

D R A F T

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RESERACH AND DEVELOPMENT OBJECTIVES

INFORMATION/MATERIAL HANDLING SYSTEM (IMHS)

1. INTRODUCTION. This document conveys the background, concept and requirement of a government sponsored research and development program in the field of information/material handling as it relates to imagery exploitation processes.

1.1 Background. Exploitation requirements for information and materials handling will greatly expand because of the increasing and improving acquisition materials. This, in turn, will require studies and development for handling and reporting the analysis of photo imagery. Investigation and development thus far has provided only limited "on-line" computer capability for the derivation of selected stored information. This program is intended to cover three areas of development necessary to solve the problems arising from the increasing volume of imagery materials which require exploitation, these being: information handling, materials handling and a resultant data link systems development. This program is concerned with these aspects only and does not address an overall system analysis concerning complete organizational operation. For purposes of clarification as to what is understood by Information and Materials Handling as opposed to System Analysis, the following definations are presented:

System Analysis is a process of thorough and methodical examination of the operations of an organization or device. It involves the application of scientific methodology to investigate functional relationships for the purpose of identifying and evaluating critical problem areas. The objective of system analysis is to gain insight to those aspects of system operations which most significantly affect total performance. System analysis is, thus,

concerned with determining which functions of an organization have the most influence on output.

Information and Material Handling is concerned with methods for the efficient flow of essential knowledge within a system. Whereas the exploitation process is, in itself, an information flow process, Information and Materials Handling as used here refers to the supporting functions which aid and abet the conversion of information. Research in this area is concerned with more effectively coding, storing, retrieving, and displaying facts.

It is anticipated that initial (FY 66) equipment development, if any, will be restricted to immediate short term requirements, while the follow-on effort (FY 67 & 68) will concentrate on the expansion of the development plan into a fully integrated IMHS.

1.1.1 Information Handling. Study and development is required to allow the photo interpreter to communicate directly with a large-capacity, computerized, information storage system in order to determine collateral information and to up-date intelligence. This includes the development of highly versatile data block and time-pip readers which are keyed to the automation of both the substantive reporting and the mensuration processes. Information should be displayed through a high-speed electronic system which is capable of handling images as well as printed information.

1.1.2 Materials Handling. The predicted increased work loads will require significant advances in the automation of materials handling problems that exist in the areas of both collateral and operational acquisition materials. Systems are needed for reduction in storage requirements and for automation of the storage, retrieval, accountability, transport, and loading processes. One of the most significant problems is that of manual roll-film handling; materials such as maps, charts,

reports, and previous photography are manually handled in much the same fashion. Studies for analysis of current procedures, predicting workloads, establishing practical levels of automation, and recommending detailed alternative solutions are required. As a result of these studies appropriate hardware should be developed. It is anticipated that control will be handled by a central computer in keeping with established procedures. One anticipated development is an automated, roll-film, handling system for storage, retrieval, accounting and transporting roll film material between the storage vault and specific operational zones.

1.1.3 Data Link System. A data link system must be developed in anticipation of the advent of [REDACTED] 25X1 reconnaissance acquisition. Systems of this type will require completely new exploitation techniques and equipment, differing in basic principles from those currently in use. Studies will be needed to define this type of exploitation. Reproduction, storage and retrieval, viewers, and mensuration equipment must be developed in consonance with the needs of the exploitation components; an entire exploitation system for NPIC use must be defined and developed. Allowances should be anticipated for the increased complexities imposed by security requirements, the

[REDACTED] 25X1
[REDACTED] around-the-clock, all-weather basis. The 25X1
likelihood of fundamental advances in image transmission technology should also be anticipated.

1.2 Concept. The contracted organization selected to accomplish this research must be capable of independent management of the program. The contracted organization must also: (1) provide or utilize leading technical

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authorities in the field; (2) be responsive to government requirements; (3) be aggressive and effective in achieving the objectives; (4) furnish forthright technical guidance to the government. Representatives of the Government, involved in this program, will maintain an open mind in evaluating any new concepts which, if successfully pursued, would add to the store of knowledge and advance the state-of-the-art. Organizations engaged in these technical developments are encouraged to present new ideas which they believe will advance the program. It is the intention of the Government to permit freedom for imagination and creativity.

1.3 Scope. The program will be planned on the basis of a three year term. This paper defines only broad objectives; proposals in response to them should contain an evaluation of the significance as related to cost and time. Careful utilization of reputable industrial management will be required, as well as obtaining maximum efficiency in all technological aspects.

2. ADMINISTRATION. The Government will retain ultimate control of the program. Objectives, costs, priorities, sub-contractors and consultants involved in the program come under the purview of the Government and approval must be obtained before these factors are employed.

2.1 Projects. Each project under this program will be divided into major accomplishment/cost phases to facilitate government review and control.

2.2 Contract Information.

2.2.1 The contractor is expected to provide competent and cooperative administrative service; he will be vested with certain authority to control the direction and degree of technical effort within the bounds of the estimated costs.

2.2.2 The contractor shall be responsible for the work performance of his sub-contractors.

2.2.3 The Contracting Officer of the Government will designate a Technical Representative to authorize specific development efforts of the contractor. Such authorization shall be given in the form of written work orders either in its original form or to confirm an oral authorization.

2.2.4 Certain written progress reports will be required on a regular basis by the Technical Representative to include status of projects, money expended, and money required to complete the projects. In addition, the contractor will be expected to provide the Technical Representative with written reports concerning research and development efforts when deemed advisable by the Government as well as verbal elaborations as may be desired by the Technical Representative or Contracting Officer.

3. TECHNICAL REQUIREMENTS. The preliminary investigative areas of this program are defined as: (1) a study effort to define information handling problems of non-computer and computer oriented data bases as applied to the NPIC, including Real-time, batch processing, and off-line application i.e., closed circuit T.V., automated report writing, computer control information storage, retrieval and handling equipment; (2) a study effort to define requirements for efficient handling of photographic and collateral materials in natural and/or cut forms; and (3) a study effort of exploitation techniques for imagery and collateral information transmission on a Real-time basis (data link).

These investigations should consist of, but not be limited to: an analysis of the in-house existing and planned methods of information/material handling and transmission; the combining of existing and planned techniques and equipment with present or advanced state-of-the-art; and result in the presentation of an integrated development plan for a highly automated IMHS. More specifically, the technical requirements for carrying out this program within the context of the broad objectives stated above can be broken down into three phases: analysis, concept and design.

3.1 Analysis. Determine current and known future input and output parameters from the aspect of:

- a. Physical Properties
- b. Information Content
- c. Data Rates
- d. Volume
- e. Data Sources
- f. Correlation between different inputs and outputs
- g. Real-Time Requirements

Primary consideration in this analysis should include but not be limited to equipment-both operational and planned; materials-collateral, roll film, cut film and chips; methods - analysis, query, reporting, etc; interface-equipment and methods; requirements-current and practical future; and timeliness.

3.2 Concept. Determine complete concept parameters required to satisfy the results of the analysis (3.1), considering:

- a. Interpretation/Analysis
- b. Viewing/Display
- c. Storage/Retrieval

- d. Computation
- e. Data Conversion
- f. Reporting
- g. Management/Control

In addition, an operational flow concept necessary to convert the inputs to the specific outputs, shall be determined considering: inputs to each operation; modes of operation; interrelationship between operations; and output of each operation.

3.3 Design. From results of the analysis phase (3.1) and determination of the concepts (3.2) a design will be formulated which will select the best techniques and equipments to accomplish the operational procedures, considering such criteria as:

- a. Cost effectiveness of operation
- b. Accuracy of operation
- c. Speed of operation
- d. Compatibility with component operations
- e. Simplicity
- f. Reliability
- g. Flexibility
- h. Maintenance
- i. Manning requirements and training
- j. Growth Potential
- k. Availability (equipment)
- l. Modifications (equipment)
- m. Configuration

3.4 Other requirements are:

3.4.1 Provide consultation to the Government in the information and materials handling field as well as related data link systems.

3.4.2 Contribute to the establishment of the future research goals.

3.4.3 Awareness of all commercial and other research organizations working in this field. Possession of current and historical knowledge in order to preclude duplication of effort and to maintain awareness of the state-of-the-art.