selected for electrical transmission to the central group in the US, the remainder being delivered by courier. The field group receives its material in about 30 minutes and the central analysis group in one to five hours. These times are considered to be adequate.

Discussion

We have examined the present communication system used for COMINT and have been shown the proposed improvements which are to be made. The present channels, both overseas and continental land lines, seem to be fairly adequate for their purpose. Certain contemplated improvements, such as automatic switching and on-line encryption, will provide more expeditious handling of traffic through relay centers. We have not been shown any detailed time studies of traffic delays but presume they are available. Efforts to route overseas traffic through the best possible routes seem to have been made. Two channels on North Atlantic cables are now available

to the Department of Defense on an immediate call-up basis; and, in addition, an eight channel trans-Atlantic cable will be installed in about two years for exclusive use of Defense communications. At present, some 245,000 groups per day are being handled by electrical communications. While this is a creditable performance, some improvements are still to be made.

Technical improvements

Among the technical improvements which are feasible may be included: better and faster encryption devices, higher transmitting speeds, and more efficient utilization of radio frequencies and land line facilities.

We have been informed that newer and better cryptographic techniques are contemplated which will provide fast and secure on-line operation.

Some considerable reduction can be made in the actual transit time of high precedence and of other traffic by adopting at a future date some of the principles and methods now available. Among these may be mentioned those reported by the Progress Research Unit of the Johns Hopkins University concerning this subject. [1] These methods which are applicable both to radio and land line communication channels propose the utilization of the available band widths of present communication channels to increase the speeds of transmission some 10 to 40 times those currently in use.

Methods of determining the most effective radio frequency to use at a given time have been published. The back-scatter measurement technique is a notable example. The use of this method alone should provide additional assurance that an early warning message will move with the

[1] PRU145 to DMR.

minimum delay. Furthermore, it offers the possibility that a frequency can be chosen which will be least susceptible to enemy jamming. A careful study of this subject seems to be indicated as a possible means of maintaining the required continuity of overseas communications. Study should also be given to a method of pooling all available radio frequencies with assignments to individual stations on an immediate basis to meet ionospheric conditions.

Operational Improvements

Time studies should be continued with a view to reduction of processing times in message centers. Training programs to implement the indicated improvements should be pressed vigorously. In particular, the delivery of messages to their recipients should receive careful attention. Our information is that considerable time can be saved here.

Careful consideration should be given to (i) the matter of delegation of authority to intercept and analysis-evaluation groups to originate urgent intelligence messages, (ii) the sort of material for which they should watch, and (iii) the addressees to whom the information should be sent. Timely warning of enemy attack is more likely to come from units nearest to the intercept station.

VI - TRAFFIC ANALYSIS, LOW-LEVEL CODES AND CIPHERS, AND PLAIN TEXT

General Remarks

Traffic Analysis (T/A) is a methodology by which COMINT is derived from the analysis of traffic volumes, operator chatter, and message externals. The COMINT derived from T/A is collated with that recovered from low-level codes and ciphers, plain text messages, and voice communications in an operation known as "T/A Fusion".

COMINT Now Produced from these Sources

(b)(1)
(b)(3)-50 USC 403
(b)(3)-18 USC 798
(b)(3)-P.L. 86-36

[redacted]

Finally, it should be emphasized that the experience of World War II and of Korea established the tactical necessity of analysis and reading of low-level codes and ciphers and plain language transmissions for close support of Army, Navy, and Air Force fighting units, [redacted] Whatever capability the T/A Fusion operation attains in peacetime, it will have indispensable value in wartime, when properly deployed.

(b)(1)
(b)(3)-50 USC 403
(b)(3)-18 USC 798
(b)(3)-P.L. 86-36

Possibilities of Improving COMINT from these Sources

1. Improving Sources of Material for T/A: Adequate direction finders in conjunction with intercept operations can save much valuable time and allow better evaluation of traffic. Present direction finders are often separated by as much as 100 miles from the intercept station and the two units not connected with secure lines. These efforts should be co-located so that D/F data would be at the intercept operator's hand, or intercept and D/F stations should be connected by direct and rapid telephone communication. Alternatively, a secure and rapid communication service should be provided. Even such meager efforts as obtaining one line of direction and transmitting the information promptly to the intercept center would save much intercept time. D/F operations in the field are not well coordinated. Better training of officers in D/F is required; current training is much too brief for the importance of the subject.

Similar remarks apply to another important source of supporting evidence for T/A, namely, procedures for identification of transmitters and operators. ELINT has a potentiality as a source of supporting evidence for T/A which is yet to be fully developed and exploited (see Appendix VIII).

2. Increasing T/A's Contribution to Indicators: At the present time, almost all of the information underlying the direct indicators of the imminence of war as developed by the Air Defense Command and the Air Force Directorate of Intelligence is obtained through T/A Fusion. Yet, in the case of some of these indicators, the COMINT is rather coarse and roughly used. There is a need for doing a better job of quantifying some of the information.

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This is especially true of information concerning the activities of the [redacted] Consideration should be given to the construction of measures of amount of activity of various types. These measures or indices should be plotted against time to show rates of change of activity, rates of change of build-ups of various kinds, etc. They should be constructed by analysts who have intimate knowledge of the material underlying them.

The possibilities of machine methods in this work deserve careful study.

[redacted]

4. The Deployment of Analytic Efforts: the Problem of Timeliness: Here we consider the problem of deriving through COMINT and utilizing a pre-radar warning of an impending attack against the US [redacted]

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(b)(3)-50 USC 403
(b)(3)-18 USC 798
(b)(3)-P.L. 86-36

There are three distinct phases to this problem. The first phase is to pick up the clue or clues of an impending attack. This depends on the capabilities of our interception system--the men and equipment at the intercept stations. If the clues are contained somewhere in intercepted material, then the second phase is to recognize them at some stage in the processing of the material. The third phase is to transmit the information recognized as the clue to those responsible for the air defense of the US in time to take action.

This is obviously a precarious chain of events and none but the naive and foolhardy would claim that the tipoff would, with 100% certainty, be discovered, transmitted, and acted upon in time to take effective action. Yet we must be realistic and consider what practical steps might be taken to increase the chance of success. Here we comment especially on the aspects of the situation concerning T/A, voice traffic, and information from low-level systems. If the clue is contained in one or several messages intercepted at a given site and if the significance of such a clue can be recognized by the interceptor or by an analyst, it is obvious that we should increase the chance of recognizing it at the intercept station. This argues for the desirability of assigning an analyst or two to each intercept station to work closely with the intercept operators. Such a situation now exists at some stations, particularly in the case of the intercept squadrons operated by AFSS.

If the clue is more diffuse and must be sifted from intercepted material from a given geographical area, this argues for the establishment of forward analysis units by geographical areas which would perform analysis on intercepted

material from the area, incorporating into their analysis material already summarized by the intercept stations, which would make use of D/F, RFP, ELINT, and any other relevant data. [redacted]

[redacted]

Under such a system of deployment of analytic effort, the main function of the Headquarters analysis units would be to carry out deeper analysis and develop COMINT of more long range value. In order to build up and maintain an adequate and sensitive background for analysts against which to interpret intercepted material at the intercept and area levels, there would have to be a constant feedback of COMINT reports as well as reports based on collateral intelligence. Some rotation of personnel through the system would be necessary to keep it sensitive.

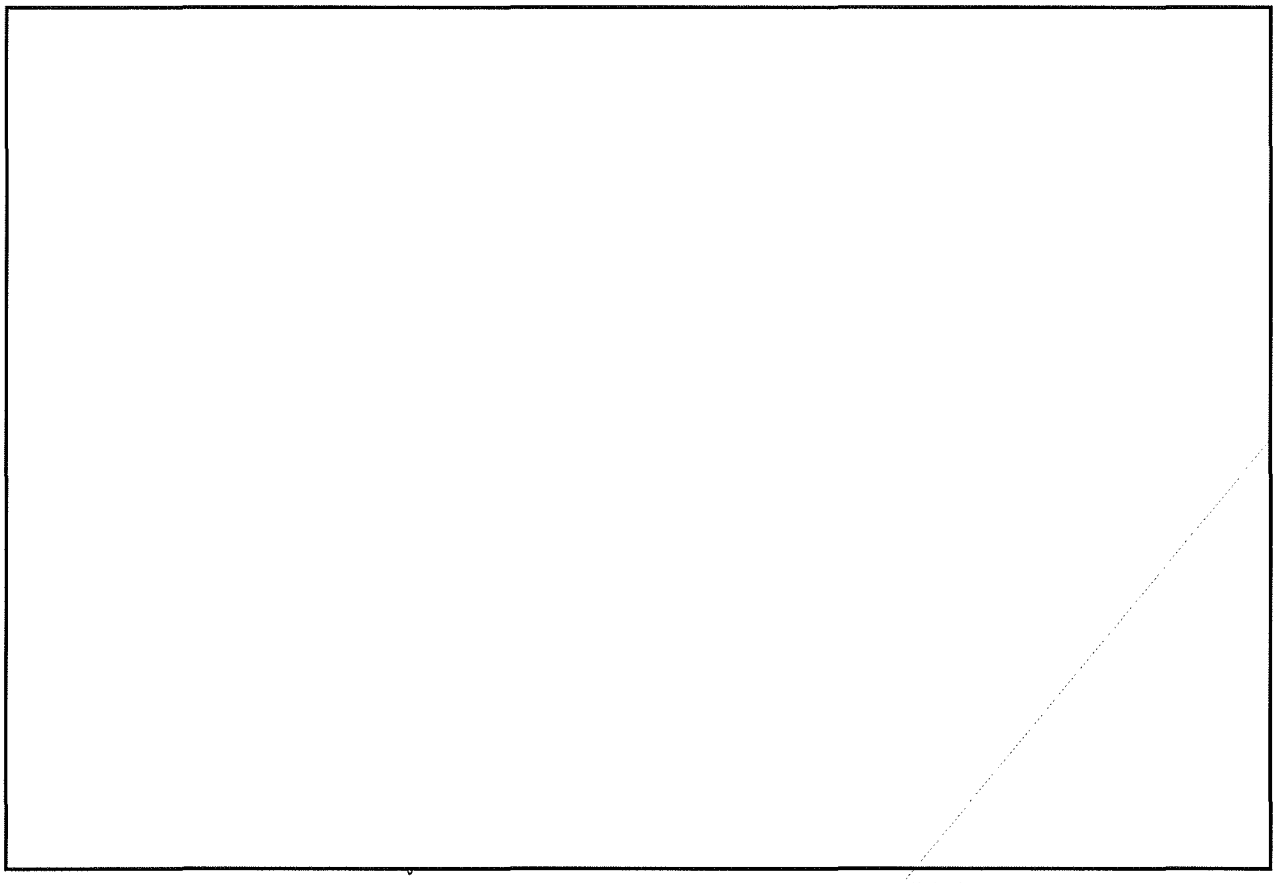
In wartime, a deployment of analytic effort along the lines indicated above would form the basis of a tactical COMINT system to support the theater commanders. The necessity for a deployment of this type has been clearly indicated by the experience of World War II and Korea.

5. Research in Connection with the T/A Fusion Effort: At the present time, almost all T/A Fusion effort and thinking is directed toward production of material to meet consumer requirements. Not enough attention is devoted to research and development of new methods of analysis including further study of the possibilities of high speed machines for handling some of the problems. The NSA would do well to set up a small research group whose members have competence to investigate new approaches in various fields relevant to the problem.

6. The Personnel Problem: The quality of the COMINT effort based on sources discussed in this Appendix depends heavily on the effectiveness of interception and the competence of the analysts. The problems of improving procedures for the selection, training, and proficiency evaluation of such personnel and related personnel problems are discussed in Appendix IX.

VII - SPECIAL INTELLIGENCE

Special Intelligence is COMINT resulting from successful cryptanalytic attack on high-grade cryptographic systems. Its value during World War II can scarcely be overestimated. Through the decryption of German and Japanese messages, we were able to penetrate the enemy lines and enter the Headquarters of High Commands, Army Groups, Fleets, and Air Forces. On a strategic level, Special Intelligence was the unique source of advance knowledge of the enemy's plans for both offensive and defensive operations. It was the timeliest, most complete, and most reliable source of intelligence on his Order of Battle, intentions, and capabilities (see Appendix X).



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(b)(3)-P.L. 86-36

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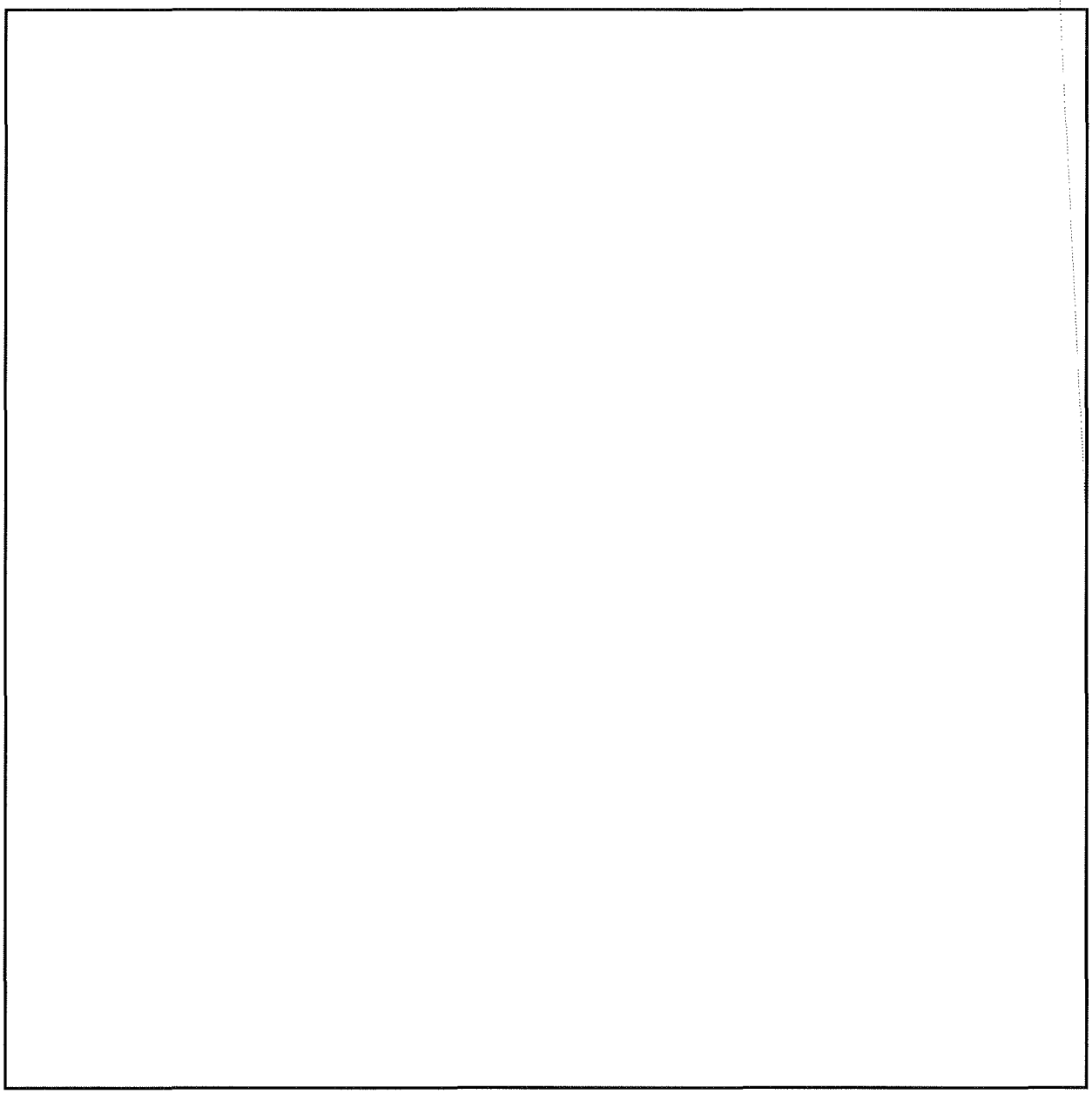

The potentialities of Special Intelligence are so great that the difficulties involved in obtaining it can scarcely be considered a deterrent factor. Nor should the benefits which it could reasonably promise be discounted on the grounds that it would not have the demonstrable capability of furnishing specific warning that hostilities were about to be initiated.

Such a guarantee is beyond the power of any COMINT organization, which reads the messages originated by a foreign nation but does not write them.

With that exception, however -- a limitation which applies to COMINT not only in its present condition but also in a hypothetical state in which intercept facilities were virtually unlimited and cryptanalytic success was complete -- it can be stated that the capability of COMINT to provide warning of inminent hostilities is directly proportionate

[redacted]

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[redacted] ELECTRONICS INTELLIGENCE (ELINT)

The Army ELINT Program

1. General Remarks: The Department of the Army maintains ELINT stations in [redacted] These stations cover the frequency range of 15 kilocycles to 12,500 megacycles and are primarily designed to concentrate on radar-type signals. A 24-hour watch is maintained, and three main indicators have been established as a basis for FLASH reporting. These are (i) any indications of radar build-up, (ii) any indication that known or identified enemy signals appear to be unusually close to the stations, and (iii) unusual signal activity which the operator may feel to be cause for alarm.

2. Intercept Locations:

[redacted]

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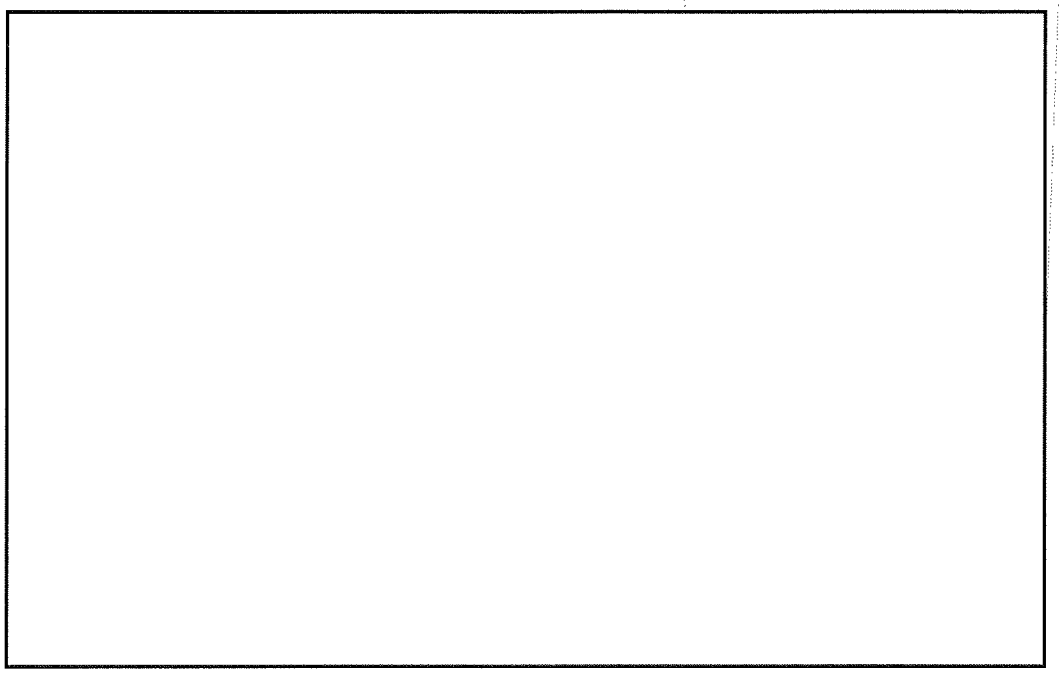

The above effort includes 10-12 teams. About 16 teams will be overseas in the next year. There are not at present sufficient personnel in these teams to sustain a 24-hour operation for longer than a limited emergency time.

3. Reporting: Logs from intercept stations are routinely sent by mail twice a month, sustaining a dely of approximately 3-4 weeks. Duplicate copies are sent to the Electronic Warfare Center (EWC) at Fort Monmouth, Air Technical Intelligence Center (ATIC), Naval Research Laboratory (NRL), and the Army-Navy Electronic Evaluation Group (ANEEG). ANEEG retains and files, as well as evaluates, these reports.

Each team under EWC has a one-time pad for FLASH reporting. A code word alerts EWC that FLASH traffic is under way. EWC then alerts the Monmouth cryptanalysis personnel who decode the message. Sig-Op-5 in Washington is then alerted, which in turn alerts G-2 and ANEEG. The message is then

received by G-2, evaluated, and transmitted to appropriate personnel within the space of a few minutes. Current arrangements are such that a FLASH message can be transmitted to the Washington area in approximately 35 minutes from the time of intercept.

4. Coordination: The JEIC (Joint Electronic Intelligence Center) in PACOM receives the FLASH message simultaneously with other addressees and alerts other service electronic countermeasures activities in the theater (the word "Joint" means Army-Navy only--no Air Force participation). In Europe, the Army Electronic Intelligence Center performs similar functions, again without Air Force participation. ASA stations are also alerted, and arrangements are being made for ASA to alert the Army teams on a reciprocal basis. This is the only contact between field agencies.

Navy ELINT Program

1. General: The Naval effort is directed more toward acquisition of strategic technical data than toward warning indicators. [redacted] (b)(1) OGA JS [redacted] An 8-hour watch is maintained, and indicators are similar to those of the Army. Usually, one or two submarines are under special control. They do not have full teams aboard.

2. Intercept Operations:

[redacted]

Airborne team based in the Philippines [redacted]

[redacted]

[redacted]

3. Reporting: Airborne teams report through Top Secret channels with priority rating to CNO as the prime addressee, with others on the list. Message time varies from 1 to 4 hours. Reports are received at the Navy Security Station in Washington and given to ANEBG. Ship teams report in similar fashion, if the report is sufficiently important, but the data are usually sufficiently routine to be sent by secret dispatch. Land based teams have one-time pads in conjunction with the Army, and their reports go both to Army and to CNO. Routine reports come at intervals of about two weeks by mail, although emergency channels are available for reporting.

4. Coordination: COMINT officers at ASA collate Navy intercept reports with other intelligence and send the final report to ONI. There is a 24-hour duty watch in Washington. Field COMINT personnel are alerted in advance of Navy maneuvers. These data are coordinated with the British in routine exchange. There is also a field exchange between the Air Force and the Navy, with certain exceptions such as magnetic tape recordings of the USAF. There are two evaluation units in the field.

Air Force ELINT Program

1. General: Frequency coverage is from slightly less than 30 kilocycles to 10,750 megacycles on an 8-hour watch basis (for ground teams). Indicators are similar to those of the Army and Navy but more limited. The primary effort is directed toward locating enemy stations; secondary effort is toward determining technical characteristics of the radiating station. The Air Force also monitors [redacted] (b)(1) (b)(3)-50 USC 403 (b)(3)-P.L. 86-36

2. Intercept Locations:

United States - Nine ground stations as an integral part of Air Defense Command around the perimeters of the US.

[redacted]

(b)(1) (b)(3)-50 USC 403 (b)(3)-18 USC 798 (b)(3)-P.L. 86-36

3. Reporting: SAC field operators can flash messages from field operations in 2-3 hours to (i) theater Headquarters, (ii) local Navy and Army Headquarters, and (iii) SAC Headquarters. Air Force personnel state that the time of communication depends on atmospheric conditions and mention that a 4-hour time might be a figure to shoot at. It has been stated that 30-minute reporting would be possible if the requirements were sufficiently strong.

4. Coordination: Raw data are not given to the Air Force by the Army in the field, but the Air Force gives such data to the Army, with the exception of magnetic tape recordings which are sent to Wright Field for analysis and, much later, to ANEEG. These recordings contain highly useful data, and, to be fully effective, should be made available to a group such as ANEEG in the shortest possible time. The need for coordination is such as to override individual service prejudices.

Again there does not appear to be adequate tie-in with COMINT at field levels. All services should have closely coordinated COMINT and ELINT activities from field units on up to the highest levels, and all service ELINT activities should be closely coordinated at a central place within a given operating area.

~~VIII~~ IX - PERSONNEL

General Remarks

In the various discussions and briefings which the Study Group has had concerning the present COMINT effort, the most universally mentioned problem is that of improving the quality and proficiency of personnel. The success of any organization depends critically on its personnel. In the case of NSA--and the military Services--a number of factors which limit the effectiveness of certain key groups of personnel has been brought to the attention of the Group.

Here we describe briefly some of the problems now faced primarily in connection with three crucial groups of NSA personnel, namely, high-level research and development personnel, analytical personnel, and interception personnel. We shall also make some comments and suggestions concerning supervisory personnel.

Research and Development Personnel

At the present time, there is serious need for further research and development activity in NSA. The success of such a program will depend almost entirely on the quality of research and development personnel.

A good part of this activity can be contracted out to private organizations; but, even for this effort to be successful, it is necessary that NSA itself have a highly competent group to recognize NSA's needs and to translate them into requirements which can be used by private firms as a basis for research and development. NSA has lost a considerable number of men of this type and is finding it almost impossible to compete with industry

in filling the vacancies created, not to mention recruiting such men to expand the research and development staff. This situation calls for a re-examination of salary scales for research and development personnel. It is also suggested that explorations be made to determine the extent to which scientists and engineers from universities and industrial laboratories could be usefully borrowed for limited periods of time.

One of the basic difficulties in attracting and retaining top-flight scientific personnel is the problem of providing recognition for their contributions, not measured purely in status and salary advances, but in terms of scientific prestige. At the present time, the only possibility for such recognition is through scientific contributions almost wholly unrelated to their research in the COMINT field. This sets a double standard of achievement which very few persons can meet. The Group has no solution to offer concerning this dilemma. The least that can be done is to consider extra premiums in terms of working conditions and financial inducement for good men to enter the field.

Analysts

The second key group of COMINT personnel consists of the analysts: the cryptanalysts, and the traffic analysts. The main core of this group is comprised of more than 1100 civilians, but it also contains a large complement of service personnel. The civilian members provide the basic continuity of the analytic effort, although there is considerable turnover. The turnover is even greater for the service personnel because of rotation policy and relatively short terms of service for most military personnel.

There is great variation in the quality of personnel in these two groups of analysts. Considerable difference of opinion exists as to what type of person at recruitment will make a good analyst and what type will not. It is generally agreed, however, that, once a good analyst is selected, his proficiency steadily improves with experience. In view of this situation, and since there is a continuing recruitment program to keep analytic personnel up to strength, it is extremely important to establish sound selection and training procedures. Modern psychometric methods applied in close consultation with leading NSA analysts can be expected to aid materially in improving selection procedures. It is not sufficient, however, for such procedures merely to be applied to some candidates. They must be applied to candidates from the most promising sources. This in turn calls for a re-examination of NSA policy for giving the potentially good candidate some notion, within realistic security limitations, of what cryptanalysis and traffic analysis are and how important in terms of national security. Only then will NSA attract the potentially best candidates actually to become candidates for selection. In making these suggestions, the Group is thinking primarily of civilian analysts, but the principles are no less applicable to military personnel.

Another important aspect of the problem of recruiting and holding good analysts relates to salary and promotion policy. At present, there seems to be some disparity in this respect between cryptanalysis and traffic analysis. We raise the question whether salary and promotion policy is as favorable to strong development of T/A capability in NSA as it is in the case of C/A, especially in view of our present heavy dependence on T/A.

A final aspect is the supporting services available to the analysts, particularly the machine sections which do the extensive machine processing. The personnel in these sections have a routine but highly responsible task and the efficient performance of the work depends on skilful leadership and ingenuity in planning the use of the machinery to best advantage. Steps should be taken to make this work attractive by expanding the opportunities for advanced training and promotion in the area.

Intercept Operators

The third large group of personnel in the COMINT effort are the intercept operators, who, at present, are almost entirely military. The greatest problem here is that created by the usual enlistment and rotation policies. The potential value of an intercept operator increases with experience at a particular intercept location. The more familiar the operator becomes with the material he intercepts the more expert he can become in the preliminary interpretation of it. It is widely recognized that the problem of building up and maintaining a reasonable amount of know-how for interpreting material at the intercept site is of basic importance with respect to early warning. Part of the solution of the problem, as far as it can be dealt with, is probably to be found in the establishment of a service career for military personnel in COMINT. A service man with interception experience at one site can be expected to capitalize rapidly on this experience when placed at another site. Another possibility for improving our interpretation capability at the intercept site, in some cases at least, is to indoctrinate intercept operators in the rudiments of cryptanalysis and traffic analysis or to supply an analyst for the site to work in close collaboration with the operator.

In sites where voice intercept can be taken, the importance of knowledge of the Russian language is obvious.

There are well-recognized difficulties in using civilian experts at intercept sites or in theaters of operation. On the other hand, World War II experiences in operations research, use of radar, and other fields are full of instances where these difficulties were overcome.

We also point out that profitable return can be expected from the use of modern psychometric methods in the selection and proficiency evaluation of intercept operators.

Supervisory Personnel

Finally, we wish to make some comments concerning the selection of supervisory personnel, especially those in an immediate supervisory capacity. It is axiomatic in good personnel management that immediate supervisors of any technical activities should themselves have expert knowledge of the activity they supervise. The best way of obtaining such supervisors is by advancement of properly qualified individuals from within the groups themselves. This principle, however, is more easily applied to the civilian component of a group than to the military personnel. In the case of military personnel, with rotation policy as it now exists, the Group believes the best approach to the supervisory problem lies in the establishment of a career service in COMINT in the Army and Air Force along lines already developed in the Navy.

IX X - COMINT as a Source of Advance Warning in World War II and the Korean Conflict

During World War II, and again during the conflict in Korea, COMINT was the timeliest, most complete, and most reliable source of intelligence on the Order of Battle, intentions, and capabilities of the enemy. It was the unique source of reliable advance knowledge of his plans for both offensive and defensive operations. The following examples have been selected from among innumerable instances which illustrate the COMINT capability to provide advance warning of impending enemy operations, on both strategic and tactical levels, and the advantages which may be derived from the receipt of such warning.

World War II--The German Attack on the USSR:

During the first three months of 1941, Special Intelligence [1] indicated a general eastward movement of German air and ground forces which enabled British Intelligence to estimate with increasing certainty that the concentrations which were taking place were to be directed against the USSR. By the end of March, sufficient information was available from deciphered German messages to suggest that (i) preparations were being made to intimidate the Soviet Union by assembling an armored striking force on the Russo-Polish frontier, and (ii) those preparations might lead to the outbreak of war.

Special Intelligence then revealed the deflection of the striking force to the Balkans for the conquest of Yugoslavia and its subsequent withdrawal, after a month's participation in the campaign, and redeployment,

[1] COMINT derived from decryption of high-level cryptographic systems.

together with an air corps, to its previous destination in south Poland. By 31 May, little doubt remained that the Germans intended to initiate hostilities and not merely to intimidate their erstwhile ally. In an estimate of 7 June 1941, the British COMINT organization predicted "a very large scale campaign against Russia, with the main front of attack in Poland and East Prussia," and stated that the German forces would be ready to begin the operation soon after 16 June.

An estimate of 16 June summarized the COMINT information received during the preceding nine days and concluded: "...it is probable that the German Air Force will be ready to strike as from 19 June onwards."

German messages of 19 June, which were available to COMINT recipients on the following day, made it clear that the period immediately preceding D Day had been reached.

Thus, COMINT provided (i) a general warning several months in advance of the attack and (ii) as the date of invasion grew nearer, increasingly specific information which enabled intelligence personnel to estimate the scope of the intended campaign, the areas of concentration, and the approximate date on which the frontier crossing would take place.

For the British strategic planners, that advance intelligence was invaluable. In view of the weakness of their military forces, it was not possible to prepare for the defense of every vulnerable point which the enemy might choose to attack. Reliable intelligence on the enemy's intentions was vital, therefore, to the continued existence of the British nation. COMINT supplied that intelligence and, incidentally, gave the Prime Minister a period of several weeks to consider the policy which he announced at 9 p.m. on 22 June 1941 that Britain would give "whatever help" she could to the Soviet Union.

Korea:

The COMINT contribution in Korea during the period November 1950-July 1951 is summarized in a citation for the 1st Radio Squadron, Mobile, dated 11 October 1951. That citation includes mention of the following "specific accomplishments, considered of extraordinary value to the mission of the UN Forces in Korea and in at least two cases to the vital interests of the United States":

(i) advance notification that the enemy was aware of UN plans to attack Anju and Chinnampo, as well as his plans for countermeasures;

(ii) advance warning of the enemy's intent to bomb American troops on Hill 872 near Tuk Son;

(iii) advance warning of the exact times and intentions of the enemy air attack on Sinmido Island on 19 June 1951 which resulted in severe reverses for the enemy; and

(iv) advance information on the times and places of intended attacks during the evacuation of the Ham Hung beachhead.

More recently, COMINT provided warning that, during the final stages of the armistice negotiations, the Chinese Communists were preparing an offensive against the UN Forces. It is too early to establish the reasons for cancellation or postponement of that attack, but UN countermeasures--made possible by the advance knowledge of enemy intentions--may well have caused the Communists to decide that sufficient military advantage to warrant diaruption of the armistice negotiations was no longer assured.

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