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RESEARCH STUDY 59-1

Survey of Psychological Factors In Image Interpretation

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PERSONNEL RESEARCH AND PROCEDURES DIVISION
THE ADJUTANT GENERAL'S OFFICE
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Research Study, ~~59-1~~

6 SURVEY OF PSYCHOLOGICAL FACTORS IN IMAGE INTERPRETATION,

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BRIEF

SURVEY OF PSYCHOLOGICAL FACTORS IN IMAGE INTERPRETATION

Requirement:

The Assistant Chief of Staff for Intelligences has a requirement for human factors research in image interpretation. This requirement stems from the Army's critical need to improve the combat intelligence capability of tactical units. Moreover, technological advances have created special purpose systems that place new demands upon the human element involved in image interpretation.

Procedure:

A survey of research literature on image interpretation was conducted during which 68 publications were reviewed and 19 organizations concerned with image interpretation were contacted. These means were used to gain a thorough understanding of military requirements in this area and appropriate general guidelines necessary for the development of a broad program of psychological research.

Conclusions:

The Army's personnel selection and utilization problems in image interpretation phases of intelligence information collection are amenable to a research approach. The following six research areas are suggested as comprising a suitable plan in that they most clearly focus upon the Army's needs, and they promise to yield a good return. (A more detailed description of this plan is presented in the complete FY 1960 task statement, attached as Appendix B):

Identification of Basic Factors in Image Interpretation

Development of Selection Techniques for Image Interpreter Personnel

Techniques and Missions for More Effective Utilization of Image Interpreters

Utilization Measures under Conditions of Emergency Demands

Identification of Basic Factors in "Real Time" Interpretation

Effective Group Approaches for the Accomplishment of Major Image Interpreter Missions

SURVEY OF PSYCHOLOGICAL FACTORS IN IMAGE INTERPRETATION

BACKGROUND AND PURPOSE

The procurement of accurate intelligence about the enemy plays a prominent role in the successful accomplishment of tactical missions. Military decisions require an estimate of the enemy's strengths and weaknesses, manner of deployment, and his possible courses of action. To provide needed information, various sources of intelligence must be utilized by a tactical military organization.

The Army has long had a need for a strong intelligence capability for meeting tactical demands. A rapidly-advancing technology has spelled out the need for establishment of special purpose systems in order to improve this capability. The optimal exploitation of these systems once in operation present a challenge that has major implications for greater utilization of human skills and abilities.

Image interpreters already play a prominent role in intelligence operations because of the huge amount of reliable information that can potentially be obtained by the skilled performer in this type of assignment. While automation can be expected to play a larger and larger role in intelligence information collection and processing, the human intellect must still be relied upon to extract meaningful information from images. In line with this thinking, the Assistant Chief of Staff for Intelligence has generated a requirement for human factors research in image interpretation. In order to meet this requirement, the Personnel Research Branch has conducted an exploratory study to define the problem areas and to identify those areas that:

1. Most clearly focus upon the Army's needs.

2. Are amenable to research attack.

3. Promise to yield a good return.

In this study, an effort was made to take advantage, of prior research in the field--civilian and military--to serve as a point of departure for the current proposals. Information was obtained by conducting a survey of research literature and by consulting with knowledgeable people directly and peripherally concerned with image interpretation--both research and user persons. (See Appendix A for a list of organizations in which such people were consulted.)

This report describes military requirements in image interpretation, suggests where psychological studies are needed, and develops a broad program of research with particular emphasis on the significance to the Army of each of the proposed research areas. The proposed areas are limited to those within the mission and capabilities of the Personnel Research Branch.

THE MILITARY REQUIREMENT

Intelligence information which lacks timeliness is of little value; inaccurate information could lead to military failure, as could incomplete information. To perform his role adequately, the image interpreter must scan the photographs, determine what is relevant, and extract the necessary information quickly, accurately, and completely. In addition to extracting the intelligence information, the image interpreter must communicate this material so that its exact meaning is conveyed to those making decisions. Hence, the military requirement of image interpretation can be defined as the COMMUNICATION TO ACTION PEOPLE OF RELEVANT, TIMELY, ACCURATE AND COMPLETE INFORMATION DERIVED FROM IMAGERY.

THE NEED FOR PSYCHOLOGICAL RESEARCH

The need for psychological research is in large measure predicated upon the demands of the military for quantitative and qualitative improvement in the intelligence information collection capability1/. This need relates particularly to the ever-increasing volume and variety of photographic and other imagery material that is becoming available as a function of the actual and planned increase in the Army's collection effort for intelligence information of a tactical nature. It is evident that as new devices are developed and improved, the human being will become more and more the limiting factor in the intelligence processing subsystem. Therefore it becomes imperative to take a close look at the image interpreter himself to see how he fits into the intelligence chain, and how human resources can best be utilized and manipulated in order to keep pace with the ever mounting needs of the Army in this nuclear missile age. The broad, basic problems that need psychological study are:

1. HOW CAN HUMAN SKILLS AND ABILITIES BE EMPLOYED TO YIELD HIGHLY ACCURATE INTELLIGENCE INFORMATION FROM CONVENTIONAL HIGH RESOLUTION IMAGES AS WELL AS FROM NONCONVENTIONAL IMAGES PROCURED BY NEW DEVICES AND TECHNIQUES?

2. HOW CAN HUMAN RESOURCES OF THE IMAGE INTERPRETER PERSONNEL BE MANIPULATED TO COPE WITH THE INCREASING VOLUME AND TYPES OF IMAGES AND STILL MEET ACCEPTABLE STANDARDS OF TIMELINESS, ACCURACY, AND COMPLETENESS OF INTELLIGENCE INFORMATION?

SPECIFIC RESEARCH AREAS

The six suggested human factors research areas presented below focus primarily on the manipulation of human resources in order to maximize quality and quantity of output of the image interpretation system. Three of the research areas (A, B, and E) deal primarily with the individual's contribution to an image interpreter system as a function of his abilities and techniques.

1/Field Army Combat Surveillance, 1960-1970, 1 Sep 58.

Areas C, D, and F focus principally on the utilization of image interpreter personnel. Each of these areas is discussed in turn with emphasis on the nature of the problem and the specific contribution it is expected to make. The FY 1960 work program statement of the Personnel Research Branch appears as Appendix B.

A. IDENTIFICATION OF BASIC FACTORS IN IMAGE INTERPRETATION

What basic psychological factors--skills, abilities and personality components--are requisite to good interpreter performance? What are the differences introduced in these psychological requirements by the introduction of images that differ in type (e.g., radar) from the conventional high resolution photograph? And what are those related to differences in content (e.g., mobile missile sites vs. nuclear stockpiles)? Which techniques employed by image interpreters are conducive to good performance? What are the clues and misclues specific to critical targets? Three subareas are contemplated to provide the answers to these questions.

Identification of Basic Skills, Abilities and Personality Characteristics. The first subarea deals with factors differentially related to image type (high resolution pictures, degraded photographs, radar pictures, and infrared images) and image content (e.g., images of urban areas and of rural areas). This study encompasses both the identification of skills, abilities and personality characteristics required in image interpretation of high resolution images, as well as the identification of similarities and differences in those psychological factors which are related to change in image type and image content. Not only will this study contribute to the understanding of the underlying psychological variables related to performance, but it will be designed to yield measures which are differentially predictive of success in the interpretation of the different types of images. Such measures would be useful for purposes of differential classification or differential utilization of image interpretation personnel.

Psychological Processes. The second subarea relates to psychological processes and techniques utilized in image interpretation. The purpose of this subarea is to identify the critical techniques and procedures successfully employed by image interpreters. Interpreters will be identified who are at the good end and who are at the poor end of the range of image interpretation abilities; then the specific and unique procedures used by the good performers will be identified for use in improving the product itself.

Target Identification. The intent of the third subarea is to identify critical targets, clues, and misclues useful to image interpreters in the conduct of their work. Critical targets will be identified by a panel of experts. Test imagery of these critical targets will be administered experimentally to image interpreters. Reasons for the detection and identification of these targets will be used to fix on the clues and misclues specific to each target. Such information will improve not only the quality of intelligence information but also the speed with which it is obtained.

Image Interpreter Performance. In the conduct of research on factors differentially related to image type and on psychological processes in image interpretation, a realistic and objective measure of image interpreter performance will be developed. This measure will be used in the first case to assess the measures of skill, ability, and personality and in the second case to assess the techniques which may be most closely related to good performance. It will incorporate sub-scores on the speed, accuracy, and completeness with which a series of given images is interpreted. The development of such a criterion measure of performance, in and of itself, may be considered a prime contribution to the other research areas, since this measure in its entirety or with some modification is needed in many of the proposed studies.

End Product. Research Area A will yield information contributing to the understanding of the underlying psychological variables related to performance. It will yield a measure of performance that can be used with (or perhaps without) modification in subsequent research studies. It will provide an answer to the question of whether different skills and abilities are required in the interpretation of different types of images. It may provide measures which can be used for the selection and utilization of personnel in the interpretation of different types of images. It may identify techniques causative of good image interpreter performance. It will pin-point certain skills and abilities related to good performance that should be developed and emphasized, and it will specifically identify clues most relevant to the identification and location of critical targets.

B. DEVELOPMENT OF SELECTION TECHNIQUES FOR IMAGE INTERPRETER PERSONNEL

The absence of a systematic selection procedure for officer personnel to attend image interpreter training, coupled with the dissatisfaction expressed by training personnel with the quality of the performance of officers currently assigned for image interpreter training, provides the basis for the second research proposal2/. The purpose of this research study is to develop measures which will identify, prior to assignment, those officers who can be expected to perform well in the area of image interpretation.

Selection for Training and Assignment to Duty. Two subareas are contemplated to resolve the problem of selection. Subarea 1 relates to school performance and Subarea 2 to on-the-job performance. Variables that appear promising in Research Area A, "Identification of Basic Factors in Image Interpretation" will be assessed in terms of their predictive efficiency for the selection of officers who will perform well in training. Area A variables, together with

2/ The selection measure for enlisted assignment to image interpreter training, Aptitude Area GT, has been found to be highly efficient for identifying EM who will be good in image interpreter training. However, this measure does not possess sufficient sensitivity for the already highly selected officer group. Furthermore, other factors above and beyond those measured by Aptitude Area GT can be expected to exert a relatively more profound effect on officer performance than on enlisted performance. However, the measures developed for the officer group may be tried out in an EM group.

other promising ones, will be assessed in terms of their predictive efficiency for the on-the-job performance. On-the-job performance is, of course, the most critical element since this is where the improvement is desired. Moreover, on-the-job performance imposes many requirements that differ from those in the school situation. Final course grade will be used as a measure of school success; the performance measure developed in the conduct of the preceding research, or a modification thereof, will be used for the on-the-job evaluations.

End Product. The end product will be a set of selection measures which can be used for the selection of officers to attend image interpreter training and for the assignment of officers to image interpreter jobs. The use of such measures can be expected to improve the quality of personnel input into these jobs, and hence result in an improvement of image interpreter performance itself.

C. TECHNIQUES AND MEASURES FOR MORE EFFECTIVE UTILIZATION OF IMAGE INTERPRETERS

Timely intelligence information that is both accurate and complete is a basic military requirement. Very frequently, timeliness of information is dependent on the speed with which the images are processed, including time for the interpretation of the image itself. A complicating factor that must be considered when interpretation speed-up becomes a requirement is accuracy loss. It is evident that speed and accuracy (certainly beyond a certain level of speed) are inversely related to each other. Consequently, it becomes imperative in developing effective measures of image interpretation, to understand the extent of accuracy loss for specified speed requirements. Under varying conditions, various accuracy levels might be acceptable. Once the minimum level of accuracy acceptance is established for a given situation, the minimum time that must be provided for the interpretation of the image is fixed, provided the relationship between speed and accuracy is known.

Utilization of Image Interpreters to Meet Necessary Speed Requirements. Two subareas of research are contemplated. Subarea 1 will establish the relationships among speed, accuracy, and completeness of image interpretation. For given sets of imagery, accuracy determinations will be made at specified time intervals of image interpretation. Subarea 2 will identify various scanning approaches used by image interpreters and will assess the effectiveness of each of the approaches in terms of speed, accuracy, and completeness of image interpretation.

End Product. Research Area C will make two primary contributions: (a) It will provide commanders of interpreter units with information about the parameters of speed, accuracy, and completeness as they relate to each other. This information can be used in the assignment of work tasks as the situation demands. (b) It will identify optimal scanning procedures and approaches contributing to improvement in speed, accuracy, and completeness of image interpretation.

D. UTILIZATION MEASURES UNDER CONDITIONS OF EMERGENCY DEMANDS

Another problem facing the image interpreter today is the increased volume of imagery that he is required to interpret. This increase in volume imposes new and at times excessive demands on the image interpreter, placing him in a situation of stress. To complicate matters, the new types of imagery impose yet another problem. If anything, the demand for information is increasing and the new types of imagery are of a quality far below that obtained by means of high resolution photography. Therefore this research proposal is concerned with evaluating two aspects of the effect of operational demands on productivity. The first one (Subarea 1) is to determine the effect of demand-produced stress on image interpreter productivity, and the second one (Subarea 2) is to determine just how much information can be squeezed out of image interpreters in their interpretation of images of low quality.

Demand-Produced Stress and Productivity. The intent in this area is to determine the effect of demand for volume on output in terms of volume, accuracy, and completeness of image interpretation. It is quite possible that the demand for increased volume at given accuracy levels may result in an increase in volume at the expense of accuracy; or there might be no increase in volume at all coupled with a decrement in accuracy. What are the limits in demand to which the image interpreter can be subjected that will provide optimal output? What are the effects of demand on output, separately, for speed, accuracy and completeness?

Limits of Information that Image Interpreters Can Provide. By the very nature of their training and work which puts a premium on accuracy, image interpreters may be subconsciously reluctant to give all information that they see in the picture if this information does not come up to their standards of accuracy. This research, by means of probing techniques, will attempt to determine how much information of this type can be obtained, and its level of accuracy.

End Product. Results of this study will provide knowledge of what productivity can be expected from image interpreters under varying conditions of demand-produced stress, and how much more information at varying levels of accuracy can be obtained by pressuring image interpreters to respond in a manner that breaks through the limits of psychological set.

E. IDENTIFICATION OF BASIC FACTORS IN REAL TIME INTERPRETATION

The presentation of fleeting, momentary images, such as seen on television, can be expected to play an important role in future reconnaissance systems. The interpretation required is commonly called 'real time' interpretation and may present new problems requiring different procedures and aptitudes.

Projected Army plans contemplate the use of real time image interpretation in the tactical situation. Demands for speedy procurement of information are the essential factors basic to this requirement. The purpose of this study is to determine similarities and differences in psychological factors required in real time image interpretation when compared with those found in the more

conventional type of image interpretation. Such knowledge can be useful in the development of selection devices for people who will do real time image interpretation. It can provide information on the skills and abilities specific and unique to real time image interpretation which should be developed and emphasized; and it can identify techniques and approaches conducive to good real time image interpretation.

Basic Factors and Techniques. Three subareas are contemplated. Subarea 1 will identify the skills and abilities required for real time interpretation which can then be compared with those identified for conventional image interpretation. Subarea 2 will be a technique study designed to produce individual interpreter approaches most productive for intelligence procurement; and Subarea 3 will focus on the major configurational patterns and other associational factors leading to instantaneous detection and recognition of critical targets.

Performance in Real Time Interpretation. The assessment device for the first two subareas, a performance measure on moving picture film, can be developed, and accuracy and completeness scores of the interpretation can be obtained. Subarea 3 will utilize the same performance measure, but not as an assessment device. Instead, the performance measure will be used in the identification of configurational patterns and associational features required in the instantaneous recognition of critical targets.

End Product. Area E will therefore make three contributions: (a) It will provide selection and classification tests that identify individuals who will perform well in real time interpretation. (b) It will provide techniques that yield high quality intelligence from real time interpretation. (c) It will yield configurational patterns and other features associated with the instantaneous detection and recognition of critical targets. This latter knowledge is useful not only in real time interpretation, but it may also have application in the interpretation of other imagery and thus contribute to general speed-up.

F. EFFECTIVE GROUP APPROACHES TO ACCOMPLISH MAJOR IMAGE INTERPRETER MISSIONS

The preceding research areas focused on the individual with the intent of improving the output of each individual. In contrast, this research area concerns the group, the image interpreter unit. Typical unit missions and approaches to their solution will be subjected to empirical study. A typical mission might be the determination of the existence of a missile site. The need for this information is immediate and the number of images is very large. What are the different approaches in terms of work assignment that can be taken, and which one of these best fulfills the Army's requirements? Although improvements in image interpreter selection and image interpreter techniques in and of themselves can be expected to yield an improved product, such improvements are not sole determiners of high quantity and high quality interpreter productivity. Proper utilization of personnel to accomplish specified missions could do much to insure a high yield. Conversely, improper utilization of personnel could do much to negate any improvements in image interpreter selection and image interpreter techniques. It therefore becomes important

to take a close look at different group approaches to the image interpreter missions. The nature of such a group study imposes certain limitations, however. Specfically, atypical situations are not included, since by definition they occur rarely and hence the expected payoff is negligible. Essentially, the study is to find out what are the typical interpreter missions and what are the typical approaches to these missions? Following this, an assessment of the effectiveness of these approaches will be made to identify the best.

Identification and Assessment of Typical Missions. From a research point of view, two subareas evolve logically out of this problem. Subarea 1 deals with an establishment of typical missions, together with approaches (both empirical and theoretical) for their accomplishment. Subarea 2 deals with the assessment of these approaches. In the assessment of approaches, the various approaches will be evaluated against total unit performance in terms of the volume of imagery interpreted over a specified period of time and the accuracy and completeness with which this is done. The assessment measure will be a modification of the criterion measure developed in the conduct of the prior research.

End Product. The yield of this study will be a series of group approaches specific to typical missions which can be expected to maximize unit productivity, both in terms of quality and quantity.

SUMMARY OF RESEARCH PROPOSED

The proposed six research areas focus on the needs of the Army as a result of the ever-increasing volume, and types of imagery and variety of image content that is becoming available in conjunction with the increased demands for speed, accuracy, and completeness of image interpretation. Each of the areas revolves around this central requirement with the first research area covering the more general psychological processes and subsequent research areas investigating the more specific ones. All of these areas are amenable to research attack and can be expected to yield a good return by providing the image interpreters and administrators with the essential tools and techniques that will improve their product in terms of the Army's requirements. Briefly recapitulated, the research problems and their expected contributions are:

IDENTIFICATION OF BASIC FACTORS IN IMAGE INTERPRETATION

Selection and assignment procedures.

Improved techniques for image interpretation.

Clues that identify critical targets.

Knowledge and skills that should be developed.

DEVELOPMENT OF SELECTION TECHNIQUES FOR IMAGE INTERPRETER PERSONNEL

A test battery identifying prior to assignment those officers who will be good in image interpreter training, as well as on the job.

Improved productivity as a result of better image interpreter talent assigned to image interpreter duties.

TECHNIQUES AND MEASURES FOR MORE EFFECTIVE UTILIZATION OF IMAGE INTERPRETERS

Parameters of speed, accuracy and completeness of interpretation as they relate to each other--useful in the assignment of tasks as the situation demands.

Scanning procedures that contribute to speed-up of image interpretation.

UTILIZATION MEASURES UNDER CONDITIONS OF EMERGENCY DEMANDS

Knowledge of how much can be demanded of image interpreters without adversely affecting productivity.

Knowledge of how much information can be squeezed out of the incumbent in his interpretation of degraded imagery.

IDENTIFICATION OF BASIC FACTORS IN REAL TIME INTERPRETATION

Selection and assignment procedures.

Techniques conducive to good real time interpretation.

Real time interpretation clues for critical targets.

Knowledge of special skills that should be developed.

EFFECTIVE GROUP APPROACHES TO ACCOMPLISH MAJOR IMAGE INTERPRETER MISSIONS

A determination of the typical missions.

Group approaches designed to maximize image interpreter productivity in typical missions.

REQUIREMENTS

The requirements of the research vary with the different research areas. However, there are certain general requirements.

1. Subject matter experts, individuals with a great deal of image interpretation experience, must be made available for test construction purposes.

2. Imagery that meets specified requirements of type and content must be procured.

3. Image interpreters to serve as examinees in the experiments are needed in some cases for as long as two to three days. Because only a small number of image interpreters exists in all three services, interservice cooperation would be most desirable in order to obtain results that possess the desired stability.

4. Testing facilities, e.g., testing rooms and special equipment must be made available.

CONCLUSIONS AND RECOMMENDATIONS

The scope of the research program presented in this report is extensive, covering many facets of selection, classification, assignment, and utilization of image interpreters. The implementation of such a program requires many man-years of professional service. It therefore becomes important to take a close look at the program in order to determine which areas to attack first. While such determination is ultimately made by the user agency, since it can best interpret operational requirements, research considerations such as the following nevertheless enter into the picture.

For example, the study on psychological factors basic to image interpretation would logically come first, since it will provide information and test materials needed in the other studies. A research area that might be given low priority, on the other hand, is the one on effective group approaches to accomplish major image interpretation missions. The stumbling block to the accomplishment of this research area would be a lack of a large number of functioning image interpreter units. Research results based upon small samples are generally unreliable and hard to interpret. A longitudinal approach to this study might provide large enough samples, but the very nature of such an approach makes it very time consuming.

Consistent with operational requirements, therefore, the recommendation would be to assign top priority to the "basic factors" study, lowest to the "group approaches" study and have the remaining studies assessed by the user people for the establishment of order of preference.

APPENDIXES

Appendix A Organizations Visited on Survey on Research in Image Interpretation

Appendix B Psychological Factors in Image Interpretation--IMAGERY

APPENDIX A

ORGANIZATIONS VISITED ON SURVEY ON RESEARCH IN IMAGE INTERPRETATION

I. CONTROL AND USER ORGANIZATIONS

A. Office of the Assistant Chief of Staff for Intelligence
B. The Army Intelligence Board
C. The Photo Intelligence Center
D. The Naval Intelligence Photographic Interpretation Center
E. Joint Chiefs of Staff
F. WSEG

II. IMAGE INTERPRETATION TRAINING ORGANIZATIONS

A. The Army Intelligence School
B. The Naval Intelligence School
C. AF Directorate for Intelligence Training, Photo-Radar Interpretation Branch, Sheppard Air Force Base, Texas

III. ORGANIZATIONS DOING IMAGE INTERPRETATION RESEARCH

A. The Rome Air Development Center
B. The United States Army Combat Surveillance Agency
C. The United States Army Electronic Proving Grounds, The Combat Surveillance Department, Fort Huachuca, Arizona
D. Cornell Aeronautical Laboratory
E. Applied Psychology Corporation
F. Aero Service Corporation
G. Broadview Research Corporation
H. Florida State University
I. United States Army Engineer Research and Development Laboratory
J. Personnel Laboratory, Lackland Air Force Base

APPENDIX B

The Adjutant General's Personnel Research Work Program proposed for FY 1960 includes the following task description for research to be undertaken in the area of image interpretation:

Task Title: Psychological Factors in Image Interpretation--IMAGERY

Principal Investigators:

S. H. King
J. Zeidner

Scope:

Need for and objective of research: The Assistant Chief of Staff for Intelligence has a requirement for research in the area of Image Interpretation. Photographic, radar, thermal (infrared) and television images as well as moving target indicators (MTI) are important sources of intelligence information. Speed, accuracy, and completeness in the interpretation of these expensively obtained images are essential to effective strategic and tactical planning.

The initial objective was to survey the scope and nature of the problem with respect to the development of performance standards and selection methods. The research effort was then to be expanded to include determination of the common and unique psychological abilities, skills and techniques involved in image interpretation via the several media. Such information would provide a basis for the conduct of pay-off research in this area

Method of attack: During FY 1959 an exploratory study (the present study) was conducted which included both a survey of research literature and an interview survey of user and research individuals concerned with image interpretation. This survey provided the information needed to formulate more detailed research plans.

Image interpreters will be observed, interviewed and measurements of performance by several media will be obtained. The characteristics of personnel presently engaged in image interpretation will also be assessed by collecting available background and aptitude data, by measuring physiological capacities, and by development of other specific measures of relevant skills and aptitudes. On the basis of these data, selection and assignment procedures will be developed. Identification will be made of the knowledges and skills that should be developed in image interpretation.

Assessment of the requirements of image interpretation jobs and the necessary characteristics of persons engaged in these jobs will be determined to develop more effective individual and unit performance.

Analysis will be made of the specific techniques employed by good and poor interpreters--of the clues they use in making identification. The relationship of speed, accuracy and completeness parameters of image interpretation and of methods for extracting additional information from degraded imagery will also be determined.

Potential military research end-result: (1) Performance standards for image interpreters, (2) Selection tests for image interpreters, (3) Improve techniques for image interpretation, particularly from the standpoint of speed of interpretation, (4) Approaches that maximize group and individual interpreter productivity in typical missions, (5) Knowledge of optimal limits of sustained work and time demands, and (6) Determination of clues useful in identifying critical military targets.

Subtasks:

The FY 1960 effort is planned to include work in the following areas:

Identification of basic factors in image interpretation

Development of selection techniques for image interpreter personnel

Techniques and measures for more effective utilization of image interpreters

Utilization measures under conditions of emergency demands

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