RESEARCH REPORT 1210

IMAGERY INTELLIGENCE (IMINT) PRODUCTION MODEL

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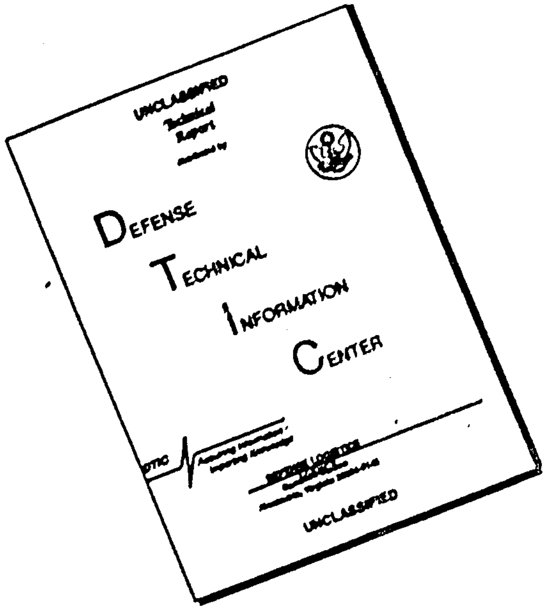

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The Imagery Intelligence (IMINT) Production Model presented in this report was developed as a part of a study entitled "Investigation of Methodologies and Techniques for Intelligence Analysis," which is aimed at constructing a model of the cognitive processes underlying intelligence analysis. The approach to constructing such a model is based on the investigation of analytical processing in two types of single source analysis (SIGINT and IMINT), subsequently generalizing to multisource analysis. For the purposes of

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this investigation, intelligence analysis was defined as a spectrum of analytical judgmental activities involved in the processing and production of intelligence, where particular individuals may devote more or less time to different aspects of such activities according to their individual roles in the intelligence cycle.

The IMINT production model described in this report was developed to serve as a basis for selecting IMINT processes involving high analytical and judgmental content for further study, directed at understanding the cognitive functions that underlie these IMINT processes. Thus, the model was constructed with a specialized focus, for the purposes of the study described above. Rather than concentrating exclusively on either strategic or tactical IMINT, the model was designed to encompass both dimensions of IMINT. The rationale for this decision was the fact that imagery interpretation analysts (IIAs) with more than minimum length of service are likely to operate in each type of mission at some time in their career, demonstrating the practical assumption that the required knowledge base and cognitive skills are similar for the two dimensions of IMINT. The imagery interpretation analyst is the true generic focus of the IMINT production model presented in this report; in order to gather data for developing the model 56 interviews with IIAs were carried out at 8 sites, including both strategic and tactical missions.

The report contains three sections: an introduction, an overview of the IMINT production model, and the model description. Section 1 describes the IMINT model in the context of the study discussed above, and also treats the scope of the model and the collection of the information on which the model is based. Section 2 presents an overview of the model, describing findings about the role of the imagery interpretation analyst, the impact of management on analysis, the IMINT time dimension, and the special role of informal information channels in IMINT analysis. This section also describes the format of the model description, which is represented in terms of hierarchical input-process-output (HIPO) charts. Section 3 presents the IMINT model, which is segmented into two major parts: IMINT production management activities and ~~IMINT~~ processing, analysis, and reporting activities.

RESEARCH REPORT 1210

IMAGERY INTELLIGENCE (IMINT) PRODUCTION MODEL

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FOREWORD

Intelligence collection systems have proliferated over the past several years, increasing in complexity and in volume of output. However, there has been no corresponding improvement in the ability of intelligence personnel to analyze this flood of data. US Army Intelligence and Security Command (INSCOM) studies and Army Research Institute (ARI) research indicate that improved support to and training of analysts are necessary to effectively utilize the increased collection capability and satisfy increasing demands for intelligence within current personnel constraints. INSCOM and ARI therefore initiated a joint research program to provide improved support to the intelligence analyst. During early discussions of the issues it became clear that any procedural, training, organizational, or system changes to support analysis will be effective only if based upon a detailed understanding of the analysts' role, methods and thought processes in intelligence production. The first need was to evaluate and describe the human analytic processes underlying intelligence analysis, synthesis and production. The present paper, one of several products of this initial effort, provides a production model of imagery intelligence which focuses on the human processes and factors involved.

The methodological approach used to study current imagery intelligence production involved interviews with image interpretation personnel in different organizations with varying levels of experience, familiar with either tactical or strategic operations, as well as observation of operations during field exercises. Imagery intelligence documentation and research reports obtained from INSCOM and ARI as well as analyst files also provided data and background material as a basis for the imagery production model. Invaluable and outstanding support was received by the research team from personnel at numerous imagery interpretation training or production facilities.

The research was accomplished by a government-contractor team under contract MDA 903-78-C-2044 and monitored jointly by INSCOM and ARI. Continuous interaction and collaboration of personnel from Operating Systems, Inc., INSCOM and ARI insured a multidisciplinary approach to this research.

This report and a corresponding model of signals intelligence production previously developed by INSCOM provide a basis for the development of a detailed functional model of the intelligence analyst. The current report should be very useful during the development or evaluation of training materials, procedures, doctrine and automated support for the image interpreter analyst.

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IMAGERY INTELLIGENCE (IMINT) PRODUCTION MODEL

BRIEF

Requirement:

To develop a model of the processes involved in the production of imagery based intelligence. This model will be used to support subsequent research on the cognitive functions of both single mode (e.g., signals intelligence; imagery intelligence) and multi-source intelligence analysts.

Approach:

A series of structured interviews was conducted with image interpretation personnel in a variety of organizations. An attempt was to include persons with various levels of experience, familiar with tactical or strategic operations. Interviews with developers of training materials, and observation of classroom instruction and of field exercises, provided additional information on individual and group responsibilities. The interviews and observation were supplemented by documentation and research reports from INSCOM and ARI. The various findings and viewpoints were consolidated and integrated into a model of the processes being examined.

Product:

The model of imagery intelligence production processes is presented as a series of hierarchical input-process-output (HIPO) charts with parallel verbal discussion of critical points. This format, discussed in detail in the text, provides a convenient means for representing the complex processes involved at a usable level of detail. The model is divided into two major parts: activities associated with production management; and activities associated with processing, analysis, and reporting.

Utilization:

The model presented lays an important foundation for a continuing effort to describe in detail the cognitive processes involved in intelligence analysis and to develop training and system support to analysts. The model will be useful during the development or evaluation of training materials, procedures, doctrine of employment, and automated support for the image interpreter.

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1.0 INTRODUCTION

1.1 Background

The Imagery Intelligence (IMINT) Production Model has been developed as part of a study entitled 'Investigation of Methodologies and Techniques for Intelligence Analysis' aimed at constructing a model of the cognitive processes underlying intelligence analysis. There are three basic assumptions motivating this research. First, it is assumed that there exists a set of common analytical processes which crosscut the various intelligence disciplines, constituting the core processes of intelligence analysis. Second, it is assumed that the set of core processes represents a continuum of analytical complexity ranging from those lower in cognitive and judgmental content to those involving a high degree of cognition and judgment. Third, it is postulated that a better understanding of these core analytical processes will

- facilitate efforts to develop and evaluate training programs and training doctrine for intelligence analysts;
- provide criteria for the development and evaluation of advanced system designs in support of intelligence analysis,
- provide assistance in personnel selection, motivation, and career planning;
- provide criteria for evaluating intelligence analysis processes, and for modifying and adapting such processes;
- contribute to the improvement of intelligence analysis management and formulation of operating policies and procedures.

The approach to identifying the set of core analytical processes and developing a generic cognitive model based on these is to investigate analytical processing as currently practiced in two types of single source analysis, subsequently generalizing to all source analysis. The initial task thus involved a preliminary investigation of signal intelligence (SIGINT) to isolate those SIGINT processes which appeared to have a high analytical and judgmental content for further study directed at an understanding of the cognitive processes that underlie them. The basis for the initial investigation was the SIGINT production model prepared by the Kuras-Alterman Corporation [Ref. 29].

The second intelligence discipline investigated under this study was imagery intelligence (IMINT). Since no comparable production model existed for IMINT, the model described in this document was prepared to serve as a basis for selecting IMINT processes involving high analytical and judgmental content, and to compare these with similar SIGINT processes in order to provide an initial definition of the core analytical processes that crosscut the various intelligence disciplines.

This initial definition of core analytical processes and the cognitive processes underlying them based on SIGINT and IMINT analytical processing will then be expanded to all source analytical processing, including HUMINT. A generic cognitive model for intelligence analysis will then be developed, which will demonstrate the nature of, and relationships between, specific cognitive components used in intelligence analysis activities. Such components operate within the head of the analyst and include, among others, memory, perceptual, conceptual, decision, and learning aspects.

When completed, the generic model will highlight the commonalities and differences among various intelligence analysis disciplines, and will provide a systematic, meaningful framework which will prove useful in a number of ways. The design of tasks and tasking procedures, training regimens, and task-supportive technologies can benefit from a systematic framework for the comparative description of intelligence analysis specialties formulated in terms of cognitive functioning. Areas of analytic practice may be identified for which unrealistic demands are now made on various aspects of an analyst's cognitive resources. Components of emergent new analytic tasks may present themselves, and the model may suggest better ways to process them. A comparative framework such as the model can provide a systematic, rationalized means for the borrowing of insights and techniques by different specialties from one another. The generic model can provide a common ground to promote better understanding, coordination, and orchestration between the efforts of different specialties. For each of the possibilities just mentioned, the model may operate to suggest research questions and research approaches for the solution of problems.

As indicated earlier, to insure that the generic cognitive model is representative of a range of intelligence, it will be based on several kinds of information. Specifically:

(1) A model of processing activities for SIGINT production [Ref.29];

(2) A model of processing activities for IMINT production;

(3) A range of interview and observational data involving SIGINT, IMINT, and HUMINT.

This document presents the IMINT production model. IMINT interview and observational data outside the scope of this model will be treated in a later paper.

1.2 Scope of the IMINT Production Model

The IMINT production model presented in this report was developed with a specialized emphasis and focus, to serve the specific needs of the research study described in the preceding paragraphs. The model should not be construed as having detailed applicability for other purposes, although it may provide useful insights outside the original intent of the study. In its main outlines, the model represents a framework within which the common aspects of various IMINT specialties are described. It is neither an exhaustive nor a detailed description of any particular IMINT specialty, although some of the dimensions of variation among specialties are noted.

1.2.1 Strategic versus Tactical IMINT. A major issue in developing the model of IMINT production involved the decision to use IMINT processing as practiced on the tactical level as a basis for the model, or IMINT processing as performed by the national strategic resources, or to construct a model that would represent both tactical and strategic IMINT. The last alternative was selected for two reasons. First, an imagery interpretation analyst (IIA) who has a career of any length is likely to serve at some time on both levels, indicating that the analytical and cognitive processing is at least presumed to be similar; this makes it important to accommodate both processing environments within the same IMINT production model, in order to accomplish the objectives of the basic study described in Section 1.1. Second, preliminary investigation of IMINT indicated apparent parallels between IMINT processing on the strategic and tactical levels. With the exception of a few real time imagery interpretation tasks that are exclusive to the tactical mission -- i.e., Side-Looking Airborne Radar (SLAR), and Infrared (IR) processing -- there are obvious parallels in almost all aspects of IMINT production (including imagery media, IMINT analysis, collateral resources, time phasing, and products). The main differences between the strategic and tactical processing environments involve the percentage of time devoted to various IMINT analytical and information handling activities (reflecting differences in mission requirements), support availability, and the range in skill levels and knowledge of individual IIAs working in the mission (Army strategic II facilities, for example, apparently do not utilize the lower skill levels).

1.2.2 Format of the Model. The detailed processing steps in different IMINT specialties, and between the same activities performed at the tactical and the strategic levels vary as to both inclusion and sequence within the activities and processes, making a detailed flow charting form of representation inappropriate. The parallels between specialties, and between tactical and strategic level IMINT processing emerge more clearly at a less detailed level of description, and are consequently best illustrated by hierarchical input-process-output (HIPO) charts. The representation conventions for these charts are explained in Section 2. Thus, unlike the SIGINT production model [Ref.29], the IMINT model does not consist of step-by-step flow diagrams of detailed task activities.

1.3 Data Collection

The sources of information on which the IMINT production model is based include the documents listed in the references (INSCOM and ARI reports, Army training manuals and field manuals), site visits to the strategic and tactical II facilities listed in Appendix A, and numerous detailed interviews with IIAs at all levels.

The majority of available documentation in the II field addresses training of lower skill level tactical analysts and the more mechanical aspects of the IMINT production process. There exists no formal documentation describing IMINT production in the national strategic environment.

The more complex aspects of IMINT analysis -- especially those aspects which are relevant to development of a generic cognitive model of intelligence analysis -- are passed on as an 'oral tradition', or are spontaneously learned by an IIA. The high security classification of many IMINT products is a major contributing factor in sustaining this 'oral tradition' and restricting the availability of reference documents and other materials, such as training imagery and II keys, in the tactical environment. Interviews with IIAs were thus the most important source of information for the model.

2.0 IMINT PRODUCTION MODEL OVERVIEW

B. IMAGERY INTELLIGENCE PRODUCTION MODEL

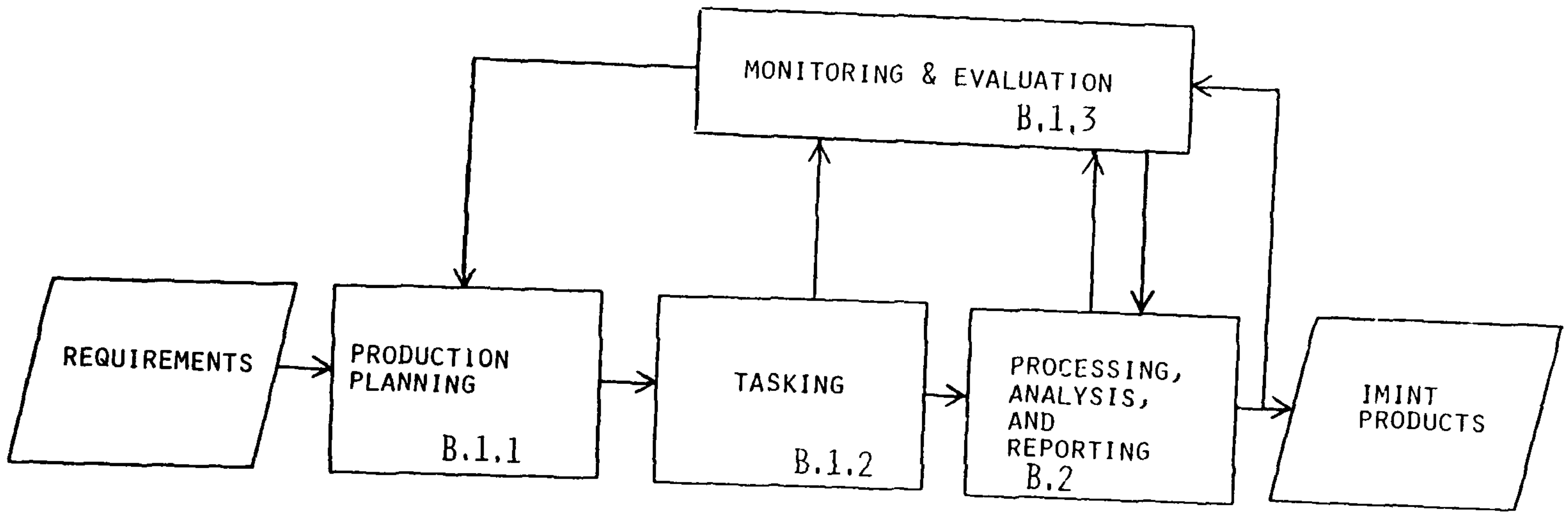


Figure 2-1. Model Overview

2.1 Concept of IMINT Production

The IMINT production process involves a combination of management, analytical, and support activities that operate against defined requirements and generate specified products. In attempting to determine the analytical and cognitive processing that occurs during imagery interpretation, it became clear that the management functions of planning, tasking, and evaluation had major impacts on the performance of imagery interpretation activities, and on the role of the image interpretation analyst (Section 2.1.1). As shown in the overview chart of the IMINT production model, Figure 2-1, these management activities are included as an integral component. Each of the management activities is discussed in the model description (Section B.1), although the amount of detail is less than for the analytical activities (Section B.2), which are the focus of the model development. Management of the II facility, which also affects the performance of IMINT activities, is discussed in Section 2.1.2, while the important impacting factor of timeliness is treated in Section 2.1.3. The formal lines of communication in the model overview chart show the use of feedback mechanisms through monitoring of tasking, analytical processing, and products. Feedback is one of the most ubiquitous and powerful mechanisms that occurs in the IMINT context, and is thus addressed throughout the IMINT production model. In addition to these formal lines of communication, and perhaps more effective, are the informal lines of communication described in Section 2.1.4.

2.1.1 <u>The Role of the Image Interpretation Analyst (IIA).</u> The obvious focus of the study of IMINT production was the role of the imagery interpretation analyst (IIA). No documentation describes how the IIA actually derives intelligence information from imagery. As noted above, the training manuals and relevant reports listed in the references concentrate on what IIAs do -- on the mechanical, observable activities -- rather than on how they do it. Thus much of the information on which the IMINT production model is based is derived from interviews with practicing IIAs or IIA instructors. These interviews allowed the construction of a role model for the IIA which is quite different from the image conveyed by the documents listed in the references.

Imagery interpretation is a highly skilled profession with areas of specialization. As in any intelligence field, the IIA must adapt rapidly to the changing world situation, as well as to evolving imagery collection capabilities and changes in tasking.

In performing imagery interpretation tasks, IIAs bring to bear the cumulation of their professional skills, experience, and knowledge in attempting to derive a product that will satisfy the needs of the user community within the constraints of available time and resources. IMINT analysts have a challenging task; their perception of threat is often the ultimate basis for critical strategic and tactical decision making.

Far from 'bean counting', the IMINT analytical activity involves complex processes of deductive reasoning. IIAs do not simply look at objects: they must be concerned with the associations between a given object and other objects which are not visible, between visible objects and configurations (e.g., TO&Es) indicating organizational size and strength, between objects and their function, and therefore, the degree of threat indicated by a given piece of equipment in a particular state of readiness, or by a particular activity in process. A strategic level IMINT instructor teaches his students the 'LST' principle, which he sums up in the following terms:

- <u>L - Look</u> at all the imagery.
- <u>S - See</u> what is in the optical field of view. Discovery and recognition of a target must come from within you. It is a function of background knowledge and concentration.
- <u>T - Think</u> about what you see. Combine logic, knowledge, curiosity, and most important, imagination, in the search. Only at the thinking level can one be considered an analyst.*

The issue of background knowledge is an important one. IIAs prepare for the IMINT production activities not only by practicing the mechanical skills of IMINT production, but also by developing a background in geographic, cultural, and technical aspects associated with the area of responsibility. They must be familiar with the geography and cultural background of an area in order to distinguish unusual objects and conditions from normality. IIAs in general are highly concerned with pursuing available information resources, both background and collateral. They are information entrepreneurs and archivists, whose external memory store of information is as important as the internal one it supports.

Successful IIAs appear to be highly motivated, and have a natural or developed curiosity about the area of analysis, frequently comparing themselves to 'detectives'. IIAs tend to be highly individualistic in their methods and take pride in their accomplishments; however, this individualism is balanced by a strong 'team' sentiment. IIAs feel responsible for assisting other members of an II group in the education of novice IIAs and in carrying out complex tasks.

<u>2.1.2 Management of an II Production Facility.</u> II facilities exhibit considerable difference in production processing based on their mission and resources in terms of staff, support, and imagery collection inputs. The activities of the II facility as a whole may vary considerably as a function of time depending on the active missions the facility has at the time of observation. A tactical unit in garrison may have only a training and exercise mission.

Facilities with active missions have problems in allocating scarce personnel and support resources to perform tasks. Facilities without active missions are faced with the problem of preparing for contingency operations and maintaining the proficiency of the IIA staff. In the latter cases, the dedication of the II facility management and senior analysts is the determining factor in how actively the facility engages

*From the instructional materials of John Schlegel.

in training and preparation for contingency operations of various types.

A case in point which was referred to frequently by interviewed analysts was that, especially in peacetime, Army corps level II operations tended to assume division II functions. This condition occurs because most decisions are made at corps level, where intelligence operations have ready access to national assets and direct knowledge of the broader context of intelligence operations. Division level intelligence resources thus tend not to be regularly tasked except for major exercises (such as Reforger), and must rely on their own initiative to maintain an active proficiency in imagery interpretation.

Support capabilities can also constrain the activity of the II facility. Lack of storage for classified material, secure communication channels, and photo lab facilities has a major impact on the II facility capacity for performing active missions.

A given facility may not engage in a complete spectrum of imagery interpretation tasks, because of area of responsibility, constrained resources, and/or lack of support capabilities. The II facility management can provide training or exercises to complement its active mission role, to diversify its capabilities, and satisfy general training requirements for the II MOS skill area.

2.1.5 Timeliness in IMINT Analysis and Reporting. The intelligence products which derive from imagery analysis may support a diversity of missions, including Indications and Warning (I&W), targeting, collection exploitation, basic intelligence, or direct support. The scope and form of these products vary substantially between tactical and strategic missions. An attribute of these missions and products that is common for both strategic and tactical imagery interpretation is timeliness. In IMINT production, timeliness requirements are defined in terms of First Phase, Second Phase, and Third Phase processing. Definition of IMINT processing in terms of three phases is a convention which is normally applied only in the environment of the national strategic IMINT resources. For purposes of this model, the three phased definition is also applied to tactical level processing because of the parallelism which exists in terms of analytical and reporting time constraints. The effect of these phases on analytical and reporting activities is described in detail in Section B.2 of the model; the following paragraphs present brief definitions of the approximate time periods represented by these phases.

First Phase processing refers to derivation of intelligence from the initial scan of imagery (or from real time imagery generated by SLAR, IR, or video devices) and is normally tasked by time-critical applications.

Second Phase processing refers to exploitation of imagery within a period of more than one and less than 24 hours, and applies primarily to current intelligence applications.

Third Phase processing includes periodic reporting, special support-processing wih 48-hour or longer turnaround, and basic intelligence reporting.

While organizations within a national strategic IMINT facility may specialize in only one phase of processing, a tactical II facility more commonly engages in all three phases of IMINT production, depending on operational requirements.

2.1.4 Informal Information Channels. One of the more powerful mechanisms that operates to make the IMINT production process more efficient and adaptive to the environment is the informal information flow and coordination that takes place during the course of imagery interpretation production. As with other intelligence analysis disciplines, imagery interpretation is an inexact process because results can be partially speculative, data are incomplete, ambiguities are prevalent, and the environment being monitored is continually changing. Informal communications channels allow the IMINT production process to exploit all available information sources in the generation of useful intelligence products.

Informal information flow tends to be more direct because it bypasses chain of command delays and avoids the overhead of filling out forms and having paperwork reviewed. Personal contact or secure voice conversations are the most common communications channels for informal information flow, but secure TTY circuits (OPSCOMM, INDICOM) are also used.

Informal communication channels do not conflict with standard operating policies or formal reporting policies, but in fact act as a supplement. Experienced II analysts are allowed to initiate external communications without management approval when the context is within the given IIA's area of responsibility. Imagery interpretation is the type of process which cannot be monitored at the process level. Management would have to replicate the IIA's entire task in order to determine if the analyst was performing that task correctly. II management must depend on the professionalism of the II analyst to seek informal help from other IIAs in problem areas. Direct control of the II analyst is generally achieved only by monitoring the IIA's time, productivity, and quality of the products he generates, as well as by tasking the IIA in areas where his proficiency is known.

The major types of informal information flow that were identified through interviews with II analysts and instructors are shown in Figure 2-2. Actual flow is more in terms of a network, where analysts in the network are tied together by mutual area of interest. Creation of these networks is also an informal process resulting from joint working groups, personal references, appearance of analyst names on intelligence products, and past experiences in dealing with other agencies. The informal networks seem to be sustained on the basis of credibility of the analyst's information and sharing of information resources that are either not globally available or are more easily understood when interpreted by a specialist in the area.

Two types of informal communications most often mentioned by interviewed analysts as having positive effects on the quality of IMINT products were:

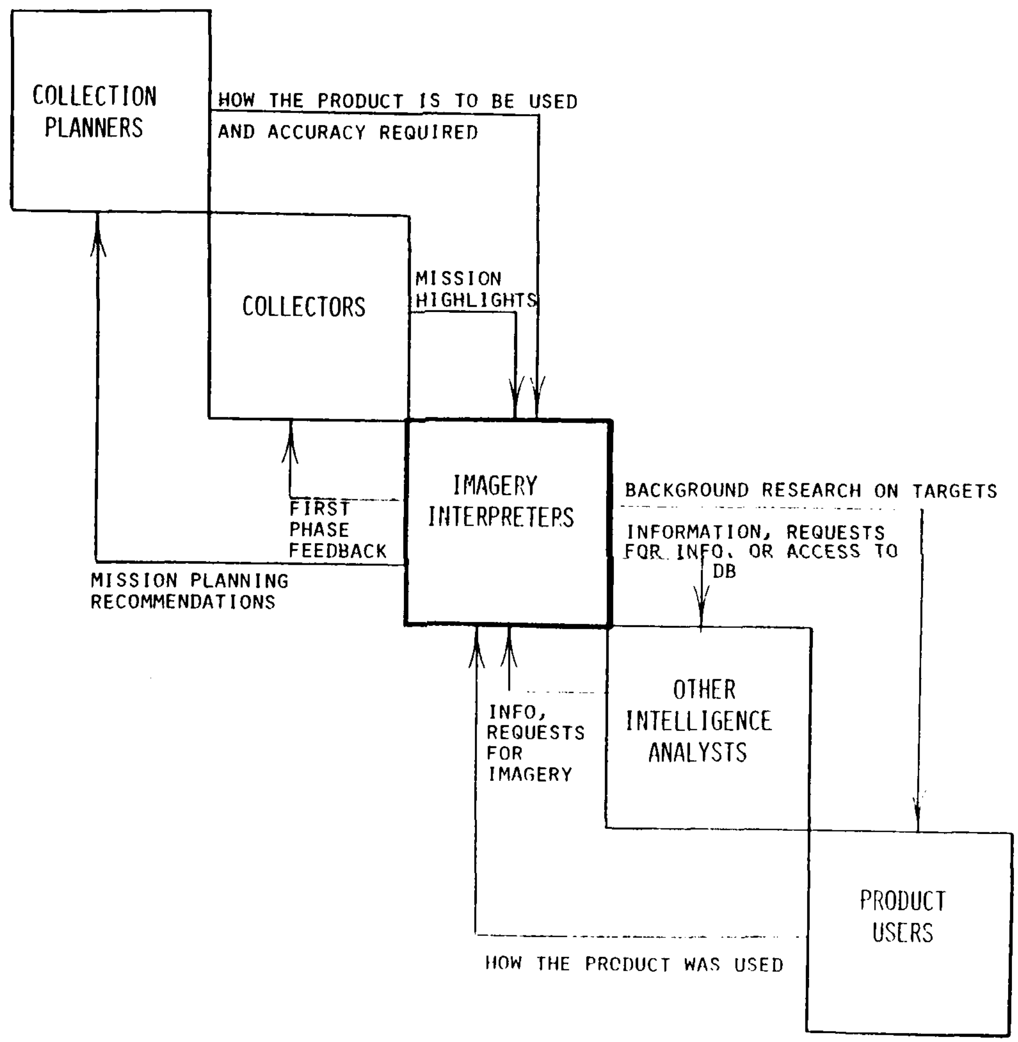


Figure 2-2. Informal Information Flow

1) communications regarding how the product will be used, and accuracy required when the requirement is issued; or

2) recognition of work well done.

2.2 Representation of IMINT Production Activities

The primary variables in determining the breakdown of IMINT production activities are mission, skill level, and time. As mentioned above, the variable of time tends to be dominant at the strategic level, where the IMINT production organizations may be described as having a mission which is single phase (in terms of the discussion of Section 2.1.3). On the other hand, tactical II facilities tend to carry out all three types of processing, depending on the operational requirements. Within both environments, assignment of analytical and reporting tasks depends on the skill level of the individual IIA. These three variables focus on different dimensions of IMINT production process, which must be represented in some way in the model.

The representativeness of the model of different types of IMINT activity also depends on the manner of observation of the IMINT production process. The time of observation of an IMINT production activity could range from a 'snapshot' of peak processing activity to a long term observation of a unit and its operation cycles. The long term observation could also be interpreted as the expected or probable assignments that an individual IIA would receive over his career in the IMINT field: i.e., covering multiple skill levels and a diversity of active missions and training in various II schools and facilities.

In addition to these general issues of process representation, there are several specific problems in devising a format for accurately representing IMINT production activities. Some performance steps for IMINT activities are in fixed sequence, others show high variability in sequence; some sequences are logically mandatory, others optional. Moreover, some activity steps are restricted to certain work roles and organizational slots, while others are distributed very generally; some steps occur rarely, some occur with great frequency. II analysts may be assigned concurrent processing tasks, resulting in a time-sliced, priority-driven allocation of daily activities. As a direct consequence of these practices, an analysis is needed to reflect time spent by an IIA in various processing activities. As shown in the processing activity matrix of Table 1, the activities of a given facility can be represented by the proportion of time spent in particular activities.

The formula for computing level of activity in a given task is equivalent to the statistics produced by a standard Management Information System (MIS) which keeps track of II analyst activity on an hour-by-hour basis. This type of MIS data is in fact maintained at national strategic level organizations for use in planning and allocation of personnel resources.

This form of activity representation is useful in examining crucial areas of skill development, as well as life cycle impacts of management

Table 1

IMAGERY INTERPRETATION PRODUCTION - PROCESSING ACTIVITY MATRIX

MISSION n

MISSION 1

PROCESSING ACTIVITY B_j	FIRST PHASE PROCESSING — Skill Level 1 2 . . . n	SECOND PHASE PROCESSING — Skill Level 1 2 . . . n	THIRD PHASE PROCESSING — Skill Level 1 2 . . . n
B.1 IMINT Production Management			
B.1.1 Production Planning			
B.1.2 Tasking			
B.1.3 Monitoring and Evaluation			
B.1.3.1 Evaluate Backlog			
B.1.3.2 Evaluate Capabilities			
B.1.3.3 Evaluate Requirements			
B.1.3.4 Evaluate Products			
B.2 IMAGERY Intelligence Processing, Analysis, and Reporting			
B.2.1 Imagery Intelligence Analysis			
B.2.1.1 Search	P		
B.2.1.2 Registration/Plotting			
B.2.1.3 Target Detection			
B.2.1.4 Target Identification			
B.2.1.5 Target Quantification			
B.2.1.6 Unusualness Analysis			
B.2.1.7 Function Analysis			
B.2.1.8 Complex Studies			
B.2.1.9 Photogrammetric Sciences			
B.2.2 Reporting			
B.2.2.1 First Phase Reporting			
B.2.2.2 Second Phase Reporting			
B.2.2.3 Third Phase Reporting and Products			
B.2.3 Support Activities			
B.2.3.1 Collection Coordination			
B.2.3.2 All Source Data Review and Reduction			
B.2.2.3 History of Coverage Maintenance			
B.2.2.4 Target Analysis/Development			
B.2.3.5 Imagery Interpretation Key Development			
B.2.3.6 Knowledge and Skill Development			
B.2.4 Administrative Support			
B.2.4.1 Computer System Operations			
B.2.4.2 Data Catcgorization, Filing, and Distribution			
B.2.4.3 Typing, Graphics, and Reproduction			

Proportion of time (P) spent in a given activity is best represented by a model of the career cycle of the IIA. This includes the cumulation of time spent in training, garrison, tactical, and strategic missions, and varies as the IIA advances in skill level. At any particular point in time, it will vary according to the particular mission and type of imagery being exploited.

and support activities. The existence of a particular type of activity or processing task -- whatever the level of activity -- is important in determining the information structure and complexity of cognitive processing, pursuant to the ultimate objectives of this research described in Section 1.1.

The left hand column in Table 1 reflects the higher level structure of production activities in terms of staff organizations, time sequence, and processing sequence. Since facilities will tend to have more than one type of mission, this table is in fact multiplied by each type of mission.

This type of probabilistic representation of IMINT production activities has several uses:

(1) as an illustration of the diverse activities for which IIAs must be trained over the long term,

(2) as an indication of which activities analyst resources are utilized in,

(3) as a comparison of skill needs to skill training.

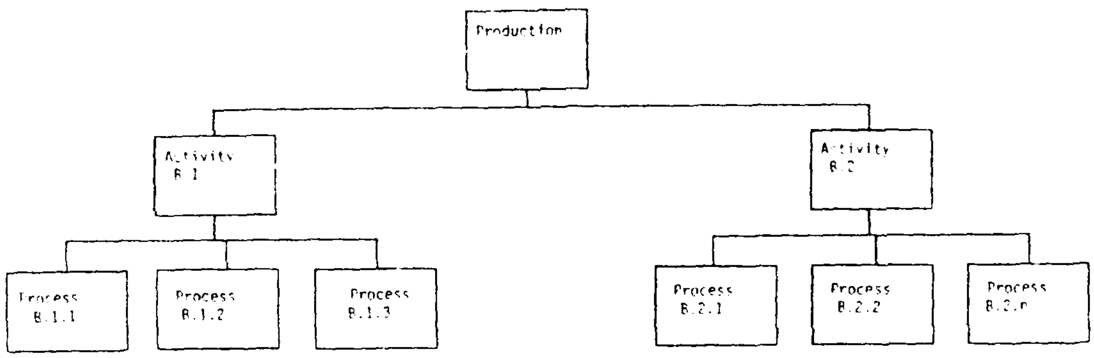
Since the model presented in this report is intended only as a generic representation of the spectrum of IMINT production processing activities, no attempt has been made to fill in the comparative level-of-activity values for individual task areas.

2.3 Process Description Format

IMINT production processes are described in Section 3.0 using the HIPO (Hierarchical Input-Process-Output) format. This format was selected over the more conventional flow diagramming format for the reasons discussed in the preceding section -- especially because the processes forming a particular IMINT production activity are not necessarily sequential. The HIPO format provides a means for systematically describing IMINT production in terms of a hierarchy of management and analytical activities. These activities are further subdivided into processes, which are in turn composed of subprocesses, where all three levels may have specific or general inputs and outputs. While the management activities described in Section B.1 of the model are not elaborated to the subprocess level, the analytical activities described in Section B.2 are specified in more detail. A further description of the conventions used in the HIPO charts on analytical activities is contained in Section B.2.1.

As illustrated in Figure 2-3, the HIPO descriptions are composed of hierarchical charts which identify major production activities, and Input-Process-Output diagrams providing in depth descriptions of each activity. The HIPO format thus presents a top-down description of the overall IMINT production process, outlining a generic IMINT production facility which encompasses a broad range of both tactical and strategic IMINT production activities.

FUNCTIONAL HIERARCHY



PLUS

INPUT-PROCESS-OUTPUT DIAGRAMS

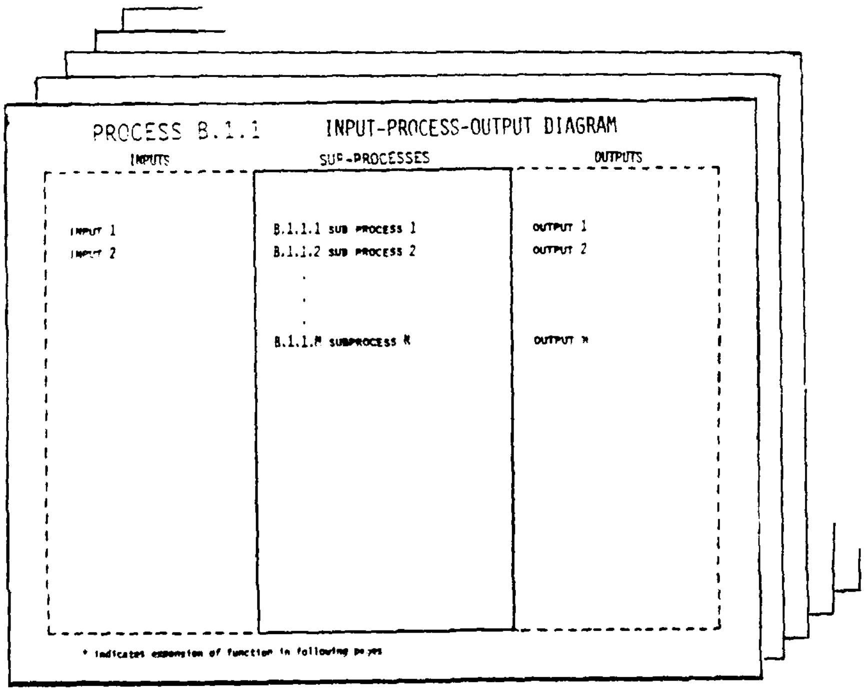


Figure 2-3. HIPO Format Used in II Model Description (Page 1 of 2)

HIPO Conventions

*An asterisk appearing in a diagram block indicates that a more detailed expansion of that block will appear in the immediately following pages.

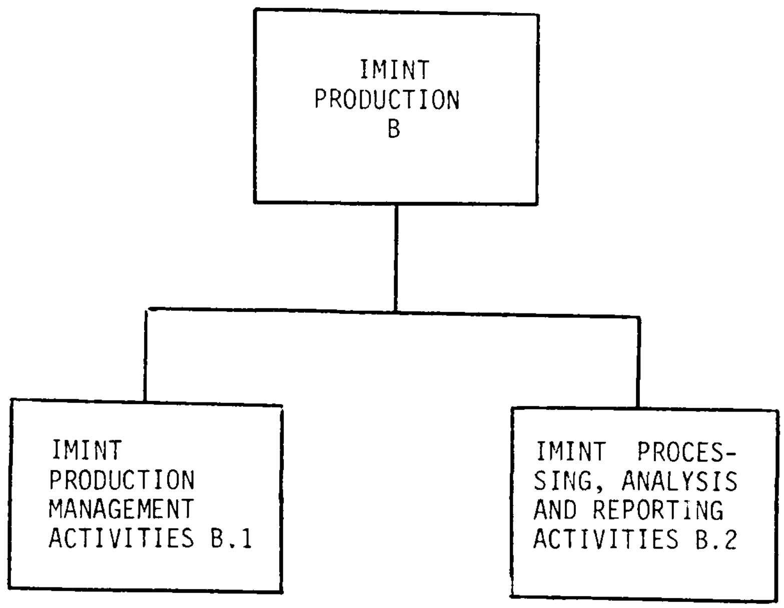
Input 1 }
Input 2 }
Input 3 }

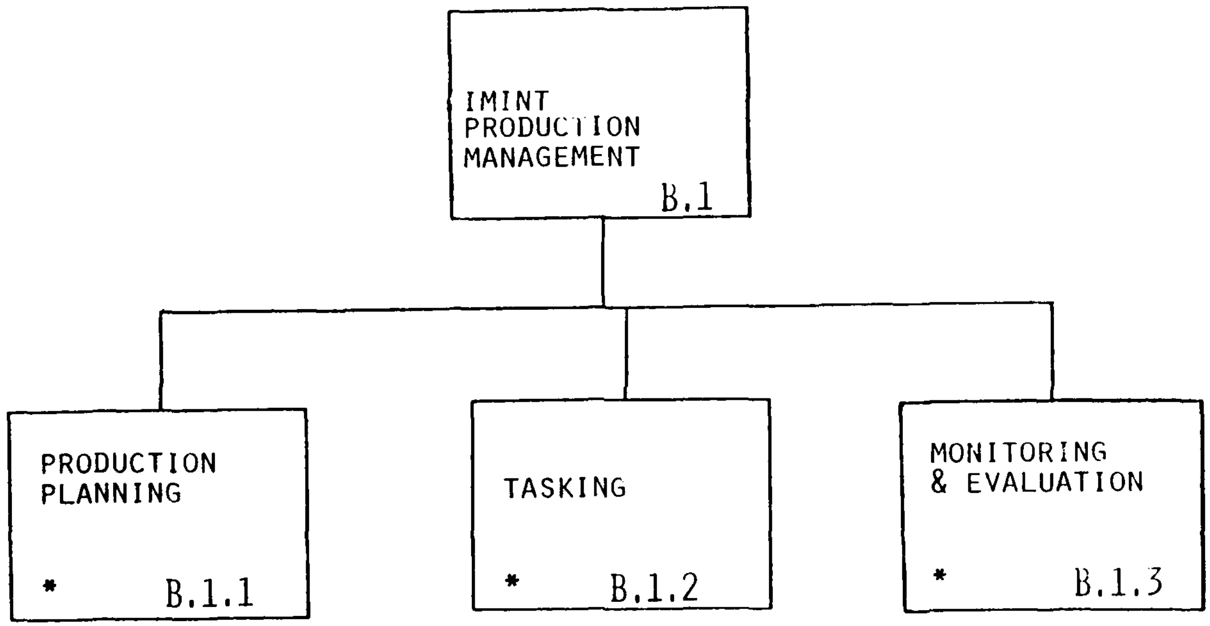
Bracketed inputs are general inputs to an activity or a process and are not specific to any particular process or subprocess; otherwise inputs are lined up with the particular process or subprocess to which they apply (similarly for outputs).

Output 2 (B.2.3.1) A model process or subprocess number appearing next to an output name indicates that the output is specifically an input to the referenced process (similarly for inputs with number references).

Figure 2-3. HIPO Format Used in II Model Description (Page 2 of 2)

3.0 IMAGERY INTERPRETATION PRODUCTION PROCESSING MODEL DESCRIPTION





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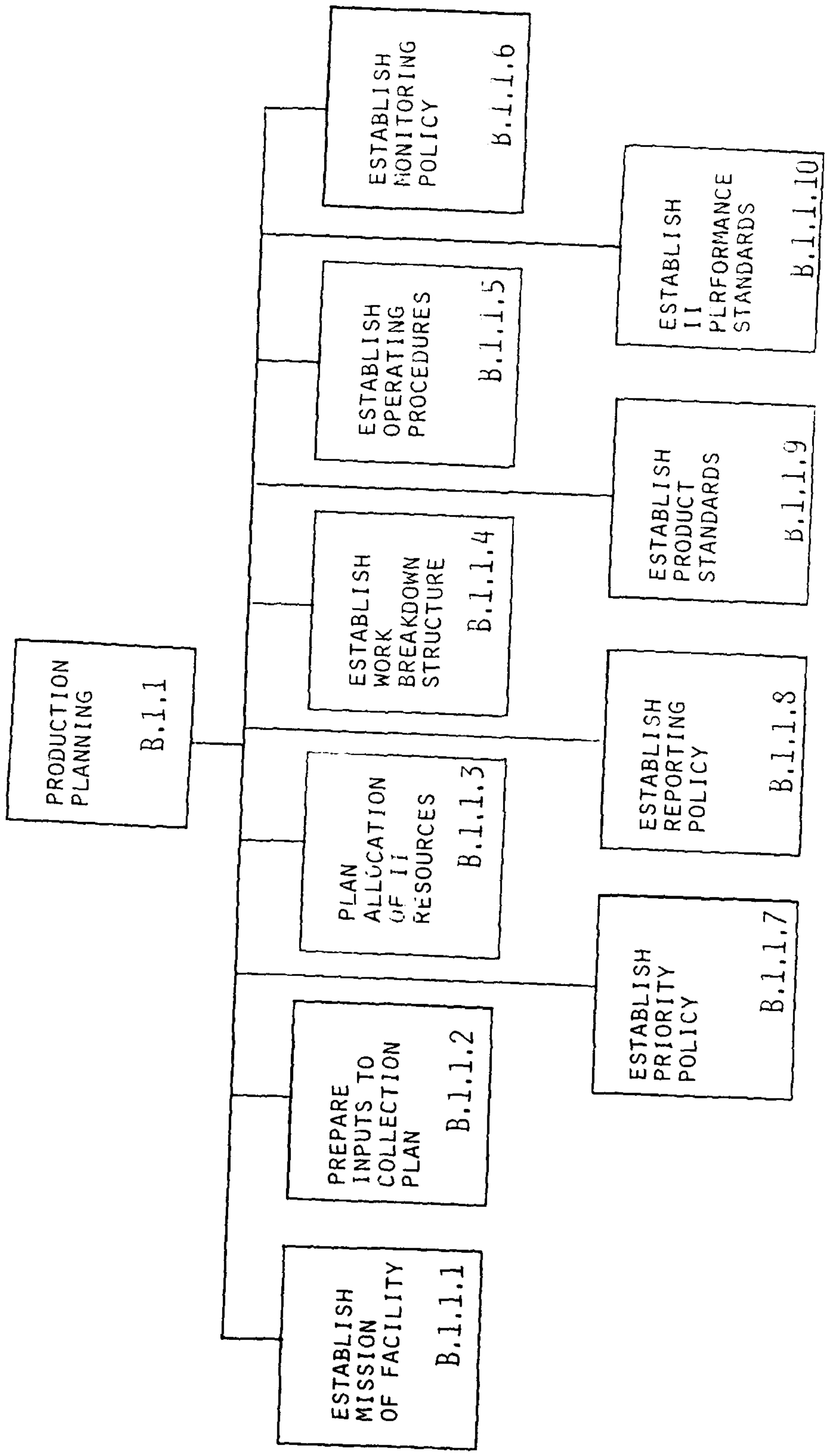
B.1 IMINT Production Management

IMINT production management has the function of allocating and controlling the use of II facility resources for the production of imagery intelligence. IMINT production is a technological activity. Management of a technological activity is different from managing a manufacturing process because the capabilities of the personnel are the principal factors in productivity and output product quality.

The IMINT production manager's primary control mechanisms are the assignment of personnel and the use of time (including the time between active missions).


PRODUCTION PLANNING
B.1.1
ESTABLISH MISSION OF FACILITY
B.1.1.1
PREPARE INPUTS TO COLLECTION PLAN
B.1.1.2
PLAN ALLOCATION OF II RESOURCES
B.1.1.3
ESTABLISH WORK BREAKDOWN STRUCTURE
B.1.1.4
ESTABLISH OPERATING PROCEDURES
B.1.1.5
ESTABLISH MONITORING POLICY
B.1.1.6
ESTABLISH PRIORITY POLICY
B.1.1.7
ESTABLISH REPORTING POLICY
B.1.1.8
ESTABLISH PRODUCT STANDARDS
B.1.1.9
ESTABLISH II PERFORMANCE STANDARDS
B.1.1.10

B.1.1 Production Planning

Production planning is the set of activities involved in preparing the II facility to perform its assigned mission. For well-established strategic II facilities, the production operates according to precedents, and much of the planning information structure is unwritten. Formal planning activities are of more importance to a tactical facility in a pre-deployment stage where personnel may be less experienced, and unfamiliar with the deployment area. Planning requirements are influenced by the list of factors presented on the associated chart, which are discussed in the following paragraphs.

Mission. The mission of an Army II facility establishes which agencies task the facility and defines the facility's areas of responsibility. The mission of the facility will vary depending on resources and course of the battle in a combat situation. Area of responsibility may be defined in terms of geographic area, type of target, or imagery source.

Collection Plan. The II facility coordinates with collection planning groups and has responsibility for recommending targets and missions within the scope of their tasking. Collection planning is necessarily controlled from the big picture perspective. The ability of a particular facility to exploit specific types of imagery will influence the collection plan.

Allocation of II Resources. The II facility is tasked concurrently in many areas of imagery interpretation. The II production manager must allocate resources for different areas of tasking and support activities. The manager has responsibility for coordinating additional resources needed to meet requirements. Using estimates of current processing backlog and projected workload, the II facility manager can produce a tasking plan to assist in deciding allocation of resources.

B.1.1 PRODUCTION PLANNING

INPUTS	PROCESS		OUTPUTS
MISSION	B.1.1.1	EVALUATE MISSION OF II FACILITY	EVALUATION OF II FACILITY MISSION
RECOMMENDED INPUTS TO COLLECTION PLAN (B.1.3)	B.1.1.2	PREPARE INPUTS TO COLLECTION PLAN	INPUTS TO COLLECTION PLAN
BACKLOG AND BACKLOG PROJECTION (B.1.3.1)	B.1.1.3	PLAN ALLOCATION OF II RESOURCES	TASKING PLAN
STANDARD OPERATING PROCEDURES FIELD MANUALS HANDBOOKS (B.1.3.2.1)	B.1.1.4	ESTABLISH WORK BREAKDOWN STRUCTURES	WORK BREAKDOWN STRUCTURE
	B.1.1.5	ESTABLISH VOCAL OPERATING PROCEDURES	OPERATING PROCEDURES
	B.1.1.6	ESTABLISH MONITORING POLICY	MONITORING POLICY
NATIONAL/TACTICAL PRIORITIES	B.1.1.7	ESTABLISH PRIORITY POLICY	PRIORITY POLICY
STANDARD REPORTING PROCEDURES	B.1.1.8	ESTABLISH REPORTING POLICY	REPORTING POLICY
COMMUNITY STANDARDS	B.1.1.9	ESTABLISH PRODUCT STANDARDS	PRODUCT STANDARDS
	B.1.1.10	ESTABLISH II SKILL DEVELOPMENT REQUIREMENTS	UNIT TRAINING PLAN

* indicates expansion of function in following pages

Work breakdown Structure. In order to utilize specialties and available skill levels. A typical facility will have branches organized by geographic area, technical specialty, target type, imagery source, or administrative function.

Operating Procedures. Procedures for conduct of imagery interpretation processes are derivatives of procedures from handbooks, field manuals, equipment operating manuals, or standard operating procedures. In most cases, these procedures are adapted to the particular needs of a facility and its production operations. Formalized operating procedures are of more importance for training than for day-to-day production operations. Units conduct their training for processes peculiar to that facility.

Monitoring. Policies for monitoring and evaluating production processes aim at outgoing product quality and timeliness. Branch and senior level analysts are assigned to review product content and quality. Policies are established to ensure consistency in producing quality. Timeliness of products is monitored by estimating production time and maintaining regular status checking of progress and analyst workload.

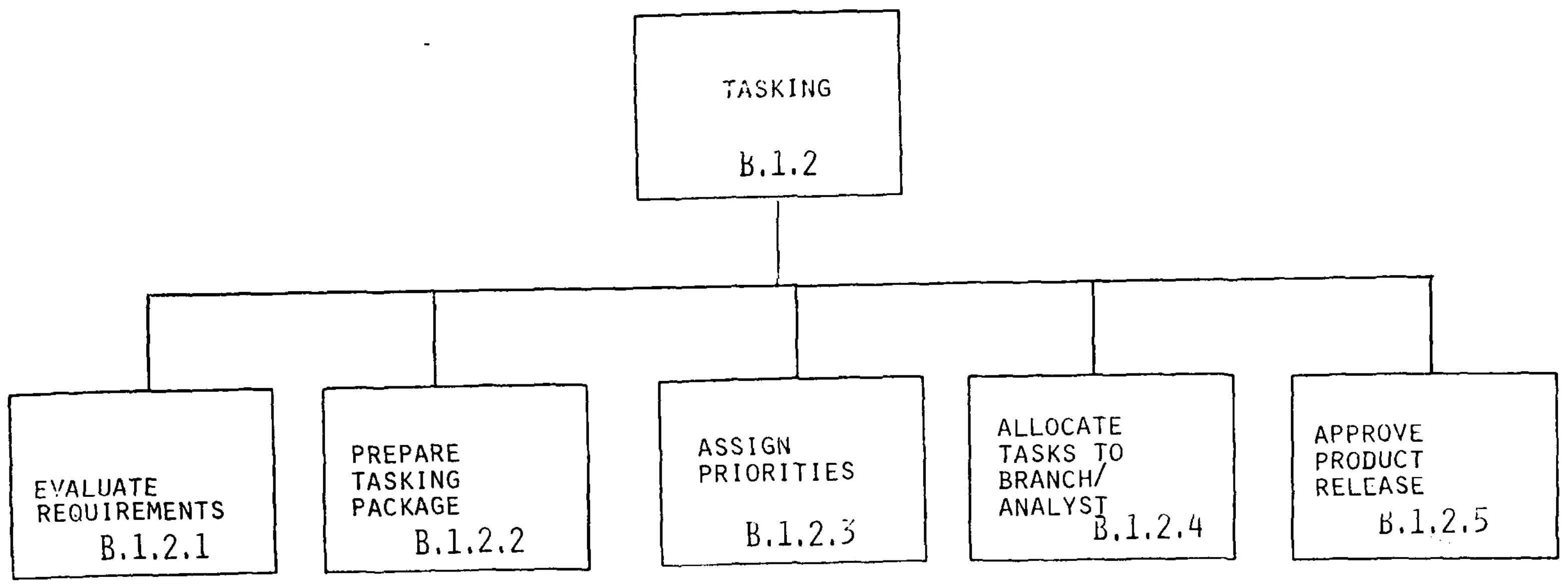
Priority Policy. Priority policies aid the facility in handling a mixture of imagery interpretation requirements with varying timeliness constraints. Priorities are adjusted when necessary to meet product suspense times.

Reporting Policy. Policies are established for the type of reporting vehicle to be used, classification of content, and distribution. Policy provides general guidelines, each report being evaluated individually on its own merit under the particular circumstances.

Product Standards. Product standards vary with respect to allowable production time, priority of requirement, extent of distribution, and resources available for production. A product may be a typeset and printed report with professional graphics, a reproduced photograph with attached notes, a record message, or an informal teletype or telephone response to a specific user.

II Skill Development Planning. In order to accomplish the IMINT production with which it is tasked, an II facility is assigned a complement of personnel who have the requisite levels of skill to operate IMINT products that meet the standards for the particular type of facility mission. The II facility staff composition may include personnel with formal training only at skill levels 1 and 2 and rotating personnel with no experience in the local mission. Some positions in the II facility may be unfilled. The II facility has the responsibility of providing unit training to adapt its available staff to the local mission and to general Army standards for the II MOS.

General standards are set by the Department of the Army in terms of the Skill Qualification Test (SQT) for promotion to higher rank in the II specialty area. Requirements for advancing in the II's analyst's specialty area may require a broader range of skills than normally needed for day-to-day tactical unit operations. Unit training must be broad in scope to insure the individual IIA's development for future mission requirements. The II facility management must plan the use of time between active missions for skill development via exercises, special training, cooperation with analysts in other technical areas, expanding the knowledge base of geographic or cultural features and conducting basic intelligence research. Although much of the responsibility for *skill development rests on the individual analyst's own initiative, management must encourage* this endeavor and allocate time and resources to support those activities as a normal function of the facility operation.



TASKING
B.1.2
EVALUATE REQUIREMENTS
B.1.2.1
PREPARE TASKING PACKAGE
B.1.2.2
ASSIGN PRIORITIES
B.1.2.3
ALLOCATE TASKS TO BRANCH/ ANALYST
B.1.2.4
APPROVE PRODUCT RELEASE
B.1.2.5

B.1.2 Tasking

The function of the tasking process is to delegate processing tasks to individual II analysts, management, and support personnel as the II facility develops its workload. Production planning establishes the general work breakdown structure and responsibilities of individuals but workload may vary as a function of time. The product goals for the facility are established by the II mission.

The tasking process is a complex decision-making activity, because limited personnel resources must be allocated to produce multiple products with limited varying timeliness requirements. The personnel limitations are not just in numbers, but in skill levels and prior experience with the target type or geographic area. As a result, the tasking activity is one of balancing requirements and production priorities against capabilities. In order to make the most efficient use of available resources, tasking is performed under the following general guidelines.

(1) time-sensitive requirements are addressed first;

(2) organization of tasking into geographic or target-oriented branches to make maximum use of analyst prior knowledge;

(3) rating of interpretation tasks by skill level requirements so that appropriate skill levels can be used whenever possible;

(4) division or organization to provide special support groups not requiring II skills;

(5) time variant priority scheme which allows periodic production tasks to gain priority as their suspense date nears;

B.1.2 TASKING

INPUTS	PROCESS		OUTPUTS
	B.1.2.1	EVALUATE REQUIREMENTS	
REQUIREMENTS	B.1.2.1.1	REVIEW REQUIREMENTS	
II MISSION (B.1.1.1)	B.1.2.1.2	ACCEPT REQUIREMENTS IF THEY ARE WITHIN FACILITY MISSION	
	B.1.2.2	PREPARE TASKING PACKAGE	
WORKLOAD ESTIMATE (B.1.3.1)	B.1.2.2.1	REQUEST EVALUATION OF PRODUCTION LOAD TO SATISFY REQUIREMENTS	
	B.1.2.2.2	INITIATE REQUEST FOR ADDITIONAL RESOURCES IF REQUIRED	REQUEST FOR ADDITIONAL RESOURCES (B.1.1.3)
	B.1.2.2.3	PREPARE TASKING PACKAGE	
PRIORITY POLICY (B.1.1.7)	B.1.2.3	ASSIGN PRIORITIES	
	B.1.2.3.1	ASSIGN PRIORITIES TO NEW TASKS	
TASK PROGRESS (B.1.3.1.1)	B.1.2.3.2	REASSIGN PRIORITIES IF NEEDED	
TASKING PLAN (B.1.1.3)	B.1.2.4	ALLOCATE TASKS TO BRANCH/ANALYST	TASKING PACKAGE (B.2, B.1.3.1)
WORKBREAKDOWN STRUCTURE (B.1.1.4)			
PRODUCT REVIEW EVALUATION (B.1.3.4)	B.1.2.5	APPROVE PRODUCT RELEASE	
	B.1.2.5.1	APPROVE RELEASE OF REVIEW PRODUCTS	REPORT RELEASE APPROVAL (B.2.2)
	B.1.2.5.2	ASSIGN REWORK	REWORK TASKING (B.2)
	B.1.2.5.3	ASSIGN FOLLOW-UP TASKS	FOLLOW-UP TASKING (B.2)

* indicates expansion of function in following pages

(6) monitoring of production time for previous products and estimating production time for new work allows management to control total workload of the facility. The tasking manager can refer to these workload estimates in deciding whether new requirements can be accepted or in initiating requests for additional resources;

(7) using non-peak production periods for pre-mission preparation, training, knowledge base development, or other support tasks;

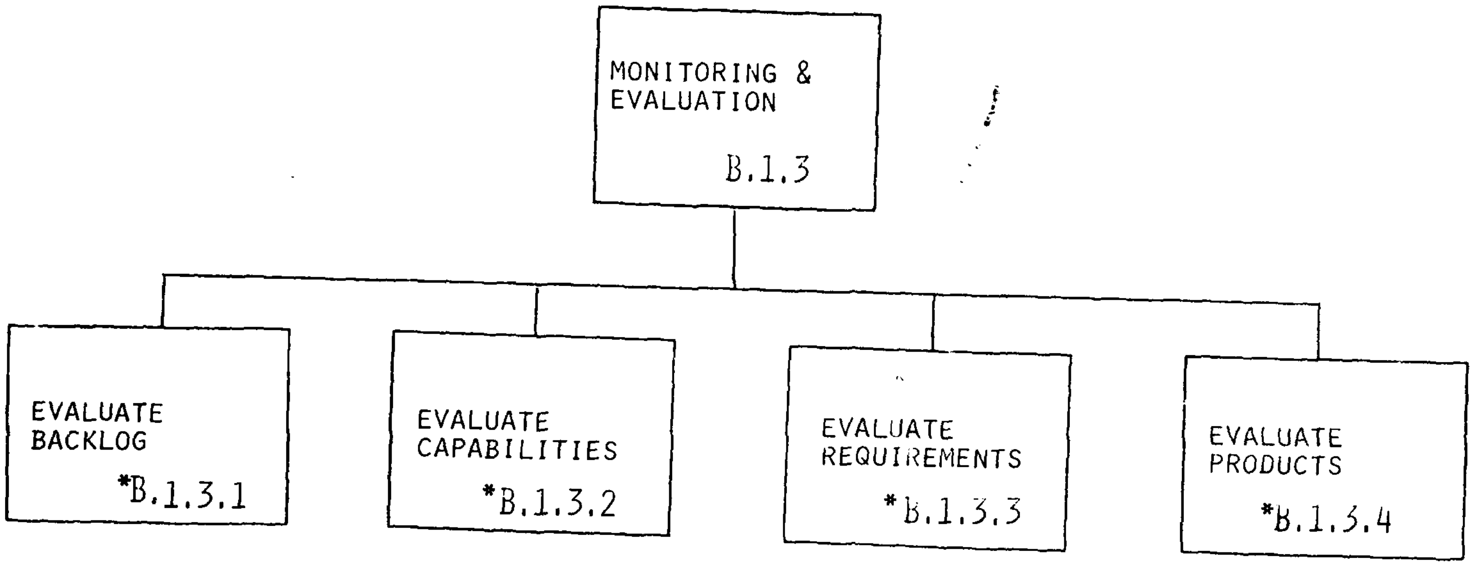
(8) informal technical assistance among analysts within the facility.

The actual control of tasking is a combination of 1) established work breakdown by branches within the II facility and specialties of analysts, 2) directed tasking in response to new requirements and 3) allocation of time for tasks.

Assigned Targets. An II may have continuing responsibilities for surveillance in a particular area, or for monitoring particular targets. Tasking is automatic whenever the area or target is covered. Continuity in target following is an essential factor in the cognitive capabilities required for unusual- ness analysis change detection, and identification processes (B.2.1.4.6). Continuity in following target types or a geographic area allows the II to build a data base of related collateral materials and a broader knowledge base of the technical or cultural/geographic area.

Direct Support Tasking. Army commands or other users with direct tasking authority may levy special case requirements. These requirements are evaluated and given priorities; estimates of workload are generated; and tasking assignements are made within the facility.

Management and Support Activity Tasking. In addition to imagery interpretation tasks, management activities and support activities must also be explicitly tasked. The division of labor within the II facility is designed for efficient use of resources but correspondingly creates a larger organization to be managed with additional branches to be tasked. Supporting activities such as skill development and collateral material collection are more heavily tasked during non-peak production periods.



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B.1.3 Monitoring and Evaluation

Monitoring of product quality and processing status provides feedback information to the IMINT production manager for planning and tasking. Monitoring and evaluation also provides feedback to the II analyst in terms of his performance and time available to complete his task. IMINT production overall is a highly adaptive process that can trade product timeliness against product quality.

Monitoring and evaluation activities are functionally oriented toward backlog, capabilities, requirements, and products. These four areas are detailed in hierarchical INPUT-PROCESS-OUTPUT (HIPO) in order to show the flow of information necessary to manage the II production process.

B.1.3.1 EVALUATE BACKLOG

INPUTS	PROCESS	OUTPUTS
MANNING STATUS EQUIPMENT STATUS	B.1.3.1.1 EVALUATE RESOURCE STATUS	REQUEST FOR ADDITIONAL RESOURCES
WORK STATUS	B.1.3.1.2 EVALUATE STATUS OF WORK IN PROGRESS	REQUEST CHANGE IN PRIORITY UPDATE TO BACKLOG ESTIMATE
COLLECTION PLAN	B.1.3.1.3 EVALUATE PLANNED MISSIONS	WORKLOAD AND SKILL LEVEL ESTIMATE FOR PLANNED MISSION
	B.1.3.1.3.1 ESTIMATE WORKLOAD BASED ON COLLECTION PLAN AND PLANNED MISSIONS	UPDATE TO BACKLOG PROJECTION
MISSION STATUS DIRECT SUPPORT REQUIREMENTS	B.1.3.1.3.2 DETERMINE CHANGES TO WORKLOAD FROM NEW MISSION MODIFICATIONS	
	B.1.3.1.4 EVALUATE DIRECT SUPPORT WORKLOAD	

* indicates expansion of function in following pages

B.1.3.1 Evaluate Backlog

The II facility, whether in a tactical environment or deployed at the national strategic level, will be subject to a cyclically varying time pressure for production output. It is essential that the II facility manager monitor not only the work in progress but the workload that will accrue from planned missions and regular reporting requirements. The priority scheduling system allows the II facility manager to exploit the cyclical nature of collection missions to produce periodic reports or basic intelligence products when there is a lull in mission activity. It is the responsibility of the monitoring function to recognize when a task is behind schedule and request an adjustment in priority to ensure completion of the task.

The backlog projection provides the II facility manager with the information necessary in deciding if he has sufficient resources to support the collection plan. If a significant difference exists between the collection plan and the II facility capabilities, coordination will be initiated to resolve the difference.

B.1.3.2 EVALUATE CAPABILITIES

INPUTS	PROCESS		OUTPUTS
STANDARD OPERATING PROCEDURES	B.1.3.2.1	EVALUATE EQUIPMENT AND PROCEDURES	RECOMMENDED CHANGES TO PROCEDURES
MANNING STATUS	B.1.3.2.2	EVALUATE STAFF CAPABILITIES	EFFICIENCY RATING
COLLECTION PLAN OPERATING PLAN FRAG ORDERS COLLATERAL MATERIAL	B.1.3.2.3	EVALUATE COLLECTION CAPABILITIES	RECOMMENDED INPUTS TO COLLECTION PLAN
	-	MISSIONS AVAILABLE	PRE-MISSION BRIEFINGS
	-	SENSOR SYSTEM CAPABILITIES	
	-	WEATHER	
	-	ENEMY DEFENSE CONSIDERATIONS	
	-	CAMOUFLAGE AND DECEPTION	
	-	ALL SOURCE INTELLIGENCE RESOURCES	
	-	IMAGERY QUALITY OF PREVIOUS MISSIONS	
SUPPORT ACTIVITY STATUS	B.1.3.2.4	EVALUATE SUPPORT CAPABILITIES	RECOMMENDATIONS FOR CHANGES TO SUPPORT ACTIVITY TASKING

* indicates expansion of function in following pages

B.1.3.2 Evaluate Capabilities

The II facility is able to adapt to new operating environments and changing requirements by continual evaluation of its own capabilities for production. Capabilities are of concern in the areas of procedures and equipment, staff skill levels and knowledge base, imagery, and support capabilities. The following paragraphs describe the processes shown in the associated chart for the evaluation activity.

B.1.3.2.1 Evaluate Equipment and Procedures

Procedures for interpretation, equipment operation, and report preparation are based initially on standard operating procedures from handbooks and field manuals. These procedures need regular evaluation and updating to reflect new techniques and peculiarities of the changing operating environment. Procedures must be appropriate within mission and time constraints.

B.1.3.2.2 Evaluate Staff Capabilities

II analysts are the most critical component of the production process. II skills represent a technology which is developed through training, working experience, technical exchange with peers, and knowledge base development in specialty areas. Imagery interpretation is such that evaluating an II process is virtually impossible without redoing the entire process for comparison. Effective utilization of a staff with varying skill levels is achieved by organizing work in terms of skill level requirements. Apprentice IIAs may work with an experienced analyst and teams of II analysts may be assigned to complex tasks. In the majority of interpretation activities, the IIA will have sole responsibility for his performance. The success of this method depends on analysts initiating requests for assistance when encountering difficult problems or targets which are unfamiliar to them, and analysts of all skill levels are encouraged to confer with peers. Individual IIAs are frequently identified with specific IMINT reports. This personal identification is an aid to users who may request additional data or clarification, and is a means of giving professional recognition to the individual. Monitoring and support of staff development is recognized as an effective means of upgrading the capabilities of the II facility. Personal attention to skill development needed for promotion and career advancement is a major factor in optimizing production capability. The high technical proficiency gained by Army trained II analysts is readily marketable as a civilian skill. This factor combined with limited career opportunities in the Army II skill specialty frequently results in high staff turnover rates.

B.1.3.2.3 Evaluate Collection Capabilities

Because the II facility is partially dependent on its collection sources for its product impact, there must be feedback mechanisms between the II facility and the collection systems. To support this information feedback channel, the II facility engages in a variety of collection capability evaluations aimed at maximizing exploitation of these sources. The most important feedback mechanism appears to be the informal coordination which takes place at the analyst level rather than the management level.

Mutual understanding of capabilities is essential in maximizing the exploitation of imagery. Interpreters have flown reconnaissance missions in order to appreciate the problems of the reconnaissance pilot. Pilots in turn may work with interpreters in evaluating the success of the collection missions and gaining feedback on how improvements can be made.

B.1.3.2.4 Evaluate Support Capabilities

Supporting activities may be as vital as interpretation processes to the production capabilities of the II facility. These activities (described in B.2.3) must be tasked and monitored. Where production conflicts occur in support activities, priorities are assigned.

B.1.3.3 EVALUATE REQUIREMENTS

INPUTS	PROCESS		OUTPUTS
II FACILITY MISSION REQUIREMENTS	B.1.3.3.1	EVALUATE REQUIREMENTS RELATIVE TO II FACILITY MISSION	ACCEPT OR REQUEST CHANGES IN REQUIREMENTS
HISTORY OF COVERAGE (B.2.3.3)	B.1.3.3.2.	DETERMINE IF EXISTING IMAGERY CAN BE USED	IDENTIFIED IMAGERY FOR INTERPRETATION TASK (B.1.2.2)
MISSION PLANS	B.1.3.3.3	DETERMINE IF NEW COLLECTION MISSIONS ARE REQUIRED	RECOMMENDED INPUTS TO COLLECTION PLAN

* indicates expansion of function in following pages

B.1.3.3 Evaluate Requirements

Requirements for imagery intelligence are diverse and may be received from a number of different tasking agencies. Requirements may be categorized into one of three general types: standing, direct support, or basic intelligence.

Standing Requirements. Imagery interpretation requirements that are relatively fixed over time are referred to as standing requirements. A standing requirement may require following of particular target types or surveillance of particular areas of interest. Reporting requirements may be on a periodic schedule, reported each time coverage occurs, or on an unusualness basis. Standing requirements are usually reflected in the facility mission statement. Standing requirements are evaluated on the basis of their impact on processing load and collection requirements.

Direct Support. The II facility generally has in its mission the requirement to provide direct support to various authorized tasking agencies. Direct support requirements involve all three phases of interpretation production and vary in priority and complexity. Direct support requirements must be evaluated carefully from a mission standpoint so that overlapping interpretation tasks do not occur between facilities.

Basic intelligence. Imagery interpretation is utilized to produce a wide variety of basic intelligence such as order of battle. The II facility may be tasked with providing inputs to basic intelligence files or preparing Basic Imagery Interpretation Reports (BIIRs). Characteristically, basic intelligence tasks are more complex, take longer to process, and involve extensive use of all-source intelligence materials.

B.1.3.4 EVALUATE PRODUCTS

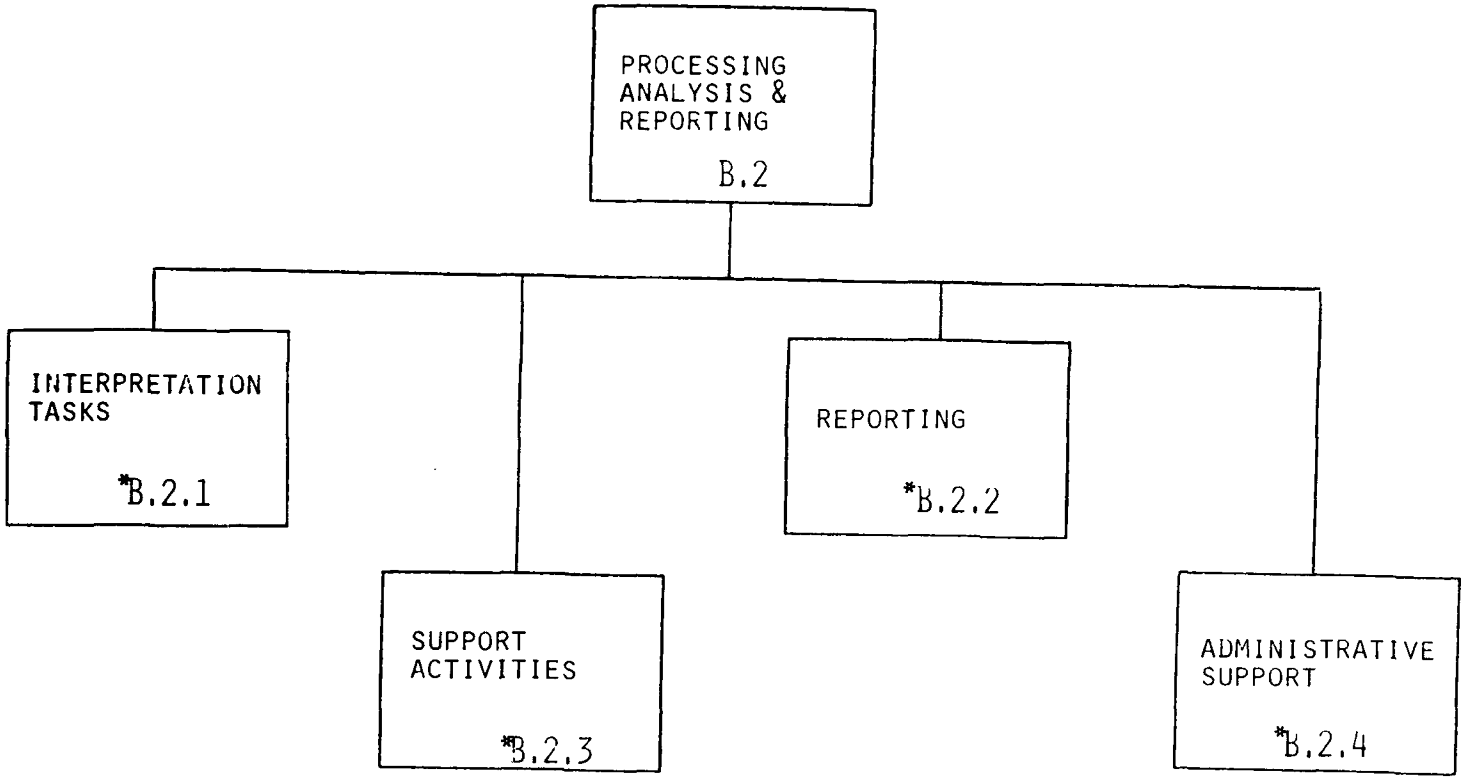
INPUTS	PROCESS	OUTPUTS
PRODUCTS: REPORTS, BRIEFINGS, IMAGERY, KEYS/POSTERS, MOSAICS	B.1.3.4.1 EVALUATE PRODUCT QUALITY	RECOMMENDATION FOR RELEASE OR RECOMMENDATION FOR REWORK (TO B.1.2.5)
STANDARD DISTRIBUTION LISTS	B.1.3.4.2 REVIEW DISTRIBUTION LIST	
REPORTING CRITERIA	B.1.3.4.3 EVALUATE APPROPRIATENESS OF REPORTING VEHICLE FOR PRODUCT TIMELINESS	
	B.1.3.4.4 EVALUATE FOLLOW-UP REQUIREMENTS	RECOMMENDED FOLLOW-UP ACTIONS (TO B.1.2.5)

* indicates expansion of function in following pages

B.1.3.4 Evaluate Products

All products are reviewed prior to release for distribution with the exception of informal technical exchange between analysts. Products are reviewed for grammatical and technical quality, correctness of distribution, classification level, and reporting vehicle. In some cases reviewers may be able to also look at the source imagery. This is not practical in those cases such as search or complex studies involving a large amount of imagery. Review tasks are normally handled by senior analysts, branch chiefs, or a technical area review committee. Quality standards, report formats, reporting policy, and standard distribution lists are used as references in the product review process.

Certain types of products require follow-up actions. Follow-up reports may be required to expand the detail in an immediate report; or, collection plan modifications might be appropriate as a consequence of a product's content.



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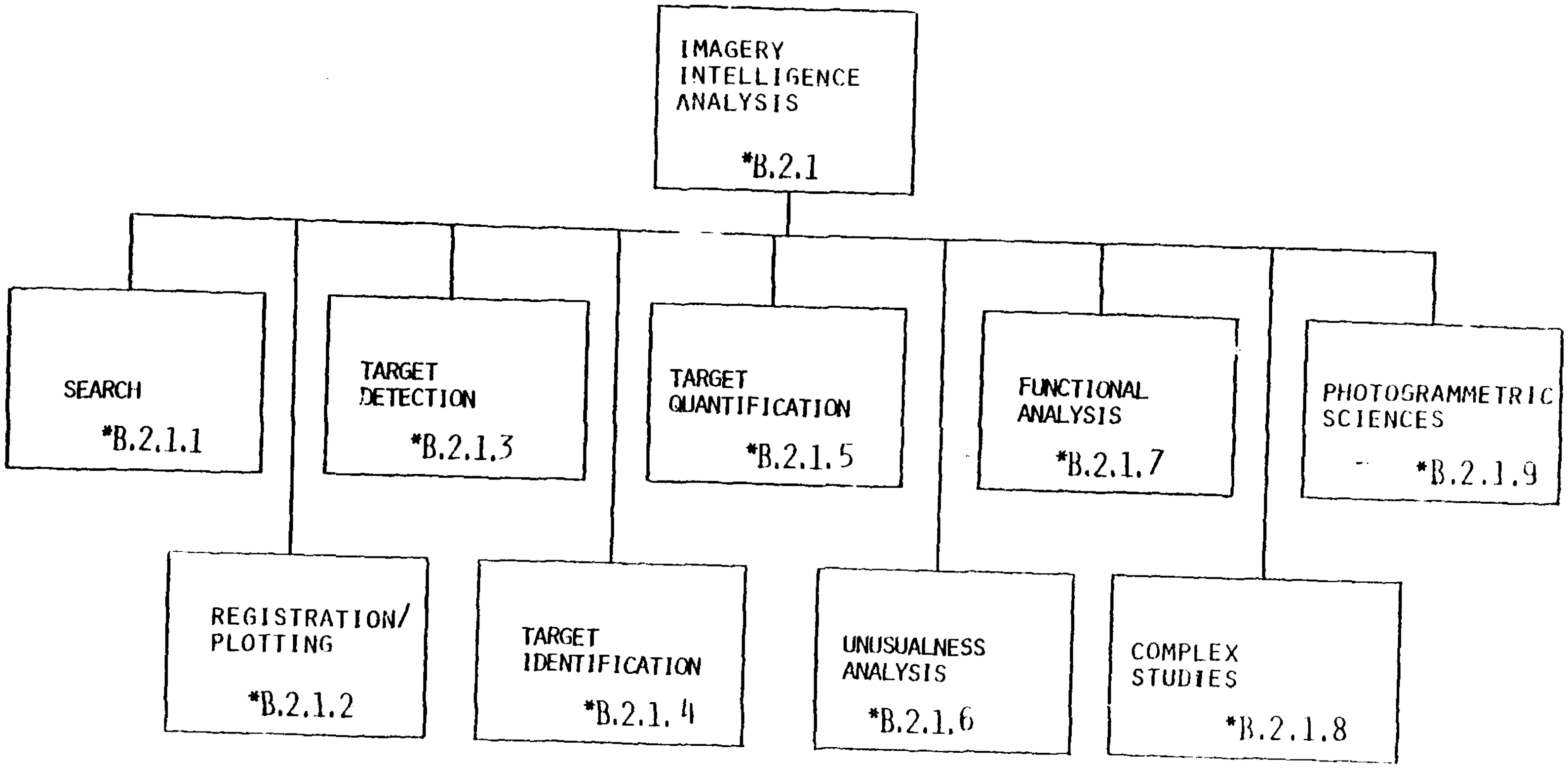
B.2. Imagery Intelligence Processing, Analysis, and Reporting

The imagery intelligence production activities described in part B.1 of the model deal with planning, tasking, and evaluation of the product. Although the impact of those activities upon the analytical and reporting activities discussed here in part B.2 is substantial, the latter activities are of primary interest in this model, since specification of the analytical, cognitive and judgmental content of the activities described below is fundamental to the development of a cognitive model of intelligence analysis (see Section 1.1). In fact, the title of this part is selected to facilitate comparision with analogous SIGINT activities, referred to as Processing, Analysis, and Reporting (PAR) in the model document [Ref. 8] used for a preliminary investigation of SIGINT activities involving cognitive processing.

The Processing, Analysis, and Reporting activities of an imagery intelligence production facility are organized along lines of skills and function, and are further segmented in terms of product suspense times that allow the IMINT production process to adapt to different loading conditions and operating environments. The major areas of activity are analysis, reporting, support activities, and administrative functions. These areas of activity are readily observable in larger II facilities and less distinct in smaller facilities where staff functions are more general. These subdivisions of activity are important from a tasking point of view, because the level of activity shifts dramatically between these areas over time. Short term variations will occur on an hourly, daily, and weekly cycle during normal operations. Larger shifts in activity will occur as the facility experiences mission changes due to the dynamics of the international situation, with concomitant changes in intelligence collection and tasking.



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B.2.1 Imagery Intelligence Analysis

As an introduction to the analysis of imagery, several issues which are generic to the variety of analytical activities shown on the facing page merit discussion. These include the concept of imagery analysis as opposed to 'bean counting', and the constraints imposed on the analytical process by time, the quality of the imagery, and the knowledge and experience of the IIA assigned to a particular task. In addition, the chart format for describing the analytical activities is described.

The Imagery Interpretation Process

The imagery interpretation process essentially consists of identification of physical objects, such as equipment, in the context of its environment, which includes associations between such equipment and the function of the military unit that uses it, leading to identification of such a unit -- e.g., engineering equipment indicates the presence of an engineering unit, possibly a headquarters. In addition, characteristics or conditions of interest (e.g., the modification of terrain by excavation) should be identified; -- and to the extent possible -- activities, such as bridge construction, river crossing training, which may reveal the intent of the enemy. These sets of objects, conditions, and activities are of interest because they have military significance: in the broad sense of the word, they are potential targets for military exploitation. Use of the term 'target' in the following discussion is intended to convey this broader meaning, rather than a particular installation in a targets file as a specific target, since such an installation in fact may contain a large variety of objects and equipments which are targets in themselves.

As mentioned above, the imagery interpretation activity involves to some extent the association of objects with other objects (e.g., a type of support equipment with a particular type of missile), the association of (equipment) objects with a known TO&E configuration of equipment (e.g., six 120 mm mortars indicates a battery, seven indicates two batteries), the association of equipment with an organizational unit of a particular size (e.g., one mortar battery may indicate a motorized rifle battalion while two could indicate the presence of a motorized rifle regiment), the association of equipment with function, and consequently, with a degree of threat (e.g., a SAM on a launcher is ready to fire, a SAM on a transporter is not). All of these associational processes require deductive reasoning, and distinguish the function of imagery interpretation from simple 'bean counting'.

The Time Factor

Imagery interpretation analysts are aware of these inferential processes and can apply them to the categories of targets within their competence. However, the depth of analysis is often severely limited by the length of time available to perform the analysis. An IIA preparing Hot Photo Interpretation Reports (HOTPHOTOREPs) in a Tactical Imagery Interpretation Facility (TIIF) may have only a few minutes to actually analyze imagery, since substantial segments of the time period from engine shutdown to report filing deadline must be devoted to film processing and to registering, plotting, and validating the mission trace. Time is thus a critical limiting factor in the analysis which provides the basis for a HOTPHOTOREP. This limitation is compensated by the additional analysis which optionally follows, resulting in a supplement to the original HOTPHOTOREP within the next hour. The problem is that such supplements have lower priorities than the HOTREPs themselves, so should additional missions continue to arrive, no further analysis on an earlier mission already covered by a HOTREP is possible.

Although the above scenario is tactically oriented, the inverse relationship of time and depth of analysis also exists on the strategic level. In fact, the three temporally defined phases of IMINT processing described in Section 2.1.3 are applicable to both tactical and strategic environments. Many IIAs on both levels are concerned with the preeminence of the time factor over analytical performance, even in the third phase, basic study context. Others seem to have accepted time constraints as an occupational parameter, and do not appear to be unduly concerned with the possibility of missed information.

The Quality of Imagery

An important aspect of IMINT analysis is that imagery utilized by any facility -- whether a local TIIF or a national imagery interpretation resource -- will not have consistent quality. Sensor and platform capabilities, range, height, and atmospheric conditions all contribute to wide variations in the quality of imagery. Each IIA essentially evaluates imagery from the perspective of his own processing task, in order to determine the extent to which the image can be exploited in the context of that task. For example, a 50% cloud coverage on an area would reduce the effectiveness of an imagery interpretation search function by 50%, but may or may not affect particular targets within the imagery frame. For oblique imagery, near objects would have better resolution and could thus be more accurately identified than remotely located objects. Haze produced from various causes might obstruct identification of certain objects, but not others.

For these reasons, an IIA cannot usually anticipate the quality of imagery related to his interpretation tasks until he is actually viewing a particular segment of imagery. Productivity is not affected by this lack of prior evaluation in tasks which require search of previous imagery files. Methods are currently being established for evaluating imagery products across the broad range of imagery interpretation applications. In particular, a national standard, called the National Imagery Interpretability Rating System (NIIRS), has recently been implemented on the national level; this standard will presumably be adopted in some form on all imagery interpretation echelons in the near future.

Knowledge and Experience of the Individual IIA

An additional factor in IMINT analysis is the set of experiences, background, and knowledge that an individual IIA brings to bear on a particular analytical task. A new IIA who has previously served in the infantry or artillery has an advantage in identifying equipment and in knowing where to look for it. Such a person may also be able to infer enemy intent from the disposition of equipment and personnel, thus providing an in depth analysis of an enemy situation that would be very difficult for a novice IIA with a civilian background to duplicate. Similarly, an IIA with experience in a strategic level II position in an active mission will have acquired a detailed background in a specific area relevant to that mission, which may or may not be directly exploitable in a tactical environment. For example, equipment relevant to strategic missions does not generally include US or NATO equipment, which is used in tactical exercises. Thus equipment learned in detail in the course of a strategic assignment may not be directly relevant to a tactical assignment; however, the methodological knowledge and experience of analyzing equipment of any kind is an important part of the knowledge base of an IIA, and gives the IIA with strategic experience an advantage in performing tactical or strategic imagery analysis. The IIA in a tactical assignment is a generalist, prepared to deal with any imagery analysis task. Basic Army IIA training therefore includes course blocks dealing with targets which are not normally Army responsibilities, such as ports, harbors, inland waterways, and strategic industries. On the other hand, strategic level assignments tend to be more specific, requiring an IIA to become an expert in a particular set of targets or types of equipment.

3.2.1.3 TARGET DETECTION

INPUTS	PROCESSES	OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI)	3.2.1.3.1 OBTAIN RELEVANT IMAGERY	IMAGERY
GENERAL MISSION REQUIREMENTS	3.2.1.3.2 OBTAIN COMPARATIVE COVER IMAGERY	
INTERPRETATION PRIORITIES	3.2.1.3.3 OBTAIN RELEVANT DEBRIEFING/MISSION REPORTS	DEBRIEFING, MISSION REPORTS TO 3.2.1.3.5
	3.2.1.3.4 RETRIEVE RELEVANT MAPS/OVERLAYS	MAPS/OVERLAYS
	*3.2.1.3.5 PERFORM TARGET DETECTION PROCESS	
	3.2.1.3.6 GENERATE DATA FOR REPORTS/BRIEFINGS	REPORT DATA (TO 3.2.2)

Figure 3.1 A

3.2.1.1.5 TARGET DETECTION PROCESS

INPUTS	SUBPROCESSES	OUTPUTS
IMAGERY (3.2.1.3.1)	3.2.1.3.5.1 DISPLAY INPUT IMAGERY	
DEBRIEFING/MISSION REPORTS (3.2.1.3.3)	3.2.1.3.5.2 DISPLAY MAP/OVERLAY	
MAPS/OVERLAYS (3.2.1.3.4)	3.2.1.3.5.3 SCAN IMAGERY	
	3.2.1.3.5.4 DETECT POSSIBLE TARGETS, OBJECTS OR CHARACTERISTICS OF MILITARY SIGNIFICANCE	
	3.2.1.3.5.5 DETERMINE LOCATION OF ITEMS OR CHARACTERISTICS DETECTED	
	3.2.1.3.5.6 RECORD LOCATION OF DETECTED ITEMS AND MARK FRAME FOR FURTHER ANALYSIS	RECORD OF DETECTED ITEMS (TO 3.2.1.4)
	3.2.1.3.5.7 MAKE COMPARISONS WITH PAST COVERAGE OR OTHER INTELLIGENCE REPORTS	

Figure 3.1 B

* indicates expansion of function in following pages

Presentation of Analytical Activities in HIPO Charts

In the following discussion and associated charts, the set of imagery analysis activities is segmented functionally for convenience of analysis in terms of cognitive processes *underlying* particular functions, in line with the larger context of the cognitive model for intelligence analysis for which this II model has been constructed (see Section 1.1). An IIA in the field may in fact perform the whole range of activities at some level in the course of a typical work day. Moreover, the detection, identification, quantification, and unusualness analysis activities (B.2.1.3-6) are performed to some level in all phases of interpretation, although the more detailed analysis represented by the functions identified as B.2.1.7-9 (where B.2.1.8 includes such functions as Order of Battle, terrain, and entry zone analysis) are essentially third phase, less time sensitive, activities.

Partition of Information Handling versus Analytical Processes in Charts

The chart presentations of the majority of these activities differ from those of the preceding section in level of detail and process segmentation. The charts are more detailed and the majority are organized in terms of a segmentation into information manipulation processes versus analytical processes. As an illustration, Figure 3-1a treats information handling processes for the target detection activity, and identifies an analytical process which is expanded into subprocess descriptions in the following chart (signaled by an asterisk), shown in Figure 3-1b.

The inputs of the information handling activities are general mission requirements on the one hand, and on the other, Specific Requests for Information (SRI), and interpretation priorities driving the particular activity in a given case (for example, the the EEI at a given point in time in a particular situation). The outputs of the information handling processes -- for example, the acquisition of imagery and relevant reference materials shown by the processes labeled B.2.1.3.1-4 in Figure 3-1a -- have as outputs the given imagery and materials aligned in the output column with the associated processes. These outputs are labeled with the analytical process (B.2.1.3.5) to which they are sent, and appear as inputs to that process in Figure 3-1b, labeled with the number of the process which generated them. The outputs of the given analytical process then are sent to the next activity, B.2.1.3.4, Target Identification, and are simultaneously sent to reporting (B.2.2).

It should be remembered, as discussed in Section *.1, that all the listed processes may not occur in any given case, or may not be performed in the sequence in which they are listed. In many cases, time pressure or lack of reference materials eliminates one or more of the information acquisition steps, while many of the analytical processing steps may be performed essentially simultaneously, or omitted as irrelevant in a given case.

B.2.1.1 SEARCH

INPUTS	PROCESSES	OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI)	B.2.1.1.1 OBTAIN RELEVANT IMAGERY	IMAGERY (TO B.2.1.1.4)
GENERAL MISSION REQUIREMENTS	B.2.1.1.2 OBTAIN RELEVANT DEBRIEFING/ MISSION REPORTS	REPORTS (TO B.2.1.1.4)
INTERPRETATION PRIORITIES	B.2.1.1.3 RETRIEVE RELEVANT REFERENCE MATERIALS/ STUDIES	REFERENCE MATERIALS (TO B.2.1.1.4)
	*B.2.1.1.4 PERFORM SEARCH PROCESSING	
	B.2.1.1.5 GENERATE DATA FOR REPORTS/BRIEFINGS	REPORT DATA (TO B.2.2)

* indicates expansion of function in following pages

B.2.1.1 Search

The following description of the imagery analysis activity assumes two modes of search, as well as the three phases of interpretation discussed above. The two modes of search are general or 'accountable' search (as it is described on the strategic level), and specific search for selected items. General search is driven by all-inclusive mission or tasking requirements, by which a particular imagery interpretation element must account for all targets in its functional and geographic areas of responsibility, examining every square inch of film within a given period of time after receipt of imagery. Specific search, on the other hand, is driven by Specific Requests for Information (SRI), limiting the scope and objectives of the search. Both types of search are characteristic of the imagery interpretation process at the level of the tactical unit, as well as at the level on which national strategic and service-wide imagery interpretation resources operate.

B.2.1.1.4 PERFORM SEARCH PROCESSING

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.1.1) DEBRIEFING/MISSION REPORTS (FROM B.2.1.1.2) REFERENCE MATERIALS (FROM B.2.1.1.3)	B.2.1.1.4.1	SEARCH ENTIRE DESIGNATED AREA FOR ANYTHING UNUSUAL	SEARCH DATA (TO B.2.1.4.3; B.2.2)
	B.2.1.1.4.2	SEARCH ENTIRE DESIGNATED AREA FOR PARTICULAR TYPES OF TARGETS	
	B.2.1.1.4.3	SEARCH FOR REGISTRATION POINTS	
	B.2.1.1.4.4	SEARCH FOR PINPOINT TARGETS	

* indicates expansion of function in following pages

B.2.1.1.4 Perform Search Processing

The search activity is differently practiced at the various levels of the IMINT production effort. On the level of national strategic imagery interpretation resources, search is more closely associated with unusualness analysis and change detection (see B.2.1.6 for discussion). The search activity as practiced there is a specialized form of accountable search, in which special techniques and equipment are used to simulate 'flying' over the imagery on a light table. As every square inch of the film is 'overflown', the IIA looks for unusual aspects of the terrain or known targets in the area to determine whether any changes have occurred since the last imagery was obtained. If possible changes are detected, a retrospective search of previous imagery is performed to pinpoint the time at which the change occurred by locating imagery antedating the particular unusual characteristic. Thus if an excavation for a possible missile silo is noted, comparative cover imagery will be examined to 'negate' the excavation condition: i.e., to determine the date of coverage when such a condition did not exist, in order to bracket the time frame within which the change occurred. A second aspect of accountable search involves specific checking for new targets of a particular type, assigned as a functional responsibility to an individual IIA or an IIA group.

On the level of the tactical II facility, an analogous type of search activity occurs. An example of this search related to unusualness analysis and change detection is provided by tactical image interpretation operations in Vietnam. Imagery analysis was generally segmented by geographical area and, in most cases, sufficient image interpretation capability was available to allow fairly small areas to be assigned to individual IIAs. These IIAs thus tended to become experts in their particular area of responsibility, which meant that they could easily distinguish objects and configurations associated with the Vietnamese cultural background from objects and configurations of military significance (e.g., grave mounds from weapons emplacements). In a careful search of every inch of film from each new mission flown, the experienced IIA could notice anything at all unusual (for example, possible camouflage), or immediately detect the slightest change in his area of responsibility ("I could tell if they'd moved one tree," a veteran IIA said).

A similar type of search activity associated with target detection (see B.2.1.4) is practiced in tactical units performing real time processing of imagery produced by Side-Looking Airborne Radar(SLAR), Forward-Looking Infrared (FLIR), and video devices. Also, where an aircraft was directed to photograph between coordinates rather than to photograph pinpoint targets, a detailed search of the film precedes the analytical activities of target detection, identification, etc.

In addition, the registration and plotting activity involved in tracing the route flown by a reconnaissance aircraft is also preceded by a type of search activity -- in this case, a search of the imagery for registration points required to calibrate the mission photography with the IIA's map and with the pilot's concept of the route flown in the particular mission. Similarly, a search precedes the detection and identification of pinpoint targets photographed on a particular reconnaissance mission.

B.2.1.2 REGISTRATION/PLOTTING

INPUTS	PROCESSES		OUTPUTS
GENERAL MISSION REQUIREMENTS	B.2.1.2.1	OBTAIN RELEVANT IMAGERY	
	B.2.1.2.2	OBTAIN RELEVANT DE-BRIEFING/MISSION REPORTS	
	B.2.1.2.3	RETRIEVE RELEVANT MAPS	
	*B.2.1.2.4	PERFORM REGISTRATION/ PLOTTING PROCESS	PLOT OF MISSION

* indicates expansion of function in following pages

B.2.1.2 Registration/Plotting

Before an IIA can begin to detect or identify targets photographed in the course of a tactical reconnaissance mission, the strip of film which is to be analyzed must be registered with the IIA's map and a preliminary plot of the mission trace must be made. Registration involves identifying features on the film which correspond to prominent features on the map likely to endure for some period of time (i.e., terrain features, man-made features such as roads, urban areas, airfields, etc.). Once the film has been registered to the IIA's map, an approximate plot of the mission can be prepared, using code matrix data on the film as necessary to determine specific coordinates.

The first phase registration and plotting activities are extremely important in an environment where an II facility is associated with a tactical reconnaissance squadron -- for example, a collocated MIBARS detachment in a temporary deployment for the purpose of an exercise, or on permanent assignment to a tactical air base. In this environment, most imagery interpretation tasking is directed at immediate readout of aerial photographic missions, where the registration/plotting activity provides the vital parameter of location to the analytical and reporting activities that follow immediately, all three activities (as well as film processing) being accomplished usually within an hour of engine shutdown.

B.2.1.2.4 PERFORM REGISTRATION/ PLOTTING PROCESS SUBPROCESSES

INPUTS	B.2.1.2.4 PERFORM REGISTRATION/PLOTTING PROCESS SUBPROCESSES		OUTPUTS
IMAGERY (B.2.1.2.1)	B.2.1.2.4.1	LOCATE PERMANENT FEATURES ON IMAGERY	
DEBRIEFING/MISSION REPORTS (B.2.1.2.2)	B.2.1.2.4.2	ORIENT PERMANENT FEATURES ON IMAGERY TO IDENTICAL FEATURES ON MAP	
MAPS (B.2.1.2.3)	B.2.1.2.4.3	LOCATE STARTING POINT OF IMAGERY	
	B.2.1.2.4.4	DETERMINE PATH COVERED BY MISSION	
	B.2.1.2.4.5	CONVERT GEOGRAPHIC TO UTM COORDINATES	

* indicates expansion of function in following pages

B.2.1.2.4 Perform Registration/Plotting Process

In theory, the basis for this activity is the pilot's trace of the mission flown, as well as the ARLO's debriefing and the mission report or MISREP (which, in the training exercises observed, was substantially prepared before engine shutdown, from the mission plan and inflight reports received from the pilot).

In practice, the pilot and/or navigator appear in the II facility as soon as the imagery has been developed, and the orientation of the mission imagery to the IIA's map is carried out with the active participation of pilot and/or navigator, in the interest of making the most rapid assessment of the mission for a Hot Photo Interpretation Report (HOTPHOTOREP).

The difficulty is that the reconnaissance mission may not have covered the area identified in the mission plan, nor photographed the targets in the planned sequence, nor turned the cameras on and off at the planned points. Weather, enemy fire, and other considerations may change planned coverage. The orientation/registration problem involved in plotting the mission is complicated by such factors, and the difficulty of registering the mission in terms of a map is inversely proportional to the number of salient features in the area of mission coverage. For this reason, IIA's in a MIBARs detachment have estimated that the registration and plotting of a mission occupies about 80% of the time spent in active interpretation, report preparation the next highest percent of time (around 15%), and analysis of the imagery, the smallest proportion of image interpretation time.

The plotting function is also an important second phase function, where accuracy is emphasized (see B.2.3.3). On the national resource level, the plotting function is required for first and second phase analysis of all imagery produced by airborne platforms.

R.2.1.3 TAPGET DETECTION

INPUTS	PROCESSES	OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI)	B.2.1.3.1 OBTAIN RELEVANT IMAGERY	IMAGERY
GENERAL MISSION REQUIREMENTS	B.2.1.3.2 OBTAIN COMPARATIVE COVER IMAGERY	DEBRIEFING/ MISSION REPORTS (TO B.2.1.3.5)
INTERPRETATION PRIORITIES	B.2.1.3.3 OBTAIN RELEVANT DE-BRIEFING/MISSION REPORTS	MAPS/OVERLAYS (TO B.2.1.3.5)
	B.2.1.3.4 RETRIEVE RELEVANT MAPS/OVERLAYS	REPORT DATA (TO B.2.2)
	*B.2.1.3.5 PERFORM TARGET DETECTION PROCESS	
	B.2.1.3.6 GENERATE DATA FOR REPORTS/BRIEFINGS	

* indicates expansion of function in following pages

B.2.1.3. Target Detection

Target detection is essentially the perception of a potential target, which is then validated through the identification activity (B.2.1.4). The activity of target detection includes real time imagery analysis (e.g., involving Side-Looking Airborne Radar (SLAR), Forward-Looking Infrared (FLIR), or video devices), or interpreting wet or dry film under less severe time constraints. In dynamic processing of SLAR imagery, the image interpretration activity is limited to detection of probable moving targets via the Moving Target Indicator (MTI) capability of the SLAR, as identification of the particular target as armor, personnel transports, etc., is not possible. SLAR systems -- when provided with ground-based or airborne interpreter stations to perform detection in real time -- can be exploited for quick response targeting and area activity monitoring.

In the case of SLAR interpretation then, the necessary information for target identification is not present in the medium, thus the analytical activities of detection and identification are distinct, conforming to the separation of these two activities in the model. Since the necessary information for identification is usually present in the case of infrared imagery (IR), video or film (whether real time or not), the distinction between the detection and identification activities is somewhat arbitrary, as some type of identification will usually be made simultaneously with detection. When the visual cues constituting the necessary information for identification are not present -- for example, when the quality of the imagery is low -- identification requires additional analysis involving comparative cover imagery, keys, etc., such that the detection and identification activities are functionally separate, as presented here.

B.2.1.3.5 TARGET DETECTION PROCESS

INPUTS	SUBPROCESSES	OUTPUTS
IMAGERY (B.2.1.3.1) DEBRIEFING/MISSION REPORTS (B.2.1.3.3) MAPS/OVERLAYS (B.2.1.3.4)	B.2.1.3.5.1 DISPLAY INPUT IMAGERY B.2.1.3.5.2 DISPLAY MAP/OVERLAY B.2.1.3.5.3 SCAN IMAGERY B.2.1.3.5.4 DETECT POSSIBLE TARGETS, OBJECTS OR CHARACTERISTICS OF MILITARY SIGNIFICANCE B.2.1.3.5.5 DETERMINE LOCATION OF ITEMS OR CHARACTERISTICS DETECTED B.2.1.3.5.6 RECORD LOCATION OF DETECTED ITEMS AND MARK FRAME FOR FURTHER ANALYSIS B.2.1.3.5.7 MAKE COMPARISONS WITH PAST COVERAGE OR OTHER INTELLIGENCE REPORTS	RECORD OF DETECTED ITEMS (TO B.2.1.4)

* indicates expansion of function in following pages

B.2.1.3.5 Target Detection Process

For first phase search, the preliminary screening function associated with detection generally does not involve comparative cover imagery, reports, imagery interpretation keys, or other reference materials because of the time critical nature of such scans, exemplified on the tactical level by the initial screening for items requiring generation of a HOTPHOTOREP. A minimum of comparative material -- e.g., a SITMAP -- is used to detect changes in the location of moving targets.

In second phase search, (roughly, within 24 hours) exemplified on the tactical level by search for items meriting an 'Immediate' report, there is sufficient time to utilize aids and reference materials for more precise and detailed reporting.

In third phase interpretation, the detection effort is largely directed at guaranteeing that no reportable items in the functional and geographic areas of responsibility of the particular imagery interpretation element have been missed in the previous, time-constrained, scans (for example, because of camouflage or concealment practiced by non-friendly forces).

Thus, time-critical reporting of items detected may involve only the recording of an approximate location and marking of the particular frame of imagery for further analysis, identification, and quantification, while less time sensitive scans are directed at full exploitation of available imagery, based on all available data. The latter type of detection processing can therefore include the so-called 'negation' analysis, where the coverage history of an object or condition is followed to the point before the item appeared.

B.2.1.4 TARGET IDENTIFICATION

INPUTS	PROCESSES		OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI)	B.2.1.4.1	OBTAIN RELEVANT IMAGERY	IMAGERY (TO B.2.1.4.7, B.2.1.4.8)
GENERAL MISSION REQUIREMENTS	B.2.1.4.2	OBTAIN COMPARATIVE COVER IMAGERY	
INTERPRETATION PRIORITIES	B.2.1.4.3	OBTAIN RELEVANT DE-BRIEFING/MISSION REPORTS	DEBRIEFING/MISSION REPORTS (TO B.2.1.4.7, B.2.1.4.8)
RECORD OF DETECTED ITEMS (B. 2.1.3.6)	B.2.1.4.4	RETRIEVE RELEVANT MAPS/OVERLAYS	MAPS/OVERLAYS (TO B.2.1.4.7, B.2.1.4.8)
	B.2.1.4.5	RETRIEVE RELEVANT KEYS FOR IDENTIFYING EQUIPMENT/CONDITIONS	KEYS (TO B.2.1.4.7, B.2.1.4.8)
	B.2.1.4.6	RETRIEVE OTHER RELEVANT REFERENCE MATERIALS	REFERENCE MATERIALS (TO B.2.1.4.7, B.2.1.4.8)
	*B.2.1.4.7	IDENTIFY ITEMS OF MILITARY EQUIPMENT IN AREA OF RESPONSIBILITY	
	*B.2.1.4.8	IDENTIFY ITEMS OF MILITARY SIGNIFICANCE IN AREA OF RESPONSIBILITY	
	*B.2.1.4.9	IDENTIFY PORTS, HARBORS AND INLAND WATERWAY FACILITIES IN AREA OF RESPONSIBILITY.	
	B.2.1.4.10	RECORD DATA FOR REPORTABLE ITEMS	RECORDS OF REPORTABLE ITEMS TO B.2.1.5, B.2.2

* indicates expansion of function in following pages

B.2.1.4 Target Identification

The identification of targets is the primary activity of an IIA. It consists in interpreting the visual cues or distinctive features of imaged objects and terrain conditions in order to determine their identity. The distinctive features are analyzed using the five 'S's (size, shape, shadow, shade, and surroundings). The depth of analysis involved in target identification is highly dependent on the time constraints for completion of the identification process. An object may be tentatively identified as a medium tank, without specifying what type of tank it is, in order to produce a HOTPHOTOREP indicating a change in an area where no armor was previously noted. Where time is less critical, careful and complete identification of equipment and its implications (e.g., headquarters unit in area) can be carried out using all available reference data and analytical aids.

In performing the identification function (especially under time pressure), the problems of errors of invention, misidentification, and missed information must be considered. Suppose an IIA mistakes rectangular grave mounds for weapons emplacements or grain stacked in shocks as a minefield pattern, or logs and debris on a river for small boats. These inventive errors could result in the sending of forces against such false targets at no small cost, economically or tactically speaking, to the commander.

Another problem involves missing a target representing a potential threat -- e.g., a SAM site -- by interpreting it as an object having no military significance. The cost of missing such information is proportional to the threat associated with the given target: failing to identify a tank is presumably less costly (tactically and economically) than missing a SAM site.

The cost of misidentification errors (identifying one type of military object as another) is also associated with the potential threat represented by the misidentified object. For example, identification of a missile transporter as another type of transport trailer could be serious in the absence of other iinformation indicating the presence of missiles in the the area of interest.

The use of error keys, such as the key designed by ARI for use in Vietnam [Ref.24], can be more productive than "rights" keys in avoiding interpretation errors in some cases. Both error and "rights" key products are designed to encourage use even in time-critical reporting situations.

Also, IIAs tend to specialize in identifying and reporting particular classes of targets, and are often functionally organized along these lines. Responsibilities may be assigned only for particular types of equipment and conditions, improving identification accuracy and timeliness, but also requiring that multiple scans be made of the same imagery. Any type of available intelligence to aid in confirming target identifications or guiding hypotheses as to probable areas of operation or associated units is exploited by the IIA in searching for and identifying targets. Of particular importance is the IIA's knowledge of 'surroundings' -- the fifth 'S' in image analysis. The concept of surroundings includes associations between types of equipment and between equipment and organizational units mentioned above (B.2.1). Thus some types of targets imply the presence of others, leading to a more detailed investigation of the particular imagery.

Apart from the IIA's internal knowledge of targets and associations and the external knowledge sources represented by keys, reference materials, and comparative cover imagery, an extremely valuable external knowledge source is embodied in other IIAs. Although IIAs are highly individualistic in their approach to interpretation and in their information acquisition behavior (see B.2.3.2), they are essentially team workers who respect the ability of fellow IIAs and utilize their knowledge in areas where they feel the need of assistance or expert opinion. This attitude is consistent with the experienced IIA's concern and feeling of responsibility for the acquisition of knowledge by novice IIAs (B.2.3.6).

B.2.1.4.7 IDENTIFY ITEMS OF MILITARY EQUIPMENT

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.4.1/2) DEBRIEFING/MISSION REPORTS (FROM B.2.1.4.3) MAPS/OVERLAYS (FROM B.2.1.4.4) EQUIPMENT KEYS (FROM B.2.1.4.5) REFERENCE MATERIALS (FROM B.2.1.4.6)	B.2.1.4.7.1	IDENTIFY ITEMS OF ARTILLERY (LOCATIONS, TYPE, CALIBER)	IDENTIFICATION DATA (TO B.2.1.2.10)
	B.2.1.4.7.2	IDENTIFY TANKS AND SELF-PROPELLED GUNS (LOCATIONS, DIRECTION TYPE)	
	B.2.1.4.7.3	IDENTIFY OTHER TACTICAL MILITARY VEHICLES (LOCATIONS, DIRECTION, TYPE)	
	B.2.1.4.7.4	IDENTIFY ENGINEER/(E.G. RIVER-CROSSING EQUIPMENT) (LOCATION)	
	B.2.1.4.7.5	IDENTIFY MISSILE SYSTEMS (LOCATION. TYPE)	
	B.2.1.4.7.6	IDENTIFY ELECTRONIC EQUIPMENT (LOCATION, TYPE)	
	B.2.1.4.7.7	IDENTIFY AIRCRAFT (ESP. HELICOPTERS, LOCATION, TYPE)	
	B.2.1.4.7.8	IDENTIFY NON-MILITARY TRANSPORT EQUIPMENT (LOCATION, DIRECTION, TYPE)	

* indicates expansion of function in following pages

B.2.1.4.7 Identify Items of Military Equipment

The major classes of military equipment a tactical IIA is concerned with are artillery, wheeled vehicles (non-military as well, since these may also be used for military purposes), tanks and self-propelled guns, special types of engineering equipment, CBR equipment, missile systems, electronic equipment, and aircraft. In identifying mobile items of military equipment, IIAs are also concerned with determining direction of movement, and noting changes in location and direction from previously reported activities and condition (e.g., state of combat readiness -- a missile observed on a transporter versus a missile on a launcher).

In third phase interpretation at the strategic level, identification of equipment, both in development and deployed, is carried out on an extremely detailed level, in support of analytical activities aimed at developing an extensive knowledge of foreign technology.

In evaluating equipment and the important factor of 'surroundings', the association between equipments, and between equipments and organizations leads to detailed searches of the imaged area, as noted under B.2.1.4.

B.2.1.4.8 IDENTIFY ITEMS OF MILITARY SIGNIFICANCE

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.4.1/2)	B.2.1.4.8.1	IDENTIFY INDICATIONS OF ENEMY CAMOUFLAGE AND CONCEALMENT ACTIVITIES	IDENTIFICATION DATA (TO B.2.1.4.10)
DEBRIEFING/MISSION REPORTS (FROM B.2.1.4.3)	B.2.1.4.8.2	IDENTIFY POSSIBLE DUMMY POSITIONS, AS WELL AS POSSIBLE DUMMY EQUIPMENT AND DECOYS	
MAPS/OVERLAYS (FROM B.2.1.4.4)	B.2.1.4.8.3	IDENTIFY OBSTACLES, BARRIERS, CHOKE POINTS, FORTIFICATIONS, AND OTHER DEFENSES.	
EQUIPMENT KEYS (FROM B.2.2.5)	B.2.1.4.8.4	IDENTIFY POSSIBLE ENEMY SUPPLY AREAS	
REFERENCE MATERIALS (FROM B.2.1.4.6)	B.2.1.4.8.5	IDENTIFY BIVOUACS, HEADQUARTERS UNITS, AND OTHER INSTALLATIONS	
	B.2.1.4.8.6	IDENTIFY ASSOCIATED PERSONNEL	

* indicates expansion of function in following pages

B.2.1.4.8 Identify Items of Military Significance

In addition to items of military equipment, all objects, characteristics and conditions of military significance must be identified, using the IIA's personal knowledge of distinctive features of items of military significance, in terms of the principles discussed under B.2.1.4. A particularly important task involves the determination of the presence of indicators of camouflage and concealment, since such activities may cause reportable objects or conditions (e.g., an excavation for a missile site) to be missed. *Other indications of attempted deception*, such as dummy positions, equipment, and decoys are also extremely critical in terms of establishing intent of unfriendly forces. Other important objects and conditions of military significance to be identified include route-associated items such as barriers, obstacles, and choke points, having significance both for enemy and friendly movements. In addition, enemy supply areas, bivouacs, headquarters units, installations, and associated personnel must be identified and reported.

B.2.1.4.9 IDENTIFY PORTS, HARBORS, AND INLAND WATERWAYS

INPUTS	SUBPROCESSES	OUTPUTS
IMAGERY (FROM B.2.1.4.1/2)	B.2.1.4.9.1 IDENTIFY COMPONENTS OF INLAND WATERWAYS	IDENTIFICATION DATA (TO B.2.1.4.10)
DEBRIEFING/MISSION REPORTS (FROM B.2.1.4.3)	B.2.1.4.9.2 IDENTIFY PORT FACILITIES	
MAPS/OVERLAYS (FROM B.2.1.4.4)	B.2.1.4.9.3 IDENTIFY HARBORS AND HARBOR DEFENSES	
EQUIPMENT KEYS (FROM B.2.1.4.5)	B.2.1.4.9.4 IDENTIFY TRANSSHIPMENT PORTS	
REFERENCE MATERIALS (FROM B.2.1.4.6)		

* indicates expansion of function in following pages

B.2.1.4.9 Identify Ports, Harbors, and Inland Waterways

Although the analysis of port and harbor targets tends to be a naval responsibility at the national level, the tactical image interpreter is expected to be a generalist. If such port and harbor facilities exist in the planned area of operations, the image interpreter must be able to analyze and report on them. Especially important are evidences of transshipment of military equipment and material, POL supplies, and other logistics information of military significance.

The basic image interpretation course taught at Fort Huachuca thus includes the identification and analysis of port and harbor facilities among the subject blocks presented.

Analogously, although strategic analysis of such naval facilities is primarily a naval responsibility in the national tasking, transshipment ports associated with particular targets (e.g., missile test ranges) are an important source of information on status of development and readiness, and target activity of reporting significance.

B.2.1.5 TARGET QUANTIFICATION

INPUTS	PROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.5.1/2)	B.2.1.5.1	COUNT REPORTABLE OBJECTS AND RECORD DATA	PRELIMINARY COUNT DATA (TO B.2.1.8,B.2.2)
DEBRIEFING/MISSION REPORTS (FROM B.2.1.5.3)	B.2.1.5.2	PERFORM GROSS SIZING OF OBJECT DIMENSIONS	SIZE ESTIMATES (TO B.2..1.9)
MAPS/OVERLAYS (FROM B.2.1.5.4)	B.2.1.5.3	COMPARE COUNTS WITH PREVIOUS RECORDS OF SAME TYPE REPORTABLE OBJECTS AT SAME LOCATION	
EQUIPMENT/CONDITION KEYS (FROM B.2.1.5.5)			
RECORDS OF REPORTABLE ITEMS (FROM B.2.1.5)	B.2.1.5.4	RECORD CHANGES DETECTED	CHANGE DETECTION NOTICES (TO B.2.2)
ORDER OF BATTLE DATA (FROM B.2.1.8.1)	B.2.1.5.5	PROVIDE DETAILED COUNT OF REPORTABLE OBJECTS/ CONDITIONS	DETAILED COUNT DATA (TO B.2.2.)
ALL SOURCE DATA (FROM B.2.3.2)			

* indicates expansion of function in following pages

B.2.1.5 Target Quantification

The division between the target identification (B.2.1.4) and quantification activities on the one hand, and the quantification and photogrammetric (B.2.1.7) activities on the other is often blurred in a tactical field situation where a single individual performs all these functions with respect to a given target. Even on the level of strategic imagery interpretation resources, however, an estimate of the number of identified objects of a particular type will be recorded simultaneously with the identification data, although photogrammetry is usually handled by a separate, specialized, element.

An important difference exists between the rough counts made in the course of first phase interpretation for immediate detection of significant changes in the situation and the detailed counts made in later phases of interpretation to validate records of such changes. Detailed counts involve reference to all available data to determine, for example, where the missing aircraft from a group of 28 reported earlier might be (in hangars, on a reconnaissance mission, camouflaged, lost or destroyed, returned to base of origin).

Similarly, gross sizing estimates of reportable items ("slit trenches approximately 50 feet long and 4 feet deep") are usually recorded with location and identification data. However, where required by reason of potential significance, gross sizing estimates and associated imagery are input to the photogrammetric function for exact mensuration.

B.2.1.6 UNUSUALNESS ANALYSIS

PROCESSES		OUTPUTS
B.2.1.6.1	OBTAIN RELEVANT IMAGERY	IMAGERY (TO B.2.1.6.7)
B.2.1.6.2	RETRIEVE COMPARATIVE COVER IMAGERY	
B.2.1.6.3	RETRIEVE RELEVANT MAPS/OVERLAYS	MAPS/OVERLAYS (TO B.2.1.6.7)
B.2.1.6.4	RETRIEVE RELEVANT DEBRIEFING/MISSION REPORTS	DEBRIEFING/MISSION REPORTS (TO B.2.1.6.7)
B.2.1.6.5	RETRIEVE RELEVANT KEYS FOR EQUIPMENT CONDITIONS	KEYS (TO B.2.1.6.7)
B.2.1.6.6	RETRIEVE RELEVANT REFERENCE MATERIALS	REFERENCE MATERIALS (TO B.2.1.6.7)
*B.2.1.6.7	PERFORM UNUSUALNESS PROCESSING	
B.2.1.6.8	RECORD ANALYTICAL DATA	ANALYTICAL DATA (TO B.2.1.7, B.2.2)

* indicates expansion of function in following pages

B.2.1.6 Unusualness Analysis

An important activity of an IIA is alertness to unusual objects, previously unknown equipments or novel modifications of known equipments, numbers and concentrations of military objects or personnel, terrain modifications, dispositions of equipment, directions of movement, etc. Where the knowledge of the IIA is insufficient, it can be supplemented with analytical aids and reference materials, which, in the context of the experience and skills of the particular IIA, can assist in distinguishing unusual objects and patterns of activities from normal phenomena.

Like target detection (B.2.1.3), identification (B.2.1.4), and quantification (B.2.1.5), unusualness analysis may be driven by the general requirements of the given mission, EEI in effect at that time, and Standing Requirements List (SRL), or by a Specific Request for Information (SRI) of the type "Notify me if you see anything unusual in Sector x".

Although unusual objects or conditions may be noted in a first phase or preliminary screening interpretation process, unless such manifestations are fairly dramatic, it is more likely that unusualness will be perceived during a second or third phase interpretation activity, or will be resolved at that level. If a novel item of equipment appears on a tank, exact mensuration and special functional analysis of the part may be required in order to determine the significance of the new addition.

Unusual activities or objects may be tipped off or interpreted via all- source data channels. Messages and other all source reference materials are therefore critical inputs to the recognition and analysis of unusualness.

B.2.1.6.7 UNUSUALNESS PROCESSING

INPUTS	SUBPROCESSES		OUTPUTS
	B.2.1.6.7.1	SCAN IMAGERY FOR UNUSUAL OBJECTS	
	B.2.1.6.7.2	SCAN IMAGERY FOR NEW UNUSUAL EQUIPMENT MODIFICATIONS	
	B.2.1.6.7.3	SCAN IMAGERY FOR UNUSUAL TERRAIN CONDITIONS	
	B.2.1.6.7.4	ANALYZE UNUSUAL OBJECTS/CONDITIONS	UNUSUALNESS DATA (TO B.2.1.6.8)

* indicates expansion of function in following pages

B.2.1.7 FUNCTION ANALYSIS

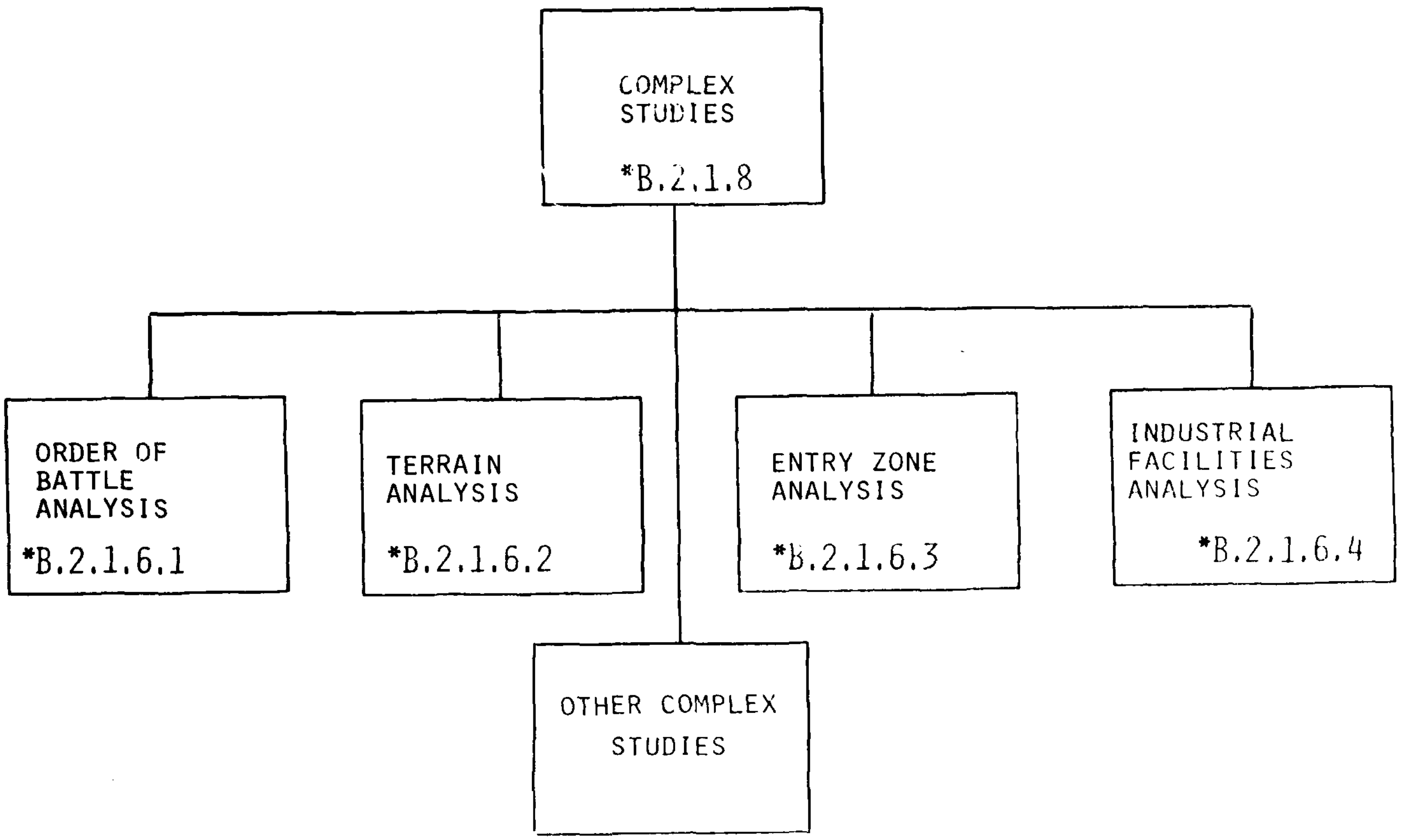
INPUTS	SUBPROCESSES		OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI); GENERAL MISSION REQUIREMENTS	B.2.1.7.1	OBTAIN RELEVANT IMAGERY	IMAGERY; KEYS; REFERENCE MATERIALS (TO B.2.1.7.4)
	B.2.1.7.2	ETRIEVE RELEVANT KEYS	
	B.2.1.7.3	RETRIEVE RELEVANT REFERENCE MATERIALS	
MENSURATION DATA (FROM B.2.1.9)	B.2.1.7.4	PERFORM FUNCTIONAL ANALYSIS OF NEW OR UNUSUAL EQUIPMENT	
	B.2.1.7.5	INTERACT WITH EXPERTS AS NECESSARY	FUNCTION DATA (TO B.2.2)
	B.2.1.7.6	RECORD FUNCTION DATA	

* indicates expansion of function in following pages

B.2.1.7 Function Analysis

In contrast to the previously described image interpretation process steps, analysis of the function of an object, equipment modification, or environment modification is mainly limited to third phase interpretation, where detailed analysis can be carried out without affecting time-critical deliveries of information.

Function analysis is especially important in image interpretation for support of basic intelligence production related to developments in foreign science and technology.


COMPLEX STUDIES
*B.2.1.8
ORDER OF BATTLE ANALYSIS
*B.2.1.6.1
TERRAIN ANALYSIS
*B.2.1.6.2
ENTRY ZONE ANALYSIS
*B.2.1.6.3
INDUSTRIAL FACILITIES ANALYSIS
*B.2.1.6.4
OTHER COMPLEX STUDIES

B.2.1.8 Complex Studies

The analytical work described under the topic of 'Complex Studies' is seen primarily as third phase, in-depth imagery interpretation activity, without the severe time constraints associated with first and second phase interpretation processes. Although some aspects of these topics may apply equally to first and second phase processing (for example, some Order of Battle analysis may in fact be carried out simultaneously with identification and quantification of objects of military significance (B.2.1.4., B.2.1.5)), the type of detailed analysis exemplified by these studies requires more processing time and the use of more reference materials than is possible in the preliminary scanning and continued processing phases.

The complex studies shown in the accompanying chart are intended as examples of the types of studies which are performed by IIAs at the tactical and strategic levels. The examples given are more typical of tactical level analytical activities. At the strategic level, detailed studies of weapon systems, missile and space technology, and other types of in-depth analytical studies involving imagery are performed.

B.2.1.8.1 ORDER OF BATTLE ANALYSIS

INPUTS	PROCESSES		OUTPUTS
RECORDS OF REPORTABLE ITEMS PREVIOUSLY IDENTIFIED (FROM B.2.1.4) QUANTIFICATION DATA ON REPORTABLE ITEMS (FROM B.2.1.5) ALL SOURCE REFERENCE MATERIAL	B.2.1.8.1.1	DETERMINE WHETHER MILITARY ACTIVITY INDICATORS ANSWER REQUIREMENTS OF REQUESTOR/MISSION	
	B.2.1.8.1.2	DETERMINE WHETHER MILITARY EQUIPMENT IDENTIFIED RELEVANT TO REQUIREMENTS OF REQUESTOR/MISSION	
	B.2.1.8.1.3	DETERMINE TYPE OF UNIT DEPLOYED AND EQUIPMENT INHERENT TO UNIT	
	B.2.1.8.1.4	COMPILE DATA FOR STUDY REPORT	ORDER OF BATTLE DATA (TO B.2.2)

* indicates expansion of function in following pages

B.2.1.8.1 Order of Battle Analysis

Using identification and quantification data from the functions represented in B.2.1.4 and B.2.1.5, the image interpreter determines the significance of these data in terms of Order of Battle. In the identification and quantification processes, the image interpreter is concerned with what type of equipment is shown in the imagery, and how many of these equipments are represented. In Order of Battle analysis, he associates these equipments with particular elements, evaluates the significance of the movement and direction of the given units, and determines what impact these deployments have on the Order of Battle of non-friendly forces by comparing current with previously reported dispositions. For example, the image interpreter may determine that the 2 T-62s previously reported are subordinate to the 103rd Tank Battalion, that they are moving toward the forward area, and may represent the vanguard of the 39th Tank Division, indicating a replacement of the previously noted 42nd Tank Division in the forward area.

In order to perform this type of analysis, the image interpreter requires -- in addition to his usual maps, overlays, and reference material -- all source reference material, including all current message traffic relevant to his area of responsibility and hard copy reports containing Order of Battle data.

B.2.1.8.2 TERRAIN ANALYSIS

INPUTS	SUBPROCESSES		OUTPUTS
REQUEST FOR SPECIFIC TERRAIN ANALYSIS STUDY	B.2.1.8.2.1	OBTAIN RELEVANT IMAGERY	IMAGERY MAPS/ OVERLAYS REFERENCES (TO B.2.1.8.2.4)
GENERAL MISSION REQUIREMENTS FOR TERRAIN ANALYSIS	B.2.1.8.2.2	RETRIEVE RELEVANT MAPS/ OVERLAYS	
	B.2.1.8.2.3	RETRIEVE OTHER REFERENCE MATERIALS	
	*B.2.1.8.2.4	PERFORM TERRAIN ANALYSIS PROCESSING	
	B.2.1.8.2.5	PREPARE TERRAIN OVER-LAYS	OVERLAYS
	B.2.1.8.2.6	COMPILE TERRAIN ANALYSIS DATA FOR BRIEFING/REPORT	TERRAIN ANALYSIS DATA (TO B.2.2)

* indicates expansion of function in following pages

B.2.1.8.2 Terrain Analysis

Terrain analysis studies are generally carried in accordance with some mission-related requirement, although special requests for terrain analysis of particular areas may also occur. In addition to imagery, maps, and overlays, the image interpreter will use other types of reference material giving details of density of forestation, width of trees, specifics of natural obstacles such as rivers and canyons, specifics of urban areas such as width of streets, height of buildings, population of the area, and other data, as required.

The analytical data resulting from this process may be presented in the form of a briefing, with graphics and overlays; as terrain overlays or templates for SITMAPS; or in the form of a message or hardcopy report.

B.2.1.8.2.4 PERFORM TERRAIN ANALYSIS PROCESSING

INPUTS

- IMAGERY (FROM B.2.1.8.2.1)
- MAPS/OVERLAYS (FROM B.2.1.8.2.2)
- REFERENCE MATERIALS (FROM B.2.1.8.2.3)

SUBPROCESSES

B.2.1.8.2.4.1	IDENTIFY ASPECTS OF TERRAIN APPLICABLE TO REQUEST/REQUIREMENTS
B.2.1.8.2.4.2	IDENTIFY KEY TERRAIN FEATURES
B.2.1.8.2.4.3	IDENTIFY CHOSEN ITEMS THAT CAN BE USED FOR CONCEALMENT AND COVER
B.2.1.8.2.4.4	IDENTIFY OBSTACLES
B.2.1.8.2.4.5	IDENTIFY AVENUES OF APPROACH
B.2.1.8.2.4.6	IDENTIFY MANMADE FEATURES WITHIN SELECTED AREAS
B.2.1.8.2.4.7	IDENTIFY OBSERVATION POINTS AND FIELDS OF FIRE
*B.2.1.8.2.4.8	IDENTIFY OTHER TERRAIN FEATURES
B.2.1.8.2.4.9	COMPUTE PERCENT OF SLOPE

OUTPUTS

- IDENTIFICATIONS OF TERRAIN FEATURES (TO B.2.1.8.2.5/6)

* indicates expansion of function in following pages

B.2.1.8.2.4 Perform Terrain Analysis Processing

In performing the terrain analysis subfunction, the image interpreter is first concerned with identifying key features of the terrain under investigation. For example, a particular hill mass in a given sector might provide an essential offensive or defensive advantage -hence possession of it is key to the friendly forces' position. Similarly, a particular bridge or river crossing (such as a fording area) may provide the unique means of controlling access to and egress from a given sector.

Terrain features which can be utilized for concealment and cover are of obvious importance in a tactical situation. To illustrate, a deciduous forest will normally carry a dense canopy of leaves during at least six months of the year, thus providing protection providing good cover from ground fire and partial cover from aerial observation; however, a planted area such as an orchard would provide very minimal cover.

Natural obstacles would include such terrain features as rivers, dense forests, mountainous or steep hilly terrain, while avenues of approach are rolling or flat areas free from such obstacles. Man-made features include building construction (e.g., buildings with basements or underground areas provide cover from enemy fire), roads, bridges, railroads, airports, etc. Observation points may be manmade, such as a church steeple, or natural, such as an escarpment. Fields of fire may be defined in terms of proximity to a terrain feature providing a good defensive or offensive position, range in terms of line-of-sight firing, relationship of cultivated land to forested areas, and so forth.

B.2.1.8.2.4.8 IDENTIFY OTHER TERRAIN FEATURES

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.8.2.1)	B.2.1.8.2.4.8.1	IDENTIFY DRAINAGE PATTERNS	IDENTIFICATIONS OF TERRAIN FEATURES (TO B.2.1.8.2.5/6)
MAPS/OVERLAYS (FROM B.2.1.8.2.2)	B.2.1.8.2.4.8.2	IDENTIFY ROCK TYPES	
REFERENCE MATERIALS (FROM B.2.1.8.2.3)	B.2.1.8.2.4.8.3	IDENTIFY ROCK STRUCTURES	
	B.2.1.8.2.4.8.4	IDENTIFY SOIL TYPES	
	B.2.1.8.2.4.8.5	IDENTIFY VEGETATION TYPES	

* indicates expansion of function in following pages

B.2.1.8.2.4.8 Identify Other Terrain Features

In addition to the more specific delineation of terrain features in terms of tactical significance, general features of the given area are also important to analyze. Knowledge of drainage patterns is critical to evaluating trafficability of roads and low-lying areas in wet seasons, information on rock types and surface materials is required for evaluating whether off-road areas can support armored vehicles and other heavy military traffic, or whether rock structures can serve as gun emplacements, etc. Information on vegetation types is also important in a tactical situation, since -- for example -- a coniferous forest is generally far more open than a deciduous forest, having less underbrush to impede movement of troops, and offering less potential for concealment from ground fire.

B.2.1.8.3 ENTRY ZONE ANALYSIS

INPUTS	PROCESSES		OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI)	B.2.1.8.3.1	OBTAIN RELEVANT IMAGERY	IMAGERY (TO B.2.1.8.3.4)
GENERAL MISSION REQUIREMENTS	B.2.1.8.3.2	RETRIEVE RELEVANT MAPS/OVERLAYS	MAPS/OVERLAYS (TO B.2.1.8.3.4)
	B.2.1.8.3.3	RETRIEVE RELEVANT REFERENCE MATERIALS	REFERENCE MATERIALS (TO B.2.1.8.3.4)
	*B.2.1.8.3.4	PERFORM ENTRY ZONE ANALYSIS SUBFUNCTION	
	B.2.1.8.3.5	RECORD INFORMATION ON OVERLAYS	INFORMATION RECORDS (TO B.2.2)

* indicates expansion of function in following pages

B.2.1.8.3 Entry Zone Analysis

Another important activity in tactical imagery interpretation is analysis of potential zones for introducing assault troops into forward areas, which may be unoccupied, or held by non-friendly forces. In the latter case, materials utilized as background for the analytical study include all source message traffic and hard copy reports as well as the imagery, maps, and other reference materials indicated in the associated chart. Potential zones that are identified by the IIA tasked with the analytical study are indicated on overlays to assist in assault planning based on a SITMAP, or other map of the given area.

B.2.1.8.3.4 PERFORM ENTRY ZONE ANALYSIS PROCESSING

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.8.3.1)	B.2.1.8.3.4.1	IDENTIFY DROP ZONES IN SUPPORT OF AIR-BORNE OPERATIONS	ENTRY ZONE IDENTIFICATION DATA (TO B.2.1.8.3.5)
MAPS/OVERLAYS (FROM B.2.1.8.3.2)	B.2.1.8.3.4.2	IDENTIFY AIR ASSAULT AREAS TO SUPPORT AIRMOBILE OPERATIONS	
REFERENCE MATERIALS (FROM B.2.1.8.3.3)	B.2.1.8.3.4.3	IDENTIFY BEACH/ AMPHIBIOUS LANDING AREAS IN SUPPORT OF AMPHIBIOUS OPERATIONS	
	B.2.1.8.3.4.4	IDENTIFY FIXED-WING LANDING AREAS	
	B.2.1.8.3.4.5	IDENTIFY HELICOPTER LANDING ZONES	
	B.2.1.8.3.4.6	IDENTIFY RIVER-CROSSING SITES	

* indicates expansion of function in following pages

B.2.1.8.3.4 Perform Entry Zone Analysis Process

The entry zone identification process covers a range of potential means of entry and offers alternate zones where possible. The analytical process thus includes identification of potential drop zones for possible airborne operations, air assault areas in support of airmobile operations, beach and amphibious landing areas for amphibious operations, fixed-wing and helicopter aircraft landing areas, and potential river crossings.

B.2.1.8.4 INDUSTRIAL FACILITIES ANALYSIS

INPUTS	SUBPROCESSES	OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI)	B.2.1.8.4.1 OBTAIN RELEVANT IMAGERY	IMAGERY (TO B.2.1.8.4.5)
GENERAL MISSION REQUIREMENTS	B.2.1.8.4.2 RETRIEVE RELEVANT MAPS/OVERLAYS	MAPS/OVERLAYS (TO B.2.1.8.4.5)
	B.2.1.8.4.3 RETRIEVE RELEVANT INTERPRETATION KEYS	KEYS (TO B.2.1.8.4.5)
	B.2.1.8.4.4 RETRIEVE RELEVANT REFERENCE MATERIALS	REFERENCE MATERIALS (TO B.2.1.8.4.5)
	*B.2.1.3.4.5 PERFORM FACILITIES ANALYSIS	
	B.2.1.8.4.6 REPORT DETAILS OF FACILITIES (LOCATION, BUILDINGS, EQUIPMENT, INPUT MATERIALS, PRODUCTS)	INDUSTRIAL FACILITIES DATA (TO B.2.2)

* indicates expansion of function in following pages

B.2.1.8.4 Industrial Facilities Analysis

At the national level, studies of strategic industrial targets are an important responsibility for continuing evaluation (e.g., analysis of new construction, changes in input materials or output products, changes in flow of materials among the various components of an industrial complex). Industrial facilities directly involved in the production of military equipment such as tanks, guns, or missiles are of special interest, with respect to information that may be gleaned concerning modifications or product developments.

In a tactical environment, industrial facilities may also be assigned for special study, if they are present in the area of operations, or are involved in support of military organizations operating in the area.

B.2.1.8.4.5 PERFORM INDUSTRIAL FACILITIES ANALYSIS

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.3.4.1)	B.2.1.8.4.5.1	IDENTIFY GUIDED-MISSILE FACILITIES	IDENTIFICATION DATA (TO B.2.1.8.4.6)
MAPS/OVERLAYS (FROM B.2.1.8.4.2)	B.2.1.8.4.5.2	IDENTIFY AIRCRAFT MANUFACTURING FACILITIES	
KEYS (FROM B.2.1.8.4.3)	B.2.1.8.4.5.3	IDENTIFY ATOMIC ENERGY FACILITIES	
REFERENCE MATERIALS (FROM B.2.1.8.4.4)	B.2.1.8.4.5.4	IDENTIFY CHEMICAL PLANT FACILITIES	
	B.2.1.8.4.5.5	IDENTIFY COKE, IRON AND STEEL MILLS	
	B.2.1.8.4.5.6	IDENTIFY ELECTRIC FACILITIES	
	B.2.1.8.4.5.7	IDENTIFY PETROLEUM FACILITIES	
	B.2.1.8.4.5.8	IDENTIFY SHIP-BUILDING FACILITIES	

* indicates expansion of function in following pages

B.2.1.8.4.5 Perform Industrial Facilities Analysis

In analyzing industrial facilities for a detailed study, the IIAs charged with the study task must perform an identification and analysis in sufficient detail to provide a complete description of the given facilities (in terms of available imagery and reference materials). Such a description should include the specific location and layout of all buildings belonging to the industrial complex, all related equipment, input materials, output products, and insofar as possible, the flow of such materials and products within the complex.

B.2.1.9 PHOTOGRAMMETRIC SCIENCES

INPUTS

- SPECIFIC REQUESTS FOR INFORMATION (SRI)
- INTERPRETATION PRIORITIES
- FROM B.2.1.5:
  - PRELIMINARY COUNT DATA
  - SIZING ESTIMATES

PROCESSES

B.2.1.9.1	OBTAIN RELEVANT IMAGERY
B.2.1.9.2	RETRIEVE RELEVANT MAPS/ OVERLAYS
B.2.1.9.3	RETRIEVE KEYS FOR RELEVANT EQUIPMENT/ CONDITIONS
B.2.1.9.4	RETRIEVE RELEVANT REFERENCE MATERIALS
*B.2.1.9.5	PERFORM COMPUTATION AND MENSURATION
B.2.1.9.6	RECORD RESULTS

OUTPUTS

- TO B.2.1.9.5:
  - IMAGERY
  - MAPS/OVERLAYS
  - KEYS
  - REFERENCE MATERIALS
- COMPUTATION AND MENSURATION DATA (TO B.2.2.)

* indicates expansion of function in following pages

B.2.1.9 Photogrammetric Sciences

The photogrammetric activity includes all detailed mensuration and computation which is required in imagery interpretation. At the lower level tactical facilities, an IIa may carry out his own complex mensuration and computation activities. On the other hand, at higher level tactical facilities and at the national resource level, photogrammetry tends to be a specialized function supported by a group of image interpreters with extensive experience in computation and mensuration, who are solely involved in photogrammetric processing.

Inputs to the photogrammetric process are mainly driven by Specific Requests for Information (SRI) in the sense that the mission of the photogrammetric specialists is to respond to such requests from the non-specialist image interpreters supported by the particular photogrammetric element. Preliminary count data and sizing estimates may provide data for validation, or in cases where there is no specialized photogrammetry support, a basis for detailed computation and mensuration.

B.2.1.9.5 PERFORM COMPUTATION AND MENSURATION

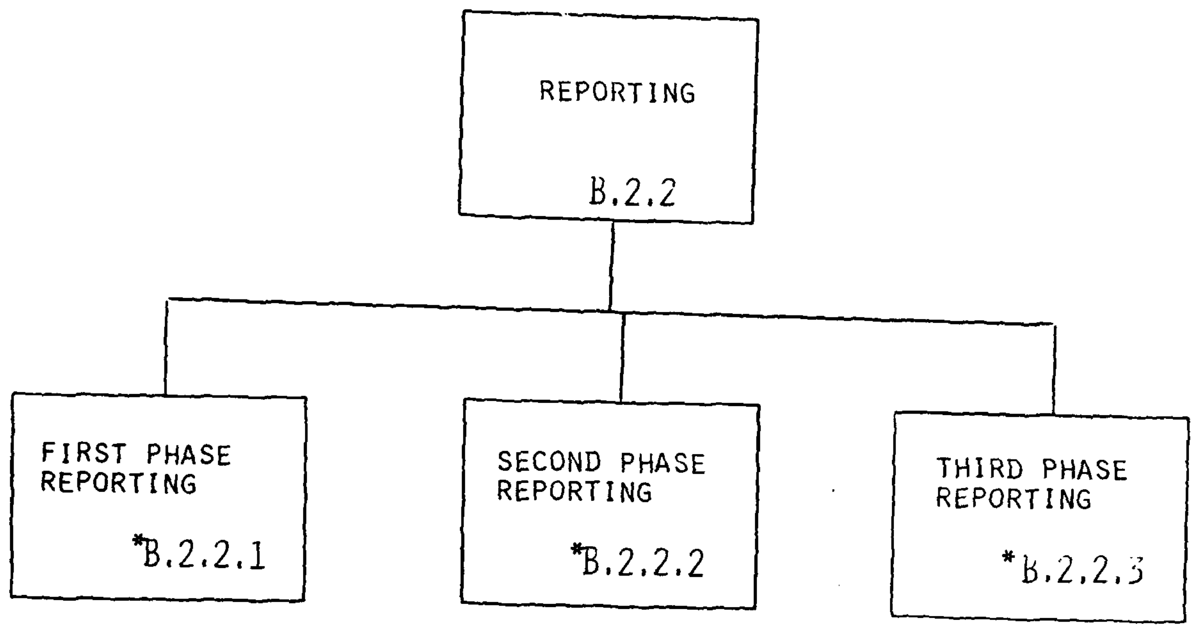
INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.1.9.1) MAPS/OVERLAYS (FROM B.2.1.9.2) KEYS (FROM B.2.1.9.3) REFERENCE MATERIALS (FROM B.2.1.9.4)	B.2.1.9.5.1	COMPUTE SCALE OF IMAGERY	
	B.2.1.9.5.2	COMPUTE DIMENSIONS OF REPORTABLE OBJECTS	
	B.2.1.9.5.3	MEASURE DISTANCES BETWEEN REPORTABLE OBJECTS/ CHARACTERISTICS	
	B.2.1.9.5.4	COMPUTE SPEED OF OF MOVEMENT AND DIRECTION OF REPORTABLE OBJECTS	
	B.2.1.9.5.5	RECORD COMPUTATION AND MENSURATION DATA	COMPUTATION AND MENSURATION DATA (TO B.2.1.9.6)

* indicates expansion of function in following pages

B.2.1.9.5 *Perform Computation and Mensuration*

The most basic photogrammetric task is that of computing the scale of the imagery involved in analysis. Although most scale computation on the national level is precalculated, because the collection effort is planned far in advance, this is an important task on the tactical level. IIAs in the tactical environment are trained to compute scale using focal length of the camera and altitude of the aircraft. If these are not available, the IIA uses computations involving determination of scale in terms of the largest and best defined scale indicator on the imagery, where photo distance and ground distance are established in terms of this indicator. More complex methods of scale determination are required when the imagery is produced by oblique or panoramic cameras.

In computing the dimensions of objects appearing on the imagery, the IIA may choose the relief displacement method (where an object with a visible base is involved), or the shadow proportion method, where film taken in full sun is available.



*INDICATES EXPANSION OF DETAIL IN FOLLOWING PAGES

B.2.2 Reporting

Reports are the primary product of the image interpretation facility. The content of reports and the procedures for generating reports are nearly always dependent upon the amount of time available to produce the report. Because of the time factor in report generation, both at the strategic and tactical level reporting tends to fall into one of the three phases defined in Section 2.:

First phase reporting: preliminary scan on receipt of imagery. (This category also includes real time processing of SLAR, IR, and video imagery.)

Second phase reporting: within 24 hours of receipt of imagery;

Third phase reporting: longer than 24 hours, and periodic reporting.

The time boundaries of these phases as indicated above are only intended to be suggestive, since actual time periods *differ slightly* between the national strategic IMINT resources and tactical and II *organizations*, and are also affected by production load and priority. From this point of intelligence *utilization* of these phases generally corresponds to Indications and Warnings (I&W), *Current* Intelligence, and Basic Intelligence, *respectively*. *Handling time is a major* factor in determining the pace of analysis and reporting. Film development time, duplication of positives, and hardcopy distribution times are significant factors in determining minimum times for reporting imagery *interpretation* production results.

Because there is less time to analyze imagery in First and Second Phase processes, the detail and accuracy of reports is affected.

A *first* phase report *mignt identify* detected trends simply as light, *medium*, or *heavy*; whereas, a second phase report would also provide type identification and unit *subordination*.

With the increased time available for analysis, in second and third phase reporting the target information carried in the report can become more detailed but the potential for exploiting the target information for tactical or warning purposes decreases. Distribution lists for reports generally reflect the different uses of II reports from first, second, or third phase analysis.

Imagery interpretation reports are composed of the following elements which are relevant to the IMINT products:

Source identification

- Facility
- Time of preparation
- Analyst

Mission

- Mission ID
- Time
- Frame reference
- Sensor parameters
- Location parameters

Requirement reference

- Agency
- Desk
- Requirement number (or message reference)
- Priority

Classification

- Content codes report priority Imagery Interpretation Text
- Graphics (optional)
- Imagery copy (optional)
- Target Description

All-source material references (optional)

Imagery quality rating

- NIIRS
- Previous report references (optional)
- Follow-up information (optional)

Release authority

- Access control information
- Distribution list
- Communication channel data
- Report reference

The imagery interpretation report as an information entity can be viewed from the perspective of the mission, the target, the tactical or strategic threat significance, security, classification, and communications. These different perspectives are the framework within which sets of messages are dealt with in various stages of production. These perspectives are highly significant to analysis of the information structure and data base requirements of the II facility.

B.2.2.1 FIRST PHASE REPORTING

INPUTS	PROCESSES		OUTPUTS
TASKING PACKAGE REQUIREMENTS MISSION DATA REPORT DATA	B.2.2.1.1	REVIEW PRODUCT DATA	
	B.2.2.1.2	DETERMINE IF DATA MEETS FIRST PHASE REPORTING CRITERIA	
REPORTING POLICY REPORTING PRIORITIES CLASSIFICATION CRITERIA DISTRIBUTION LISTS REPORT FORMATS	B.2.2.1.3	DETERMINE IF REPORT SHOULD BE MADE VERBALLY OR THROUGH MESSAGE COMMUNICATIONS	
	B.2.2.1.4	VERBAL REPORT (OPTIONAL)	VOICE COMMUNICATIONS
	B.2.2.1.5	PREPARE TEXT REPORT	
	B.2.2.1.6	SUBMIT REPORT FOR REVIEW	REPORT REVIEW COPY (B.1.3.4)
REVIEW COMMENTS (B.1.3.4)	B.2.2.1.7	MAKE CORRECTIONS IF REQUIRED	
	B.2.2.1.8	SUBMIT REPORT FOR RELEASE APPROVAL	REPORT RELEASE COPY (B.1.2.5)
RELEASE APPROVAL (B.1.2.5)	B.2.2.1.9	COMMUNICATIONS PROCESSING	SPOTREP/HOTPHOTOREP
	B.2.2.1.10	LOG AND DISTRIBUTE LOCAL COPIES	LOCAL REPORT COPY (B.2.4.2)
	B.2.2.1.11	RECOMMEND FOLLOWUP ACTIONS	RECOMMENDED FOLLOWUP ACTION (B.1.2.4)

* indicates expansion of function in following pages

B.2.2.1 First Phase Reporting

First phase reporting supports strategic Indications and Warning and current operations at the tactical level. First phase processing activities include target detection, target identification, target quantification, and unusualness analysis. These activities are scheduled with the time frame of First Phase analysis but may not result in a First Phase report unless the results meet First Phase reporting criteria.

Second and Third Phase imagery interpretation processes might result in a First Phase type of reporting if the results are of immediate intelligence significance.

Several types of reports are normally associated with First Phase reporting. Voice reports through secure communications networks are the most direct means of reporting significant items. This reporting mode is particularly effective in the tactical environment when IR or SLAR imagery interpretation is being used to exploit detection of moving targets. Verbal reports are sufficient only if the requirement is limited to a single user. Items of general interest must be recorded and reported in textual form. SPOTREPORT is a term normally associated with an in-flight intelligence report. HOTPHOTOREP is a term associated with reports resulting from the first scan of a wet or dry negative film at the completion of a mission.

First Phase interpretation products may be used to guide followup tasking in subsequent interpretation processing.

B.2.2.2 SECOND PHASE REPORTING

INPUTS	PROCESSES		OUTPUTS
TASKING PACKAGE TARGET FOLDER REPORT DATA REQUIREMENTS PHOTO ENCLOSURES GRAPHIC ENCLOSURES	B.2.2.2.1	REVIEW PRODUCT DATA	
	B.2.2.2.2	REVIEW REQUIREMENTS AND RANK SIGNIFICANCE OF DATA	
REPORTING POLICY REPORTING PRIORITIES CLASSIFICATION CRITERIA DISTRIBUTION LISTS REPORTING FORMATS	B.2.2.2.3	DETERMINE REPORTING VEHICLE(S)	
FIRST PHASE REPORTS	B.2.2.2.4	MAKE VERBAL REPORT IF APPROPRIATE	VOICE COMMUNICATIONS
AIRCREW DEBRIEFING REPORT	B.2.2.2.5	PREPARE TEXT REPORT	
	B.2.2.2.6	SUBMIT REPORT FOR REVIEW	REPORT REVIEW COPY (B.2.3.4)
REVIEW COMMENTS (B.1.3.4)	B.2.2.2.7	MAKE CORRECTIONS IF REQUIRED	
	B.2.2.2.8	SUBMIT REPORT FOR RELEASE APPROVAL	REPORT RELEASE COPY (B.1.2.5)
RELEASE APPROVAL (B.1.2.5)	B.2.2.2.9	COMMUNICATIONS PROCESSING	IPIR, GPIR, MIPIR, MISREP
	B.2.2.2.10	LOG AND DISTRIBUTE LOCAL COPIES	LOCAL REPORT COPY (B.2.4.2)
	B.2.2.2.11	RECOMMEND FOLLOWUP ACTIONS	RECOMMENDED FOLLOWUP ACTIONS (B.1.2.4)
	B.2.2.2.12	HOLD ITEMS FOR SUMMARY OR HIGHLIGHT REPORTS	

* *indicates expansion of function in following pages*

B.2.2.2 Second Phase Reporting

Second Phase reporting would nominally occur within 24 hours after receipt of imagery. A 24-hour cycle is consistent with mission scheduling during daylight hours and exploiting of Second Phase production products for current operations planning in the tactical environment.

Individual products or responses to specific requests for image interpretation products may be produced much sooner and reported when available. Other products may be delayed by workload and preemption by higher priority tasks.

Second Phase reports generally are transmitted as messages but may have accompanying photographs or graphics. Verbal reports may be used to satisfy special requirements with limited distribution. Data produced by Second Phase processing generally has a wide distribution through message communication networks. Not all users are interested in the same level of detail, so the II facility generally sorts reporting items by significance for immediate reporting, daily reporting, weekly reporting, highlighting, or summary type reports. Sorting of reportable products for these types of reports may be done on the basis of mission, geographic area, target type, or other predetermined criteria.

Since Second Phase interpretation products may be accumulated, summarized, and extracted from at the reporting stage, there must be a means of temporarily holding product data. This is normally accomplished through transfer of target folders or tasking packages which contain requirements, mission data, processing results, and appropriate enclosures. Automated data processing systems have been utilized within the larger national level facilities to manage the requirements, tasking, mission, and text reports produced during Second Phase processing. Report preparation is likely to be done by a person other than the II analyst that performed the analysis.

Typical reporting forms for Second Phase products are:

IPIR Immediate Photo Interpretation Report

SUPIR Supplemental Photo Interpretation Report

GPIR General Photo Interpretation Report

MIPIR Machine IPIR (Computer-generated report)

MISREP Mission Report

All but the MISREP generally follow the same standardized Military Message Format. The MISREP is limited to tactical environments and includes a summary of all pertinent flight parameters, sensor parameters, aircrew observations, and summary of imagery interpretation results.

B.2.2.3 THIRD PHASE REPORTING AND PRODUCT OUTPUT

INPUTS	PROCESSES		OUTPUTS
TASKING PACKAGE TARGET FOLDER/DATA REPORT DATA REQUIREMENTS PHOTO ENCLOSURES GRAPHIC ENSLOSURES MAP ENCLOSURES REFERENCES	B.2.2.3.1	REVIEW PRODUCT DATA	
REPORTING POLICY	B.2.2.3.2	DETERMINE REPORTING VEHICLE OR PRODUCT FORM	
	B.2.2.3.3	VERBAL REPORT (OPTIONAL)	VOICE COMMUNICATIONS
	B.2.2.3.4	PREPARE TEXT REPORT	
	B.2.2.3.5	SUBMIT GRAPHICS AND PHOTOCOPY TASKS	GRAPHICS AND PHOTOCOPY TASKING (B2.4.3)
	B.2.2.3.6	ASSEMBLE FINAL PRODUCT FORM FOR REVIEW	REPORT/PRODUCT REVIEW COPY (B.1.3.4)
	B.2.2.3.7	MAKE CORRECTIONS IF REQUIRED	
	B.2.2.3.8	SUBMIT PRODUCT FOR RELEASE APPROVAL	PRODUCT RELEASE COPY(B.1.2.5)
	B.2.2.3.9	COMMUNICATIONS OR PUBLICATION PROCESSING	DSIIR BIIR BRIEFINGS INTERPRETATION KEYS IDENTIFICATION POSTERS MOSAICS II FACILITY PRODUCTION PLANNING DOCUMENTS
	B.2.2.3.10	LOG AND DISTRIBUTE LOCAL COPIES	
	B.2.2.3.11	RECOMMEND FOLLOWUP ACTIONS	RECOMMENDED FOLLOWUP ACTIONS (B.1.2.4)

* indicates expansion of function in following pages

B.2.2.3 Third Phase Reporting and Products

The greatest diversity in reporting forms occurs in Third Phase II processing. Responses to tasking can be anything from a yes/no answer to a detailed document with enclosed graphics and photocopies Distribution of products may be highly selective and directed on an analyst to analyst basis. If the product is basic intelligence the report may be published as general intelligence information and receive wide distribution.

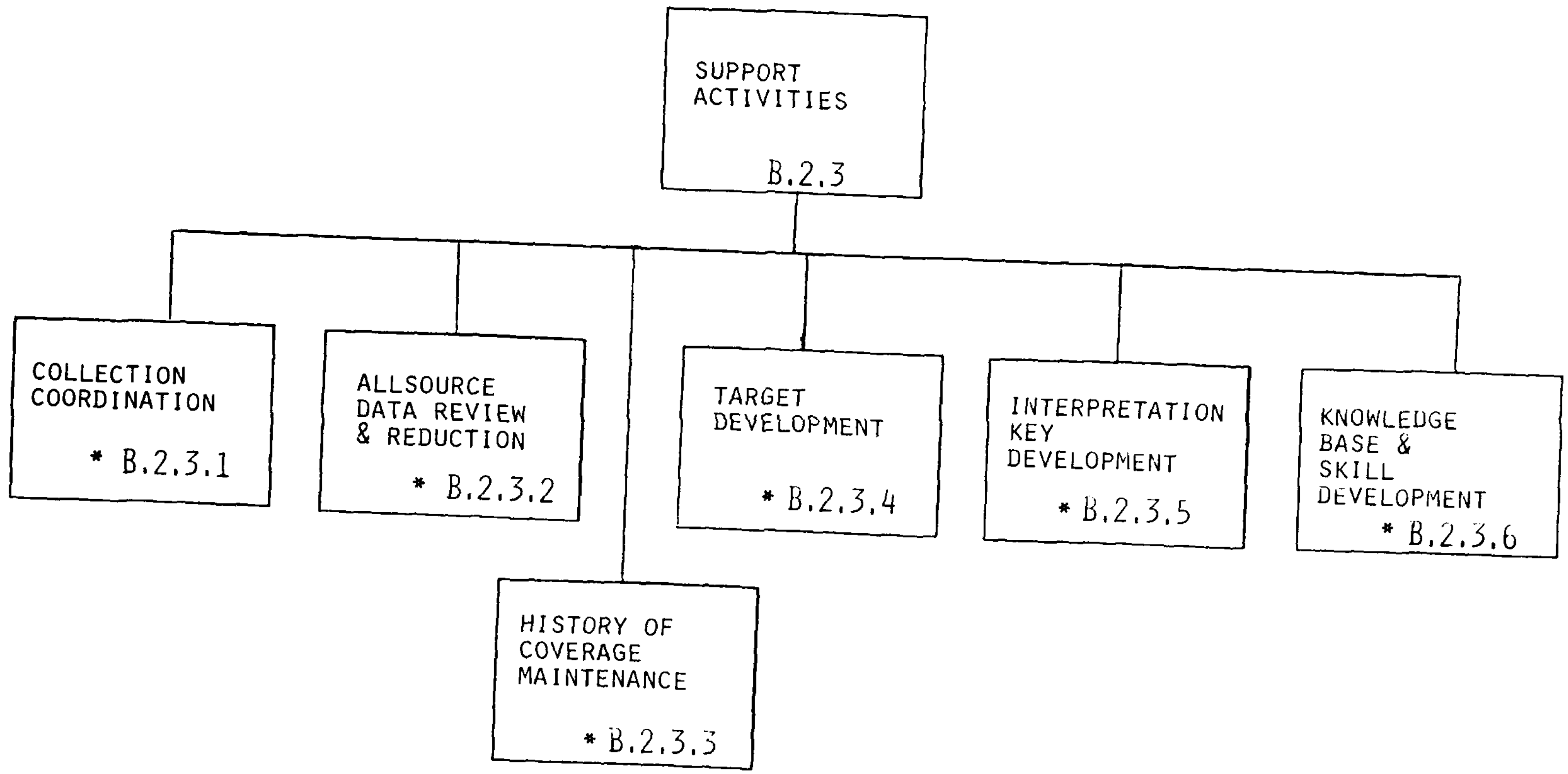
The suspense time for producing Third Phase reports may range from several days to periodic updates of basic intelligence spanning several years. Third Phase processing requires much greater use of collateral and all-source intelligence materials. All forms of imagery are exploited, and utilization of technical exchanges between intelligence analysts in different fields is possible because of the extended time available for analysis.

Information sources and reporting channels tend to be informal as well as formal. Third Phase imagery interpretation introduces a wider range of products besides written reports including:

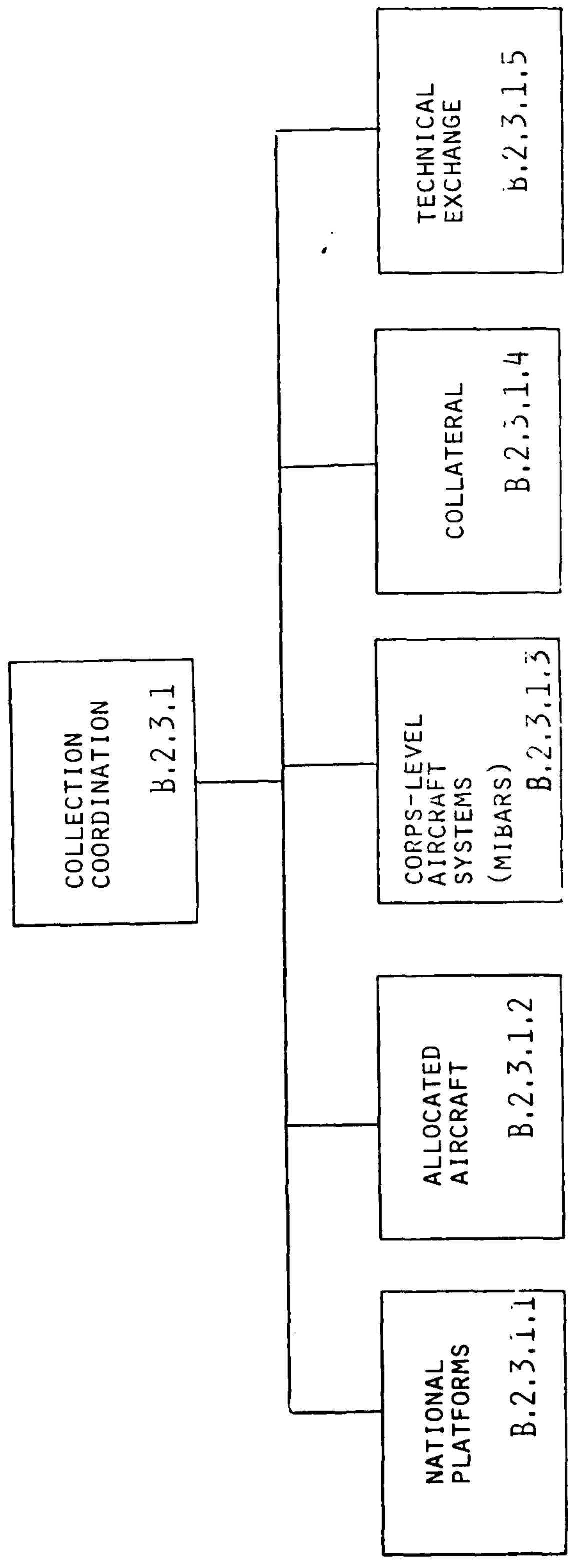
- Direct Support Imagery Interpretation Reports (DSIIR)
- Basic Imagery Interpretation Reports
- briefings
- imagery interpretation keys
- target identification posters
- mosaics
- II facility production planning documents

The *division of labor for Third Phase processing activities follows specialty* lines including the area of product preparation. Specialized support is provided for graphics and photocopies which are used extensively for Third Phase products.

One of the products of Third Phase processing is the technology to sustain the capabilities of the overall imagery interpretation mission. Imagery interpretation keys, updates to operating procedures, technical exchange between analysts, and individual skill and knowledge base development are products that aid in adapting to new requirements and improving current capabilities.



* INDICATES EXPANSION OF DETAIL IN FOLLOWING PAGES


COLLECTION COORDINATION
B.2.3.1
NATIONAL PLATFORMS
B.2.3.1.1
ALLOCATED AIRCRAFT
B.2.3.1.2
CORPS-LEVEL AIRCRAFT SYSTEMS (MIBARS)
B.2.3.1.3
COLLATERAL
B.2.3.1.4
TECHNICAL EXCHANGE
B.2.3.1.5

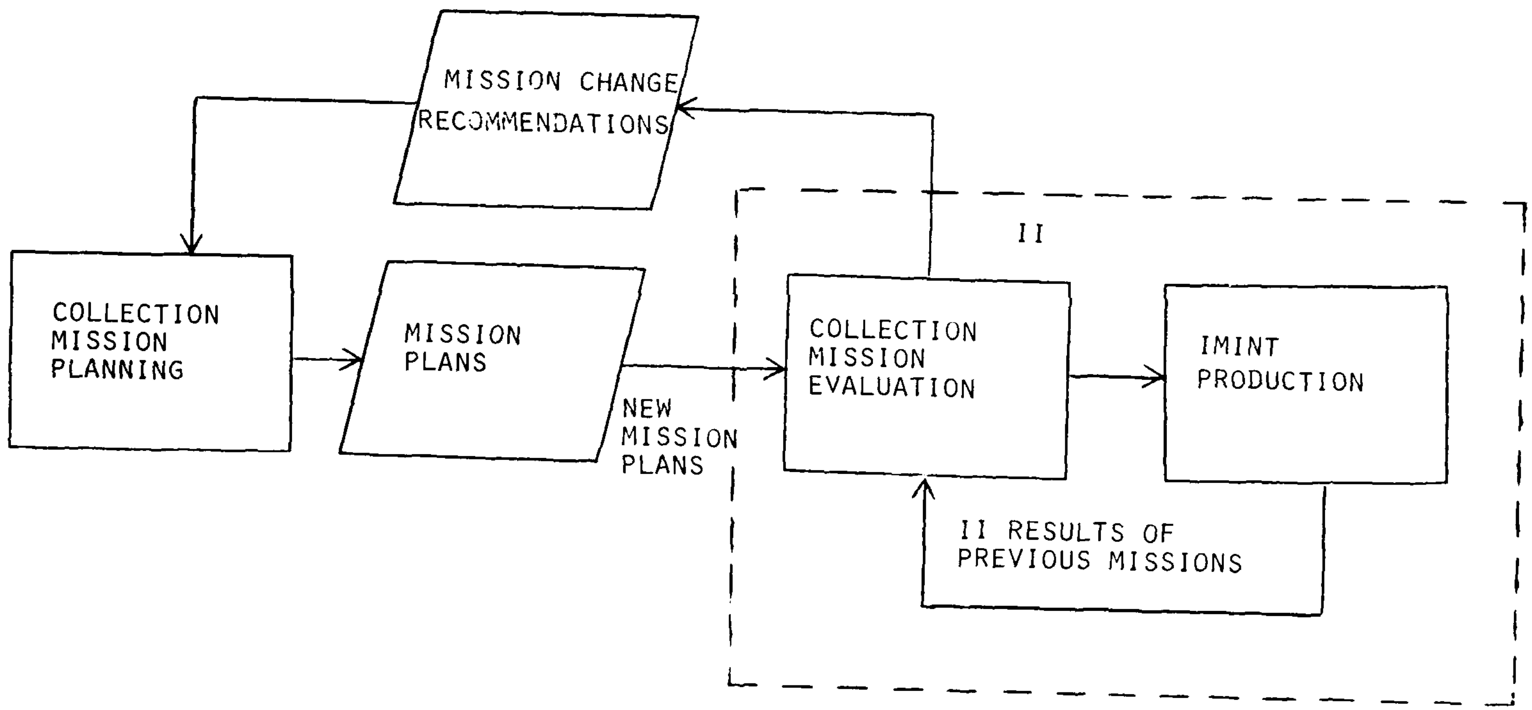
B.2.3.1 Collection Coordination

From the perspective of the IMINT production model, exploitation of collection capabilities is more of a concern than the control of collection itself. The II facility does not control collection operations or assign collection missions. However, the II facility exerts a high degree of influence on the planning of imagery collection missions through information which helps maximize the exploitation of imagery intelligence. This influence is exerted through a feedback mechanism in which the II facility manager informs the mission planner of his ability to meet production requirements with the planned collection missions. Mission planning is nearly always a limited resource problem, where an attempt is made to achieve maximum intelligence value. The feedback from the II facility to the imagery collection mission planner influences the selection of type of coverage, frequency of coverage, and priority of mission. Evaluation of previous mission results may be brought into the mission planning process where weather conditions inhibit interpretation or unusual activity is detected.

The importance of collection coordination in the imagery interpretation production model hinges on the flow of mission planning information to the II facility and the feedback of mission evaluations and recommendations to the collection planner. The benefits of this information exchange are greatest when the imagery collection missions are controlled in near real time.

As in any feedback control system, responsiveness is constrained by the delay in the feedback loop. Since the II analyst is the critical component in this loop, faster feedback can be achieved when the II analyst has an awareness of planned missions. II analysts interviewed were able to cite instances where they were able to coordinate changes in new missions in order to exploit results of newly processed imagery or adapt missions to new requirements. Filtering of information through chain of command has a dampening effect on this feedback mechanism. However, the time delay due to chain-of-command filtering can be minimized if collection coordination is implemented as a monitoring and technical exchange function and not as a formal interface.

B.2.3.1 COLLECTION MISSION COORDINATION



The particular communication channel used for coordinating collection missions depends on the collection system used and the controlling agency. Typically this communication channel is from the IMINT production manager to a liaison officer within the mission planning group. For strategic missions, an Army IMINT production facility has representation via OACSI on national level tasking committees and liaison with all U. S. intelligence agencies. In support of a theater of operations, the IMINT production unit may have the collection services of special aerial surveillance aircraft that are allocated for use on a mission per unit time basis. At the tactical level, both Army corps and division commanders will require imagery interpretation support. The MIBARS* does not have any organic collection assets. Allocation of collection assets is coordinated through the G-2 Air in the Tactical Operations Center. The G-2 will be cognizant of both division and corps level IMINT production capabilities. The G-2 will also coordinate the prioritization and allocation of collection assets for meeting the needs of Corps and Division commanders.

The MIBARS detachments interface directly with the tactical squadrons (Mohawk or AF tactical reconnaissance) that fly the missions through the Air Reconnaissance Liaison Officer (ARLO), who will be collocated with the tactical unit. In some cases, one or more MIBARS detachments may be resident at the tactical air base with the reconnaissance aircraft. The MIBARS has U-8 and U-21 aircraft for use in pickup and delivery of film or imagery products.

Mission coordination at the tactical level includes two additional activities:

(1) Pre-flight briefings of pilots on requirements and threats (responsibility of ARLO)

(2) In-flight mission coordination to exploit real-time imagery transmitted to ground interpretation stations.

The scope of interpretation that can be performed by an II is heavily dependent on awareness brought about by exposure to collateral intelligence and awareness of other intelligence activities and capabilities. This category of information is extremely broad and includes HUMINT and open source

*Military Intelligence Battalion Air Reconnaissance Support materials. Characteristically, it is at the II analyst's own initiative that these materials are collected, organized by area of interest, and applied to the imagery interpretation process.

In many cases the collateral materials work in an indirect manner, such as open-source photographs of non-military targets which aid in screening potential military targets in surveillance photography. Collateral materials such as HUMINT intelligence reports can identify general areas and types of military targets that are to be searched for and identified through image interpretation.

In terms of the IMINT Production model, collection of collateral intelligence materials is of concern from the following perspectives:

(1) Are there means of formal representation of an II analyst's area of interest for screening useful collateral materials?

(2) How can the content and application of collateral materials be represented in terms of entry points to a data base that can be managed and exploited by the overall IMINT production facility?

B.2.3.2 ALL SOURCE DATA REVIEW AND REDUCTION

INPUTS	PROCESSES		OUTPUTS
ALL SOURCE MESSAGE TRAFFIC (SIGINT, HUMINT, OPEN SOURCE)	B.2.3.2.1	SCAN TRAFFIC IN MESSAGE READ FILE	
	B.2.3.2.2	ENTER ITEMS OF INTEREST OR ENTIRE MESSAGES IN FILE	MESSAGE FILE DATA
	B.2.3.2.3	ACCESS NATIONAL LEVEL FILES WHERE AVAILABLE	QUERY/RESPONSE, TO NATIONAL LEVEL DBS (DIAOLS/COINS, ETC.)
	B.2.3.2.4	PERSONAL CONTACT WITH AREA OF INTEREST ANALYSTS (TECHNICAL, CULTURAL, LINGUISTIC)	
	B.2.3.2.5	REVIEW OPEN SOURCE MATERIALS (JOURNALS, WIRE SERVICE, MAGAZINES, ETC.)	
HUMINT KNOWLEDGEABILITY BRIEFING	B.2.3.2.6	REQUEST SPECIFIC QUESTIONS BE ASKED OF HUMINT SOURCE	QUESTIONS FOR HKB

* indicates expansion of function in following pages

B.2.3.2. All Source Data Review and Reduction

An IIA is essentially an entrepreneur whose success or failure depends upon his own intelligence, intuition, and aggressiveness in the pursuit of information. Although some national level imagery interpretation resources such as NPIC have a position dedicated to collateral research in each branch, most image interpreters carry out their own collateral and all source research. In general, IIAs will receive message traffic presumably relevant to their particular imagery interpretation area, but in most cases, such traffic does not come to them directly, but must be selected by individual image interpreters from the volume of traffic disseminated to a particular group or element. Similarly, data reduction from this volume of traffic is carried out by individual IIAs, who conduct a continuous 'reconnaissance' for particular items of interest in their area of responsibility. In the case of the national resources, some of this burden of continued awareness toward new information from any source is alleviated by the message, installation and target data bases existing at this level, but generally speaking, the IIA is his own information researcher.

The IIA may have the opportunity to gain directly related intelligence information through personal contacts with other analysts in other intelligence disciplines with interests in the same targets (e.g., SIGINT, OB areas). The IIA is in turn an informal information source to those analysts.

Queries to national or theater level data bases can be made directly if terminals are available or indirectly through a support group.

Analysts may have interaction with HUMINT sources indirectly through HUMINT knowledgeability briefings or directly where they are collocated with an IPW group.

Interviewed analysts gave examples of Vietnam experiences in which imagery analysts were able to provide cues to interrogators for lines of questioning.

B.2.3.3 HISTORY OF COVERAGE MAINTENANCE

INPUTS	PROCESSES		OUTPUTS	
MISSION REQUIREMENTS	B.2.3.3.1	OBTAIN RELEVANT IMAGERY	IMAGERY	TO B.2.3.3.5
	B.2.3.3.2	OBTAIN RELEVANT DEBRIEFING/MISSION REPORTS	MISSION/ DEBRIEFING REPORTS	TO B.2.3.3.5
	B.2.3.3.3	RETRIEVE RELEVANT MAPS	MAPS	TO B.2.3.3.5
	B.2.3.3.4	RETRIEVE RELEVANT REFERENCE MATERIALS	REFERENCE MATERIALS	TO B.2.3.3.5
	*B.2.3.3.5	MAINTAIN HISTORY OF COVERAGE	MASTER COVER TRACE PLOTS	
	B.2.3.3.6	*ENTER MOST RECENT* COVERAGE DATA IN HISTORY OF COVERAGE FILE; ENTER PURGE DATA	*HISTORY OF* COVERAGE FILE UPDATES	

* indicates expansion of function in following pages

B.2.3.3 History of Coverage Maintenance

An extremely important support activity of the imagery interpretation process is the generation and maintenance of a detailed history of all imagery on hand -- that is, the support of a history of coverage file.

In the tactical area, such a history is maintained in terms of the so-called 'Master Cover Trace', a basic map with all associated missions represented in terms of the pilot's trace, or flight line flown by the airborne platform, and related debriefing and mission report indexes. On the national level, most coverage data is maintained by automated systems designed for this purpose.

In second and third phase II processing, past imagery coverage is extremely important in change detection and performing negation analysis when a target is detected.

Because of large volumes of imagery that can be accumulated by a facility with an active mission, a library capability -- often a rudimentary one constrained by the availability of important personnel, and storage -- is required for storage, indexing (by mission, target, location), and control of film and hardcopy materials.

B.2.3.3.5 MAINTAIN HISTORY OF COVERAGE

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.3.3.1)	B.2.3.3.5.1	PLOT PILOT'S TRACE ON MAP	PLOT OF PILOT'S TRACE
DEBRIEFING/MISSION REPORTS (FROM B.2.3.3.2)	B.2.3.3.5.2	ORIENT MISSION IMAGERY TO MAP	
MAPS (FROM B.2.3.3.3)	B.2.3.3.5.3	PREPARE OVERLAY SHOWING PLOT OF MISSION COVERAGE	OVERLAY OF MISSION COVERAGE
REFERENCE MATERIALS (FROM B.2.3.3.4)	B.2.3.3.5.4	RECORD MISSION NUMBER	MISSION NUMBER
	B.2.3.3.5.5	UPDATE HISTORY OF COVERAGE TO REFLECT DESTRUCTION OF OBSOLETE MISSION IMAGERY	PURGE DATA

Outputs: TO B.2.3.3.6

* indicates expansion of function in following pages

B.2.3.3.5 Maintain History of Coverage

The basic subprocesses involved in this activity are the relation of a particular mission flown by a given aircraft to a map designating the coverage of a particular geographic area, the update of such a master cover record in terms of each new mission flown, and the amendment of mission records to reflect eventual purge and destruction of associated imagery, as it becomes obsolete.

B.2.3.4 TARGET ANALYSIS/DEVELOPMENT

INPUTS	PROCESSES	OUTPUTS
SPECIFIC REQUESTS FOR INFORMATION (SRI) MISSION REQUIREMENTS	*B.2.3.4.1 CONDUCT TARGET ANALYSIS DURING PLANNING PHASE *B.2.3.4.2 CONDUCT TARGET ANALYSIS DURING PREATTACK PHASE *B.2.3.4.3 CONDUCT TARGET ANALYSIS DURING POST ATTACK PHASE	ANALYSIS DATA TO B.2.1.3, B.2.1.4, B.2.1.5, B.2.1.6, B.2.2.

* indicates expansion of function in following pages

B.2.3.4 Target Analysis/Development

Although target analysis and development is being continually carried out on the strategic level in the areas of foreign technology assessment and other scientific and technological areas, target analysis and development processing on a tactical level tends to be more oriented toward a specific objective and associated plans of attack. In the following discussion and the associated charts, the tactical view is treated.

B.2.3.4.1 CONDUCT TARGET ANALYSIS DURING PLANNING PHASE

INPUTS	SUBPROCESSES		OUTPUTS
OBTAIN INFORMATION (FROM 3.2.1.8.1)	B.2.3.4.1.1	DEVELOP LIST OF POTENTIAL TARGETS	SURVEILLANCE PLAN TO B.1.1.2)
TERRAIN EVALUATION (FROM B.2.1.8.2)	B.2.3.4.1.2	ANALYZE COMPLETENESS AND ACCURACY OF TARGET DATA	
AIRCRAFT RESOURCES (FROM B.2.3.1)	B.2.3.4.1.3	CONSIDER "ON HAND" INFORMATION	
SENSOR RESOURCES (FROM B.2.3.2)	B.2.3.4.1.4	PLAN SYSTEMATIC SURVEILLANCE OF AREA OF INTEREST	
IMAGERY	B.2.3.4.1.5	INTEGRATE SURVEILLANCE AND RECONNAISSANCE RESOURCES IN COVERING AREA OF INTEREST	
REFERENCE MATERIALS	B.2.3.4.1.6	PARTICIPATE IN SURVEILLANCE AND RECONNAISSANCE MEETINGS	
MAPS			

* indicates expansion of function in following pages

B.2.3.4.1 Conduct Target Analysis During Planning Phase

In a tactical situation, for any given state of affairs in crisis or wartime, the processing associated with the development of detailed information on targets begins with the creation of an inventory of potential targets in the affected area relevant to the planned attack. The initial steps involve an assessment of the completeness and accuracy of target data immediately available, and on hand within a given targeting information system.

This initial review of available information is followed by a planning phase aimed at developing additional required information -- essentially, the filling in of the variety of gaps which may exist in target information -- by systematic surveillance of the area or areas of immediate military interest.

This plan for systematic surveillance of areas of interest for particular elements must then be integrated with other similar plans generated by other elements in order to provide for an integration of surveillance and reconnaissance resources in providing the desired coverage of the area(s) of interest.

B.2.3.4.2 CONDUCT TARGET ANALYSIS DURING PRE-ATTACK PHASE

INPUTS	SUBPROCESSES		OUTPUTS
PRE-STRIKE PHOTOGRAPHY	B.2.3.4.2.1	PERFORM URBAN AREA ANALYSIS TO AID IN SELECTION OF TARGET PRIORITIES	TARGET PRIORITIES
MAPS	B.2.3.4.2.2	PERFORM STRUCTURE ANALYSIS, DETERMINE BUILDING DENSITY, DETERMINE WIDTH OF STREETS	TARGET ANALYSIS DATA
REFERENCE MATERIALS			

* indicates expansion of function in following pages

B.2.3.4.2 Conduct Target Analysis During Pre-Attack Phase

In the pre-attack phase of tactical operations, particular attention is devoted to urban area analysis, as a basis for selecting target priorities for attack forces, assuming urban targets of interest in the combat area.

Detailed urban area analysis calls for structural analysis of buildings to determine height, degree of reinforcement, special characteristics, such as built-in air raid or nuclear shelters, observation points, and the like, density of building structures in various sectors of the urban area, width of streets and trafficability for armored forces of various types, population density by sector, etc.

B.2.3.4.3 CONDUCT TARGET ANALYSIS DURING POST-ATTACK PHASE

INPUTS	SUBPROCESSES		OUTPUTS
POST-STRIKE IMAGERY MAPS REFERENCE MATERIALS	B.2.3.4.3.1	CONDUCT LIMITED DAMAGE ASSESSMENT	DAMAGE ASSESSMENT REPORTS
	B.2.3.4.3.2	CONDUCT DETAILED DAMAGE ASSESSMENT AS REQUIRED TO DETERMINE WHETHER TARGET WAS NEUTRALIZED	
	B.2.3.4.3.3	CONDUCT REPAIR STUDIES AS REQUIRED	STUDY REPORTS
	B.2.3.4.3.4	CONSOLIDATE ANALYTICAL DATA	POST ATTACK ANALYSIS

* indicates expansion of function in following pages

B.2.3.4.3 Conduct Target Analysis During Post Attack Phase

Target analysis in a tactical level post-attack context is primarily concerned with assessing the amount of damage inflicted by the given attack, evaluation of suppression or neutralization of a particular target, and estimates of repairs involved before the particular target facilities can become operational again.

B.2.3.5 INTERPRETATION KEY DEVELOPMENT

INPUTS	PROCESSES		OUTPUTS	
REQUIREMENTS FOR INTERPRETATION KEYS	B.2.3.5.1	RETRIEVE RELEVANT IMAGERY	IMAGERY	TO B.2.3.5.3
	B.2.3.5.2	RETRIEVE RELEVANT REFERENCE MATERIALS	REFERENCE MATERIALS	
	*B.2.3.5.3	DEVELOP INTERPRETATION KEYS		
	B.2.3.5.4	COMPILE MATERIALS FOR INTERPRETATION KEY PRODUCT	KEY DATA	TO B.2.2)

* indicates expansion of funct' ı in following pages

B.2.3.5 Imagery Interpretation Key Development

On the level of the national imagery interpretation resources, development and maintenance of aids to the imagery interpretation process is an important research area. Based on all available materials -- including all source message traffic and hard copy reports, as well as all types of imagery relevant to the particular object, equipment, condition, or characteristic -- the objective is to develop concise and accurate materials for distinguishing items of known or potential military significance.

B.2.3.5.3 DEVELOP INTERPRETATION KEYS

INPUTS	SUBPROCESSES		OUTPUTS
IMAGERY (FROM B.2.3.5.1)	B.2.3.5.3.1	IDENTIFY DISTINCTIVE FEATURES OF SET OF OBJECTS/CONDITIONS FOR GIVEN KEY DEVELOPMENT	TO B.2.3.5.4
REFERENCE MATERIALS (FROM B.2.3.5.2)	B.2.3.5.3.2	ANALYZE II ERROR DATA (IF AVAILABLE) TO DETERMINE NEED FOR ERROR KEY	
	B.2.3.5.3.4	SELECT PHOTOS FOR KEY REPORT	
	B.2.3.5.3.5	PREPARE ROUGH GRAPHICS FOR KEY REPORT	

* indicates expansion of function in following pages

B.2.3.5.3 Develop Interpretation Keys

In developing a key for a particular set of objects, special care is devoted to identification and specification of features distinguishing different members of the given set. To illustrate: in the distinction of members of the set of U. S. Army trucks, an important distinctive feature is existence of an engine hood (distinguishes infantry weapons carrier versus cargo trucks), and number of bows on the top (cargo vehicles of differing capacities).

A related consideration involves the requirement for error keys (discussed under B.2.1.4) to avoid misidentification of items of military significance as non-military items which exhibit considerable similarity in structure, and conversely, the misidentification of non-military items as objects or charcteristics of military significance.

The materials developed in the light of these guiding principles will form chapters of the imagery interpretation documentation currently under development, and will utilize the best of available imagery supplemented by artist drawn graphics in a readily comprehensible format to provide effective imagery interpretation aids.

B.2.3.6 KNOWLEDGE BASE AND SKILL DEVELOPMENT

INPUTS	PROCESSES		OUTPUTS
MISSION REQUIREMENTS REFERENCE MATERIALS	B.2.3.6.1	VIEW U.S. EQUIPMENT RELATED TO II SPECIALTY	
	B.2.3.6.2	VIEW CAPTURED EQUIPMENT RELATED TO II SPECIALTY	
	B.2.3.6.3	VIEW GEOGRAPHIC AREAS RELATED TO II SPECIALTY	
	B.2.3.6.4	EXAMINE OPEN SOURCE MATERIALS RELEVANT TO II SPECIALTY	
	B.2.3.6.5	PARTICIPATE IN LOCAL FACILITY TRAINING PROGRAM	
	B.2.3.6.6	VISIT OTHER II FACILITIES	
	B.2.3.6.7	INTERCHANGE WITH COLLECTION ASSETS AND PARTICIPATION IN COLLECTION ACTIVITIES	
	B.2.3.6.8	PARTICIPATION IN TECHNICAL EXCHANGE GROUPS	

* indicates expansion of function in following pages

B.2.3.6 Knowledge Base and Skill Development

The training, maintenance, and enhancement of an image interpreter's skills and abilities is of paramount importance to effective, reliable, imagery interpretation at all levels. At the national level, in addition to the customary training and proficiency maintenance programs, image interpreters are involved in programs for enhancing their effectiveness and ability by a series of travel programs aimed at exposing them to U. S. equipment or developments related to their specialty, at viewing captured equipment in an environment similar to the actual operational environment in which it functions, and at viewing geographic areas similar to those in the image interpreter's area of responsibility. Moreover, image interpreters are provided with a variety of open source materials which complement and supplement the imagery they are required to interpret. Although such intensive programs do not currently exist on the level of the tactical image interpretation element, the need for them is widely recognized.

Formal Training

Formal training in general II skills is not available for all skill levels in the Army 96D II specialty. The USAICS II courses at Fort Huachuca cover only skill levels 1 and 2 plus the 35C officer course. The enlisted course for skill level 1 addresses 22 basic field skills:

(1) Security

(2) Photo interpretation

(3) Code matrix

(4) PI slide rule

(5) Photogrammetry

(6) Overlay preparation

(7) Plotting

(8) Terrain

(9) Road classification

(10) Bridges

(11) Ports, Harbors, Inland Waterways

(12) Railroads

(13) Airfields

(14) Tactical identification

(15) Installations

(16) Order of Battle

(17) SLAR

(18) IR

(19) Mosaics

(20) Reports

(21) References

(22) TIIF

These courses introduce the novice II to the field but do not fully prepare the individual for an operational role. Unit training and apprenticeship type experience are expected to qualify the II for an active role in the II production process.

Advanced schools such as the DSIATP at Offutt Air Force Base or the NPIC school are aimed primarily at analysts going into assignments within national level organizations. These programs must cover military doctrine and technical subjects as well as imagery interpretation technique. Students in general will not have sufficient field experience, prior training, or technical backgrounds to permit the courses to focus exclusively on technique. Organization of the advanced courses is substantially different from basic courses in orientation toward target types. The segments taught at Offutt are:

Introduction

Military Geography

Photogrammetry

Ground Forces

Strategic Industries

Electronics

Offensive Missiles

Air Forces

Defensive Missiles

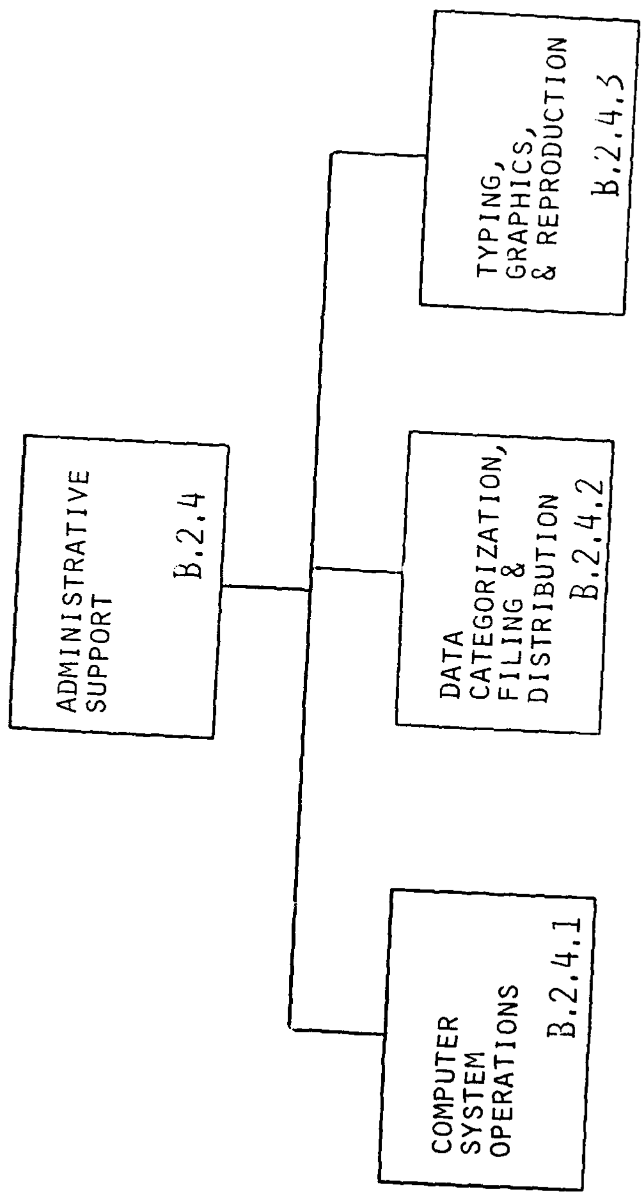
Naval Forces

Unit Training

A graduate of the DSIATP school has been trained to think like an imagery interpreter but unless his DSIATP training was preceded by relevant operational experience, he will not be capable of assuming responsibility for an active mission until he receives additional unit training at his next assignment. It is left to unit training to convey the "big picture" knowledge and tricks of the trade to the inexperienced.

Staff rotation also creates a need for the same type of unit training. It was frequently stated by interviewed analysts, that overlap time between beginning and leaving personnel was insufficient to pass along the legacy of past experience, thereby creating a necessity for self-taught skills and knowledge. An agressive, motivated analyst considers this type of environment as a professional challenge especially when supportive assistance and positive feedback are provided by management and peers.

Image interpretation was described by an advanced training instructor as essentially "an oral tradition". One image interpreter learns from another by working with him and talking about his methodology. Moreover, experienced image interpreters seem to share a special concern for informal training of novice image interpreters. Thus, although the importance of formal training cannot be underestimated, much of the image interpreter's skill derives from informal, learning, relationships with other II's.


ADMINISTRATIVE SUPPORT
B.2.4
COMPUTER SYSTEM OPERATIONS
B.2.4.1
DATA CATEGORIZATION, FILING & DISTRIBUTION
B.2.4.2
TYPING, GRAPHICS, & REPRODUCTION
B.2.4.3

B.2.4 Administrative Support

Administrative support processes in the II facility are tailored to suit the production level, mission, and data processing needs.

B.2.4.1 Computer System Operations

Operation of computer systems which support the management of tasking, production data, or data bases can be considered as falling within this category. Tasking would include computer system operator functions (starting, shutdown, configuration control, diagnostics, etc.) data entry, data base management, report generation, and user assistance. Use of computers for administrative support in II facilities is mostly restricted to national level facilities, at the current time. Field level use of computers such as in the TIIF is mainly for computational applications. Future systems will make extensive use of computers for communications and data base management as well as computation.

B.2.4.2 *Data Categorization, Filing, and Distribution*

An important administrative task is the handling of materials coming into the facility, generated within the facility, and leaving the facility. Major categories of material include:

- Procedures
- Handbooks
- Manuals
- Technical References
- Maps
- Requirements (message, letter, etc.)
- Handheld photography
- Mission film
- Open source technical journals, books, magazines, newspapers, wire service stories
- Intelligence reports
- Message traffic
- Technical exchange memoranda
- Production schedules
- Photocopy/graphic requests
- Imagery duplicates
- Personnel and equipment status
- Weather data
- Coverage history file
- Product file
- Target folders
- Mission data
- Collection Plan
- Sensor capabilities
- Intelligence analyst directories
- All-source intelligence materials

Much of the responsibility for collecting, categorizing and filing these materials rests with the analysts and control of the process may be informal along lines of interest. However, on a broad scale, informal control results in a much narrower range of materials available to individual analysts, awareness of other intelligence information is lost, and duplication of efforts cannot be controlled.

The availability of automated data processing technology has had an impact in two important aspects of this function. First, it has made it possible to maintain an integrated data base of mission parameters, tasking, and output reports. This data base capability alone has greatly improved the productivity and responsiveness of the II facility and helped eliminate duplication of effort.

The second area where automated data processing is beginning to have an impact is in the area of accessing and distributing intelligence materials on the basis of content. An automated data base containing past imagery coverage that can be searched by location parameters, time, or mission number is extremely valuable in exploiting previous missions. On a broader scale, all-source intelligence can be made more readily available for exploitation in the imagery interpretation process if it is available in a computerized file that is searchable by:

location parameters

country name

place name

time

keywords

Certain types of all-source intelligence materials are searchable in data bases maintained at the national level. Access is limited to special terminals, some which can be connected remotely through communication channels. Multiple terminals and query languages are required to access the host computer systems that maintain these data bases. Frequently, a specialist is required to operate the terminal systems for the analyst without time to learn the protocols and peculiarities of the different systems.

One means of distributing time-critical requirements and intelligence information is through global message communication networks that are accessible by every II facility. Current Army tactical facilities interface with the message communication network through hardcopy for both sending and receiving. New automated message handling technology which is in use at the national level and in prototype tactical facilities provides a direct interconnection to the world wide message communication network from computer terminals. Using these automated systems, image interpreters and other intelligence analysts can review intelligence reports or other message traffic relevant to their work area. Most time critical intelligence information passes through the message handling network, either when first generated or as an exploitation product. Message dissemination technology has been developed for automatic monitoring of the message traffic flow, filtering out relevant messages, and filing these messages for subsequent use in intelligence processing. This technology would replace the existing manual operation in the II facility which involves each analyst in perusing stacks of hardcopy messages distributed to the facility in general.

B.2.4.3 Typing, Graphics, and Reproduction

The level of administrative support provided in the II facility for product preparation and publication is variable depending on the staff size, workload, and applicable product standards for the user community. Products which have extremely wide distribution and a longer useful life are published to higher standards. Special staffing is provided to produce graphics, photocopy, and final type for facilities which produce a substantial volume of high quality products. Most facilities have some level of administrative support for these activities to give interpreters more time for analysis tasks. Automated data processing systems are beginning to impact this area.

In new systems, analysts are being given CRT terminals for entering processing data, editing, and report generation, typically referred to as word processing systems.

Integration of the word processing capabilities, data handling, and computational capabilities in a single data processing system is being planned for future systems.

APPENDIX A

Organizations Visited During Data Collection for IMINT Production Model

1. Army Research Institute (ARI)/Human Factors Technical Area
2. HQ US Army Intelligence and Security Command (INSCOM)/IASYS
3. US Army Intelligence Center and School/Director of Training, Fort Huachuca, AZ
4. National Photographic Interpretation Center (NPIC) Imagery Exploitation Group (IEG)
5. Intelligence and Threat Analysis Center (ITAC)/Imagery Interpretation Production Division (IIPD)
6. 3428th Technical Training Squadron, Defense Advanced Sensor Interpretation and Applications Training Program (DSIATP), Offutt Air Force Base, NE
7. 525th Military Intelligence Group, Fort Bragg, NC
8. 363rd Tactical Reconnaissance Wing, Shaw Air Force Base

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