

MEMO ROUTING SLIP

NEVER USE FOR APPROVALS, DISAPPROVALS,
CURRENCES, OR SIMILAR ACTIONS

1 NAME OR TITLE DR. KULLBACK	INITIALS <i>JK</i>	CIRCULATE
ORGANIZATION AND LOCATION R/D	DATE	COORDINATION
2 Mr. Friedman		FILE
S/ASST		INFORMATION
3		NECESSARY ACTION
		NOTE AND RETURN
4		SEE ME
		SIGNATURE

REMARKS

Do you think Mr. Clark would be interested in this?

Yes

Returned with thanks,
A.B. CLARK
JK

Declassified and approved for release by NSA
on 03-20-2014 pursuant to E.O. 13526

FROM NAME OR TITLE

Friedman

ORGANIZATION AND LOCATION

DATE

20 May 58

TELEPHONE

16 June 1952

~~SECRET~~~~SECURITY INFORMATION~~

MEMORANDUM

From: H. T. Engstrom

To: W. F. Friedman

I am attaching hereto three copies of a study prepared at your request during the last fortnight concerning the proposed Office of Research for the Armed Forces Security Agency. Because of the limited time available the paper does not constitute in any sense "a complete description of methods of operation and relation with other AFSA units". However, I hope it will be of some value to AFSA as a working paper.

I should like to suggest that the paper be circulated for criticism. The comments of Dr. Potter would be extremely valuable in connection with the Division of Physical Research. Dr. Kullback and Dr. Campaigne certainly will have suggestions with respect to the Mathematical Research and Dr. Eachus and others with respect to the Computer Research. It is probable that your management consultant will be able to produce a table of organization with functions and responsibilities much more precisely delineated. I am sure that Dr. Robertson and Mr. Speakman could be of great assistance.

If there is any way I can be of further assistance, I shall be most happy to have you call me whenever I am in town and other pressures not intolerable.

HTE:nh

H. T. Engstrom
H. T. Engstrom

~~This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.~~

SECRET

~~SECURITY INFORMATION~~RESEARCH ORGANIZATION OF THE ARMED FORCES SECURITY AGENCY

The following report has been prepared at the request of the Director of the Armed Forces Security Agency (AFSA) to assist in a revision of the AFSA organization in order the greater emphasis may be placed on problems of a scientific and research nature. Increased emphasis on research was recommended by the Special Communications Advisory Group (SCAG). The final report of this group dated 12 March 1952 stated:

"It is SCAG's firm opinion that a strong basis research program is of great importance in supporting developmental and operational work of AFSA and that a separate basic research organization should be set up. Research should be kpe separate from development and operations with personnel and facility assignments which cannot be infringed upon by development and operational requirements."

This opinion was supported by the AFSA Executive Group for SCAG on 16 April 1952 as follows:

"The AFSA Executive Group unanimously supports the SCAG recommendation in regard to the separation of research from development, including the transfer of the "applied research" now conducted in the Office of Operations to the Office of Research."

At the first meeting of a committee formed to revise the AFSA research organization on 6 May 1952:

"The Committee decided that the most feasible course of action would be to assign to one person the responsibility of preparing a recommended organization and functions along with a complete description of methods of operation and relations with other AFSA units."

~~SECURITY INFORMATION~~

This report does not constitute a complete description of methods of operation and relations with other AFSA units, but rather attempts to set up the basic elements of the organization and define relationships with other AFSA units at the most critical points. Thus the report should be regarded as a working paper or perhaps a skeleton to which detailed structure may be added.

In the preparation of the report, opinions expressed by SCAG members have been incorporated insofar as practicable.

OBJECTIVE:

In setting up the proposed Office of Research as well as the position of Technical Director, the objectives of the reorganization must be considered. AFSA is faced with technical problems of great complexity which require the application of scientific methods of a most advanced nature. Furthermore, these problems are in many respects peculiar to AFSA so that the Director of AFSA cannot rely completely upon other agencies, Government or private, for their solution. Although AFSA is presently carrying out a minimum amount of research in connection with its research and development program, the reorganization has been proposed to attain the following objectives:

1. To ensure that AFSA has a strong research staff which is capable of bringing to bear the most advanced scientific principles to AFSA problems.
2. To develop and implement long-range plans for the technical advancement of AFSA.
3. To maintain an atmosphere which will ensure a continuing supply of highly qualified scientific personnel.

The primary reason for the separation of research from development is to provide the research personnel freedom from operational pressures and hence with the opportunity for considering problems from a long term point of view. It further has the advantage of permitting the Office of Development to pursue projects from a strictly engineering point of view once the functional

~~SECURITY INFORMATION~~

characteristics have been established.

Although in certain cases there may be questions as to whether certain projects should be placed under research or development the general distinction should be clear. The Office of Development deals with engineering and design problems leading to specific equipment while the Office of Research deals with general problems leading towards increased knowledge or basic design principles. For certain problems within AFSA it may be advisable to carry on parallel work in the Office of Operations and the Office of Research, the former concentrating on the solution of the specific problem with the latter concentrating on general techniques applicable to the specific problems and others of the same general category.

This paper contains a general description of the responsibilities of the AFSA Senior Technical Director and the functions of the proposed Office of Research. In considering the branches of the Office of Research, opinions expressed by SCAG members have been incorporated. With regard to the Operations Research Branch, little detail has been given. This field is a highly specialized one and some one with direct experience in the field such as Dr. Robertson of WSEG should be consulted. No discussion has been included concerning the Office of Development since this office would continue as present with the transfer of its research activities. The organization of this office as recently proposed seems in line with the establishment of the new Office of Research.

Attached to the report are suggested organization charts, an estimate of personnel requirements. These personnel requirements are not completely over and above present complements, since some of the activities are being carried out by present personnel. Further study would be required to determine the actual increase in the AFSA complement implied by the establishment of the new office.

Included also in the report are suggestions for implementation.

AFSA SENIOR TECHNICAL DIRECTOR

The Senior Technical Director has the following responsibilities:

1. Planning the AFSA research program and implementing approved plans.
2. Planning the AFSA development program and implementing approved plans.
3. Carrying out special studies and projects for the other offices of AFSA insofar as he deems it practicable.
4. Ensuring a continuing competent scientific staff to carry out the research and development needs of AFSA.
5. Supervising the operations of the Office of Research and the Office of Development.

The Senior Technical Director will be supported by the Director of Research and the Director of Development. He should work closely with the technical directors of AFSA-O2 and AFSA-O4 in planning and in implementing the research and development program. The Senior Technical Director will strive to keep the Office of Research primarily engaged in its long-range program but will also have the responsibility of ensuring that the research program is of maximum assistance to the other offices of AFSA. He will have the authority of final decision in matters concerning special projects to be undertaken by the Office of Research at the request of AFSA. The qualifications which the Senior Technical Director should possess are as follows:

1. He should have advanced scientific training, PhD or equivalent.
2. He should have at least 15 years experience in planning and implementing research and development programs.
3. He should have an understanding of the problems of development engineering.

No. would perpetuate same mistake as we now have.

~~SECURITY INFORMATION~~

4. He should have general management experience.
5. He should have experience with military problems either through direct military service or work with the Department of Defense.
6. He should have contacts with university and industrial research as well as general engineering developments.
7. He should be familiar with general technical advances throughout the country.

The position of Senior Technical Director should be rated as GS-17 or higher. It is recommended that the position of Senior Technical Director be filled only after careful review of the qualifications of prospective candidates. The position is one of great importance and should not be filled immediately unless a person of exceptional qualifications presents himself.

After appointment of the Senior Technical Director, it is probable that the service functions of both the Office of Research and the Office of Development should be combined under his direct cognizance insofar as practicable in order that the directors of these offices be able to concentrate on scientific and engineering matters.

OFFICE OF RESEARCH

The Office of Research is established in order that AFSA may be in a position to apply the most advanced scientific techniques to the solution of its current and future problems. The Office of Research is segregated organizationally from the Office of Development and the Office of Operations in order that its scientific staff be able to carry out a program of long range significance uninterrupted by the operational pressures of the Office of Operations or the urgent requirements for the development of specific equipment in the Office of Development. However, the Office of Research will be expected to assist the other offices of AFSA on specific problems whenever the Senior Technical Director or the Director of

Research judge that such assistance can be provided without detriment to the long range program.

The Director of Research will have the following responsibilities:

1. Preparation of plans for a continuing long range research program to meet current and future needs of AFSA.
2. Implementing approved plans.
3. Provide assistance for other offices of AFSA as determined practicable by the Senior Technical Director.
4. Takes measures to ensure a continuing expert staff.
5. Administers the affairs of the Office of Research.

The Director of Research should have the following qualifications:

1. He should have advanced scientific training, PhD or equivalent.
2. He should have 10 years experience in planning and implementing general research programs.
3. He should have familiarity with scientific research at university, government and industrial laboratories.
4. He should have experience in government research, particularly in connection with the Department of Defense.

Because of his broad responsibilities and the wide scope of activities under his direction the Director of Research should be rated as GS-16.

The Office of Research includes an Administrative Group sufficient for administering the affairs of the Office.

Assistance in connection with monitoring research contracts will be required. However, it is considered that general administration will be provided by the staff of the Senior Technical Director when available in order that the major attention of the Director of Research may be focused on technical matters. A staff of 5 people should suffice for his administrative needs.

~~SECURITY INFORMATION~~

A technical library is a most important tool for the research worker.

It is probable that the technical library should be transferred from the Office of Development to the Office of Research when practicable.

A services group must be maintained for such laboratory facilities as the Office of Research may require. It is estimated that 10 people will be required for this purpose.

The Office of Research will include four divisions:

1. Division of Mathematical Research
2. Division of Physical Research
3. Division of Computer Research
4. Division of Operations Research

*Electronic research
Propagation res.*

DIVISION OF MATHEMATICAL RESEARCH

The increasing complexity of the problems facing AFSA has made it necessary to attack some of them by mathematical and statistical methods of a high degree of sophistication. The division of mathematical research will maintain a staff of skilled mathematicians to meet the needs of AFSA in this field. Although it may be necessary for other offices of AFSA to retain some mathematicians for their day to day problems it is expected that questions which are essentially mathematical or statistical will be referred to this division.

The head of the division will set up a long range program of research on those aspects of mathematics and statistics which will provide AFSA with its required support in the field.

The qualifications of the head of the division are as follows:

1. He should have advanced training in mathematics and statistics, PhD or equivalent.
2. He should have experience in directing research programs in mathematics.
3. He should have an extensive acquaintance with cryptanalytic and cryptographic processes.

~~SECURITY INFORMATION~~

4. He should be familiar with the general principles of operation of electronic computers, particularly with regard to programming.
5. He should be familiar with current advances in the mathematical and statistical fields.

The division will maintain branches as follows:

MATHEMATICS BRANCH

The Mathematics Branch will carry out a continuing program in the special branches of mathematics which are of importance to AFSA. The head of the branch will maintain contact with the general field by keeping familiar with current research at other establishments. Statistical studies of language as well as code and cipher phenomena will be pursued. The branch will continue to investigate such general fields as matrix approximation theory, cyclic structure of sequences, logical implication with particular reference to AFSA problems. It is estimated that this branch will ultimately require 20 people.

CRYPTANALYTIC BRANCH

The Cryptanalytic Branch will carry out a continuing program of investigation in cryptanalytic methods. The head of the branch will maintain familiarity with current and past methods in order that the work of the branch be most effectively directed towards probable future AFSA problems. A continuing program of studies will be maintained on such general problems as wiring recovery in cipher machines, exploitation methods for machine ciphers, additive recovery. The work should include investigation of methods of call sign analysis. It is estimated that this branch will ultimately require 10 people.

CRYPTOLOGIC BRANCH

The Cryptologic Branch will carry out a continuing program in privacy methods including ciphony and cifax. The head of the branch will maintain familiarity

~~SECURITY INFORMATION~~

with current and past privacy methods in order that the work of the branch be most effectively directed towards the future cryptologic problems of AFSA. A continuing program of studies will be maintained in such general fields as methods of key generation, speech privacy systems, additive generation. The work should include studies of call sign systems as well as methods of identification and arithematisation. Personnel requirements for this branch are estimated at 10 people.

SPECIAL TASK BRANCH

The Special Task Branch is established primarily in order to carry out special programs for other offices of AFSA although certain special tasks may well originate within the Office of Research. Such special tasks must have the approval of the Senior Technical Director and the Director of Research. A typical task might be the assignment of some aspects of special cryptanalytical problems from the Office of Operations for examination from a research point of view. The special task branch will operate in many cases on a task force basis with assistance from personnel in other branches of the Office of Research as well as other divisions of AFSA. It is estimated that the Special Task Branch will require a staff of 6 people.

DIVISION OF PHYSICAL RESEARCH

AFSA has a variety of requirements which require research in fields such as computers to operate at very high frequencies; analysis of radio wave forms; propagation phenomena antenna design; special recording techniques. Some of these problems require advances in fundamental physics. Although a great deal of research is now in progress in this area in connection with general communications, some of AFSA's requirements are of such a special nature that AFSA sponsorship of work in the field is necessary. It is expected that the head of the Division of Physical Research will set up a long range program of research in the

~~SECURITY INFORMATION~~

Not needed if proper use be made of work already in progress by groups who are not hampered by security resp.

physical sciences which will supplement existing programs and provide AFSA with its needed support in the field.

The qualifications of the head of the division are as follows:

1. He should have advanced training in physics or electronics, PhD or equivalent.
2. He should have experience in planning and directing research programs.
3. He should be familiar with current scientific advances in the physical sciences with particular references to electronics and communications.

It is expected that the head of the division will have the services of consultants who are experts in the required fields.

The division will maintain branches as follows:

COMPONENT RESEARCH BRANCH

Same comment as above.

The Component Research Branch will carry out a program of investigation of new components which have promise of being of future importance to AFSA. Research may be performed within the Branch or by outside contract. Examples are investigation of NHF computer components such as presently contemplated with the Corona group; investigation of static memory devices in connection with computer circuits. It is expected that the Branch will assist the Office of Development in the specification of component techniques for future equipment. This branch is estimated to require about 15 people.

ELECTRICAL RESEARCH BRANCH

This branch will be responsible for planning and implementing a program of research in support of the radio, communications and intercept aspect of AFSS's problems. It will maintain contact with outside researches in the field supporting them when necessary by projects within the branch or by outside contract. Examples of projects which would be carried out by this branch are analyses of optimum.

antenna design, methods of identification of radio waves, special recording techniques, propagation studies as required in connection with intercept activities. This branch is estimated to require 20 people.

SYSTEMS BRANCH

The Systems Branch will conduct continuing studies of problems concerning the physical techniques utilized in the collection, dissemination and analysis of RI material. It shall plan and implement a research program directed at systems which cannot efficiently resolve the manifold problems involved in world-wide communications networks. It will also consider problems related to location and integration of intercept activities. This branch is estimated to require 10 people.

DIVISION OF COMPUTER RESEARCH

Much of AFSA's analytical work involves application of special electronic computing devices. The needs of AFSA in this field require application of most advanced techniques. The Division of Computer Research will set up a continuing program of analysis of computing techniques. It is expected that the head of the Division will be familiar with existing computation equipments and their capabilities. He will be consulted in connection with the functional design of all special computational equipment required by the other offices of AFSA. He will work closely with the head of the Mathematical Research Division. It is recommended that the Division of Computer Research operate a general purpose computer devoted exclusively to research purposes in the operation of which the Director of Research determines priorities.

The Head of the Division of Computer Research should have the following qualifications:

1. He should have advanced scientific training, PhD or equivalent.
2. He should have 5 years experience in connection with the programming and operation of digital computing equipment.

3. He should be generally familiar with the techniques of cryptanalytical and cryptographic processes.
4. He should be experienced in planning and implementing computer research programs.

The Division will maintain branches as follows:

LOGICAL DESIGN BRANCH

The Logical Design Branch will carry out continuing studies of the basic analytical methods utilized in the computing problems of AFSA both in general purpose and special purpose equipment. It will carry out programming studies to determine optimum methods of carrying out computational problems on existing equipment and will make recommendations in connection with the functional and logical design of proposed equipment. It will carry out special studies for other offices of AFSA in this general field when approved by the Senior Technical Director or the Director of Research. It will assist the Mathematical Research Division in programming and computing matters. It is estimated that approximately 10 people will be required in this branch.

RESEARCH COMPUTER OPERATIONS BRANCH

It is considered most important that the Office of Research have an operating general purpose computer under its control. The Computer Operations Branch will operate this computer. It will plan and implement out a program of continuing studies in all matters of a research nature in connection with computer operations including studies of checking techniques, life studies, optimum methods of maintenance. It will carry out special studies for other offices of AFSA when approved by the Senior Technical Director or the Director of Research. It is estimated that 15 people will be required by this branch.

AUXILIARY EQUIPMENT RESEARCH BRANCH

Many problems of AFSA involve complete data handling systems. In this connection studies are required to determine functional characteristics of peripheral and translation ^{equipment} which will alter data forms in such a manner as to be suitable for special machine processing. This peripheral equipment has not been given adequate attention in the past. These problems are becoming increasingly acute with the introduction of new computing equipment utilizing various forms of input and output. It is therefore felt that the subject warrants a special branch in the Division of Computer Research. The head of the branch will set up a long range program pointed toward eventual standardization. It is estimated that 6 people will be required.

DIVISION OF OPERATIONS RESEARCH

The scientific method called operations research developed as a recognized activity in response to the military needs of World War II where it was known variously as operations analysis or evaluation and weapons system evaluation. "Operations research is a scientific method of providing executive departments with a Quantitative basis for decisions regarding the operations under their control."¹ The method proved successful in many cases. Admiral King states "Operations research bringing scientists in to analyze the technical impact of the fluctuations between measure and countermeasure made it possible to speed up our reaction rate in several critical cases."²

AFSA has a variety of problems which may be susceptible to this scientific method. Examples are:

1. Evaluation of communications intelligence as against jamming and countermeasures.

¹Methods of Operation Research by Philip M. Morse, George E. Kimball, Technology Press and John Wiley & Sons, Inc., New York.

²Admiral E. J. King, Final Report, 8 December 1945.

2. Evaluation of central processing vs. field processing.
3. Intercept target evaluation.

Operations research is in general carried out on a task force basis. It is recommended that a man with experience in this field be appointed to head the division and that he rely on personnel from other branches of the Office of Research to assist him in carrying out specific missions. The ultimate personnel requirements for this division is estimated as approximately 5 people.

The requirements for the head of the division are as follows:

1. He should have advanced scientific training, PhD degree or equivalent.
2. He should have experience in the field of operations analysis.
3. Military experience is required either direct or association with the Department of Defense.
4. He should have had experience on a supervisory level on scientific projects.

IMPLEMENTATION OF THE RESEARCH PROGRAM

The establishment of a strong Office of Research within AFSA will take a number of years. However, certain steps toward this end can be taken now.

The following measures are indicated:

1. Establishment of an Office of Research and appointment of an acting Director of Research. The acting Director of Research will prepare with the assistance of management consultants a Table of Organization for the Division along lines suggested in this report.
2. Transfer to the Office of Research the present Mathematical Research Division (34) of the Office of Research and Development.

3. Change the designation of the present Office of Research and Development to that of Office of Development with an organization essentially that proposed by Dr. Kullback in April 1952.
4. Upon selection of a head of the Division of Physical Research transfer the Engineering Research Branch (354) from the Office of Development to the Office Research.
5. Attempt to establish positions of supergrades and initiate search for a suitable Senior Technical Director.
6. The Director of Development and the acting Director of Research should examine present projects to determine which are essentially of a research character.
7. Unclassified material should be prepared describing the nature of the scientific program which can be used to interest prospective candidates for position in the Office of Research.

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REF ID:A70072

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OFFICE OF RESEARCH

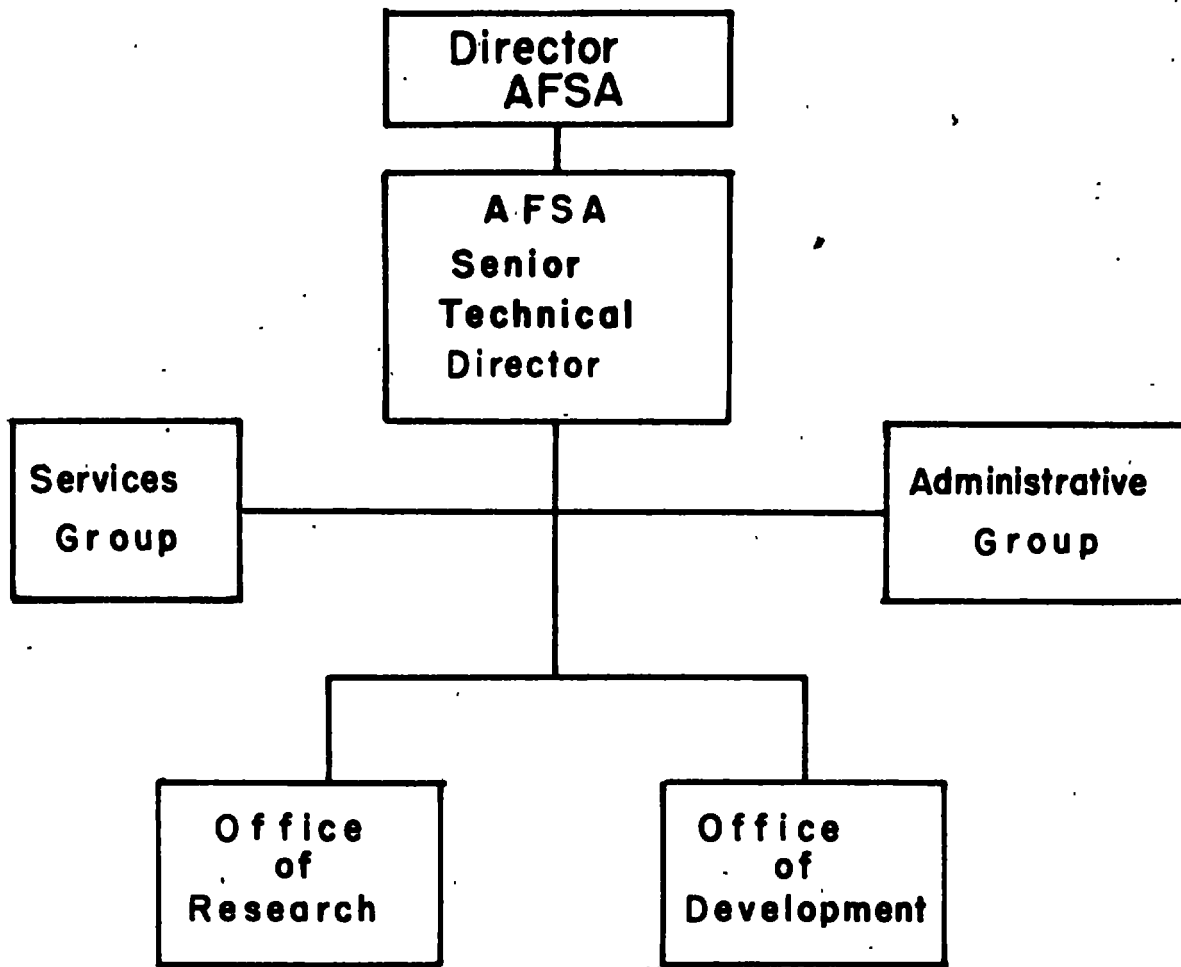
ESTIMATED PERSONNEL REQUIREMENTS

Senior Technical Director	1
Staff	5
Office of Research	
Director of Research & Staff	6
Services Group	10
Division of Mathematical Research Staff	5
Mathematics Branch	20
Cryptanalytic Branch	10
Cryptologic Branch	10
Special Task Branch	6
Division of Physical Research Staff	5
Component Research Branch	15
Electrical Research Branch	20
Systems Branch	10
Division of Computer Research Staff	5
Logical Design Branch	10
Computer Operations Research	15
Auxiliary Equipment Branch	6
Division of Operations Research Staff	5
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TOTAL PERSONNEL	164

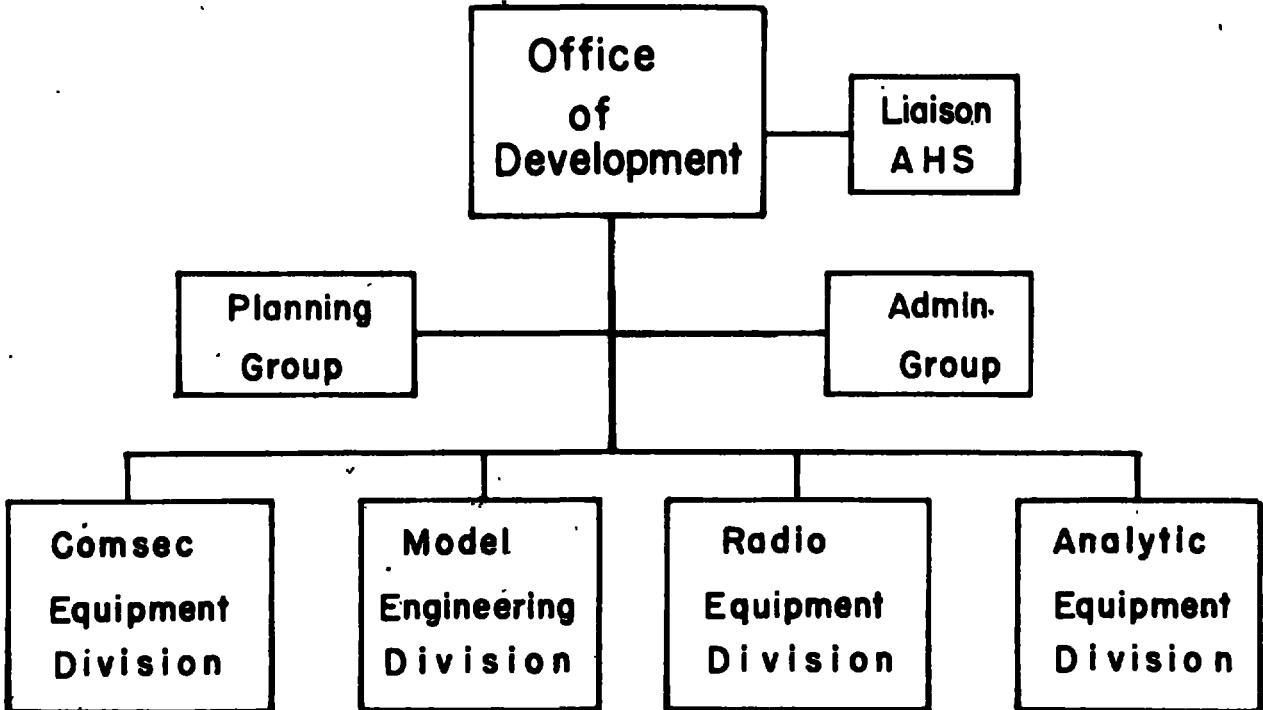
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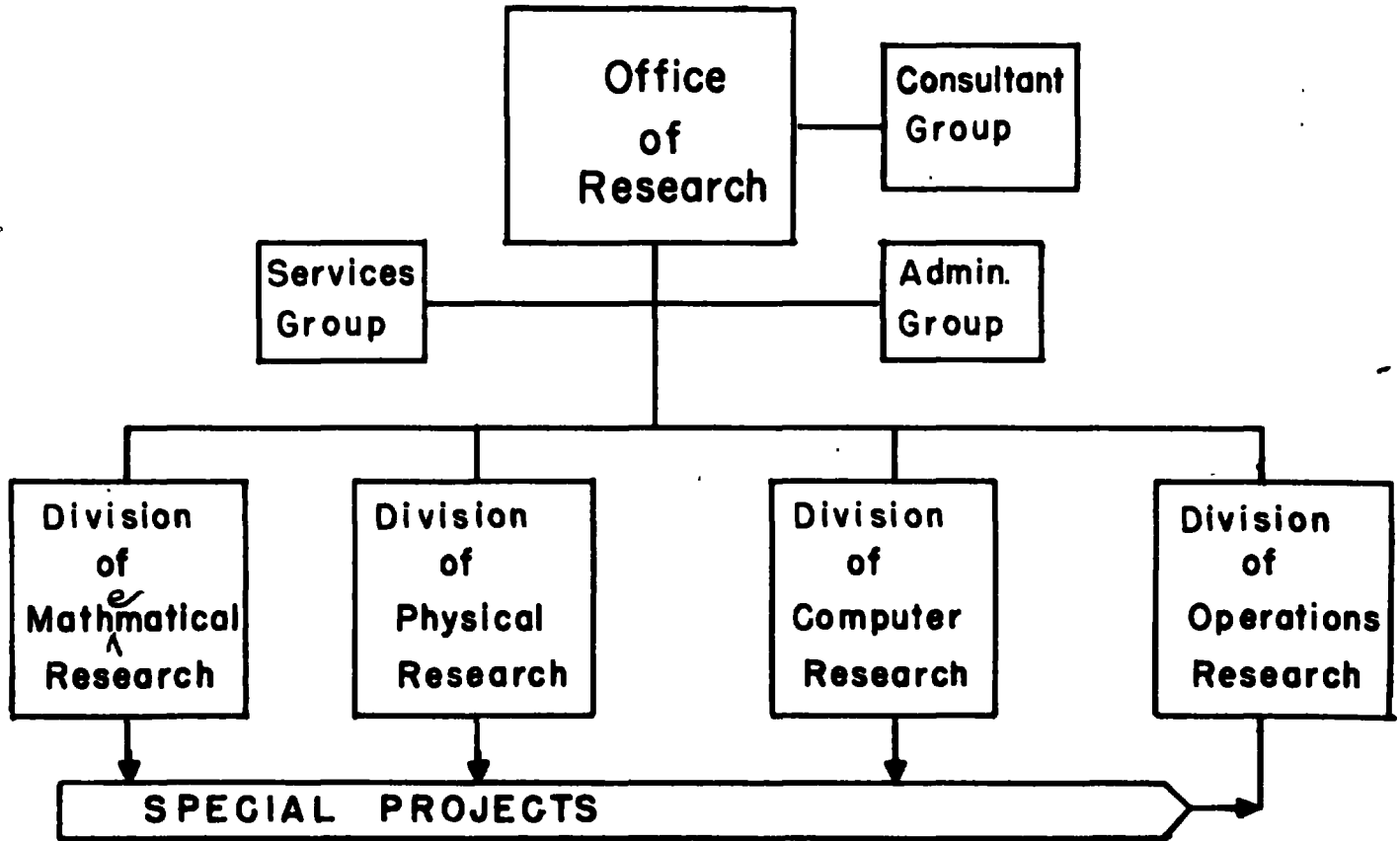
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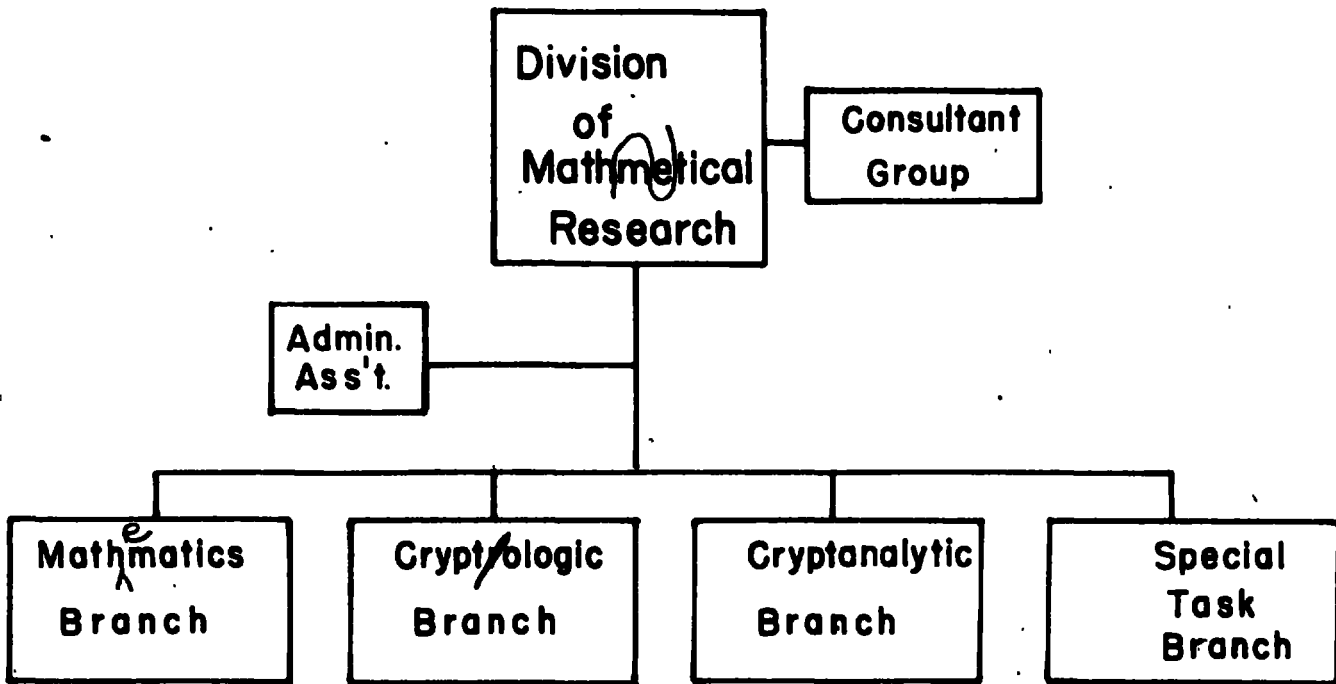
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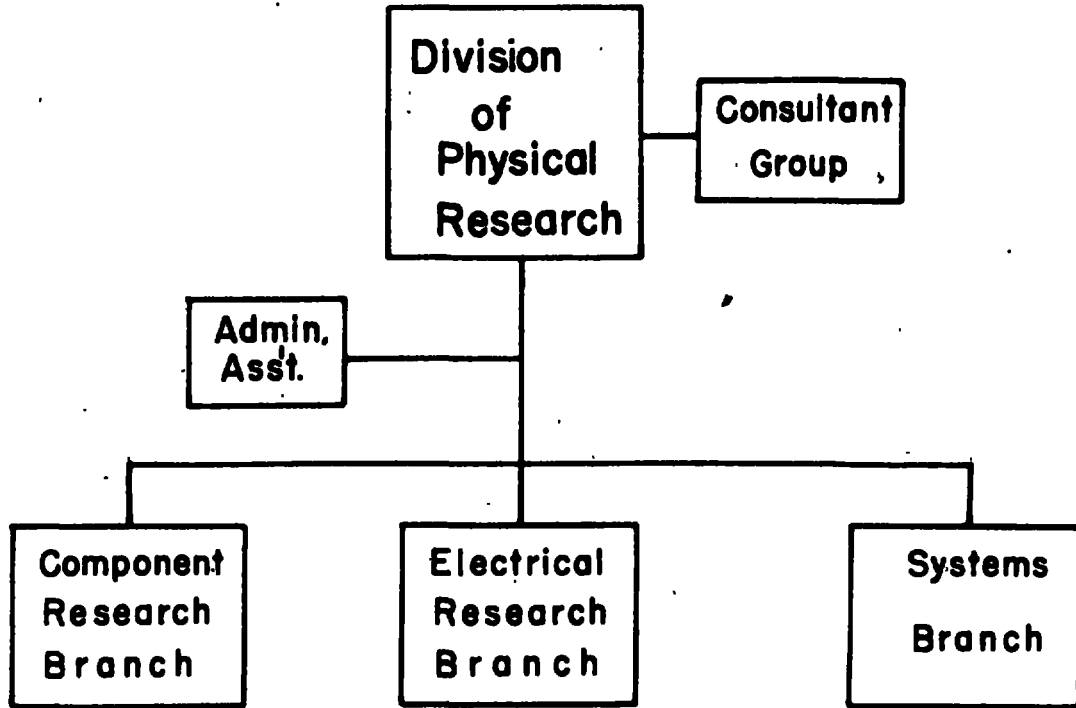
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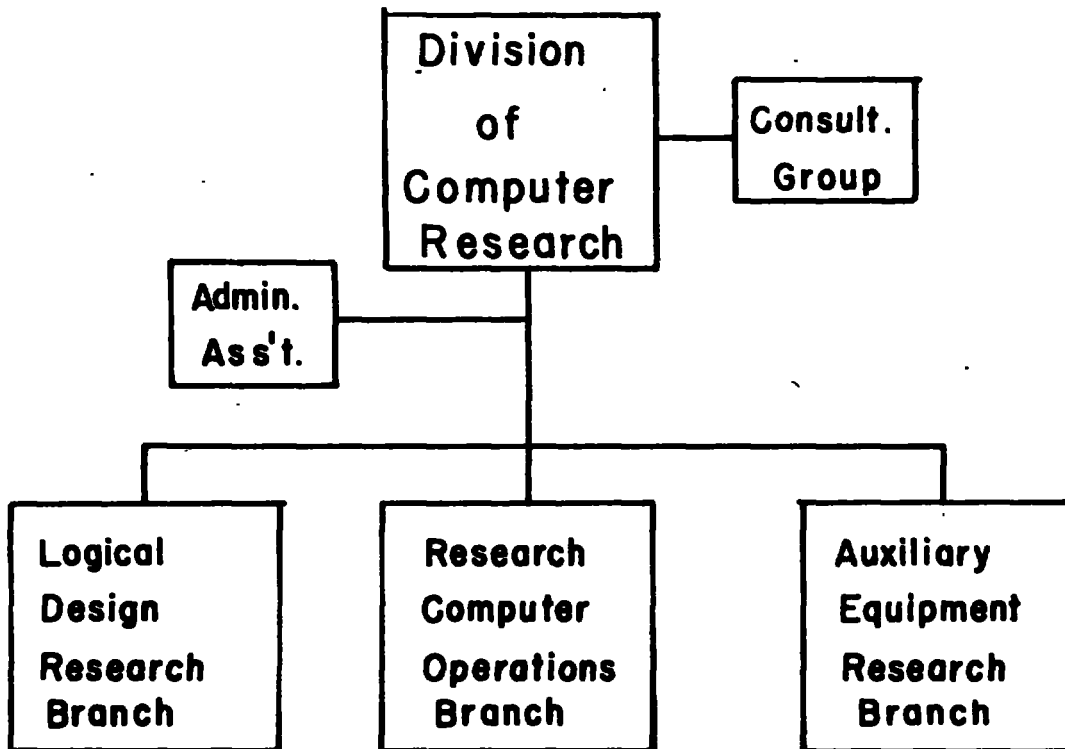
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4 August 1952

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MEMORANDUM FOR THE CHIEF OF STAFF

SUBJECT: Comments on the attached Engstrom Study

1. Although, I am not too familiar with the COMINT research problem, this proposal seems to place basic research too far away from operations. The breakdown of research functions is good. However it could be better handled if administratively a part of the Office of Operations.
2. This study practically ignores Communication Security. Although its applicability on COMSEC is apparent. The effect of such an organization on COMSEC would be considerable. This paper does not say where the new COMSEC equipment division of the Office of Development would get its guidance. Presumably, guidance would come from the Office of Research and not the Office of Communication Security. This would not be acceptable as equipment would be developed on security ideas only, and the Office of Communication Security would lose completely the ground it has gained in basing development on operational requirements and user needs as well as security objectives.
3. In the proposed organization, care must be taken in order that we truly expand our research activity and not merely reshuffle essentially the same crew we already have.



G. V. JOHNSON
LtCol. SigC.
Actg. Chief, Office of
Communication Security

~~SECRET~~

Serial: 1533

11 JUL 1952

Dr. H. P. Robertson
 Norman Bridge Laboratory of Physics
 California Institute of Technology
 Pasadena 4, California

Dear Bob:

We are indebted to you for taking the time, during the difficulties of closing up shop in Washington, to go over the Engstrom paper I sent you and I want to tell you of our appreciation.

Due note is being taken of your comments and suggestions on the paper.

In a little while I may send you a draft of a statement of a charter and mission for a new SC&C and ask for your comments.

Receipt is also acknowledged of your letter of 23 June 1952 to Dr. Campaigne, accompanying badge number 10406 which you returned to us. I will send the badge to its proper repository, and thank you for remembering this detail.

Reciprocating your personal regards and offering my best wishes to you in taking up once more your professorial duties, I am,

Sincerely,

WILLIAM F. FRIEDMAN
 Consultant

Copies furnished:
 AG (3)
 OOT

W/F.Friedman/eby/9 July 52
 Consultant

MEMO FOR RECORD: Self-explanatory. Dr. Robertson was Research Director, WSEG, Off. of the Sec. of Defense. This letter is in reply to Dr. R's letter of 30 June 52 to Mr. Friedman. Reference serial 00438, dtd 26 June 52.

WILLIAM F. FRIEDMAN
 CONSULTANT

REF ID: A70072
MEMO ROUTING SLIP

USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS

1	NAME OR TITLE <i>Admiral Wenger</i>	INITIALS <i>[Signature]</i>	CIRCULATE
	ORGANIZATION AND LOCATION	DATE	COORDINATION
2	<i>General Canine</i>	<i>[Signature]</i>	FILE
		7 JUL 1952	INFORMATION
3	<i>Mr. Friedman</i>		NECESSARY ACTION
			NOTE AND RETURN
4			SEE ME
			SIGNATURE

REMARKS

FROM NAME OR TITLE <i>Friedman</i>	DATE <i>2 July 52</i>
ORGANIZATION AND LOCATION	TELEPHONE



OFFICE OF THE SECRETARY OF DEFENSE
WEAPONS SYSTEMS EVALUATION GROUP
WASHINGTON 25, D. C.

30 June 1952

Dear Bill:

I'm terribly sorry to have been so rushed in the past few days that I haven't been able to get together with you to go over Howard Engstrom's report. I have finally - during the 1 1/2 hours since five o'clock, when I ceased to be Research Director here in WSEG - gone over it with some care. I do not feel, however, that I can offer any very constructive criticism after such an examination, without first learning a little more about some correlative matters therein touched upon.

In general, however, the proposal seems to incorporate many of the ideas generated by the late Advisory Group. It seems to provide the protection for research considered so necessary for a proper functioning. I am, however, a little in the dark as to the proposed relation between the Senior Technical Director and the other major parts of the organization; this is not brought out in the organization chart. Also, although the Senior Technical Director is explicitly given authority for final decision in special projects undertaken in the Office of Research, nothing is said as to whether he has the same authority in matters undertaken in the Office of Development - shouldn't he have there the same authority?

I should think the Org. chart I sketch this clear. ?

I do not believe the grades recommended are high enough to enable you to get the kind of people required. The Senior Technical Director should be a GS-18 or P-5, the Director of Research a GS-17 - and even then it will be hard to fill the jobs!

I think it quite appropriate to include a Division of Operations Research to deal, on staff force basis, with the kind of problems proposed. Perhaps we'll have a chance to talk this over sometime this summer - perhaps at UCLA?

I really must sign off now. Best personal regards to yourself and other friends in the organization, and good luck!

Address:
Norman Bridge Laboratory of Physics
California Institute of Technology
Pasadena 4, Calif.

Cordially
Bob
H. P. Robertson

~~SECRET~~

Serial: 00438

26 JUN 1952

~~SECURITY INFORMATION~~~~SECRET - SECURITY INFORMATION~~

Dr. H. P. Robertson
 Director of Research, WSEG
 Office of the Secretary of Defense
 The Pentagon, Room 2E996
 Washington 25, D. C.

Dear Bob:

Enclosed is a copy of Dr. Engstrom's study which he prepared at our request and which is a draft of his ideas concerning the proposed Office of Research for this Agency, the establishment of which was recommended in the SCAG Report.

If there is an opportunity before your departure next Monday, I would much appreciate discussing the paper with you and if we can not get together because of the urgency of other affairs, perhaps we could discuss it after hours at the Club, or, as a last resort, talk about it in suitable disguised language via telephone.

Please give me a call when you have read the report.

Sincerely,

WILLIAM F. FRIEDMAN
 Consultant

1 Enclosure
 Memo. from H.T. Engstrom
 to W.F. Friedman, dtd 16 June 52,
 classified SECRET.

W.F. Friedman/eby/25 June 52
 Consultant

Copies furnished:

AG (3)

OOT



MEMO FOR RECORD: This letter is self-explanatory. Dr. Engstrom suggested that the enclosed report be circulated to certain SCAG members for criticism and comments.

~~SECRET~~

WILLIAM F. FRIEDMAN
 CONSULTANT



OFFICE OF THE SECRETARY OF DEFENSE
WEAPONS SYSTEMS EVALUATION GROUP
WASHINGTON 25, D. C.

23 June 1952

Dear Howard: *HC*

Since you were officially designated as contact between SCAG and AFSA, I am returning herewith my pass No. 10406.

I hope that SCAG may have served some useful purpose. I personally regret that I did not have more time to break into the subject more thoroughly, but my duties here precluded it.

I am leaving here the first of the month for Caltech, but hope to have a chance to see you sometime during August at Cairns seminar at UCLA.

With very best regards, I am,

Sincerely yours,

Bob

H. P. ROBERTSON
Director of Research

1 Encl.

Dr. Howard H. Campaigne
3801 Nebraska Ave., N.W.
Washington 25, D. C.

~~SECRET~~ SECURITY INFORMATION

Office Memorandum • UNITED STATES GOVERNMENT

TO : Chief, Office of COMSEC

DATE: 18 July 1952

FROM : Planning Group, Mr. T. R. Chittenden

SUBJECT: Comments on Proposed Reorganization of the Research & Development Activity of AFSA

1. I ~~concur with Mr. Austin's comments that~~ this study does not take into consideration the COMSEC problem and for that reason must be considered as incomplete in its analysis of the problem of reorganizing the research and development activity of AFSA.

2. I propose that instead of taking an action which is designed to increase the actual research and development staff of AFSA that consideration be given to the following idea.

Instead of attempting to gather together a large and relatively expensive research staff within the government, let us focus our actions and thinking on the means for using the research facilities and the research brains which are available in the universities and the commercial institutions of this country.

3. There are two principal advantages to be gained from expanding our use of outside research facilities as opposed to expanding the staff and research facilities within AFSA.

- a. The first is that the use of research organizations outside the government would provide more opportunities to take advantage of scientific developments in other fields and to exchange ~~of~~ scientific information. This latter goes on freely among research people and scientists who are not hemmed in by security regulations. Security regulations are needed when specific scientific principles are applied to AFSA's specific problems but are not needed, in fact have a stultifying effect upon, pure research into basic scientific principles. In other words, I doubt that in pure research work there would be very much classified information either brought to light or revealed by the exchange of data with other scientists engaged in similar lines of research. Certainly this Agency has benefited from the research work that has been done outside the government, at least outside this Agency, in the field of digital computers. It is the application of the computer to a military problem and the results which are achieved which are classified, not the fact that a computer is able to function in such and such a manner. Therefore, I think that more information would become available to the Agency and that the efforts and products of more people engaged in related lines of research could be applied by the staff within AFSA to the specific problems which AFSA faces.

~~SECRET SECURITY INFORMATION~~

Office Memorandum • UNITED STATES GOVERNMENT

TO : Chief, Office of COMSEC DATE: 18 July 1952

FROM : Planning Group, Mr. T. R. Chittenden

SUBJECT: Comments on Proposed Reorganization of the Research & Development Activity of AFSA (Continued)

- b. The second is that we have seen through years of experience in the field of cryptology the difficulty which the government has in interesting sufficient numbers of qualified research people to enter this very restricted field and to stay with it for a sufficient length of time to be of value. The Agency does not pay enough money nor does it offer sufficient opportunity for recognition in a scientific field to lure high calibre research scientists to come into the Agency and bury themselves behind the walls of regulations which have been put up to maintain security. Actually, it is expecting too much of a man to expect that he would cut himself off voluntarily from the scientific field in which he is most interested and in which he has been trained. How many good research minds have been killed in this Agency and how many more have we scared off from ever assisting the government simply because of the unbelievably inept method of handling them as people and particularly as scientists? I believe it is a waste of talent which the nation no longer can afford.

4. With respect to the idea of an AFSA Senior Technical Director, I do not believe that AFSA is ready for a technical director of the sort described herein. AFSA is not properly organized to make use of the talents of such a man. Unless there is a fundamental change in the manner in which the Agency is supervised and a change in the source of direction, then there is no place for a Senior Technical Director. I do not believe that the present Technical Director of the Agency, or for that matter, any of the Technical Directors of the Offices have actually functioned as the two words imply, namely, directing the technical activity. It certainly did not work out during the time Dr. Sinkov was the Technical Director of AFSA-04. This Agency started off with a philosophy that the key positions in the Agency, particularly the ones involving policy making and decision making, should be military. Although we have been told that this philosophy is no longer being followed, there has not been a sharp change to the contrary. The Technical Director must have the power of decision. If he does not have then he is a technical adviser and not a director. If this is so, he should be called such, and should be responsible only for giving advice and not, as is implied in this paper, for directing the technical effort of the organization. Therefore, to bring about technical direction from the type of man which the paper outlines there must be an organizational change within AFSA of greater magnitude than is outlined in this paper. Until the Technical Director of the Agency is given the power of decision over the principal technical programs and a voice in formulating the basic administrative policy of the Agency, then he cannot be the man to charge with the responsibility for ensuring that the Agency has a continuing and adequate staff to meet the technical problems of AFSA. He could not actually supervise the operations of any of the technical offices until he has the power to decide, not merely advise.

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~~SECRET~~*Office Memorandum* • UNITED STATES GOVERNMENT

TO : Chief, Office of COMSEC

DATE: 18 July 1952

FROM : Planning Group, Mr. T. R. Chittenden

SUBJECT: Comments on Proposed Reorganization of the Research & Development Activity of AFSA (Continued)

5. I firmly believe that the principal AFSA approach as far as the problem of research is concerned should not be one in which AFSA attempts to do the research itself or attempts to build up a tremendous staff which would assure independent research, but to marshal and manage the research potential which is available in the nation for work of the type we are interested in. In other words, let us truly expand our research activity and not merely reshuffle essentially the same crew that we already have.



T. R. CHITTENDEN

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MEMO ROUTING SLIP

REF ID: A70072

NEVER USE FOR APPROVALS, DISAPPROVALS,
DIFFERENCES, OR SIMILAR ACTIONS

1 NAME OR TITLE	INITIALS	CIRCULATE
Copies went to: ✓ Harper, 02		
ORGANIZATION AND LOCATION	DATE	COORDINATION
✓ Kullback, 03		
✓ Col. Clark, COF		
2		
✓ Col. Johnson, 04	No comment	FILE 5 July 52
✓ Capt. Goodwin, COY		
Mr. Speakman, RDB		INFORMATION
Dr. Robertson, Calif. Inst. of Tech.		
3		NECESSARY ACTION
Returned 14 July ← Original - 00 - 11 July		
		NOTE AND RETURN
4		SEE ME
		SIGNATURE

REMARKS

Herewith comments by Dr. Potter on Dr. Engstrom's proposed plan for Office of Research.

FROM NAME OR TITLE	DATE
<i>W. F. Friedman</i>	11 July 52
ORGANIZATION AND LOCATION	TELEPHONE
	6093

WILLIAM F. FRIEDMAN
CONSULTANT

DD FORM 1 FEB 50 95

Replaces DA AGO Form 88, 1 Apr 43, and AFHQ Form 12, 10 Nov 47, which may be used.

16-48487-4 GPO ★

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~~SECRET~~~~SECURITY INFORMATION~~

July 7, 1952

DR. WILLIAM F. FRIEDMAN, Consultant
 Department of Defense
 Armed Forces Security Agency
 Washington 25, D.C.

Reference: 00435, 26 June 1952

Dear Dr. Friedman:

Since I do not plan to be in Washington soon my comments on the proposed reorganization are as below:

1. Dr. Engstrom has rounded this proposal up in excellent fashion and any other thoughts I have to offer are on the second-order side.
2. Some of the words concerning the function of the Office of Research (pages 5 and 6) stress "assistance" to other offices and research to support "current" needs. Interpreted improperly this could put the Office of Research in the position of a service group. To operate successfully their first responsibility must, of course, be the solution of tomorrow's problems rather than today's. Assistance on current problems should not be left out of the specification. But it is hoped the words used will be interpreted properly by future Senior Technical Directors and Directors of Research.
3. Under the Division of Mathematical Research a first responsibility might perhaps be similar to that of Mathematical Research here in Bell Laboratories. This is improvement of mathematical tools and extension of mathematical concepts as applied to the specialized fields of interest. While our Mathematical Research Department is not a service group it devotes a sizeable part of its effort to current problems in order to determine where mathematical research is needed.

This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U. S. C., Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

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Dr. William F. Friedman - 2

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4. I find no reference to a field research that is gaining wide attention in both industrial and service laboratories. It has various names such as "Human Engineering", "Equipment Use Studies", "User Preference", or simply "Psychological Research". And it is concerned with fitting the characteristics of machines to those of humans in order to realize the best overall results. There are many ways in which a good research team of this type could contribute substantially to your program. I would suggest that the group be headed by a competent experimental psychologist with a sufficient knowledge of electronic equipment, to discuss with others concerned the broader problems of design that arise in human-machine relationships. The group should preferably include a first class electronics engineer with psychological interests and ultimately, several technical assistants (possibly some girls) with formal training in experimental psychology. These technical assistants would be responsible for the necessary routine tests. A good example of such a group in the Service area is that under Dr. Arnold Small at N.E.L. in San Diego. An example of an industrial group is that under Dr. John Karlin in Bell Laboratories. On your proposed organization chart the logical place for such a group would seem to be under Operations Research.

Sincerely yours,

Ralph H. Potter
RALPH H. POTTER

~~SECRET~~~~SECURITY INFORMATION~~

File
Office
Received

Serial: 1504
 9 JUL 1952

Dr. Ralph K. Potter
 Bell Telephone Laboratories, Inc.
 Murray Hill Laboratory
 Murray Hill, New Jersey

Dear Dr. Potter:

This will be merely a brief note to acknowledge receipt of your letter of 7 July 1952 and to thank you for your cooperation.

I think the comments and suggestions your letter contains will be very useful. I was particularly impressed with the ideas set forth in paragraph 4 and assure you that my associates will give them most serious consideration since those ideas are applicable to machines used in all our specific fields of interest.

Sincerely,

/s/ WILLIAM F. FRIEDMAN
 Consultant

1 Enclosure
 Receipt for ltr dtd 7 July 52

Copies furnished:
 AG (3)
 OOT

W.F.Friedman/sby/9 July 52
 Consultant

MEMO FOR RECORD: Self-explanatory. Reference serial 00435, dtd 26 June 52.

WILLIAM F. FRIEDMAN
 CONSULTANT

Serial: 00435

26 JUN 1952

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~~SECURITY INFORMATION~~
~~SECRET~~ - ~~SECURITY INFORMATION~~

Dr. Ralph K. Potter
 Bell Telephone Laboratories
 463 West Street
 New York, New York

Dear Dr. Potter:

Enclosed is a copy of Dr. Engstrom's study which he prepared at our request and which is a draft of his ideas concerning the proposed Office of Research for this Agency, the establishment of which was recommended in the SCAG Report.

After you have had an opportunity to examine it, we would very much appreciate discussing it with you. However, if you do not contemplate a trip to Washington in the near future, we shall have to be content with your written comments and suggestions, if we are not imposing too much of a burden on you in requesting them in writing.

Copies of Dr. Engstrom's paper are also being sent to several other SCAG members for their comments.

Thanking you in advance for your cooperation,

Sincerely,

WILLIAM F. FRIEDMAN
 Consultant

1 Enclosure
 Memo. from H.T.Engstrom
 to W.F.Friedman, dtd 16 June 52,
 classified SECRET.

W.F.Friedman/eby/25 June 52
 Consultant

Copies furnished:
 AG (3)
 OOT

MEMO FOR RECORD: This letter is self-explanatory. Dr. Engstrom suggested that the enclosed report be circulated to certain SCAG members for criticism and comments. Dr. Engstrom thinks that Dr. Potter's comments would be extremely valuable in regard to the Division of Physical Research.

WILLIAM F. FRIEDMAN
 CONSULTANT

~~SECRET~~

Serial: 00446

1 JUL 1952

~~SECRET SECURITY INFORMATION~~~~SECRET - SECURITY INFORMATION~~

Mr. Edwin A. Speakman
 Vice Chairman
 Research and Development Board
 The Pentagon, Room 3E1020
 Washington 25, D. C.

Dear Ed:

Enclosed is a copy of Dr. Engstrom's study which he prepared at our request and which is a draft of his ideas concerning the proposed Office of Research for this Agency, the establishment of which was recommended in the SCAG Report.

I would like to discuss this paper with you and Dean Post some time soon. Please look it over and, when you are ready to discuss it, give me a call so that we may set the time and place for our meeting.

Sincerely,

WILLIAM F. FRIEDMAN
 Consultant

1 Enclosure

Memo. from H.T.Engstrom
 to W.F.Friedman, dtd 16 June 52,
 Classified SECRET.

W.F.Friedman/eby/27 June 52
 Consultant

Copies furnished:
 AG (3)
 OOT

MEMO FOR RECORD: This letter is self-explanatory.
 Dr. Engstrom suggested that the enclosed report
 be circulated to certain SCAG members for criticism
 and comments.

WILLIAM F. FRIEDMAN
 CONSULTANT

Declassified by NSA/CSS

Deputy Associate Director for Policy and Records

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On 20130729 by JF

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To: Consultant

JUL 15 1952

From: Comptroller

SUBJECT: Comment on Capt. H. T. Engstrom's Proposed Office of Research

1. It is believed the following points should be considered in the establishment of an Office of Research:

- a. Is this function a major responsibility of AFSA?
- b. Is the proposed organization the most economical of AFSA personnel talents?
- c. Does it create a substantial amount of additional overhead?
- d. Is it of sufficient size to warrant setting it up as a major organizational element?
- e. Does the creation of Senior Technical Director broaden to too great an extent the span of control of the Director, AFSA?
- f. Have the functions been clearly enough delineated so that all research activities can easily be eliminated from the job requirements of personnel in the Office of Research and Development and in the Office of Operations?

2. It would appear to me that the primary reason for a more determined effort by AFSA on basic research as recommended by SCAG stems from the present status of AFSA's operational abilities with respect to present or anticipated foreign cryptographic systems. In other words, in AFSA's present state of growth and technology, it is felt that all known approaches to existing or anticipated problems are inadequate. Hence, Capt. Engstrom points out the primary reason for the separation of research from development and operations is to provide for the consideration of our problem from a long-term point of view. Stated another way, he feels that we should have a group to concern themselves with the application of scientific methods of a most advanced nature to the development of new or better cryptanalytic techniques, which could then be applied to more specific problems. In AFSA's present state of cryptanalytic technology, it appears a wise course of action to establish research as a separate basic sub-division of our organization. If it is true that new techniques must be developed for our continued existence or activities, I certainly agree that the research function is clearly a major responsibility. Its separation from development eventually should be beneficial since this division of labor stresses the specialization of research and emphasizes the researchers as a homogenous separate field of activity.

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~~TOP SECRET SECURITY INFORMATION~~

JUL 15 1952

SUBJECT: Comment on Capt. H. T. Engstrom's Proposed Office of Research

To: Consultant

From: Comptroller

3. In my discussion with AFSA's Executive Group for SCAG the members indicated that initially perhaps 20 to 25 people in AFSA would be qualified and available for assignment to research work. Recruitment would be necessary to fill other existing vacancies established with an ultimate goal in their opinion of about a hundred, more or less. Their estimate is confirmed by Capt. Engstrom. His proposed organization recommends the establishment of four divisions and ten branches with consultants in each division. Taking the estimated available talent within AFSA and spreading it over such a large organization which includes 14 major segments, plus consultants, is indeed spreading our most talented personnel very thin.

4. The report recommends that the Senior Technical Director have an administrative staff of five people, the Director of Research an administrative staff of five people, and three Division Chiefs an administrative staff of four people, plus a services group of ten people for the Office of Research. This totals 32 people or 19 per cent of the total reorganization definitely to be classified as additional overhead. I feel that we cannot at the present afford such a substantial amount of additional overhead, particularly when we are so limited in our manpower. Consideration of the ultimate size of the proposed function in relationship with other organizational functions should rule out its establishment as an Office. Its creation as an Office initially as discussed above establishes immediate requirement for a substantial amount of overhead.

5. Gen. Canine now has Col. Marcy, the Chief of Staff, Adm. Wenger, Col. Hetherington, Mr. Friedman, Capt. Harper, Mr. Kullback, and Col. Sears reporting directly to him. He attempts to use the Chief of Staff as his executive vice president. In addition to these individuals mentioned, there are a great many other members of the AFSA staff, such as Chiefs of Staff Divisions, who have access to Gen. Canine on special problems. The proposed organization creates two additional people who would report directly to Gen. Canine -- the new Senior Technical Director plus the Director of Research. The problems of coordination now existing in AFSA are acute, and the creation of two more men reporting directly to the Director will multiply geometrically the present problems of coordination. Under the circumstances and with due consideration of the methods of personal control exercised by Gen. Canine, it is felt that the span of control recommended is too great.

6. It is my opinion that the delineation of lines of responsibility between operations, development, and research need a great deal more refinement. In addition, the functions of the Division of Operations Research do not appear to fit into the basic mission of the proposed organization.

~~TOP SECRET SECURITY INFORMATION~~

JUL 15 1952

SUBJECT: Comment on Capt. H. T. Engstrom's Proposed Office of Research

To: Consultant

From: Comptroller

7. In summary, it is felt that some division of the basic responsibilities of the Director, AFSA, which will recognize research as a major responsibility is necessary at this time. The proposed recommendations for doing this organizationally is not acceptable for the reasons that it is not economical of available talents; it creates a substantial amount of overhead; it is not of sufficient size to warrant setting it up as a major organizational element; and it broadens to too great an extent the Director's span of control when his methods of assignment of responsibility to deputies is considered, thus making more complicated an already difficult coordinating problem.

8. If it is desired, we can make a more detailed analysis. I realize Capt. Engstrom's approach in setting up the Office of Research did not contemplate implementing of the whole organization at one time, but I do feel that the steps selected are substantially too great. It is believed a more conservative approach initially might prove more acceptable.

9. I propose that the Director appoint a research consultant as a specialized assistant with technical responsibility for coordination and planning of all research conducted in AFSA wherein scientific methods are used for the development of new or better cryptologic techniques; that the Mathematical Division and the Engineering Research Branch of the Office of Research and Development be left where they are in close proximity to the Technical Library and with the administrative and logistic support presently provided; and that over the period of the next year or two and prior to the move to the new site the special consultant for research work out in coordination with the staff more detailed plans for further recognizing research as a major function.

G. A. CLARK, Jr.
Colonel, USAF
Comptroller

16 June 1952

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MEMORANDUM

From: H. T. Engstrom

To: W. F. Friedman

I am attaching hereto three copies of a study prepared at your request during the last fortnight concerning the proposed Office of Research for the Armed Forces Security Agency. Because of the limited time available the paper does not constitute in any sense "a complete description of methods of operation and relation with other AFSA units". However, I hope it will be of some value to AFSA as a working paper.

I should like to suggest that the paper be circulated for criticism. The comments of Dr. Potter would be extremely valuable in connection with the Division of Physical Research. Dr. Kullback and Dr. Campaigne certainly will have suggestions with respect to the Mathematical Research and Dr. Eachus and others with respect to the Computer Research. It is probable that your management consultant will be able to produce a table of organization with functions and responsibilities much more precisely delineated. I am sure that Dr. Robertson and Mr. Speakman could be of great assistance.

If there is any way I can be of further assistance, I shall be most happy to have you call me whenever I am in town and other pressures not intolerable.

HTE:nh



H. T. Engstrom

~~This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.~~

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~~SECURITY INFORMATION~~RESEARCH ORGANIZATION OF THE ARMED FORCES SECURITY AGENCY

The following report has been prepared at the request of the Director of the Armed Forces Security Agency (AFSA) to assist in a revision of the AFSA organization in order the greater emphasis may be placed on problems of a scientific and research nature. Increased emphasis on research was recommended by the Special Communications Advisory Group (SCAG). The final report of this group dated 12 March 1952 stated:

"It is SCAG's firm opinion that a strong basis research program is of great importance in supporting developmental and operational work of AFSA and that a separate basic research organization should be set up. Research should be kept separate from development and operations with personnel and facility assignments which cannot be infringed upon by development and operational requirements."

This opinion was supported by the AFSA Executive Group for SCAG on 16 April 1952 as follows:

"The AFSA Executive Group unanimously supports the SCAG recommendation in regard to the separation of research from development, including the transfer of the "applied research" now conducted in the Office of Operations to the Office of Research."

At the first meeting of a committee formed to revise the AFSA research organization on 6 May 1952:

"The Committee decided that the most feasible course of action would be to assign to one person the responsibility of preparing a recommended organization and functions along with a complete description of methods of operation and relations with other AFSA units."

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This report does not constitute a complete description of methods of operation and relations with other AFSA units, but rather attempts to set up the basic elements of the organization and define relationships with other AFSA units at the most critical points. Thus the report should be regarded as a working paper or perhaps a skeleton to which detailed structure may be added.

In the preparation of the report, opinions expressed by SCAG members have been incorporated insofar as practicable.

OBJECTIVE:

In setting up the proposed Office of Research as well as the position of Technical Director, the objectives of the reorganization must be considered. AFSA is faced with technical problems of great complexity which require the application of scientific methods of a most advanced nature. Furthermore, these problems are in many respects peculiar to AFSA so that the Director of AFSA cannot rely completely upon other agencies, Government or private, for their solution. Although AFSA is presently carrying out a minimum amount of research in connection with its research and development program, the reorganization has been proposed to attain the following objectives:

1. To ensure that AFSA has a strong research staff which is capable of bringing to bear the most advanced scientific principles to AFSA problems.
2. To develop and implement long-range plans for the technical advancement of AFSA.
3. To maintain an atmosphere which will ensure a continuing supply of highly qualified scientific personnel.

The primary reason for the separation of research from development is to provide the research personnel freedom from operational pressures and hence with the opportunity for considering problems from a long term point of view. It further has the advantage of permitting the Office of Development to pursue projects from a strictly engineering point of view once the functional

~~SECURITY INFORMATION~~

characteristics have been established.

Although in certain cases there may be questions as to whether certain projects should be placed under research or development the general distinction should be clear. The Office of Development deals with engineering and design problems leading to specific equipment while the Office of Research deals with general problems leading towards increased knowledge or basic design principles. For certain problems within AFSA it may be advisable to carry on parallel work in the Office of Operations and the Office of Research, the former concentrating on the solution of the specific problem with the latter concentrating on general techniques applicable to the specific problems and others of the same general category.

This paper contains a general description of the responsibilities of the AFSA Senior Technical Director and the functions of the proposed Office of Research. In considering the branches of the Office of Research, opinions expressed by SCAG members have been incorporated. With regard to the Operations Research Branch, little detail has been given. This field is a highly specialized one and some one with direct experience in the field such as Dr. Robertson of WSEG should be consulted. No discussion has been included concerning the Office of Development since this office would continue as present with the transfer of its research activities. The organization of this office as recently proposed seems in line with the establishment of the new Office of Research.

Attached to the report are suggested organization charts, an estimate of personnel requirements. These personnel requirements are not completely over and above present complements, since some of the activities are being carried out by present personnel. Further study would be required to determine the actual increase in the AFSA complement implied by the establishment of the new office.

Included also in the report are suggestions for implementation.

AFSA SENIOR TECHNICAL DIRECTOR

The Senior Technical Director has the following responsibilities:

1. Planning the AFSA research program and implementing approved plans.
2. Planning the AFSA development program and implementing approved plans.
3. Carrying out special studies and projects for the other offices of AFSA insofar as he deems it practicable.
4. Ensuring a continuing competent scientific staff to carry out the research and development needs of AFSA.
5. Supervising the operations of the Office of Research and the Office of Development.

The Senior Technical Director will be supported by the Director of Research and the Director of Development. He should work closely with the technical directors of AFSA-02 and AFSA-04 in planning and in implementing the research and development program. The Senior Technical Director will strive to keep the Office of Research primarily engaged in its long-range program but will also have the responsibility of ensuring that the research program is of maximum assistance to the other offices of AFSA. He will have the authority of final decision in matters concerning special projects to be undertaken by the Office of Research at the request of AFSA. The qualifications which the Senior Technical Director should possess are as follows:

1. He should have advanced scientific training, PhD or equivalent.
2. He should have at least 15 years experience in planning and implementing research and development programs.
3. He should have an understanding of the problems of development engineering.

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4. He should have general management experience.
5. He should have experience with military problems either through direct military service or work with the Department of Defense.
6. He should have contacts with university and industrial research as well as general engineering developments.
7. He should be familiar with general technical advances throughout the country.

The position of Senior Technical Director should be rated as GS-17 or higher. It is recommended that the position of Senior Technical Director be filled only after careful review of the qualifications of prospective candidates. The position is one of great importance and should not be filled immediately unless a person of exceptional qualifications presents himself.

After appointment of the Senior Technical Director, it is probable that the service functions of both the Office of Research and the Office of Development should be combined under his direct cognizance insofar as practicable in order that the directors of these offices be able to concentrate on scientific and engineering matters.

OFFICE OF RESEARCH

The Office of Research is established in order that AFSA may be in a position to apply the most advanced scientific techniques to the solution of its current and future problems. The Office of Research is segregated organizationally from the Office of Development and the Office of Operations in order that its scientific staff be able to carry out a program of long range significance uninterrupted by the operational pressures of the Office of Operations or the urgent requirements for the development of specific equipment in the Office of Development. However, the Office of Research will be expected to assist the other offices of AFSA on specific problems whenever the Senior Technical Director or the Director of

~~SECURITY INFORMATION~~

Research judge that such assistance can be provided without detriment to the long range program.

The Director of Research will have the following responsibilities:

1. Preparation of plans for a continuing long range research program to meet current and future needs of AFSA.
2. Implementing approved plans.
3. Provide assistance for other offices of AFSA as determined practicable by the Senior Technical Director.
4. Takes measures to ensure a continuing expert staff.
5. Administers the affairs of the Office of Research.

The Director of Research should have the following qualifications:

1. He should have advanced scientific training, PhD or equivalent.
2. He should have 10 years experience in planning and implementing general research programs.
3. He should have familiarity with scientific research at university, government and industrial laboratories.
4. He should have experience in government research, particularly in connection with the Department of Defense.

Because of his broad responsibilities and the wide scope of activities under his direction the Director of Research should be rated as GS-16.

The Office of Research includes an Administrative Group sufficient for administering the affairs of the Office.

Assistance in connection with monitoring research contracts will be required. However, it is considered that general administration will be provided by the staff of the Senior Technical Director when available in order that the major attention of the Director of Research may be focused on technical matters. A staff of 5 people should suffice for his administrative needs.

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A technical library is a most important tool for the research worker. It is probable that the technical library should be transferred from the Office of Development to the Office of Research when practicable.

A services group must be maintained for such laboratory facilities as the Office of Research may require. It is estimated that 10 people will be required for this purpose.

The Office of Research will include four divisions:

1. Division of Mathematical Research
2. Division of Physical Research
3. Division of Computer Research
4. Division of Operations Research

DIVISION OF MATHEMATICAL RESEARCH

The increasing complexity of the problems facing AFSA has made it necessary to attack some of them by mathematical and statistical methods of a high degree of sophistication. The division of mathematical research will maintain a staff of skilled mathematicians to meet the needs of AFSA in this field. Although it may be necessary for other offices of AFSA to retain some mathematicians for their day to day problems it is expected that questions which are essentially mathematical or statistical will be referred to this division.

The head of the division will set up a long range program of research on those aspects of mathematics and statistics which will provide AFSA with its required support in the field.

The qualifications of the head of the division are as follows:

1. He should have advanced training in mathematics and statistics, PhD or equivalent.
2. He should have experience in directing research programs in mathematics.
3. He should have an extensive acquaintance with cryptanalytic and cryptographic processes.

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4. He should be familiar with the general principles of operation of electronic computers, particularly with regard to programming.
5. He should be familiar with current advances in the mathematical and statistical fields.

The division will maintain branches as follows:

MATHEMATICS BRANCH

The Mathematics Branch will carry out a continuing program in the special branches of mathematics which are of importance to AFSA. The head of the branch will maintain contact with the general field by keeping familiar with current research at other establishments. Statistical studies of language as well as code and cipher phenomena will be pursued. The branch will continue to investigate such general fields as matrix approximation theory, cyclic structure of sequences, logical implication with particular reference to AFSA problems. It is estimated that this branch will ultimately require 20 people.

CRYPTANALYTIC BRANCH

The Cryptanalytic Branch will carry out a continuing program of investigation in cryptanalytic methods. The head of the branch will maintain familiarity with current and past methods in order that the work of the branch be most effectively directed towards probable future AFSA problems. A continuing program of studies will be maintained on such general problems as wiring recovery in cipher machines, exploitation methods for machine ciphers, additive recovery. The work should include investigation of methods of call sign analysis. It is estimated that this branch will ultimately require 10 people.

CRYPTOLOGIC BRANCH

The Cryptologic Branch will carry out a continuing program in privacy methods including ciphony and cifax. The head of the branch will maintain familiarity

SECURITY INFORMATION

with current and past privacy methods in order that the work of the branch be most effectively directed towards the future cryptologic problems of AFSA. A continuing program of studies will be maintained in such general fields as methods of key generation, speech privacy systems, additive generation. The work should include studies of call sign systems as well as methods of identification and arithematisation. Personnel requirements for this branch are estimated at 10 people.

SPECIAL TASK BRANCH

The Special Task Branch is established primarily in order to carry out special programs for other offices of AFSA although certain special tasks may well originate within the Office of Research. Such special tasks must have the approval of the Senior Technical Director and the Director of Research. A typical task might be the assignment of some aspects of special cryptanalytical problems from the Office of Operations for examination from a research point of view. The special task branch will operate in many cases on a task force basis with assistance from personnel in other branches of the Office of Research as well as other divisions of AFSA. It is estimated that the Special Task Branch will require a staff of 6 people.

DIVISION OF PHYSICAL RESEARCH

AFSA has a variety of requirements which require research in fields such as computers to operate at very high frequencies; analysis of radio wave forms; propagation phenomena antenna design; special recording techniques. Some of these problems require advances in fundamental physics. Although a great deal of research is now in progress in this area in connection with general communications, some of AFSA's requirements are of such a special nature that AFSA sponsorship of work in the field is necessary. It is expected that the head of the Division of Physical Research will set up a long range program of research in the

~~SECURITY INFORMATION~~

physical sciences which will supplement existing programs and provide AFSA with its needed support in the field.

The qualifications of the head of the division are as follows:

1. He should have advanced training in physics or electronics, PhD or equivalent.
2. He should have experience in planning and directing research programs.
3. He should be familiar with current scientific advances in the physical sciences with particular references to electronics and communications.

It is expected that the head of the division will have the services of consultants who are experts in the required fields.

The division will maintain branches as follows:

COMPONENT RESEARCH BRANCH

The Component Research Branch will carry out a program of investigation of new components which have promise of being of future importance to AFSA. Research may be performed within the Branch or by outside contract. Examples are investigation of NHF computer components such as presently contemplated with the Corona group; investigation of static memory devices in connection with computer circuits. It is expected that the Branch will assist the Office of Development in the specification of component techniques for future equipment. This branch is estimated to require about 15 people.

ELECTRICAL RESEARCH BRANCH

This branch will be responsible for planning and implementing a program of research in support of the radio, communications and intercept aspect of AFSS's problems. It will maintain contact with outside researches in the field supporting them when necessary by projects within the branch or by outside contract. Examples of projects which would be carried out by this branch are analyses of optimum

antenna design, methods of identification of radio waves, special recording techniques, propagation studies as required in connection with intercept activities. This branch is estimated to require 20 people.

SYSTEMS BRANCH

The Systems Branch will conduct continuing studies of problems concerning the physical techniques utilized in the collection, dissemination and analysis of RI material. It shall plan and implement a research program directed at systems which cannot efficiently resolve the manifold problems involved in world-wide communications networks. It will also consider problems related to location and integration of intercept activities. This branch is estimated to require 10 people.

DIVISION OF COMPUTER RESEARCH

Much of AFSA's analytical work involves application of special electronic computing devices. The needs of AFSA in this field require application of most advanced techniques. The Division of Computer Research will set up a continuing program of analysis of computing techniques. It is expected that the head of the Division will be familiar with existing computation equipments and their capabilities. He will be consulted in connection with the functional design of all special computational equipment required by the other offices of AFSA. He will work closely with the head of the Mathematical Research Division. It is recommended that the Division of Computer Research operate a general purpose computer devoted exclusively to research purposes in the operation of which the Director of Research determines priorities.

The Head of the Division of Computer Research should have the following qualifications:

1. He should have advanced scientific training, PhD or equivalent.
2. He should have 5 years experience in connection with the programming and operation of digital computing equipment.

3. He should be generally familiar with the techniques of cryptanalytical and cryptographic processes.
4. He should be experienced in planning and implementing computer research programs.

The Division will maintain branches as follows:

LOGICAL DESIGN BRANCH

The Logical Design Branch will carry out continuing studies of the basic analytical methods utilized in the computing problems of AFSA both in general purpose and special purpose equipment. It will carry out programming studies to determine optimum methods of carrying out computational problems on existing equipment and will make recommendations in connection with the functional and logical design of proposed equipment. It will carry out special studies for other offices of AFSA in this general field when approved by the Senior Technical Director or the Director of Research. It will assist the Mathematical Research Division in programming and computing matters. It is estimated that approximately 10 people will be required in this branch.

RESEARCH COMPUTER OPERATIONS BRANCH

It is considered most important that the Office of Research have an operating general purpose computer under its control. The Computer Operations Branch will operate this computer. It will plan and implement out a program of continuing studies in all matters of a research nature in connection with computer operations including studies of checking techniques, life studies, optimum methods of maintenance. It will carry out special studies for other offices of AFSA when approved by the Senior Technical Director or the Director of Research. It is estimated that 15 people will be required by this branch.

AUXILIARY EQUIPMENT RESEARCH BRANCH

Many problems of AFSA involve complete data handling systems. In this connection studies are required to determine functional characteristics of peripheral and translation ^{equipment} which will alter data forms in such a manner as to be suitable for special machine processing. This peripheral equipment has not been given adequate attention in the past. These problems are becoming increasingly acute with the introduction of new computing equipment utilizing various forms of input and output. It is therefore felt that the subject warrants a special branch in the Division of Computer Research. The head of the branch will set up a long range program pointed toward eventual standardization. It is estimated that 6 people will be required.

DIVISION OF OPERATIONS RESEARCH

The scientific method called operations research developed as a recognized activity in response to the military needs of World War II where it was known variously as operations analysis or evaluation and weapons system evaluation. "Operations research is a scientific method of providing executive departments with a Quantitative basis for decisions regarding the operations under their control."¹ The method proved successful in many cases. Admiral King states "Operations research bringing scientists in to analyze the technical impact of the fluctuations between measure and countermeasure made it possible to speed up our reaction rate in several critical cases."²

AFSA has a variety of problems which may be susceptible to this scientific method. Examples are:

1. Evaluation of communications intelligence as against jamming and countermeasures.

¹Methods of Operation Research by Philip M. Morse, George E. Kimball, Technology Press and John Wiley & Sons, Inc., New York.

²Admiral E. J. King, Final Report, 8 December 1945.

~~SECURITY INFORMATION~~

2. Evaluation of central processing vs. field processing.
3. Intercept target evaluation.

Operations research is in general carried out on a task force basis. It is recommended that a man with experience in this field be appointed to head the division and that he rely on personnel from other branches of the Office of Research to assist him in carrying out specific missions. The ultimate personnel requirements for this division is estimated as approximately 5 people.

The requirements for the head of the division are as follows:

1. He should have advanced scientific training, PhD degree or equivalent.
2. He should have experience in the field of operations analysis.
3. Military experience is required either direct or association with the Department of Defense.
4. He should have had experience on a supervisory level on scientific projects.

IMPLEMENTATION OF THE RESEARCH PROGRAM

The establishment of a strong Office of Research within AFSA will take a number of years. However, certain steps toward this end can be taken now.

The following measures are indicated:

1. Establishment of an Office of Research and appointment of an acting Director of Research. The acting Director of Research will prepare with the assistance of management consultants a Table of Organization for the Division along lines suggested in this report.
2. Transfer to the Office of Research the present Mathematical Research Division (34) of the Office of Research and Development.

3. Change the designation of the present Office of Research and Development to that of Office of Development with an organization essentially that proposed by Dr. Kullback in April 1952.
4. Upon selection of a head of the Division of Physical Research transfer the Engineering Research Branch (354) from the Office of Development to the Office Research.
5. Attempt to establish positions of supergrades and initiate search for a suitable Senior Technical Director.
6. The Director of Development and the acting Director of Research should examine present projects to determine which are essentially of a research character.
7. Unclassified material should be prepared describing the nature of the scientific program which can be used to interest prospective candidates for position in the Office of Research.

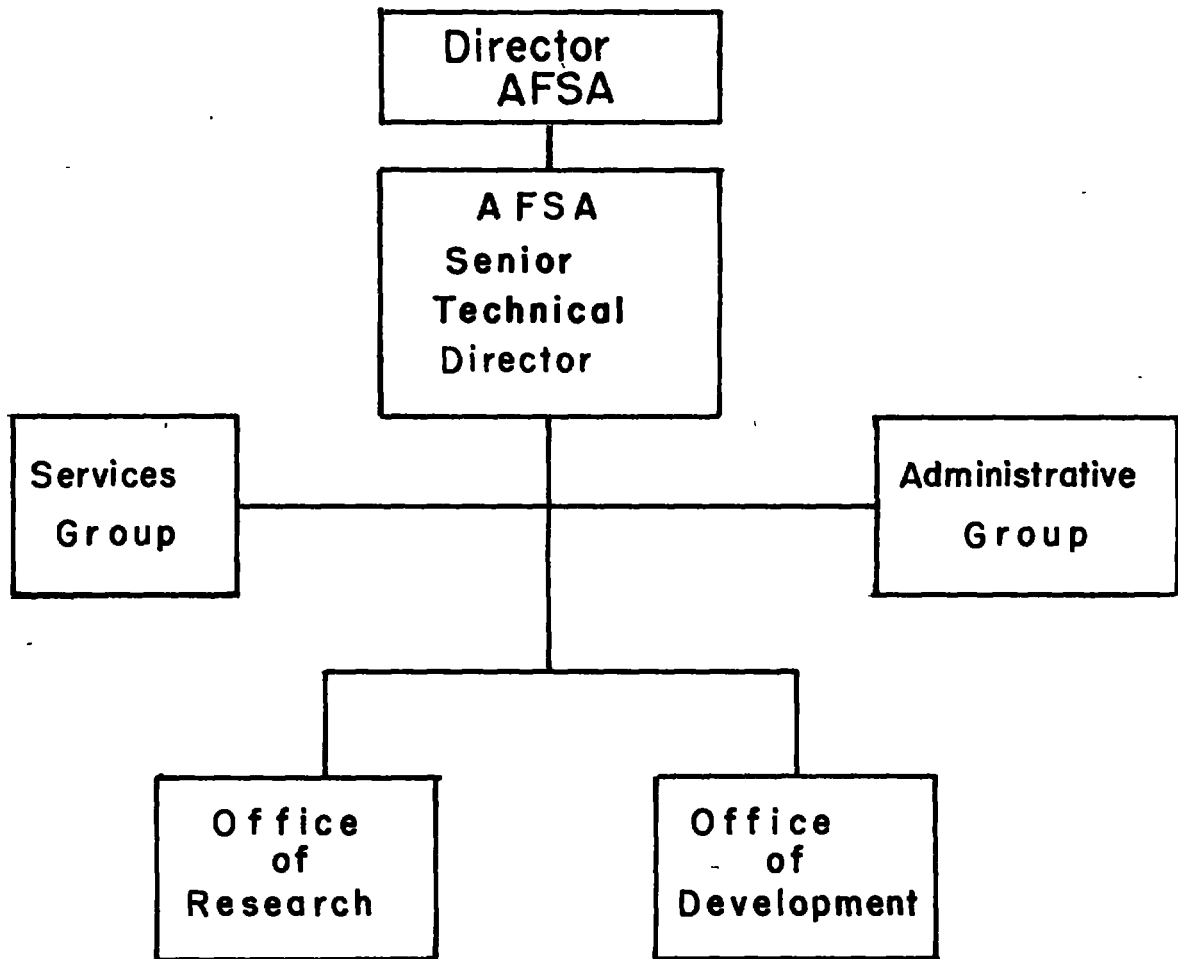
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Senior Technical Director	1
Staff	5
Office of Research	
Director of Research & Staff	6
Services Group	10
Division of Mathematical Research Staff	5
Mathematics Branch	20
Cryptanalytic Branch	10
Cryptologic Branch	10
Special Task Branch	6
Division of Physical Research Staff	5
Component Research Branch	15
Electrical Research Branch	20
Systems Branch	10
Division of Computer Research Staff	5
Logical Design Branch	10
Computer Operations Research	15
Auxiliary Equipment Branch	6
Division of Operations Research Staff	5
	<hr/>
TOTAL PERSONNEL	161

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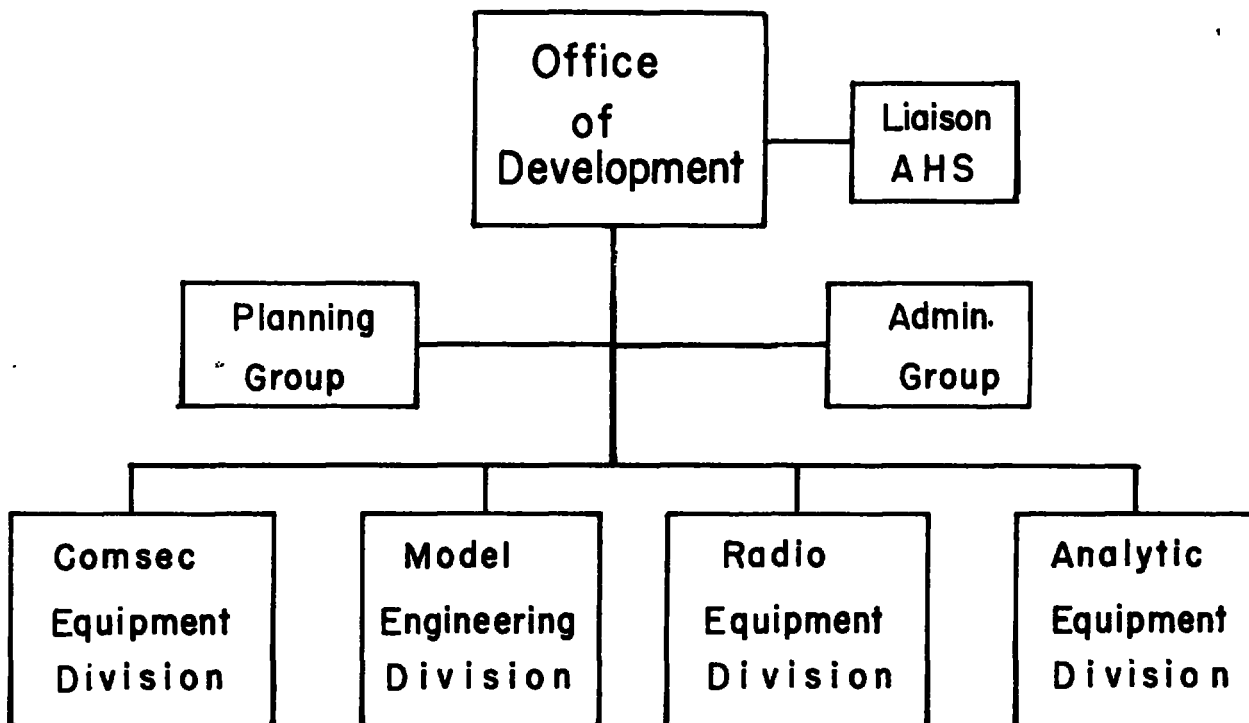
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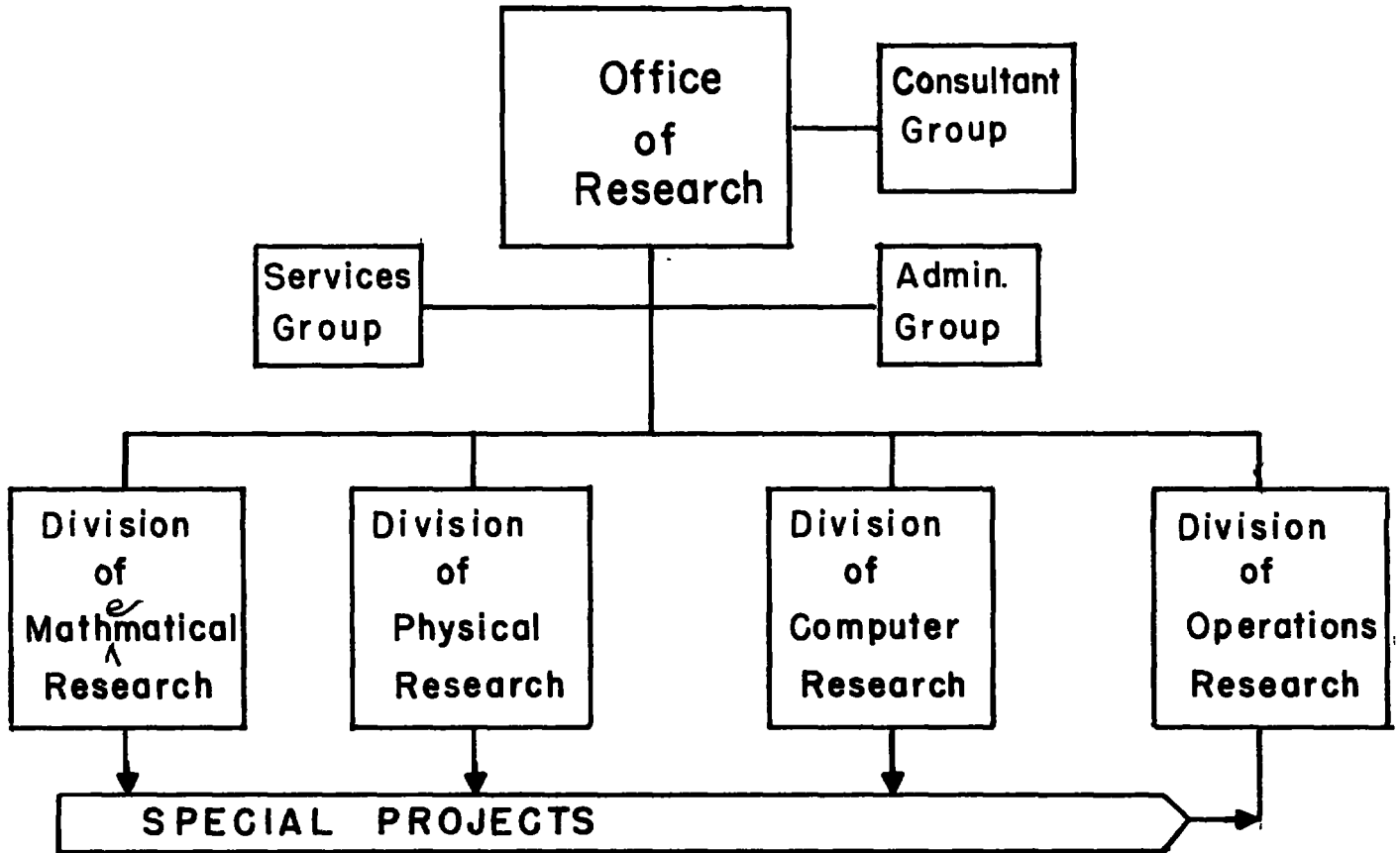
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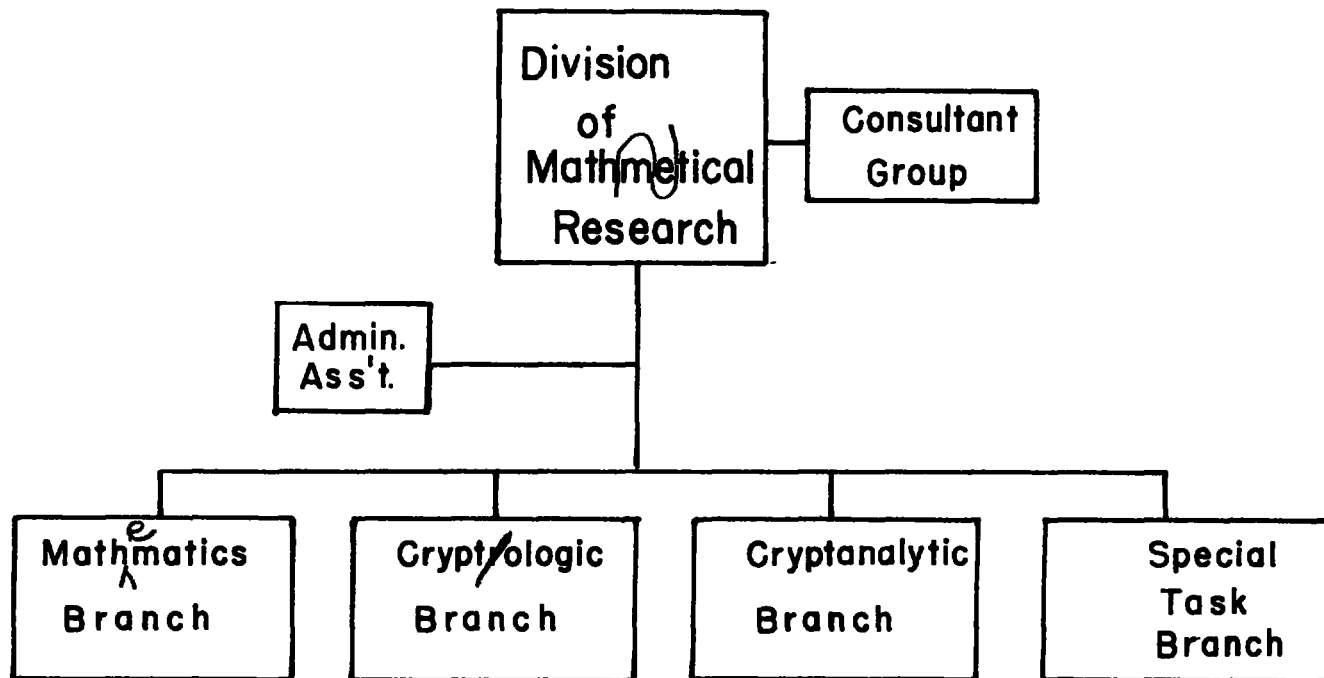
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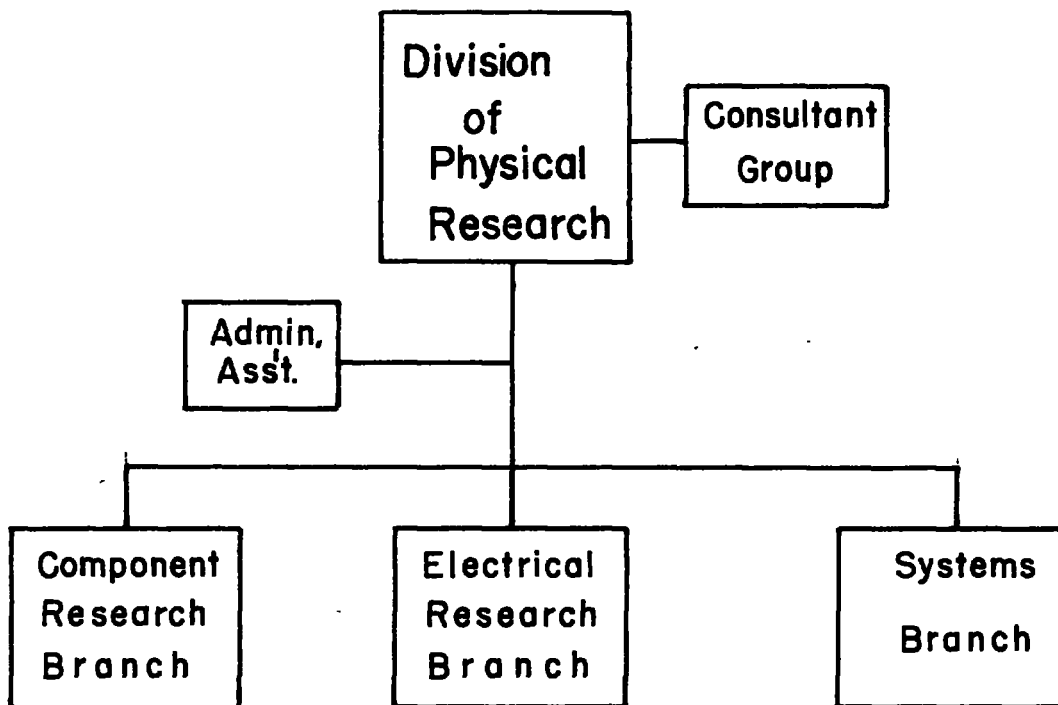
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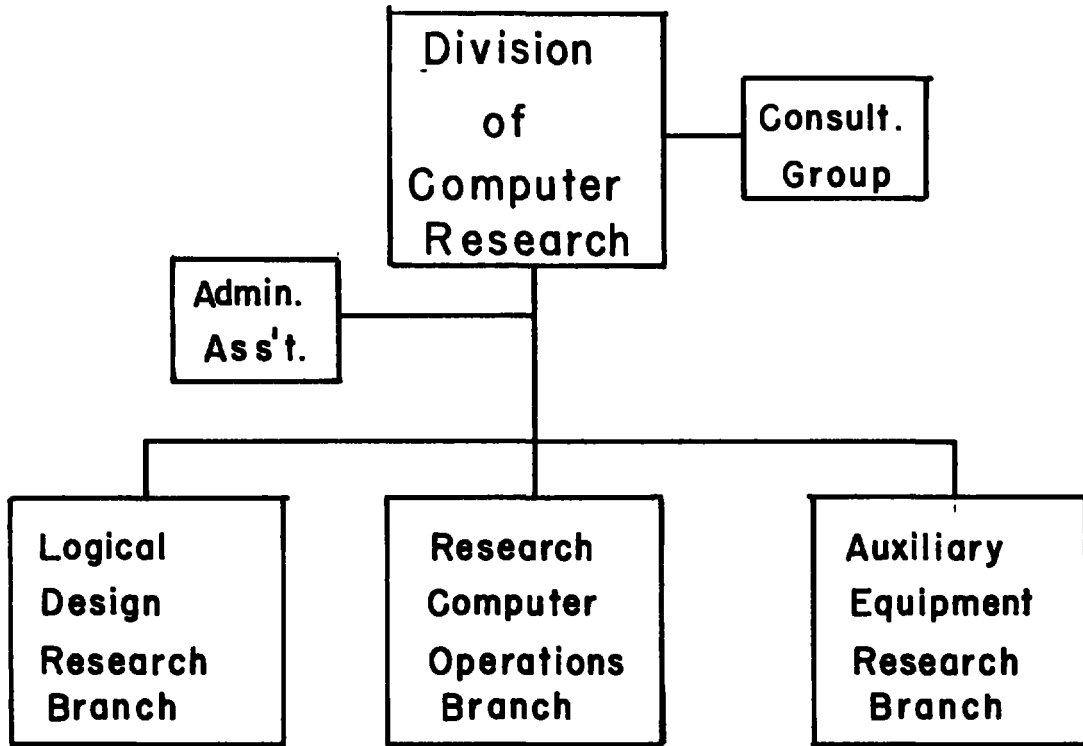
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OFFICE OF RESEARCH AND DEVELOPMENT

TASK LIST (CROSS-INDEX)

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30 September 1954
30213

COPY #43

MANAGEMENT, FACILITIES, AND MAINTENANCE

30 September 1954

<u>TASK NUMBER</u>		<u>TASK NUMBER</u>	
300-0100	NSA-30 Management	300-0110	NSA-30 Facilities & Maintenance
310-0101	NSA-31 Management	310-0111	NSA-31 Facilities & Maintenance
320-0102	NSA-32 Management	320-0112	NSA-32 Facilities & Maintenance
330-0103	NSA-33 Management	330-0113	NSA-33 Facilities & Maintenance
340-0104	NSA-34 Management	340-0114	NSA-34 Facilities & Maintenance
350-0105	NSA-35 Management	350-0115	NSA-35 Facilities & Maintenance
360-0106	NSA-36 Management	360-0116	NSA-36 Facilities & Maintenance
370-0107	NSA-37 Management	370-0117	NSA-37 Facilities & Maintenance

TASK NUMBER

320-0500	Model Shop
320-0501	Engineering and Services for Staff
320-0502	Engineering and Services for PROD
320-0503	Engineering and Services for COMSEC
320-0504	Engineering and Services for ASA and AHS
300-0600	ENVELOPE - Engineering and Shop Services
300-3514	DINGBAT - Printing Telegraph Signal Normalizer (Project SIGMA)

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COMMUNICATIONS SECURITY EQUIPMENT DIVISION

NSA-31

SIGMA

IO-12

TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAM RADAC NO.
312-1100		BUTTRESS	Research on Speech Analysis and Synthesis (Project RHO)	1-B	U	DA49-170-sc-1349	
<u>LITERAL CIPHER MACHINES</u>							
311-3000	AFSAM 7, AFSAM D7A		Low Echelon Literal Cipher Machine	1-B(U)	S	DA49-170-sc-1284 DA49-170-sc-1337	T/SE 2/2a
313-3001	AFSAM D17		Portable Mechanical Cipher Machine	1-B(U)	C	DA49-170-sc-1252	T/SE 35
311-3002	AFSAM 47 AFSAM 47B		Shipboard Literal Cipher Machine	1-B(U)	C	NObsr-64125 (3C)	
311) 313)-3003	AFSAM D498		Manual Authentication Device	1-B(D)	C		T/SE 29/1
311-3004	AFSAZ D7304		Off-Line Automatic Ancillary Equipment	1-C(N)	C		T/SE 33
<u>TELETYPE SECURITY EQUIPMENTS</u>							
311-3100	AFSAM 9		Portable Teletype Security Equipment	1-B(U)	S	DA49-170-sc-1244	T/SE 6
311-3101	AFSAM D22		Teletype Multiplex (AN/FGC-5) Enciphering Equipment	1-B(U)	S	DA49-170-sc-1105	T/SE 25
311-3102	AFSAM D30		High Echelon Teletype Security Equipment	1-B	S	DA49-170-sc-1351	
311-3103	AFSAM D44		Off-Line One-Time Tape Teletype Security Equip- ment	1-B(N)	C		T/SE 27/1

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFICATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
311-3104	AFSAM D45		On-Line One-Time Tape Teletype Security Equipment	1-B(U)	C		T/SE 12
311-3105	AFSAZ D7303		High Grade Synchroniser for Teletype Security Equipment	1-B	C		
311-3106	AFSAZ D7305		Message Synchronizer for Teletype Security Equipment	1-B(N)	U	DA49-170-sc-1110	T/SE 34
311-3107	AFSAZ D7315 A		Single Channel Fully Synchronous Teletype Equipment	1-B(U)	C	DA49-170-sc-1084 (4) DA49-170-sc-1137	T/SE 3
311-3108	AFSAM D33		Teletypewriter Cryptographic Attachment, MK-2			NObgr-64125	
311-3109	AFSAZ D7319		Electronic Teletype Mixer			DA49-170-sc-1343	
311-3110	AFSAZ D7323		Teletype Speed Converter		U		
<u>SPEECH SECURITY EQUIPMENTS</u>							
312-3200	AFSAY D801		Special Purpose Ciphony Equipment	1-B	C	DA49-170-sc-1120	
312-3201	AFSAY D804		Low Echelon Ground Ciphony Equipment	1-B(U)	S	DA49-170-sc-1009 DA49-170-sc-1335	T/SE 7
312-3203	AFSAY D806		High Echelon Ciphony Equipment	1-B(U)	S	DA49-170-sc-1102	T/SE 9
312-3204	AFSAY D807		Key Generator for AN/TRC-25	1-B(N)	S		T/SE 15/3
312-3205	AFSAY D808		Low Echelon Airborne Ciphony Equipment	1-B(U)	S	DA49-170-sc-1155 DA49-170-sc-658	T/SE 10

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
312-3206	AFSAY D809		High Echelon Unattended Ciphony Equipment	1-B(N)	S	DA49-170-sc-1286	T/SE 5
	AFSAZ D7322		AFSAY D809 Radio Adaptor		U		
<u>FACSIMILE SECURITY EQUIPMENTS</u>							
312-3300	AFSAX D503		Low And Medium Echelon Cifax Equipment	1-B(U)	S		T/SE 11a
<u>CIPHONY AND CIFAX TRANSMISSION EQUIPMENTS</u>							
312-3400	AFSAZ D7300		AFSAY D806 Regenerative Relay Equipment	1-B(N)	U	DA49-170-sc-1102	T/SE 9/1
312-3401	AFSAZ D7306		Cifax Wire Transmission Equipment				
<u>SPECIAL PURPOSE EQUIPMENTS</u>							
313-3500	AFSAM D18		Back-Up Type Crypto-System	1-B(N)	S		T/SE 18
313-3501	AFSAM D21		One-Time Tape M-209 (Alphabetical)	1-B(N)	C		T/SE 19
313-3506	AFSAL D5342		Call Sign Cipher Machine	1-B(N)	S		T/SE 20
313-3507	AFSAW D7213	DONNA	Tape Checker for AFSAW 7200	1-B(U)	C		T/SE 26/1
313-3508	AFSAW D7215		Automatic Rotor Wiring Equipment	1-B(U)	C	DA49-170-sc-1269	R/CS 39

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
313-3509	AFSAW D7221	MOOSE	Letter Check Generator for M-209 and AFSAM 36	1-B(U)	C		T/SE 31
313-3510	AFSAW D7224		High Speed Key Tape Production Equipment	1-B(U)	C	DA49-170-sc-1329	R/CS 38
313-3512	AFSAW D7225	LEECH II	Letter Check Equipment for POLLUX, ADONIS, ATHENA, IRIS, and PYGMALION	1-B(U)	C		
313-3513	AFSAW D7233		High Speed One-Time Pad Production Equipment		C		
<u>SUPPORTING ACTIVITIES</u>							
311-3600		GRINDSTONE	Testing and Shop Services	1-B(N)	U		
311-3601		PACKAGE	General Development of Literal and Teletype Security Equipment	1-B(U)	S	DA49-170-sc-953 DA49-170-sc-1084 DA49-170-sc-1296 DA49-170-sc-1354	T/SE 14/5
311-3602		BAGGAGE	General Development of Components for Literal and Teletype Security Equipment	1-B(N)	S	DA49-170-sc-1033 DA49-170-sc-1091	T/SE 14/4
311-3603		SAUCER	General Development of Rotors	1-B(N)	S	DA49-170-sc-1086 DA49-170-sc-1122 DA49-170-sc-1231 DA49-170-sc-1160 DA49-170-sc-125	
311-3604		TEMPEST	General Studies on Radiation Suppression	1-B(U)	S	DA49-170-sc-1119	

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.	
313-3605	AFSAX D504 AFSAX D505 AFSAX D507	INFERNO	General Studies on Equipment and Document Destruction	1-B(N)	C			
312-3606		FREEDOM	General Development of Ciphony Equipment	1-B(U)	S	DA49-170-sc-1133	T/SE 15/2	
312-3607		RAMBLE	General Development of Cifax Equipment Low Echelon Portable Cifax Equipment FOX Broadcast Cifax Equipment High Speed Cifax Equipment	1-B(U)	S	DA49-170-sc-1240 DA49-170-sc-1378	T/SE 15/1	
312-3608		HIGHWAY	General Development of Ciphony and Cifax Trans- mission Equipment	1-B(U)	S			
312-3609		FRIAR	General Development of Ferro-Resonant Elements	1-B	C	DA49-170-sc-1037		
312-3610		LARYNX	General Development of High Quality Vocoder Systems	1-B	S	DA49-170-sc-1088		
312-3611		VIBRATE	General Development of Secure Pulse Communica- tions Systems	1-B	S	DA49-170-sc-1104		
313-3612		AFSAW D7234	SATCHEL	General Development of Special Cryptographic Equipment Printed Circuit Techniques IBM Key Card Generator	1-B(N)	S C		
313-3613			WALLET	General Development of Components for Special Cryptographic Equipment	1-B(N)	S	DA49-170-sc-1091	
314-3614			ABACUS	General Studies on Cryptographic Systems	1-B(N)	S		T/SE 37

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
314-3615	AFSAZ D7308	DIPLOMA	General Studies on IFF Systems	1-B(U)	S		T/SE 21
314-3616		COBALT	General Studies on Data Transmission Systems	1-B(N)	S		T/SE 24
312-3617		HALFTONE	General Development of Halftone Techniques Halftone Cifax Adaptor	1-B(N)	C		
311-3618		DOMINO	Building Block Electronic Assemblies for COMSEC Equipment				
312-3619		HEATER	Ciphony and Cifax Radiation				

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RADIO EQUIPMENT DIVISION

NSA-33

IOTA

IO-9

TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
331-1101		DOOR	Noise Communications Intercept Equipment Study (Project RHO)	1-C(N)	S	DA49-170-sc-1195	T/IP 12/9
<u>RFP EQUIPMENTS</u>							
331-5000		BANANA	Local RFP Research	1-C(N)	S		T/IP 12/7
331-5001	AFSAV D17		Interim RFP Equipment	1-B(N)	S		T/IP 12/1
331-5002		APRICOT	Development of Interim RFP Techniques	1-C(N)	S	DA49-170-sc-1094	T/IP 12/3
331-5003		TOMATO	Study of the Fundamental Aspects of RFP Problems	1-C(D)	S		T/IP 12/6/A
331-5004	AFSAV D27		Special Signal Generator	1-C(N)	C	DA49-170-sc-1040	T/IP 12/8
331-5005	AFSAV D37		Mobile RFP Equipment	1-C(N)	C	DA49-170-sc-1068	T/IP 12/10
331-5006	AFSAV D51		RFP Baud Averager and Ripple Detector	1-C(N)	S		R/IN 12/11
333-5007	AFSAV D22		RFP Camera Design	1-B(U)	C		T/IP 7/3
333-5008	AFSAV D33 AFSAV D33A AFSAV D33B		Rapid Photographic Paper Processing Equipment	1-C(U)	C	DA49-170-sc-1299	T/IP 7/7

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
333-5009	AFSAV D41/1 AFSAV D41/2	OAK	Magnetic Tape Signal Analysis Equipment	1-C(N)	C	DA49-170-sc-1230	R/IN 7/8
<u>RECORDERS</u>							
333-5100	AFSAV D25 AFSAV D25A		Ciphony and Cifax Intercept Recorder-Reproducer	1-C(U)	C	DA49-170-sc-1112	T/IP 8/6
333-5101		IGLOO	Magnetostatic Reading Head	1-C(N)	U	DA49-170-sc-1123	T/IP 7/4
333-5102	AFSAV D73	SODA	Wide Band Recorder-Reproducer		C		
333-5103	AFSAV D75		General Purpose Recorder-Reproducer(Operator Back-Up)				
333-5104	AFSAV D80		High Speed Trace Recorder				
<u>MORSE OPERATOR ANALYZER EQUIPMENTS</u>							
332-5200	AFSAV D31 AFSAV D31A		Morse Operator Analyzer	1-B(U)	C		T/IP 9/14
335-5201	AFSAV D31A		MOA Fabrication	1-B(N)	C		
335-5202			TINA Research Study				
<u>SPECIAL RECEIVING EQUIPMENT</u>							
331-5300	AFSAV D26	EAGLE	High Speed Signal Intercept Equipment	1-C(U)	S	DA49-170-sc-1375	T/IP 11/5

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
<u>MULTI-CHANNEL EQUIPMENTS</u>							
332-5400	AFSAV D13	ROCK	Electromechanical Demultiplexer	1-C(N)	C		T/IP 9/12
332-5402	AFSAV D15A		3N Demultiplexer (JAN)	1-B(N)	C		T/IP 9/6
332-5403	AFSAV D24		2B Demultiplexer	1-B(N)	C		T/IP 9/11
332-5404	AFSAV D46	FOREST	Transistor Demultiplexer	1-B(N)	C		T/IP 9/16
332-5405		MISTY	Multi-Cathode Trigger Tubes	1-B(N)	C	DA49-170-sc-871	T/IP 9/15
332-5406		BARBER	Modified Model 28 Teletype Equipment	1-B(N)	C		T/IP 9/19
332-5407	AFSAV D5	GOLFBALL	DFS Demodulator (I-F)	1-C(N)	C		T/IP 2/5
332-5408	AFSAV D16 AFSAV D16A		Three Channel Tone-Shift Demodulator	1-C(D)	C		T/IP 2/1
332-5409	AFSAV 65		Redesigned CXOF Corrector and Demodulator	1-B(N)	C		R/IN 9/20
332-5410		BASEBALL	Central Processing System			DA49-170-sc-1391	

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAF RADAC NO.
332-5411	AFSAV D70		407 Flexible Storage Unit	1-B(U)	C	NObsr-63472	R/AE 2
332-5412	AFSAV D79		Time Division Demultiplex Equipment				
<u>UNI-CHANNEL EQUIPMENTS</u>							
332-5500	AFSAV D39		Two Channel Re-Keyer	1-B(U)	U		T/IP 2/7
332-5501	AFSAV D40		FSK Demodulator	1-B(N)	U		R/IP 2/8
335-5502	AFSAV D34		Sub-Carrier FM Demodulator	1-C(N)	U		T/IP 5/6
<u>SUPPLEMENTARY EQUIPMENTS</u>							
331-5600	AFSAV D18 AFSAV D18A		Diversity Antenna Selector Switch	1-C(N)	U		T/IP 11/2
331-5601	AFSAV D32		Multipath Transmission Simulator	1-C(N)	U		T/IP 11/7
331-5602		SUNSET	Intermediate Frequency Converter Adapter Equipment	1-C(N)	U		T/IP 12/5
332-5603	AFSAV D36		Translator	1-B(N)	C		T/IP 9/18
333-5604	AFSAV D28	STAPOS	Stabilized Frequency Power Supply	1-C(N)	U		T/IP 8/11

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
333-5605	AFSAV D30		Precision Audio Spectrum Analyzer	1-C(U)	C	DA49-170-sc-904	T/IP 7/6
335-5606	AFSAV D31B		Fabrication of MOA Pre-Production Prototype Models	1-B(N)	C		
<u>SIGNAL ANALYSIS EQUIPMENTS</u>							
334-5700		HATCHET	Signal Analysis	1-B(U)	S		T/IP 3/1
334-5701		CADET	Radiation and Conduction Study on Cryptographic Equipments	1-B(U)	TS		T/IP 11/6
334-5702		PHANTOM	Modern Communication Systems Study	1-B(N)	TS	DA49-170-sc-1219	R/IN 3/4
334-5703		GHOST	Speech Privacy Intercept Equipment	1-B(N)	S		R/IN 3/5
<u>SUPPORTING ACTIVITIES</u>							
331-5800		POMEGRANATE	Specialized Position Fixing Applications	1-C(N)	C		T/IP 11/3
331-5801		GRAPEFRUIT	Specialized Intercept Receiving Equipment	1-C(N)	C		T/IP 11/4
332-5802		CAMEO	General R/D of Demultiplex Equipment	1-C(N)	S		T/IP 9/10
332-5803	AFSAV D48	SIREN	Study of Morse Translator Design	1-B(N)	C		T/IP 9/13

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
332-5804		TANGO	Development of Frequency-Division Demultiplex Equipment	1-C(N)	C		T/IP 2/6
333-5805		SILEX	General R/D of Recording Equipment	1-C(N)	C		T/IP 8/5
333-5806		JUNIPER	Development of Graphic Recorder Equipment	1-C(N)	C		T/IP 7/5
333-5807		POLO	Development of Special Facsimile and Telephony Equipment	1-C(N)	C		T/IP 4/2
335-5808		CLINCH	Engineering Methods Research	1-C(N)	C	DA49-170-sc-885	T/IP 5/2
335-5809		PUPPY	Services and Materials Contract (Model Shop Facility)	1-C(N)	C		.
335-5810		ECLIPSE	Small Job Fabrication for PROD	1-B(N)			
330-5811			R/D Assignments	1-B(U)		DA49-170-sc-1304	
331-5813		BAMBOO	Antenna Study				
<u>FIELD RESEARCH ACTIVITIES</u>							
330-5900			Field Research Stations	1-B	C		T/IP 14
<u>VHF/UHF/SBF</u>							
331-6000		GINGER	VHF/UHF Intercept Problem				

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MATHEMATICAL RESEARCH DIVISION

NSA-34		RHO				IO-9	
TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
3400-1000		CRUST	General Cryptologic Research	1-B(N)	TS		T/CA 6/56
340-1001		ANABRANCH	Cycle Studies	1-B(N)	TS	N6ori-07127	T/CA 6/52
340-1002		SWEATER	Specialized Mathematical Research	1-B(N)	TS	N0bsr-63010 (37)	T/CA 6/53
340-1003		HARRIDAN	Studies of Theoretic Cryptanalysis	1-B(N)	C	Nonr-870 (00) Nonr-530 (03)	T/CA 6/55
340-1004		SCAMP	Mathematical Research at Institute for Numerical Analysis, University of California, Los Angeles, California	1-B(N)	U	NAonr-233 (00)	T/CA 6/57

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NSA-35		ALPHA				IO-9	
TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
<u>COMPUTERS</u>							
350-7000 350-7001 350-7002 350-7003		YOKUM	General Development of Computers Computers-Modifications Computers-Operations Computers-Maintenance	1-B(N)	S		T/CA 9/50
352-7006	AFSAF D70A	ATLAS II	Sequence Controlled Cryptanalytic Device	1-B(N)	S	NObsr-63010 (29,32)	T/CA 9/52
351-7007 352-7007	AFSAF D81 thru D88	NOMAD	High Speed Mass Data Handling System	1-B	S	DA49-170-sc-458	T/CA 31a
351-7008 352-7008	AFSAF 32	ABNER I Serial 1	Serial Computer	1-B(U)	S		T/CA 10/51
352-7009	AFSAF D53	ABNER I Serial 2	High Speed Serial Computer	1-B(N)	S	DA49-170-sc-898	T/CA 10/53
351-7010	AFSAF D89	BAKER	Relay Analog of ABNER I	1-B(U)	C		T/CA 10/52
352-7011	AFSAF D131	BOGART	Limited Purpose Computer	1-B(N)	U	NObsr-63010 (39)	R/AE Ad Hoc 1
354-7012			ATLAS I Modification II	1-B(N)	U	NObsr-63010	R/AE 62
<u>GENERAL STATISTICAL ANALYTIC EQUIPMENTS</u>							
350-7100			General Statistical Analytic Equipments-General Development				

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
350-7101 350-7102 350-7103			General Statistical Analytic Equipments-Modifications General Statistical Analytic Equipments-Operations General Statistical Analytic Equipments-Maintenance				
352-7105	AFSAF D76	McSNOYD II	Tape Operated Cross Product Computer	1-B(D)	C		T/CA 8/64
351-7106	AFSAF D72	SLED I	IBM Alphabetic Slide Run Machine	1-B(U)	S	NObsr-63472	T/CA 23/50
351-7108	AFSAF D72/10	CONSORT	Interim Placode Diagnostic Equipment	1-B(N)	C	NObsr-63472	T/CA 33/51
353-7109	AFSAF D68	DUCHESS	High Speed Statistical Placode Diagnostic Equipment	1-B(U)	C	NObsr-63472 DA49-170-sc-1277	T/CA 33/52
353-7111	AFSAF D1A	CONNIE II	Teletype Tape Comparator	1-B(N)	S	DA49-170-sc-932	T/CA 15/52
353-7112	AFSAF D12B	VIVIAN	Delay Line Comparator	1-B	C	DA49-170-sc-1175	T/CA 16/55
353-7113	AFSAF D51	DELLA	Megacycle Robin Comparator	1-B(U)	C		T/CA 24/52
353-7114	AFSAF D133	SLED II	General Purpose Cryptanalytic Device	1-B(N)	C		R/AE 63
353-7115		FARMER	Integrated Cryptanalytic Machine System				

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
<u>DATA CONVERSION EQUIPMENTS</u>							
350-7200			General Development of Data Conversion Equip- ments				
		DISCUS	Investigation of High Speed Recorders				T/CA 22
		MAGGIE	Magnetic Tape Preparation Equipment	1-B(N)	C	DA49-170-sc-1292	T/CA 45
350-7201			Data Conversion Equipments-Modifications				
350-7202			Data Conversion Equipments-Operations				
350-7203			Data Conversion Equipments-Maintenance				
355-7205		FREEZER	Document Conversion and Storage	1-B(N)	C		T/CA 30/53
352-7206			ABNER Magnetic Tape Preparation Equipment	1-B(N)	S		
354-7207			ATLAS Paper Tape Preparation Equipment	1-B(N)	S		T/CA 9/50
354-7208	AFSAF 96B	CXCO-2	Development of CXCO-2 Type Equipment	1-B(N)	C	NObsr-64082	T/CA 8/63
354-7209	AFSAF D51/10	MILLIE	Magnetic Tape Preparation Equipment for Use with DELLA	1-B(U)	TS		T/CA 45/51
352-7210	AFSAF D97/1 AFSAF D97/2	PALLY BUDDY PATRICIA	Copy Editing Recognition and Recording System Teletype Tape to Hard Copy Converter Category Scanner	1-B(N)	C	DA49-170-sc-1322	T/CA 3/50

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
355-7212	AFSAF D69	DEFROST	Micro-Film Searcher Viewer and Reproducer	1-B(N)	U	DA49-170-sc-1171	R/CA 45/52
352-7213	AFSAF D70/11	MAYBE	Computer Magnetic Tape Conversion Equipment	1-B(U)	S		
352-7214			Magnetic Tape Handling System				
354-7215	AFSAF D127	CAPPY	High Speed Card to Tape Converter				
355-7216	AFSAF D136		Tape Transport Mechanism				
<u>SUPPORTING ACTIVITIES</u>							
354-7300			General Development			T/CA ₇	
350-7301			Modifications				
351-7302			Operations				
351-7303		IODINE	Maintenance	1-B	C		
353-7305		PROFESSOR	Test Equipment for ABNER and DUCHESS				
350-7306			Equipment Temperature and Humidity Control				
<u>ROTOR PROBLEM ANALYTIC EQUIPMENTS</u>							
350-7400			Rotor Problem Analytic Equipments-General Development				
350-7401			Rotor Problem Analytic Equipments-Modifications				
350-7402			Rotor Problem Analytic Equipments-Operations				
350-7403			Rotor Problem Analytic Equipments-Maintenance				
351-7405	AFSAF D80	WARLOCK II	Statistical Message Placer	1-B(N)	S	T/CA 14/51	

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
353-7406		DERVISH	High Speed Rotor Analog	1-B(U)	TS	DA49-170-sc-1227	T/CA 31
<u>SPECIAL PROBLEM EQUIPMENTS</u>							
350-7500 350-7501 350-7502 350-7503		BURRO	Special Problem Equipments-General Development Special Problem Equipments-Modifications Special Problem Equipments-Operations Special Problem Equipments-Maintenance	1-B(N)	TS		T/CA 12/50
353-7506	AFSAF D74	MAISIE	Magnetic Card File	1-B(N)	S	NObsr-63472	T/CA 4
353-7507	AFSAF D33A	FROG	Special Cipher Machine Solution Device	1-B(U)	TS		T/CA 16/54
354-7508	AFSAF D124	BISON	Binary Machine Setting Generator	1-B(N)	S		R/CA 12/55
<u>DESK AIDS</u>							
350-7600 350-7601 350-7602 350-7603		ABYSS	Desk Aids-General Development Desk Aids-Modifications Desk Aids-Operations Desk Aids-Maintenance	1-B(N)	C	DA49-170-sc-1401	T/CA 8/50

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ENGINEERING RESEARCH DIVISION

NSA-36		RHO				IO-9	
TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
361-1102		BROADCLOTH	Application of Electronics to Cryptology	1-B(N)	S	N7onr-419 (6) DA49-170-sc-1289	T/CA 15/50
361-1103		TAURUS	Component Investigation	1-B(N)	U	NObsr-63010 (37)	T/CA 15/51
361-1104		MAGNET	Study of Bi-Stable Magnetic Elements	1-B(N)	U	DA49-170-sc-1116	T/CA 15/55
361-1105		VARANT	Various Analytical Tubes	1-B	S	DA49-170-sc-1295	T/CA 11
362-1106		THOR	UHF Research	1-B(N)	S	NAonr-151-52	T/CA 37
361-1107		DIAS	Ferro-Electric Storage Problem	1-B(N)	S	NObsr-63010 (36)	R/CA 54
361-1108		WAGON	Study of High Speed Switching	1-B(N)	S	DA49-170-sc-1315	R/AE 60
361-1109		BRICK	Study of a Logical Electronic Building Block	1-B(N)	U	NObsr-63010 (38)	R/AE 66
361-1110		POGO	Study of Factors Affecting Ferro-Resonant Devices	1-B(N)	U		R/AE 67
361-1111		ANDY	Study of Non-Destructive Readout	1-B(N)	U	NObsr-63010 (41)	R/AE 65
361-1112			Diode Research				

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TASK NO.	NOMENCLATURE	COVER NAME	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
361-1113			Transistor Research				

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NOMENCLATURE OR COVER NAME

NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
ABACUS	314-3614	General Studies on Cryptographic Systems	1-B(N)	S		T/SE 37
ABNER I, Serial 1, AFSAF 32	351-7008 352-7008	Serial Computer	1-B(U)	S		T/CA 10/51
ABNER I, Serial 2, AFSAF D53	352-7009	High Speed Serial Computer	1-B(N)	S	DA49-170-sc-898	T/CA 10/53
ABYSS	350-7600	Desk Aids-General Development	1-B(N)	C		T/CA 8/50
AFSAF D1A CONNIE II	353-7111	Teletype Tape Comparator	1-B(N)	S	DA49-170-sc-932	T/CA 15/52
AFSAF D12B NIVIAN	353-7112	Delay Line Comparator	1-B	C	DA49-170-sc-1175	T/CA 16/55
AFSAF 30/10 PLUTOCRAT	354-7200	Camera to Record PLUTO (AFSAF 30, Cycle Analyzer)				
AFSAF 32 ABNER I, Serial 1	351-7008 352-7008	Serial Computer	1-B(U)	S		T/CA 10/51
AFSAF D33A FROG	353-7507	Special Cipher Machine Solution Device	1-B(U)	TS		T/CA 16/54
AFSAF D51 DELLA	353-7113	Megacycle Robin Comparator	1-B(U)	C		T/CA 24/52

NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT PADAC NO.
AFSAF D51/10 MILLIE	354-7209	Magnetic Tape Preparation Equipment for Use with DELLA	1-B(U)	TS		T/CA 45/51
AFSAF D53 ABNER I, Serial 2	352-7009	High Speed Serial Computer	1-B(N)	S	DA49-170-sc-898	T/CA 10/53
AFSAF D68 DUCHESS	353-7109	High Speed Statistical Placode Diagnostic Equipment	1-B(N)	C	NObsr-63472 DA49-170-sc-1277	T/CA 33/52
AFSAF D69 DEFROST	354-7212	Micro-Film Searcher Viewer and Reproducer	1-B(N)	C	DA49-170-sc-1171	
AFSAF D70A AFSAF D70B ATLAS II	352-7006	Sequence Controlled Cryptanalytic Device	1-B(N)	S	NObsr-63010 (29,32)	T/CA 9/52
AFSAF D70/10 CENSOR	355-7200	Tape Checking Device for ATLAS I, ATLAS II, and DEMON III	1-B(N)	C		
AFSAF D70/11 MAYBE	352-7213	Computer Magnetic Tape Conversion Equipment	1-B(U)	S		T/CA 45/52
AFSAF D72 SLED I, Serial 2	351-7106	IBM Alphabetic Slide Run Machine	1-B(U)	S	NObsr-63472	T/CA 23/50
AFSAF D72/10 CONSORT	351-7108	Interim Placode Diagnostic Equipment	1-B(N)	C	NObsr-63472	T/CA 33/51

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
AFSAF D74 MAISIE	353-7506	Magnetic Card File	1-B(N)	S	NObsr-63472	T/CA 4
AFSAF D80 WARLOCK II	351-7405	Statistical Message Placer	1-B(N)	S		T/CA 14/ 51
AFSAF D81 thru 88 NOMAD	351-7007 352-7007	High Speed Mass Data Handling System	1-B	S	DA49-170-sc-458	T/CA 13a
AFSAF D81/11 PRIMATE	354-7200	Program Tape Printing Device for NOMAD				
AFSAF D89 BAKER	351-7010	Relay Analog for ABNER I	1-B(U)	C		T/CA 10/ 52
AFSAF 96B CXCO-2	354-7208	Development of CXCO-2 Type Equipment	1-B(N)	C	NObsr-64082	T/CA 8/ 63
AFSAF D97/1 BUDDY AFSAF D97/2 PATRICIA	353-7210	Teletype Tape to Hard Copy Converter Category Scanner			DA49-170-sc-1322	T/CA 3/ 50
AFSAF D97A CHUMMY	354-7501	Page Print Controlled Formats				
AFSAF U105A NAG	354-7500	C-38 Analog				
AFSAF D109 PEELER I	354-7600	Strippers Aid				

NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
AFSAF D122 DIAC	353-7600	Desk Digital Counter			DA49-170-sc-1401	
AFSAF D123 INSPECTOR	354-7300	Punched Tape Verification Equipment	1-B(N)	S		T/CA 12/ 55
AFSAF D124 BISON	354-7508	Binary Machine Setting Generator	1-B(N)	S		T/CA 12/ 55
AFSAF D125 INCHER	352-7200	Intermittent Magnetic Tape Stepper			DA49-170-sc-1292	
AFSAF D126 TIZZY	352-7215	Paper Tape-to-Card Converter	1-A	U		
AFSAF D127 CAPPY	353-7215	High Speed Card-to-Tape Converter	1-B(N)	C		
AFSAF D128 SCOOTER	354-7600	Keyboard Input Strippers Aid	1-B(N)	S		T/CA 8/ 50
AFSAF D129 PADDLE	355-7600	Multi-Alphabet Decipherer-Decoder	1-B(N)	TS		
AFSAF D130 BUNNY	354-7200	High Speed Regen Equipment				
AFSAF D131 BOGART	352-7011	Limited Purpose Computer	1-B(N)	U	NObsr-63010 (39)	R/AE Ad Hoc 1
AFSAF D133 SLED II	353-7114	General Purpose Cryptanalytic Device	1-B(N)	C		R/AE 63

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
AFSAF D134 JANET	355-7300	EDITOR Program Tape Checker				
AFSAF D135	355-7200	Medium Speed Printer				
AFSAF D136	355-7216	Tape Transport Mechanism				
AFSAL D5342	313-3506	Call Sign Cipher Machine	1-B(N)	S		T/SE 20
AFSAM 7, AFSAM D7A	311-3000	Low Echelon Literal Cipher Machine	1-B(U)	S	DA49-170-sc-1284 DA49-170-sc-1337	T/SE 2/ 2A
AFSAM 9	311-3100	Portable Teletype Security Equipment	1-B(U)	S	DA49-170-sc-1244	T/SE 6
AFSAM D17	311-3001	Portable Mechanical Cipher Machine	1-B(U)	C	DA49-170-sc-1252	T/SE 35
AFSAM D18	313-3500	Back-Up Type Crypto-System	1-B(N)	S		T/SE 18
AFSAM D21	313-3501	One-Time Tape M-209 (Alphabetical)	1-B(N)	C		T/SE 19
AFSAM D22	311-3101	Teletype Multiplex (AN/FGC-5) Enciphering Equipment	1-B(U)	S	DA49-170-sc-1105	T/SE 25
AFSAM D24	311-3601	A High Level Cipher Machine	1-B(N)	S	DA49-170-sc-953	T/SE 14/ 5
AFSAM D26	311-3601	Single Channel Synchronous Teletype Security Equipment	1-B(N)	S	DA49-170-sc-1296	T/SE 14/ 5
AFSAM D30	311-3102	High Echelon Teletype Security Equipment	1-B	S	DA49-170-sc-1351	
AFSAM D31	313-3502	Modified DEM 21, Weather Cipher Device				T/SE 14/ 4

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
AFSAM D33	311-3108	Teletypewriter Cryptographic Attachment, MK-2			NObsr-64125	
AFSAM D37	(included under 311-3601)	Shipboard Synchronous Teletype Security Equipment (FOX)			DA49-170-sc-1354	
AFSAM D44	311-3103	Off-Line One-Time Tape Teletype Security Equipment	1-B(N)	U		T/SE 27/ 1
AFSAM D45	311-3104	On-Line One-Time Tape Teletype Security Equipment	1-B(U)	U		T/SE 12
AFSAM 47 AFSAM 47B	311-3002	Shipboard Literal Cipher Machine	1-B(U)	C	NObsr-64125 (3C)	
AFSAM D129	313-3503	ADONIS Adaptor for CSP 2900	1-B(N)	C		T/SE 14/ 4
AFSAM 309	(included under 311-3100)	Improved Teletype Security Device		S	DA49-170-sc-1244	
AFSAM D498	311-3003	Manual Authentication Device	1-B(D)	C		T/SE 29/ 1
AFSAV D5 GOLFBALL	332-5407	DFS Demodulator (I-F)	1-C(N)	C		T/IP 2/ 5
AFSAV D13 ROCK	332-5400	Electromechanical Demultiplexer	1-C(N)	C		T/IP 9/ 12
AFSAV D15A	332-5402	3N Demultiplexer (JAN)	1-B(N)	C		T/IP 9/ 6

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSA RADAC NO.
AFSAV D16 AFSAV D16A	332-5408	Three Channel Tone-Shift Demodulator	1-C(D)	C		T/IP 2/1
AFSAV D17	331-5001	Interim RFP Equipment	1-B(N)	S		T/IP 12/1
AFSAV D18 AFSAV D18A	331-5600	Diversity Antenna Selector Switch	1-C(N)	U		T/IP 11/2
AFSAV D22	333-5007	RFP Camera Design	1-B(U)	C		T/IP 7/3
AFSAV D24	332-5403	2B Demultiplexer	1-B(N)	C		T/IP 9/11
AFSAV D25 AFSAV D25A	333-5100	Ciphony and Cifax Intercept Recorder-Reproducer	1-C(U)	C	DA49-170-sc-1112	T/IP 8/6
AFSAV D26 EAGLE	331-5300	High Speed Signal Intercept Equipment	1-C(U)	S	DA49-170-sc-1375	T/IP 11/5
AFSAV D27	331-5004	Special Signal Generator	1-C(N)	C	DA49-170-sc-1040	T/IP 12/8
AFSAV D28 STAPOS	333-5604	Stabilized Frequency Power Supply	1-C(N)	U		T/IP 8/11
AFSAV D30	333-5605	Precision Audio Spectrum Analyzer	1-C(U)	C	DA49-170-sc-904	T/IP 7/6
AFSAV D31 AFSAV D31A	332-5200	Morse Operator Analyzer	1-B(U)	C		T/IP 9/14
AFSAV D31A	335-5201	MOA Fabrication	1-B(N)	C		
AFSAV D31B	335-5606	Fabrication of MOA Pre-Production Prototype Models	1-B(N)	C		

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
AFSAV D32	331-5601	Multipath Transmission Simulator	1-C(N)	U		T/IP 11/7
AFSAV D33 AFSAV D33A AFSAV D33B	333-5008	Photographic Paper Rapid Processing Equipment	1-C(U)	C	DA49-170-sc-1299	T/IP 7/7
AFSAV D34	335-5502	Sub-Carrier FM Demodulator	1-C(N)	C		T/IP 5/6
AFSAV D36	332-5603	Translator	1-B(N)	C		T/IP 9/18
AFSAV D37	331-5005	Mobile RFP Equipment	1-C(N)	C	DA49-170-sc-1068	T/IP 12/10
AFSAV D39	332-5500	Two Channel Re-Keyer	1-B(U)	U		T/IP 2/7
AFSAV D40	332-5501	FSK Demodulator	1-B(N)	U		R/IN 2/8
AFSAV D41/1 AFSAV D41/2 OAK	333-5009	Magnetic Tape Signal Analysis Equipment	1-C(N)	C	DA49-170-sc-1230	R/IN 7/8
AFSAV D46 FOREST	332-5404	Transistor Demultiplexer	1-B(N)	C		T/IP 9/16
AFSAV D48 SIREN	332-5803	Study of Morse Translator Design	1-B(N)	C		T/IP 9/13
AFSAV D49	332-5802	Teletype TINA Device	1-C(N)	C		T/IP 9/10
AFSAV D50	331-5801	VLF Receiver	1-C(N)	S		T/IP 11/4
AFSAV D51	331-5006	RFP Baud Averager and Ripple Detector	1-C(N)	S		R/IN 12/11

NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
AFSAV 65	332-5409	Redesigned CXOF Corrector and Demodulator	1-B(N)	C		R/IN 9/ 20
AFSAV D69	332-5200	Card Comparator				
AFSAV D70	332-5411	407 Flexible Storage Unit	1-B(U)	C	NObser-63472	R/AE 2
AFSAV D71	335-5810	Tuning and Recording Aids				
AFSAV D72	332-5804	Deviation Detector				
AFSAV D73 SODA	333-5102	Wide-Band Recorder-Reproducer				
AFSAV D74	333-5805	Variable Frequency Motor Control Oscillator				
AFSAV D75	333-5103	General Purpose Recorder-Reproducer (Operator Back-Up)				
AFSAV D76	333-5807	Facsimile Recording Control Unit				
AFSAV D77	335-5810	Utility Oscilloscope				
AFSAV D78	331-5801	Low Noise UHF Pre-Amplifier				
AFSAV D79	332-5412	Flexible Demultiplex Equipment				
AFSAV D80	333-5104	High Speed Trace Recorder				
AFSAW D7213 DONNA	313-3507	Tape Checker for AFSAW 7200	1-B(U)	C		T/SE 26/ 1
AFSAW D7215	313-3508	Automatic Rotor Wiring Equipment	1-B(U)	C	DA49-170-sc-1269	R/CS 39

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFEAT RADAC EO.
AFSAW D7221 MOOSE	313-3509	Letter Check Generator for M-209 and AFSAM 36	1-B(U)	C		T/SE 31
AFSAW D7224	313-3510	High Speed Key Tape Production Equipment	1-B(U)	C	DA49-170-sc-1329	R/CS 38
AFSAW D7225 LEECH II	313-3512	Letter Check Equipment for POLLUX, ADONIS, ATHENA, IRIS, PYGMALION	1-B(U)	C		
AFSAW D7233	313-3513	High Speed One-Time Pad Production Equipment		C		
AFSAW D7234	313-3612	IBM Key Card Generator		C		
AFSAX D503	312-3300	Low and Medium Echelon Cifax Equipment	1-B(U)	S		T/SE 11a
AFSAX D504	312-3607	Low Echelon Portable Cifax Equipment	1-B(U)	S	DA49-170-sc-1240	T/SE 15/
AFSAX D505		FOX Broadcast Cifax Equipment			DA49-170-sc-1378	1
AFSAX D507 RAMBLE		High Speed Cifax Equipment				
AFSAY D801	312-3200	Special Purpose Ciphony Equipment	1-B	C	DA49-170-sc-1120	
AFSAY D804	312-3201	Low Echelon Ground Ciphony Equipment	1-B(U)	C	DA49-170-sc-1009 DA49-170-sc-1335	T/SE 7
AFSAY D806	312-3203	High Echelon Ciphony Equipment	1-B(U)	S	DA49-170-sc-1102	T/SE 9
AFSAY D807	312-3204	Key Generator for AN/TRC-25	1-B(N)	S		T/SE 15/ 3
AFSAY D808	312-3205	Low Echelon Airborne Ciphony Equipment	1-B(U)	S	DA49-170-sc-658 DA49-170-sc-1155	T/SE 10

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAZ TASK NO.
AFSAY D809	312-3206	High Echelon Unattended Ciphony Equipment	1-B(N)	S	DA49-170-sc-1286	T/SE 5
AFSAZ D7300	312-3400	AFSAY D806 Regenerative Relay Equipment	1-B(N)	U	DA49-170-sc-1102	T/SE 9
AFSAZ D7303	311-3105	High Grade Synchroniser for Teletype Security Equip- ment	1-B	C		
AFSAZ D7304	311-3004	Off-Line Automatic Ancillary Equipment	1-C(N)	C		T/SE 33
AFSAZ D7305	311-3106	Message Synchroniser for Teletype Security Equipment	1-B	U	DA49-170-sc-1110	T/SE 34
AFSAZ D7306	312-3607	Cifax Wire Transmission System Equipment				T/SE 15/1
AFSAZ D7308	312-3617	Halftone Cifax Adaptor		C		
AFSAZ D7315A	311-3107	Single Channel Fully Synchronous Teletype Equipment	1-B(U)	C	DA49-170-sc-1084 (4) DA49-170-sc-1137	T/SE 3
AFSAZ D7319	311-3109	Electronic Teletype Mixer			DA49-170-sc-1343	
AFSAZ D7320 DINGBAT II	300-3514	RCA, Electronic Printing Telegraph Signal Normalizer	1-B(U)	U	DA49-170-sc-1404	
AFSAZ D7321 DINGBAT I	300-3514	Western Union, Electro-mechanical Experimental Model	1-B(U)	U	DA49-170-sc-1402	
AFSAZ D7322	312-3206	AFSAY D809 Radio Adaptor				
AFSAZ D7323	311-3110	Teletype Speed Converter		U		

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
ANABRANCH	340-1001	Cycle Studies	1-B(N)	TS	N6or1-07127	T/CA 6/ 52
ANDY	361-1111	Non-Destructive Read-Out				
APRICOT	331-5002	Development of Interim RFP Techniques	1-C(N)	S	DA49-170-sc-1094	T/IP 12/ 3
ATLAS II AFSAF D70A AFSAF D70B	352-7006	Sequence Controlled Cryptanalytic Device	1-B(N)	S	NObsr-63010 (29,32)	T/CA 9/ 52
AUTOMAT	355-7600	Remote Operated Analytic Equipment				
AXEL	361-1108	High Speed Switching (Includes AXEL, High Speed Wired Rotor Analog)				
BAGGAGE	311-3602	General Development of Components for Literal and Teletype Security Equipment	1-B(N)	S	DA49-170-sc-1033 DA49-170-sc-1091	T/SE 14/ 4
BAKER AFSAF D89	351-7010	Relay Analog of ABNER I	1-B(U)	C		T/CA 10/ 52
BAMBOO	331-5813	Antenna Study				
BANANA	331-5000	Local RFP Research	1-C(N)	S		T/IP 12/ 7
BARBER	332-5406	Modified Model 28 Teletype Equipment	1-B(N)	C		T/IP 9/ 19
BASEBALL	332-5410	Central Processing System			DA49-170-sc-1391	

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT PADAC NO.
BISON AFSAF D124	354-7508	Binary Machine Setting Generator	1-B(N)	S		T/CA 12/ 55
BOGART AFSAF D131	352-7011	Limited Purpose Computer	1-B(N)	U	NObsr-63010 (39)	R/AE Ad Hoc 1
BRICK	361-1109	Coincidence Anti-Coincidence Detector Units			NObsr-63010 (38)	
BROADCLOTH	361-1102	Application of Electronics to Cryptology	1-B(N)	S	N7onr-419 DA49-170-sc-1289	T/CA 15/ 50
BUDDY AFSAF D97/1	352-7210	Teletype Tape to Hard Copy Converter	1-B(N)	C		T/CA 3/ 50
BUNNY AFSAF D130	354-7200	High Speed Regen	1-B(N)	U		
BURRO	350-7500	Relay Cryptologic Aids	1-B(N)	TS		T/CA 12/ 50
BUTTRESS	312-1100	General Research on Speech Reinforcement	1-B	U	DA49-170-sc-1349	
CADET	334-5701	Radiation and Conduction Study on Cryptographic Equipments	1-B(U)	TS		T/IP 11/ 6
CAMEO	332-5802	General R/D of Demultiplex Equipment	1-C(N)	C		T/IP 9/ 10
CAPPY AFSAF D127	353-7215	High Speed Card to Tape Converter	1-B(N)	C		

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
CENSOR AFSAF D70/10	355-7200	Tape Checking Device for ATLAS I, ATLAS II, and DEMON III	1-B(N)	C		
CLINCH	335-5808	Engineering Methods Research	1-C(N)	C	DA49-170-sc-885	T/IP 5/ 2
COBALT	314-3616	General Studies on Data Transmission Systems	1-B(N)	S		T/SE 24
CONNIE II AFSAF D1A	353-7111	Teletype Tape Comparator	1-B(N)	S	DA49-170-sc-932	T/CA 15/ 52
CONSORT AFSAF D72/10	351-7108	Interim Placode Diagnostic Equipment	1-B(N)	C		T/CA 33/ 51
CORVETTE		Automatic Set-Up for Recognition				
CRUST	340-1000	General Cryptologic Research	1-B(N)	TS		T/CA 6/ 56
CXCO-2 AFSAF 96B	354-7208	Development of CXCO-2 Type Equipment	1-B(N)	C	NObsr-64082	T/CA 8/ 63
DAFOR		Desk Aid for Readers				
DEFROST AFSAF D69	354-7212	Micro-Film Searcher Viewer and Reproducer	1-B(N)	U	DA49-170-sc-1171	
DELLA AFSAF D51	353-7113	Megacycle Robin Comparator	1-B(U)	C		T/CA 24/ 52
DERVISH	353-7406	High Speed Rotor Analog	1-B(U)	TS	DA49-170-sc-1227	T/CA 31

NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
DIAC AFSAF D122	353-7600	Special Purpose Desk Digital Counter				
DIAS	361-1107	Ferro-Electric Storage Problem	1-B(N)		NObsr-63010 (36)	R/CA 54
DINGBAT AFSAZ D7320 AFSAZ D7321	300-3514	Printing Telegraph Signal Normalizer	1-B(U)	U		
DIPLOMA	314-3615	General Studies on IFF Systems	1-B(U)	S		T/SE 21
DISCUS	353-7200	Investigation of High Speed Recorders	1-C			T/CA 22
DOMINO	311-3618	Building Block Electronic Assemblies for COMSEC Equip- ment				
DONNA AFSAW D7213	313-3507	Tape Checker for AFSAW 7200	1-B(U)	C		T/SE 26/ 1
DOOR	331-1101	Noise Communications Intercept Equipment Study	1-C(N)	S	DA49-170-sc-1195	T/IP 12/ 9
DUCHESS AFSAF D68	353-7109	High Speed Statistical Flacode Diagnostic Equipment	1-B(N)	C	NObsr-63472 DA49-170-sc-1277	T/CA 33/ 52
EAGLE AFSAV D26	331-5300	High Speed Signal Intercept Equipment	1-C(U)	S		T/IP 11/ 5
ECLIPSE	335-5810	Small Job Fabrication for PROD	1-B(N)			
FARMER	353-7115	Integrated Cryptanalytic Machine System				

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC EO.
FOREST AFSAV D46	332-5404	Transistor Demultiplexer	1-B(N)	C		T/IP 9/ 16
FREEDOM	312-3606	General Development of Ciphony Equipment	1-B(U)	S	DA49-170-sc-1133	T/SE 15/ 2
FREEZER	355-7205	Document Conversion and Storage	1-B(N)	C		T/CA 30/ 53
FRIAR	312-3609	General Development of Ferro-Resonant Elements	1-B	C	DA49-170-sc-1037	
FROG AFSAF D33A	353-7507	Special Cipher Machine Solution Device	1-B(U)	TS		T/CA 16/ 54
GHOST	334-5703	Speech Privacy Intercept Equipment	1-B(N)	S		R/IN 3/ 5
GINGER	331-6000	VHF/UHF Intercept Problem				
GOLFBALL AFSAV 5	332-5407	DFS Demodulator (I-F)	1-C(N)	C		T/IP 2/ 5
GRAPEFRUIT	331-5801	Specialized Intercept Receiving Equipment	1-C(N)	C		T/IP 11/ 4
GRINDSTONE	311-3600	Testing and Shop Services	1-B(N)	U		
HALFTONE	312-3617	General Development of Halftone Techniques	1-B(N)			
HARRIDAN	340-1003	Studies of Theoretic Cryptanalysis	1-B(N)	C	Nonr-530 (03) Nonr-870 (00)	T/CA 6/ 55
HATCHET	334-5700	Signal Analysis	1-B(U)	S		T/IP 3/ 1

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
HEATER	312-3619	Ciphony and Cifax Radiation				
HIGHWAY	312-3608	General Development of Ciphony and Cifax Transmission Equipment	1-B(U)	S		
ICEBOX	354-7200	Microfilm Camera Investigation				
IGLOO	333-5101	Magnetostatic Reading Head	1-C(N)	U	DA49-170-sc-1123	T/IP 7/ 4
INCHER AFSAF D125	352-7200	Intermittent Magnetic Tape Stepper			DA49-170-sc-1292	
INFERNO	311-3605	General Studies on Equipment and Document Destruction	1-B(N)	C		
INSPECTOR AFSAF D123	354-7300	Punched Tape Verification Equipment				
IODINE	350-7303	Operational and Maintenance Procedures	1-B			
JANET AFSAF D134	355-7300	EDITOR Program Tape Checker				
JUNIPER	333-5806	Development of Graphic Recorder Equipment	1-C(N)	C		T/IP 7/ 5
KNOBBY	354-7300	Silent Tape Reader		U		
LARYNX	312-3610	General Development of High Quality Vocoder Systems	1-B	S	DA49-170-sc-1088	
LEECH II AFSAW D7225	313-3512	Letter Check Equipment for POLLUX, ADONIS, ATHENA, IRIS, and PYGMALION	1-B(U)	C		

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	APEAT RADAC NO.
MAGGIE	350-7200	Magnetic Tape Preparation Equipment	1-B(N)	C		T/CA 45
MAGNET	361-1104	Study of Bi-Stable Magnetic Elements	1-B(N)	U	DA49-170-sc-1116	T/CA 15/ 55
MAISIE AFSAF D74	353-7506	Magnetic Card File	1-B(N)	S	NObsr-63472	T/CA 4
MAYBE AFSAF D70/11	352-7213	Computer Magnetic Tape Conversion Equipment	1-B(U)	S		R/CA 45/ 52
MILLIE AFSAF D51/10	354-7209	Magnetic Tape Preparation Equipment for Use with DELLA	1-B(U)	TS		T/CA 45/ 51
MISTY	332-5405	Multi-Cathode Trigger Tubes	1-B(N)	C	DA49-170-sc-871	T/IP 9/ 51
MOOSE AFSAW D7221	313-3509	Letter Check Generator for M-209 and AFSAM 36	1-B(U)	C		T/SE 31
NAG AFSAF D150A	354-7500	C-38 Analog				
NELLY	353-7210	A Combined BUDDY and PATRICIA				
NOMAD AFSAF D81 thru 88	351-7007	High Speed Mass Data Handling System	1-B	S	DA49-170-sc-458	T/CA 31a
OAK AFSAV D41	333-5009	Magnetic Tape Signal Analysis Equipment	1-C(N)	C	DA49-170-sc-1230	R/IN 7/ 8

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	A FEAT RADAR
PACKAGE	311-3601	General Development of Literal and Teletype Security Equipment	1-B(U)	S	DA49-170-sc-953 DA49-170-sc-1084 DA49-170-sc-1296 DA49-170-sc-1354	T/SE 14/ 5
PADDLE AFSAF D129	355-7600	Multi-Alphabet Decipherer-Decoder	1-B(N)	TS		
PALLY	352-7210	Copy Editing Recognition and Recording System	1-B(N)	C		T/CA 3/ 50
PATRICIA AFSAF D97/2	352-7210	Category Scanner		C		
PEELER AFSAF D109	354-7600	Strippers Aid				
PHANTOM	334-5702	Modern Communication Systems Study	1-B(N)	S	DA49-170-sc-1219	R/IN 3/ 4
PLUTOCRAT AFSAF 30/10	354-7200	Camera to Record PLUTO (AFSAF 30, Cycle Analyzer)				
POGO	361-1110	Study of Factors Affecting Ferro-Resonant Devices	1-B(N)	U		R/AE 67
POLO	333-5807	Development of Special Facsimile and Telephony Equipment	1-C(N)	C		T/IP 4/ 2
POMEGRANATE	331-5800	Specialized Position Fixing Applications	1-C(N)	C		T/IP 11/ 3
PRIMATE AFSAF D81/11	354-7200	Program Tape Printing Device for NOMAD	1-B(N)	C		

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAV RADAR
PROFESSOR	353-7305	Test Equipment for ABNER and DUCHESS				
PUPPY	335-5809	Services and Materials Contract (Model Shop Facility)	1-C(N)	C		
RAMBLE	312-3607	General Development of Cifax Equipment	1-B(U)	S	DA49-170-sc-1240 DA49-170-sc-1378	T/SE 15/ 1
ROCK AFSAV D13	332-5400	Electromechanical Demultiplexer	1-C(N)	C		T/IP 9/ 12
ROGUE		Remote Operated General Computers				
SATCHEL	313-3612	General Development of Special Cryptographic Equipment	1-B(N)	S		
SAUCER	311-3603	General Development of Rotors	1-B(N)	S	DA49-170-sc-1086 DA49-170-sc-1122 DA49-170-sc-1231 DA49-170-sc-1160 DA44-114-sc-125	
SCAMP	340-1004	Mathematical Research at Institute for Numerical Analysis, UCLA	1-B(N)	U	NAonr-233 (00)	T/CA 6/ 57
SCOOTER AFSAF D128	354-7600	Keyboard Input Strippers Aid	1-B(N)	S		
SILEX	333-5805	General Research and Development of Recording Equipment	1-C(N)	C		T/IP 8/ 5
SIREN AFSAV D48	332-5803	Study of Morse Translator Design	1-B(N)	C		T/IP 9/ 13

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
SLED I Serial 2 AFSAF D72	351-7106	IBM Alphanumeric Slide Run Machine	1-B(U)	S	NObsr-63472	T/CA 23/ 50
SLED II AFSAF D133	353-7114	General Purpose Cryptanalytic Device	1-B(N)	S		
SODA AFSAF D73	333-5102	Wide Band Recorder-Reproducer				
STAPOS AFSAV D28	333-5604	Stabilized Frequency Power Supply	1-C(N)	U		T/IP 8/ 11
SUNSET	331-5602	Intermediate Frequency Converter Adapter Equipment	1-C(N)	U		T/IP 12/ 5
SWEATER	340-1002	Specialized Mathematical Research	1-B(N)	TS	NObsr-63010 (37)	T/CA 6/ 53
SHANGO	332-5804	Development of Frequency-Division Demultiplex Equip- ment	1-C(N)	C		T/IP 2/ 6
TAURUS	361-1103	Component Investigation	1-B(N)	U		T/CA 15/ 51
TEMPEST	311-3604	General Studies on Radiation Suppression	1-B(U)	S	DA49-170-sc-1119	
THEOR	362-1106	Ultra High Frequency Research	1-B(N)	S	NAonr-151-52	T/CA 37
TIZZY AFSAF D126	354-7215	Paper Tape-to-Card Converter	1-B(N)	C		

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NOMENCLATURE OR COVER NAME	TASK NO.	DESCRIPTION	PRIORITY	CLASSIFI- CATION OF TASK	CONTRACT NO.	AFSAT RADAC NO.
TOMATO	331-5003	Study of the Fundamental Aspects of RFP Problems	1-C(D)	S		T/IP 12/ 6A
VARANT	361-1105	Various Analytical Tubes	1-B	S	DA49-170-sc-1295	T/CA 11
VIBRATE	312-3611	General Development of Secure Pulse Communications Systems	1-B	S	DA49-170-sc-1104	
VIVIAN AFSAF D12B	353-7112	Delay Line Comparator	1-B	C	DA49-170-sc-1175	T/CA 16/ 55
WAGON	361-1108	Study of High Speed Switching	1-B(N)	S		R/AE 60
WALLET	313-3613	General Development of Components for Special Cryptographic Equipment	1-B(N)	S	DA49-170-sc-1091	
WARLOCK II AFSAF D80	351-7405	Statistical Message Placer	1-B(N)	S		T/CA 14/ 51
YOKUM	350-7000	General Development of Computers	1-B(N)	S		T/CA 9/ 50

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT RAC NO.
DA49-170-sc-125 Molded Insulation Co.		Research and Development on Two Types 36-point Rotors and Two Types 26-point Rotors	311-3603	1-B(N)	S	
DA49-170-sc-458 Raytheon Mfg. Co.	AFSAF D81 thru 88 (NOMAD)	Development of High Speed Mass Data Handling System	351-7007	1-B	S	T/CA 13a
DA49-170-sc-658 Philco Corporation	AFSAY D808	Research and Development of Airborne Speech Enciphering Deciphering Equipment	312-3205	1-B(U)	C	T/SE 10
DA49-170-sc-871 Chatham Electronics Corp.	MISTY	Research and Development on Multi-Cathode Trigger Tubes	332-5405	1-B(N)	C	T/IP 9/15
DA49-170-sc-885 Cook Electric Co.		Research and Development on Improved Commutator Assembly	335-5808	1-C(N)	C	T/IP 5/2
DA49-170-sc-898 Technitrol Engineering Co.	AFSAF D53 (ABNER I, Serial 2)	Research and Development on High Speed Electronic Digital Computer	352-7009	1-B(N)	S	T/CA 10/ 53
DA49-170-sc-904 Davies Laboratories, Inc.	AFSAV D30	Research and Development on Improved Audio Spectrum Analyzer	333-5605	1-C(U)	C	T/IP 7/6
DA49-170-sc-932 National Union Electric Corp.	AFSAF D1A (CONNIE II)	Research and Development on General Purpose Teletype Tape Comparator	353-7111	1-B(N)	S	T/CA 15/ 52
DA49-170-sc-953 Anderson-Nichols and Co.	AFSAM D24	Research and Development on Off-Line, Literal Cipher Machine	311-3601	1-B(U)	S	T/SE 14/5
DA49-170-sc-1009 Bendix Aviation Corp., Radio Division	AFSAY D804	Research on Low Echelon Vehicular Speech Equipment	312-3201	1-B(U)	C	T/SE 7

CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT RADAC NO.
DA49-170-sc-1033 Burroughs Corp.		Research on Bi-Stable Magnetic Elements	311-3602	1-B(N)	S	T/SE 14/4
DA49-170-sc-1037 Computer Research Corp. of California	FRIAR	Research Study on Ferro-Resonance	312-3609	1-B	C	
DA49-170-sc-1040 Freed Electronics and Controls Corp.	AFSAV D27	Research and Development of Signal Generator	331-5004	1-C(N)	C	T/IP 12/8
DA49-170-sc-1068 Transmitter Equipment Co.	AFSAV D37	Research and Development on Intercept Signal Adapters	331-5005	1-C(N)	C	T/IP 12/ 10
DA49-170-sc-1084 Anderson-Nichols and Co.		Communication Security Research and Development Assignments	311-3601	1-B(U)	S	T/SE 14/4
DA49-170-sc-1084 (4) Anderson-Nichols and Co.	AFSAZ D7315	Single Channel Fully Synchronous Teletype Equipment	311-3107	1-B(U)	C	T/SE 3
DA49-170-sc-1086 Molded Insulation Co.		Rotor (X-10)	311-3603	1-B(N)	S	
DA49-170-sc-1088 Stromberg-Carlson Co.		High Quality Vocoder and Multiplex	312-3610	1-B	S	
DA49-170-sc-1091 National Scientific Laboratories, Inc.	BAGGAGE	Research and Development Assignments on Cryptological Techniques and Components	311-3602	1-B(N)	S	T/SE 14/4
DA49-170-sc-1094 Sylvania Electric Products, Inc.	APRICOT	Development of Interim RFP Techniques	331-5002	1-C(N)	S	T/IP 12/3

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT TASK NO.
DA49-170-sc-1102 Norden Laboratories Corp.	AFSAZ D7300	Research and Development on the AFSAZ D7300 and Improvements on the AFSAY D806	312-3400	1-B(N)	C	T/SE 9/1
DA49-170-sc-1104 Motorola, Inc.		Research Study on Secure Pulse Communications Systems	312-3611	1-B	S	
DA49-170-sc-1105 Airborne Instruments Laboratory, Inc.	AFSAM D22	Multiplex Encipherment Equipment (AN/FGC-5)	311-3101	1-B(U)	C	T/IP 25
DA49-170-sc-1110 Victor Adding Machine Co.	AFSAZ D7305	Message Synchronizer for Teletype Security Equipment	311-3106	1-B(N)	U	T/SE 34
DA49-170-sc-1112 Ampex Electric Corp.	AFSAV D25A	Ciphony and Cifax Intercept Recorder-Reproducer	333-5100	1-C(U)	C	T/IP 8/6
DA49-170-sc-1116 Armour Research Foundation		Research on Core Materials	361-1104	1-B(N)	U	T/CA 15/ 55
DA49-170-sc-1119 International Electronics Engineering, Inc.	TEMPEST	Research Study on Spurious Signal Radiation and Conduction	311-3604	1-B(U)	S	
DA49-170-sc-1120 Air Associates	AFSAZ D801	Research on High Echelon Speech Security Equipment	312-3200	1-B	C	T/SE 15/2
DA49-170-sc-1122 Minneapolis-Honeywell Regulator Co.		Research and Development on Rotor (X-11)	311-3603	1-B(N)	S	

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT RABAC NO.
DA49-170-sc-1123 ERA, Division of Remington Rand	IGLOO	Magnetostatic Head Reproducing Equipment	333-5101	1-C(N)	U	T/IP 7/4
DA49-170-sc-1133 Western Electric Co.		Research Study on Communication Problems	312-3606	1-B(U)	S	T/SE 15/2
DA49-170-sc-1137 Anderson-Nichols and Co.	AFSAZ D7315	Development of Service Test Models of AFSAM D15 (AFSAZ D7315)	311-3107	1-B(U)	C	T/SE 3
DA49-170-sc-1155 Philco Corporation	AFSAY D808	Development of Low Echelon Ciphony System	312-3205	1-B(U)	C	T/SE 10
DA49-170-sc-1160 American Phenolic Corp.		Rotor (X-9)	311-3603	1-B(N)	S	
DA49-170-sc-1171 Remington Rand	AFSAF D69 (DEFROST)	Research and Development on Microfilm Viewer- Reproducer	354-7212	1-B(N)	C	T/CA 30/ 53
DA49-170-sc-1175 Denver Research Institute	AFSAF D12B (VIVIAN)	Research and Development on Special Purpose Comparator	353-7112	1-B	C	T/CA 16/ 55
DA49-170-sc-1195 University of Pennsylvania, Moore School of Engineering	DOOR.	Noise Communications Intercept Study	331-1101	1-C(N)	S	T/IP 12/9
DA49-170-sc-1219 ERA, Remington Rand	PHANTOM	Modern Communications System Study	334-5702	1-B(N)	TS	
DA49-170-sc-1227 Technitrol Engineering Co.	DERVISH	Engineering and Shop Services	353-7406	1-B(U)	TS	T/CA 31

CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT RAC NO.
DA49-170-sc-1230 Davies Laboratories, Inc.	AFSAV D41/1 AFSAV D41/2 (OAK)	Magnetic Tape Signal Analysis Equipment	333-5009	1-C	C	R/IN 7/8
DA49-170-sc-1231 Boston Research Division, U. S. Testing Co.		Research and Development on Flammable Plastics Material	311-3603	1-B(N)	C	
DA49-170-sc-1240 Philco Corporation	RAMBLE (AFSAX D505/1) (AFSAX D505/2)	General Development of Cifax Equipment	312-3607	1-B(U)	S	T/SE 15/1
DA49-170-sc-1241 Anton Tool and Mfg. Co.		Machine Shop Services	320-0500	1-B(N)	S	T/SE 14/4
DA49-170-sc-1244 Anderson-Nichols and Co.	AFSAM 9	Research and Development of Portable High-Security Cipher Machine	311-3100	1-B(U)	S	T/SE 6
DA49-170-sc-1252 Underwood Corporation	AFSAM D17	Research and Development on Portable Mechanical Cipher Machine	311-3001	1-B(U)	S	T/SE 35
DA49-170-sc-1269 Sterling Engineering Co.	AFSAW D7215	Automatic Rotor Wiring Equipment	313-3508	1-B(U)	C	R/CS 39
DA49-170-sc-1277 Airtronic Research, Inc.		Engineering and Shop Services (for design, layout, construction and testing of DUCHESS and other equipment)	353-7109	1-B(N)	C	T/CA 32/ 52
DA49-170-sc-1284 Anderson-Nichols and Co.	AFSAM D7A	Research and Development on Low Echelon Cipher Machines	311-3000	1-B(U)	S	T/SE 2/ 2a

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT RADIO NO.
DA49-170-sc-1286 Western Electric Co.	AFSAY D809	High Echelon Unattended Ciphony Equipment	312-3206	1-B(N)	S	T/SE 5
DA49-170-sc-1289 Technitrol Engineering Co.	BROADCLOTH	Research Study of Electric Delay Lines (Application Electronics to Cryptology)	361-1102	1-B(N)	S	T/CA 15/ 50
DA49-170-sc-1292 Anderson-Nichols and Co.	INCHER (AFSAF D125)	Intermittent Tape Stepper	353-7200			
DA49-170-sc-1295 National Union Electric Corp.	VARANT	Various Analytical Tubes	361-1105	1-B	S	T/CA 11
DA49-170-sc-1296 Burroughs Corp.	AFSAM D26	Single Channel Synchronous Teletype Security Equip- ment	311-3601	1-B(N)	S	T/SE 14/5
DA49-170-sc-1299 Eastman Kodak Co.	AFSAV D33A	Rapid Automatic Film Processor	333-5008	1-C(U)	C	T/IP 7/7
DA49-170-sc-1304 Davies Laboratories, Inc.		Research and Development Assignments	330-5811	1-B(U)		
DA49-170-sc-1305 Perrin and Martin, Inc.		Sheet Metal Work	320-0500			
DA49-170-sc-1311 National Electrical Machine Shops, Inc.	ENVELOPE	Engineering Shop Services	300-0600			
DA49-170-sc-1315 Burroughs Corp.	WAGON	Study of High Speed Switching	361-1108	1-B(N)	S	R/AE 60

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT PARAGR NO.
DA49-170-sc-1322 Ultrasonic Corp.	PALLY	Copy Editing Recognition and Recording System	352-7210	1-B(N)	C	T/CA 3/50
DA49-170-sc-1329 Air Associates, Inc.	AFSAW D7224	High Speed Key Tape Reproduction Equipment	313-3510	1-B(U)	C	T/CS 38
DA49-170-sc-1335 Bendix Radio Corp.	AFSAY D804	Low Echelon Ground Ciphony Equipment	312-3201	1-B(U)	S	T/SE 7
DA49-170-sc-1337 Burroughs Corp.	AFSAM D7A	Low Echelon Literal Cipher Machine	311-3000	1-B(U)	S	T/SE 2/ 2a
DA49-170-sc-1343 International Electronics Engineering, Inc.	AFSAZ D7319	Electronic Teletype Mixer	311-3109	1-B(U)	S	
DA49-170-sc-1349 Haskins Laboratories, Inc.	BUTPRESS	Research on Speech Analysis and Synthesis	312-1100	1-B	U	
DA49-170-sc-1351 Remington Rand, Inc.	AFSAM D30	High Echelon Teletype Security Equipment	311-3102	1-B	S	
DA49-170-sc-1354 Philco Corp.	AFSAM D37	Shipboard Synchronous Teletype Security Equipment (FOX)	311-3601	1-B(U)	S	T/SE 14/5
DA49-170-sc-1375 Fada Radio and Electric Co.	AFSAV D26A EAGLE	High Speed Signal Intercept Equipment	331-5300	1-C(U)	S	T/IP 11/5
DA49-170-sc-1378 Allen B. Dumont Laboratories		General Development of Cifax Equipment (High Speed Key Generator Research)	312-3607	1-B(U)	S	T/SE 15/1

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT PARAG NO.
DA49-170-sc-1391 Melpar, Inc.	BASEBALL	Central Processing System	332-5410			
DA49-170-sc-1401 Burroughs Corp.	AFSAF D122	Desk Digital Counter	353-7600			
DA49-170-sc-1402 Western Union Telegraph Co.	DINGBAT I (AFSAZ D7321)	Electro-Mechanical Experimental Model	300-3514	1-B(U)	U	
DA49-170-sc-1404 Radio Corporation of America	DINGBAT II (AFSAZ D7320)	Electronic Printing Telegraph Signal Normalizer	300-3514	1-B(U)	U	
NAonr-233 (00) University of California	SCAMP	Mathematical Research at Institute for Numerical Analysis, University of California, Los Angeles, California	340-1004	1-B(N)	U	T/CA 6/ 57
NAonr-151-52 Bureau of Ordnance	THOR	UHF Research	362-1106	1-B(N)	S	T/CA 37
NObsr-63010 (29) ERA, Division of Remington Rand, Inc.	AFSAF D70A (ATLAS II Serial 1)	Sequence Controlled Cryptanalytic Device	351-7006	1-B(N)	S	T/CA 9/ 52
NObsr-63010 (32) ERA, Division of Remington Rand, Inc.	AFSAF D70B (ATLAS II Serial 2)	Sequence Controlled Cryptanalytic Device	351-7006	1-B(N)	S	T/CA 9/ 52
NObsr-63010 (36) ERA, Division of Remington Rand, Inc.	DIAS	Ferro-Electric Storage Problem	361-1107	1-B(N)	U	R/CA 54

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT R&AC NO.
NObsr-63010 (37) ERA, Division of Remington Rand, Inc.	SWEATER	Specialized Mathematical Research	340-1102	1-B(N)	TS	T/CA 6/ 53
NObsr-63010 (37) ERA, Division of Remington Rand, Inc.	TAURUS	Component Investigation	361-1103	1-B(N)	U	T/CA 15/ 51
NObsr-63010 (38) ERA, Division of Remington Rand, Inc.	BRICK	Coincidence Anti-Coincidence Detector Units	361-1109	1-B(N)	U	R/AE 66
NObsr-63010 (39) ERA, Division of Remington Rand, Inc.	BOGART (AFSAF D131)	Limited Purpose Computer	352-7011	1-B(N)	U	R/AE Ad Hoc 1
NObsr-63010 (41) ERA, Division of Remington Rand, Inc.	ANDY	Non-Destructive Readout	361-1111	1-B(N)	U	R/AE 65
NObsr-63472 International Business Machines	AFSAF D68 (DUCHESS)	High Speed Statistical Placode Diagnostic Equipment	353-7109	1-B(N)	C	T/CA 33/ 52
NObsr-63472 International Business Machines	AFSAF D70	407 Flexible Storage Unit	332-5411	1-B(U)	C	R/AE 2
NObsr-63472 International Business Machines	AFSAF D74 (MAISIE)	Magnetic Card File	353-7506	1-B(N)	S	T/CA 4

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CONTRACT NO.	NOMENCLATURE OR COVER NAME	DESCRIPTION	TASK NO.	PRIORITY	CLASSIFI- CATION OF TASK	AFSAT PARAGR NO.
NObsr-63472 International Business Machines	AFSAF D72 (SLED I)	IBM Alphabetic Slide Run Machine	351-7106	1-B(U)	S	T/CA 23/ 50
NObsr-64082 Commercial Controls Corp.	AFSAF 96B	Development of CXCO-2 Type Equipment	354-7208	1-B(N)		T/CA 8/ 63
NObsr-64125 Teletype Corporation	AFSAM 47 AFSAM 47B	Shipboard Literal Cipher Machine	311-3022	1-B(U)	C	
NObsr-64125 Teletype Corporation	AFSAM 33	Teletypewriter Cryptographic Attachment, MK-2	311-3108			
Nonr-530 (03) Iowa State College	HARRIDAN	Studies of Theoretic Cryptanalysis	340-1003	1-B(N)	C	T/CA 6/ 55
Nonr-870 (00) North Carolina State College of Agriculture and Engin- eering	HARRIDAN					
N6Ori-07127 University of Illinois	ANABRANCH	Cycle Studies	350-1001	1-B(N)	TS	T/CA 6/ 52
N7onr- 419		Research Studies on Multiplier Tubes	361-1102	1-B(N)	S	T/CA 15/ 50

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