

LEVEL III

2
B.S.

AD A 096547



DBE FILE COPY

DTIC
ELECTE
MAR 19 1981
S D

KAPPA  **SYSTEMS, INC.**

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

81 3 19 002

LEVEL II

2

KAPPA SYSTEMS, INC.
Prime Contractor

James R. Brownell, Jr., Ph.D.
(703) 522-8758
Principal Investigator

6 RESEARCH DESIGN FOR AN AUTOMATED
BEHAVIORAL INTELLIGENCE (ABI) PROJECT

(SHORT TITLE - ABI RESEARCH DESIGN)

11 14 May 1980

12 139

9 Final rpt.

10 by
James R. Brownell, Jr. Ph.D.
Michael Jon Stoil Ph.D.
Col Charles E. Thomann (USA, Ret.)

DTIC
ELECTE
S MAR 19 1981 D

15 MDA 903-80-C-0265, DARPA Order-3912

February 4, 1980
Effective Date of Contract

October 30, 1980
Contract Expiration Date

This research was sponsored by the Defense
Advanced Research Projects Agency under
DARPA Order No: 3912
Contract No.: MDA 903-80-C-0265
Monitored by: Judith Ayres Daly, Ph.D.
Cybernetics Technology Division

The views and conclusions contained in this document are those of the
authors and should not be interpreted as necessarily representing the
official policies, either expressed or implied, of the Defense Advanced
Research Projects Agency or the U.S. Government.

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

391067

KAPPA SYSTEMS, INC.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. <i>AD-A096547</i>	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Research Design For An Automated Behavioral Intelligence (ABI) Project		5. TYPE OF REPORT & PERIOD COVERED Final
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dr. James R. Brownell, Jr. Dr. Michael Jon Stoil Col. Charles E. Thomann, USA (ret.)		8. CONTRACT OR GRANT NUMBER(s) MDA 903-80-C-0265 <i>ms</i>
9. PERFORMING ORGANIZATION NAME AND ADDRESS KAPPA Systems, Inc. 1501 N. Wilson Blvd. Arlington, Virginia 22209		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS DARPA Order No. 3912
11. CONTROLLING OFFICE NAME AND ADDRESS Defense Advanced Research Projects Agency 1400 N. Wilson Blvd. Arlington, Virginia 22209		12. REPORT DATE 14 May 1980
		13. NUMBER OF PAGES 135
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Recommended for public release, unlimited distribution		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Automated Behavioral Intelligence Psychological Warfare Intentions Analysis Intelligence Psychophysiology Foreign Elites Templating Political Science Research Design Intelligence Templating Perceptions Analysis		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The ABI project is designed to encompass the development and use of advanced computer-based life and social science methodologies and technologies to: describe, explain, and predict planned courses of action (intentions) and perceptions of foreign decision-makers; integrate this and other intelligence information in a comprehensive automated system; and develop appropriate other uses for techniques involved. The research design describe the concepts involved in the ABI project; provides for research controls; discusses means of acquiring relevant behavioral information. (cont.)		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-LF-014-6601UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(Item #20 continued)

information; describes the ABI interface with human expertise; lists special applications; and provides a prioritized, scheduled list of research tasks.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

FOREWORD

Thanks are extended to Col. Hugh B. Carnes, Jr. (USAF Ret), Dr. Jamie G. Carbonell of Carnegie Mellon Institute, and Dr. John J. Thompson (Col. U.S.A. Ret.) of KAPPA SYSTEMS for their comments and suggestions.

Sincerely,

James R. Brownell Jr.
James R. Brownell, Jr.
Principal Investigator

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A	

DTIC
ELECTE
S MAR 19 1981 D
D

TABLE OF CONTENTS

	Page
Foreward	
1 INTRODUCTION	
1.0 INTRODUCTION	1-1
1.1 BACKGROUND	1-2
1.2 OBJECTIVE	1-6
1.3 ORGANIZATION OF THE RESEARCH DESIGN	1-6
1.4 GENERAL CONCEPT OF ABI PROJECT AUTOMATION	1-8
1.4.1 Why Automated Behavioral Intelligence?	1-8
1.4.2 Automation and the Issue of Alternative Interpretations	1-9
1.4.3 The AIA Process	1-11
2 RESEARCH CONTROLS	
2.0 GENERAL	2-1
2.1 SELECTION OF APPROACHES TO BE DEVELOPED	2-1
2.1.1 Application of Controls on Approaches Being Developed	2-1
2.2 PROJECT EVALUATION (QUALITY CONTROL)	2-2
2.2.1 The Gate Hypothesis Concept	2-2
2.2.2 Gate Hypothesis Structure	2-3
2.2.3 Use of Gate Hypotheses	2-3
2.2.4 Evaluating the Support Developed for the Gate Hypotheses	2-11

<u>Section</u>	<u>Page</u>
3 AUTOMATED, INTEGRATED ANALYSIS (AIA) PROCESS	
3.0 GENERAL	3-1
3.1 BASE ESTIMATE	3-1
3.1.1 Integrating ABI-Enhanced Behavioral Analysis Into the AIA Process	3-3
3.1.2 Integration of Other Types of Material Into the Base Estimate	3-5
3.2 THE INITIAL SEARCH PLAN	3-6
3.3 THE ITERATIVE IDENTIFICATION PROCESS	3-8
3.4 INTEGRATION WITH OTHER AUTOMATED APPLICATIONS	3-8
4 ACQUISITION AND ANALYSIS OF BEHAVIORAL INFORMATION RELEVANT TO FOREIGN PERSONNEL	
4.0 GENERAL	4-1
4.1 ROLE OF BEHAVIORAL INFORMATION ACQUISITION AND ANALYSIS TECHNIQUES IN THE AIA PROCESS	4-1
4.1.1 Information Acquisition/Analysis Techniques and the Estaimtes Process	4-2
4.1.2 Information Acquisition/Analysis Techniques and the Information Search Plan	4-3
4.2 TYPES OF INFORMATION SOURCES FOR BEHAVIORAL INFORMATION	4-3
4.3 POTENTIAL TYPES OF BEHAVIORALLY RELEVANT METHODOLOGIES (INTERPRETIVE TECHNIQUES) FOR ACQUISITION AND ANALYSIS OF INFORMATION	4-4
4.3.1 Verbal - Recorded Primary Sources	4-4
4.3.2 Verbal - Recorded Secondary Sources	4-7
4.3.3 Nonverbal/Paralinguistic Techniques Applied to Recordings	4-7

<u>Section</u>	<u>Page</u>
4 ACQUISITION AND ANALYSIS OF BEHAVIORAL INFORMATION RELEVANT TO FOREIGN PERSONNEL (Continued)	
4.3.4 Techniques for Non-Recorded Indicators	4-8
4.3.5 Physiological Techniques	4-8
4.4 STATE OF THE ART IN CANDIDATE BEHAVIORALLY- RELEVANT TECHNIQUES/METHODOLOGIES	4-9
4.5 DEVELOPMENT OF MULTI-METHOD APPROACHES AND RELEVANT PREDICTIVE MODELS	4-10
5 INTERFACE WITH HUMAN EXPERTISE AND OTHER RELEVANT RESEARCH REQUIREMENTS	
5.0 GENERAL	5-1
5.1 TECHNOLOGY TRANSFER	5-1
5.2 DEVELOPMENT OF BASELINE CAPABILITIES OF INTUITIVE, EXPERIENCE-BASED JUDGMENT	5-2
5.3 SPECIALIZED APPLICATIONS	5-3
5.3.1 Prediction and Explanation of Interactions Among Groups of Nations	5-4
5.3.2 International Negotiations	5-4
5.3.3 Influencing Foreign Individual and Group Perceptions	5-5
5.3.4 Counterintelligence and Security Applications	5-7
5.3.5 Recruitment of Human Resources	5-8
5.3.6 Foreign Actor Simulation (Including RED ⁴ Forces)	5-8
5.3.7 Other Types of Specialized Activities	5-8

Section

Page

6	PRIORITIZED, SCHEDULE LIST OF RESEARCH TASKS	
6.0	APPROACH TO DEFINING, PRIORITIZING, AND SCHEDULING RESEARCH TASKS	6-1
6.1	RESEARCH TASKS IN PRIORITY ORDER	6-1
6.2	FIRST YEAR TASKS AND MULTIYEAR APPROACHES	6-10

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1-1 The ABI Project	1-3
1-2 The Focus of ABI	1-4
1-3 Automated System Phasing	1-10
1-4 Conceptualization of User Use of the Automated System	1-10
1-5 Automated Integrated Analysis Process	1-13
1-6 Base Estimate, With Input to Initial Search Plan	1-14
1-7 Initial Search Plan	1-16
1-8 Iterative Identification Process: First Iteration	1-18
1-9 Iterative Identification Process: Subsequent Iterations	1-19
2-1 Gate Hypothesis Structure for Physiologically Oriented Research	2-4
2-2 Gate Hypothesis Structure for Cognitively Oriented Research	2-5
2-3 Gate Hypothesis Structure for Automation Research	2-6
2-4 Gate Hypothesis Structure for Other Types of Research	2-7
2-5 Illustrative Application of Gate Hypothesis to a Fictional Project Using Fictional Data	2-8
3-1 Base Estimate, With Input to Initial Search Plan and Illustrative Issue Areas	3-2
4-1 Types of Indicators and Data Sources Considered	4-5
4-2 Potential Types of Behaviorally Relevant Methodologies (Interpretive Techniques)	4-6
4-3 Sample Entry of Appendix A	4-11

4-4	The State of the Art in the Candidate Techniques/ Methodologies	4-15
4-5	Operationally Relevant Considerations Applicable to Methodologies/Techniques	4-21
4-6	First Year Tasks and Multiyear Approaches	6-11

SECTION 1

INTRODUCTION

SECTION 1

INTRODUCTION

1.0 INTRODUCTION

The role of the behavioral sciences in intelligence has traditionally been to reduce uncertainty in intelligence-related estimates and predictions. Analysts need to know, with as much certainty as possible, how Country X will respond to policy initiative Y; what an enemy military commander is likely to do when confronted with a given military situation; what the impact of a major political change in one country will be on interdependent political, military, and economic relationships. During the last three decades, a tremendous investment in scientific resources has been made to address such questions as these, but the results of these inquiries remain effectively inaccessible to the average analyst. There are two reasons for this:

- the amount of information available is so vast, and its nature so diverse, that no single analyst is capable, unaided, of absorbing it or assessing its implications. Thus, the analyst is confronted with an "intelligence explosion" similar to the "information explosion" confronting researchers in academia;
- there has been little or no attempt to integrate the behaviorally-relevant information-gathering and analysis techniques and methodologies developed in the various branches of the life and social sciences during the past two decades. Thus, specialists in psychology are often unaware of relevant advances in political science; analysts trained in the social sciences are rarely knowledgeable about developments in the biological sciences which could help them in their work.

The following research design for an Automated Behavioral Intelligence (ABI) project represents a concerted attempt to deal with those issues by providing analysts with automated assistance. In effect, it is designed to provide the national security community access to the most recent developments in the behavioral sciences as applied to intelligence, much as "hardware" programs provide access to the latest military technology.

1.1 BACKGROUND

ABI may be defined as follows:

"ABI encompasses the development and automated application of advanced life and social science methodologies and technologies to:

- describe, explain and predict intentions and perceptions of foreign decision-makers;
- link these intentions and perceptions to behavior;
- where appropriate assist, test, and train key U.S. personnel.

A simpler way of describing the ABI project is given in Figure 1-1. Intelligence inputs (in which ABI focuses on selected nonverbal/paralinguistic, verbal/analytic, and psychophysiological behavioral analysis techniques) trigger an automated, integrated analysis process. This is a human-machine interactive process which is used by a computer/analyst team to produce intelligence outputs. These intelligence outputs include an integrated analysis producing estimates of foreign courses of action (intentions) and perceptions, plus a number of special uses for which ABI-developed technology is designed to be helpful. Figure 1-2 provides a conceptual construct which further indicates the focus of ABI. The two particular foci of interest are:

- automated systemic analysis, integrating all available information in a search for the perceptions and

AUTOMATED BEHAVIORAL INTELLIGENCE (ABI)

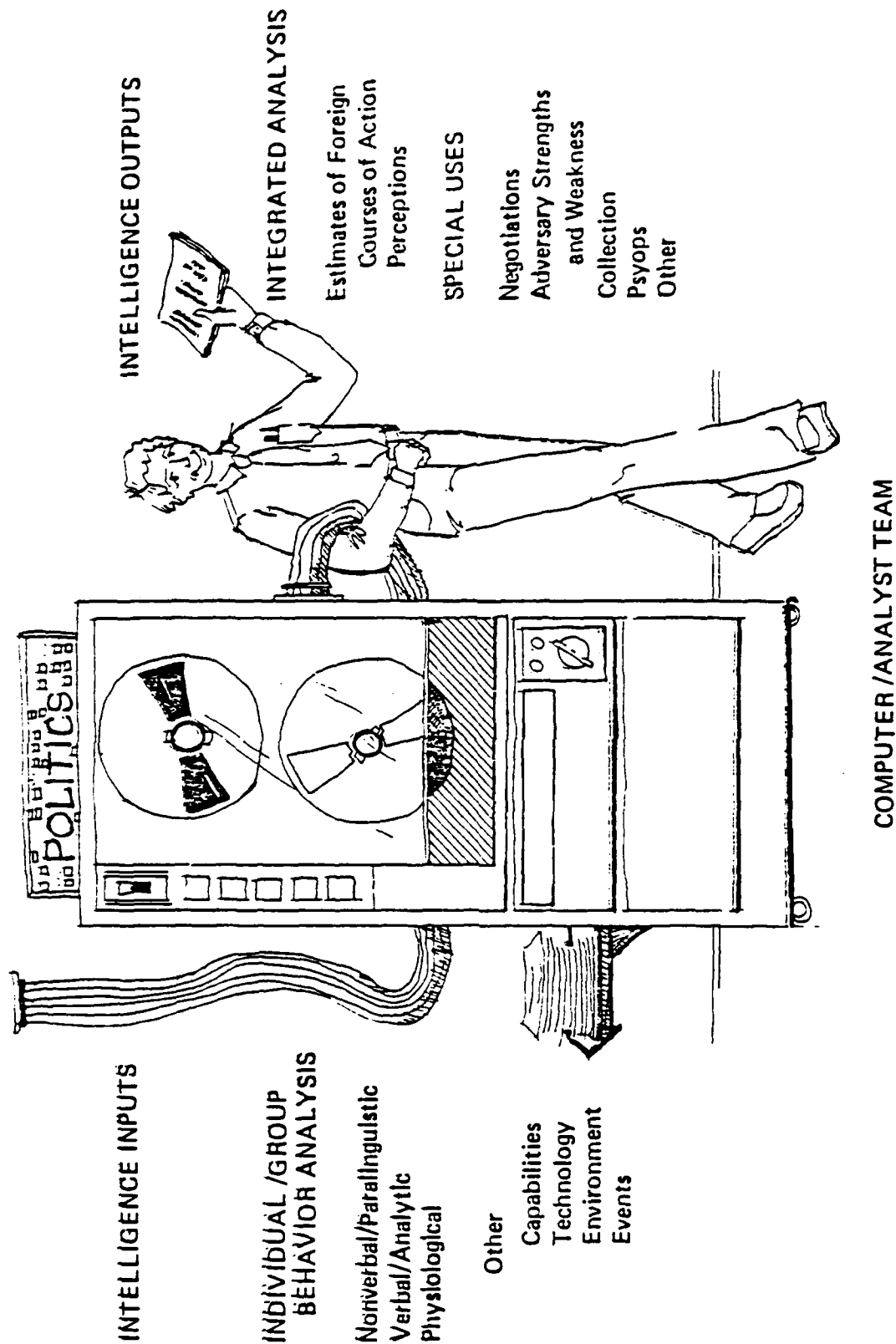


Figure 1-1. The ABI Project

Figure 1-2. Focus of ABI.

THE FOCUS OF THE AUTOMATED BEHAVIORAL INTELLIGENCE PROJECT IS ON THE ELEMENTS OF THE FOLLOWING CONCEPTUAL CONSTRUCT WHICH ARE UNDERLINED. NON-UNDERLINED ITEMS ARE INTEGRATED INTO THE ABI PROJECT AS REQUIRED, BUT WITHOUT FURTHER DEVELOPMENT EXCEPT AS REQUIRED FOR THAT INTEGRATION.

INFORMATION CATEGORIES:

1. Information on human beings:
 - *a. As individuals.
 - b. As groups (e.g., cultural, bureaucratic, organizational).
 - c. As sociological/political/economic systems.
2. Information on material capabilities:
 - a. Materiel/equipment.
 - b. Technology.
 - c. Physical environment.
3. Information on events/actions/activities:
 - a. Military.
 - b. Sociological/political/economic.
 - c. Special (e.g., counterintelligence activities).

CONVERSION OF INFORMATION INTO INTELLIGENCE REQUIRES ANALYSIS:

1. In terms of scope:
 - a. Within individual information categories.
 - b. Across categories.
 - *c. Integrated systemic analysis.
2. In terms of means:
 - a. Manual.
 - *b. Automated.

* Of particular interest are automated, integrated information analysis and assessment of individual behavior, particularly perceptions and intentions (probable courses of action).

probable courses of action¹ of the key actors (individuals or groups) who are targets of an intelligence operation;

- better ways of gathering information on the actors, their perceptions, and probable courses of action.

The methodologies involved are expected not only to enhance collection and analysis of behavioral information in general but also to produce additional fallout in terms of such specialized uses as:

- improved international negotiating capabilities
- perception management
- psychological operations capabilities,
- crisis management
- RED Force simulation
- counterintelligence, security, and recruitment of human sources.

Detailed background for ABI is provided by the immediate forerunner of this current project, the DARPA-sponsored study, Current Research and Potential Applications of Command Psychophysiology (KAPPA Systems, Inc., 30 September 1979).² The CP³ study reflected a broad approach to the whole problem; the ABI research design developed

¹The term "intentions," used earlier in defining ABI, is an appropriate term in an academic context for what is being sought. However, intentions in certain uses can have a pejorative impact--many individuals within the national security community are likely to emphasize the necessity to focus on enemy capabilities rather than intentions. These individuals are usually concerned that someone may "wish away" threatening adversary capabilities by defining intentions which do not use those capabilities effectively in a hostile sense or that intentions are subject to unpredictable change. Almost all such individuals, however, recognize the utility of determining potential enemy courses of action based on capabilities and assessing relative probabilities among them. Consequently, henceforth the term "probable course(s) of action" will normally be used in lieu of "intentions."

²The term "Command Psychophysiology" has been replaced by the term "Automated Behavioral Intelligence" (ABI) as more appropriate to the current nature of the project. The September 1979 study is hereafter referred to as the CP³ Study.

herein focuses on those aspects of automated behavioral intelligence of specific interest as the subject of DARPA-sponsored research.

1.2 OBJECTIVE

The objective of the current ABI Project may be summarized as follows:

"To provide a state of the art improvement in selected aspects of intelligence acquisition and processing by:

- using advanced techniques to obtain behavioral information concerning foreign personnel;
- integrating that information with all other relevant information concerning the foreign entity in question;
- using automated analysis techniques to assist human analysts find the best possible estimate of foreign perceptions and probable courses of action (intentions);
- providing maximum spinoff utility for the techniques developed in terms of potential uses throughout intelligence gathering and production process.

1.3 ORGANIZATION OF THE RESEARCH DESIGN

The research design for the ABI Project is organized as follows:

- General conceptualization of the planned results of the ABI project (paragraph 1.4).
- Description of research controls: development of Gate Hypothesis concepts and other relevant means for maintaining control over quality, resource requirements, and potential value of research (Section 2).
- Automated, integrated analysis system (Section 3):
 - development of automated procedures to assist humans in optimizing effectiveness of individual information acquisition and analysis processes

currently used or developed through the ABI project;

- automated integration of all available information into an iterative "analyze/search/confirm/analyze" routine designed to help humans optimize near real time intelligence .
- Acquisition and analysis of behavioral information concerning foreign personnel (Section 4):
 - types of information sources and potential methodologies for obtaining information
 - development of multimethod approaches and relevant predictive models;
 - identification and evaluation of the most promising avenues of research to be explored .
- Additional research requirements (Section 5):
 - specialized uses of techniques developed for such activities as RED Force simulation, counter intelligence and security, and recruitment of human sources; and
 - studies of technology transfer requirements, particularly in terms of the psychological aspects of technology transfer.
- Prioritized, scheduled list of research tasks:
 - task prioritization and scheduling based on potential for successful development, potential contributions to ABI objectives, and projected resource requirements;
 - list of initial priority projects with rationale for their priority;

- provision of a series of multi-year approaches, compatible with the initial project lists, leading to an operational ABI system.

1.4 GENERAL CONCEPT OF ABI PROJECT AUTOMATION

This paragraph discusses the advantages offered by the automation aspects of ABI. It also outlines the configuration of the proposed Automated Integrated Analysis (AIA) process which integrates the ABI component elements, making them accessible to system users in the national security community.

1.4.1 Why Automated Behavioral Intelligence? Why does automation hold such a prominent place in this process? First, it is necessary to emphasize again, as was graphically illustrated in Figure 1-1, that we are talking about a partnership of automation and the human analyst to do more than either can do alone. We are not talking about replacing a human with a computer. Automation can do a number of things to facilitate near real-time availability of the most current and relevant intelligence possible for all legitimate users. It can:

- a. Provide a common repository accessible to all legitimate users for intelligence data bases on all relevant topics. At the same time it can permit individual analysts to have limited access adjunct data bases for material which is not yet ready, which requires special interpretation, or is otherwise not suitable for wider access.
- b. Provide an Automated Integrated Analysis (AIA) process incorporating the behavioral information acquisition and analysis techniques developed in the ABI project in an automated templating process designed to be managed by and of significant assistance to human analysts.
- c. Provide unique analytic procedures tailored to meet the needs of specialized activities such as RED Force

simulation, counterintelligence and security, and recruitment of human resources.

This ABI objective system is graphically represented in Figure 1-3. This figure indicates the phasing to be used in attaining the ABI capability:

- Phase I, development of the AIA process and selected special analytic techniques, the near term goal of the ABI project;
- Phase II, the development of the total automated capability as an eventual goal shaped and participated in by user agencies as well as DARPA.

Figure 1-4 indicates the manner in which it is visualized that both the Phase I automation capabilities and the Phase II system would be used by the users.

1.4.2 Automation and the Issue of Alternative Interpretations.

Analysis of human behavior at the political/military level is a complex and time-consuming process. For example, the Soviets increase troop levels in Afghanistan--why? The answer depends on how one characterizes Soviet perceptions, short and long-range objectives (planned courses of action), and ideology. Trying to resolve disputes among differing viewpoints can be extremely tedious as one tries to support one set of beliefs about Soviet leaders with facts demonstrating their validity, only to discover the same set of facts being used by nimble minds with different views to support their viewpoint. At this level, and at much lower, more prosaic levels, computerization with the right methodologies appears to provide the potential to:

- use one or more sets of established rules of logic;

Figure 1-3.

AUTOMATED SYSTEM PHASING

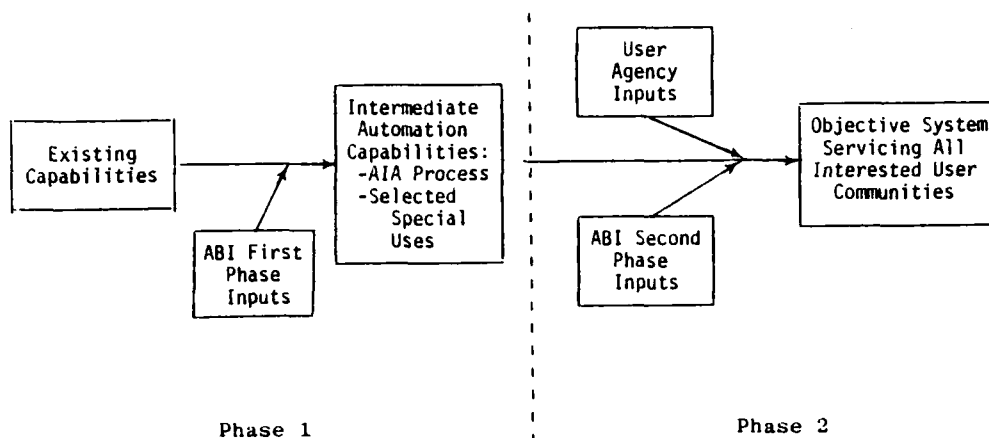
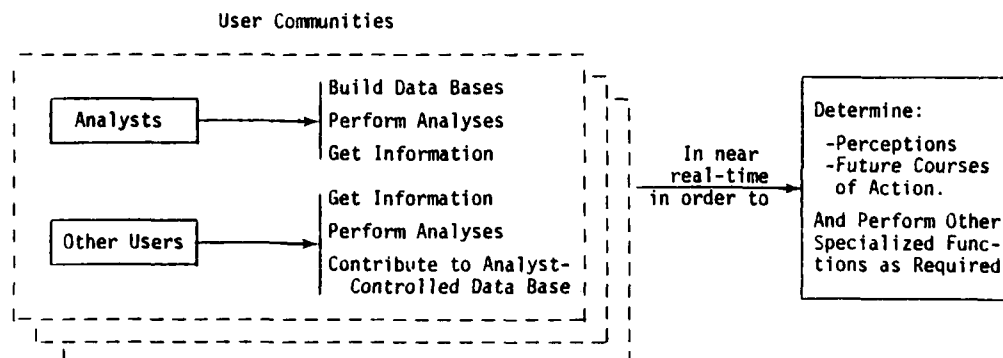


Figure 1-4. ABI Automated System.

CONCEPTUALIZATION OF USER USE OF THE AUTOMATED SYSTEM



- approach the problem from a number of alternative viewpoints concerning the target individuals' ideology, beliefs, goals, and traits;
- determine indicators of alternative probable courses of action (future goals or objectives and perceptions) according to each viewpoint;
- associate experience based probabilities and explanations with each alternative outcome.
- produce results in near real-time, even when large masses of data must be processed.

1.4.3 The AIA Process. The AIA process is at the heart of the first phase of ABI automation. It is developed in more detail in Section 3, but an overview at this point will help provide a better concept of the whole ABI project. Figure 1-4 presents a rather simplified example, but it points up what automated behavioral intelligence can accomplish for the human analyst: using a number of analyst-specified sets of political ideologies and personal traits the computer can permit the human analyst to perform many analyses in near real time identifying indicators for each alternative perception or planned course of action. Such an intensive examination of the problem would be impossible for the analyst alone. The behavioral information acquisition and analysis techniques developed in the ABI project will be incorporated in the AIA process, which is designed to be helpful to and managed by human analysts. The application of this process in the ABI Project will have a primary focus on individual behavioral aspects of foreign country politico-military activities. It will focus equally on integration of those aspects with all other relevant aspects of intelligence in a fashion generically similar to the automated templating procedures developed for military operations³

³See "Intelligence Preparation of the Battlefield (Automated)", Phase II Final Report, IBM, 14 February 1980, prepared for the Directorate for Battlefield Systems Integration, Hq. USADARCOM (Contract No. DAAK2179-0040) for the most recent development in this field.

and to other relevant automated intelligence development processes.⁴ The AIA process will make provision to use inputs as appropriate from these and other automated intelligence processes, including EWAMS.⁵ Figure 1-5 indicates the three basic components of the AIA process.

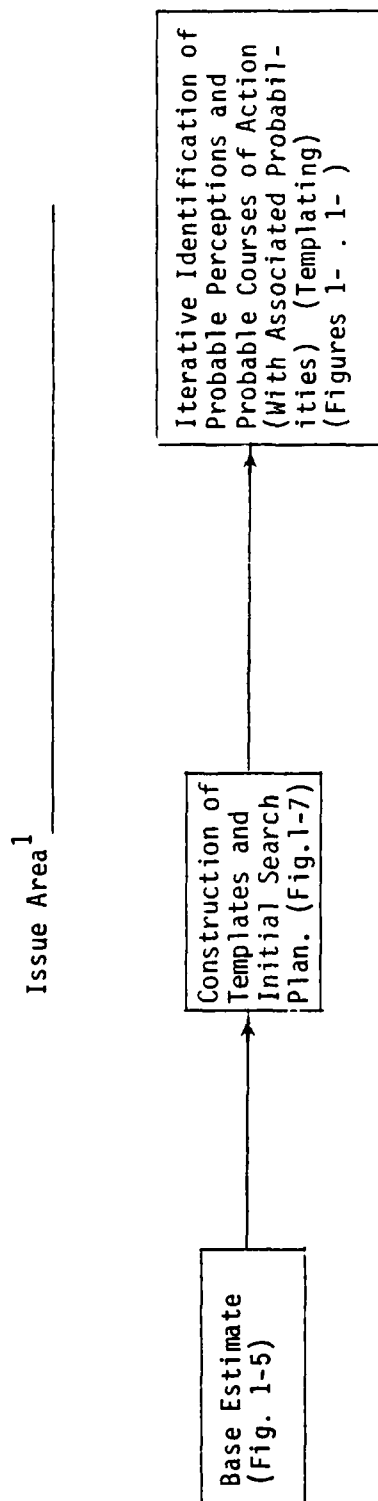
1.4.3.1 The Base Estimate. (Figure 1-6) The AIA process will usually be applied within some specific issue area defined by one or more factors such as:

- activities of a specific country or group of countries (e.g., an alliance);
- activities of a specific group (ruling council, cabinet, politburo, regional organization, negotiating team);
- activities of a specific leader or other individual;
- a specific process (a set of negotiations, a condition of hostilities);
- a specific functional or geographic area (e.g., buildup of military capabilities, expansion of influence in Southwest Asia -- or worldwide -- or in a single country).

⁴Including the one currently being developed for DARPA on terrorist activities. See "Foundations for Forecasting International Terrorism, Phase, I, Volume, II, Research Program for Designing a Terrorism Indications and Warning Capability (N)", Final Technical Report, January 1980, CACI (Contract No. MDA 903-79-C-0396). This report and the preceding one cited (Note 3) are examples at opposite poles of a technical terminology dichotomy -- the "jargon" of the national intelligence community versus that of the academic behavioral science community. In conceptualizing the ABI project, although it is largely behavioral science in discipline, frequently the user (national intelligence community) terminology will be used to facilitate technology transfer and eventual user acceptance.

⁵The DARPA Early Warning and Monitoring System, part of the DARPA Crisis Management Program.

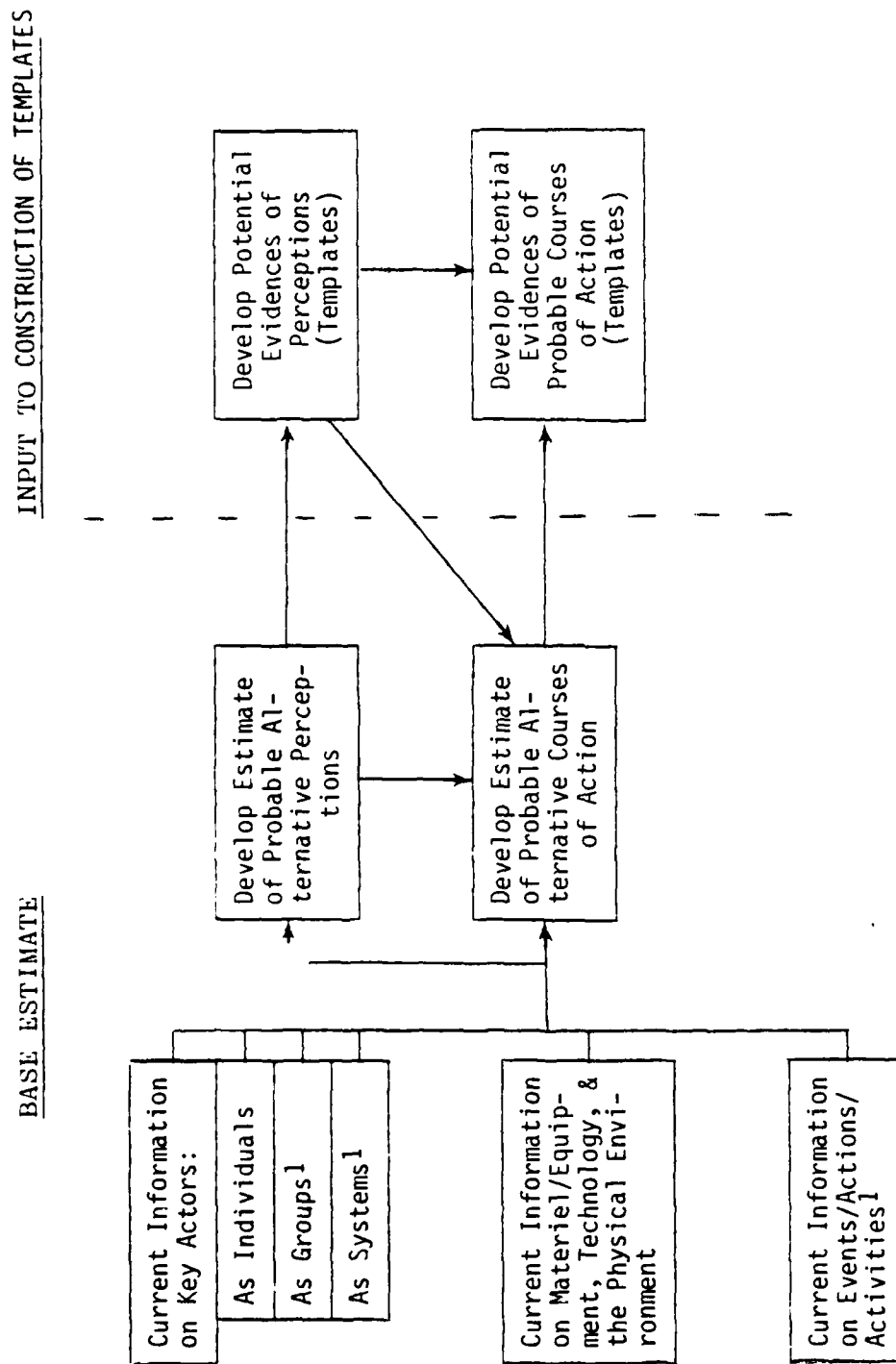
Figure 1-5 . Automated Integrated Analyses Process .



All three supplemented by Human Intervention

¹This integrated analysis process applies within a specific issues area; examples are given in the text paragraph 1.4.3.1.

Figure 1.6.. Base Estimate, With Input to Initial Search Plan.



LEGEND: Heavy black outlines indicate areas of particular focus in the ABI Project.

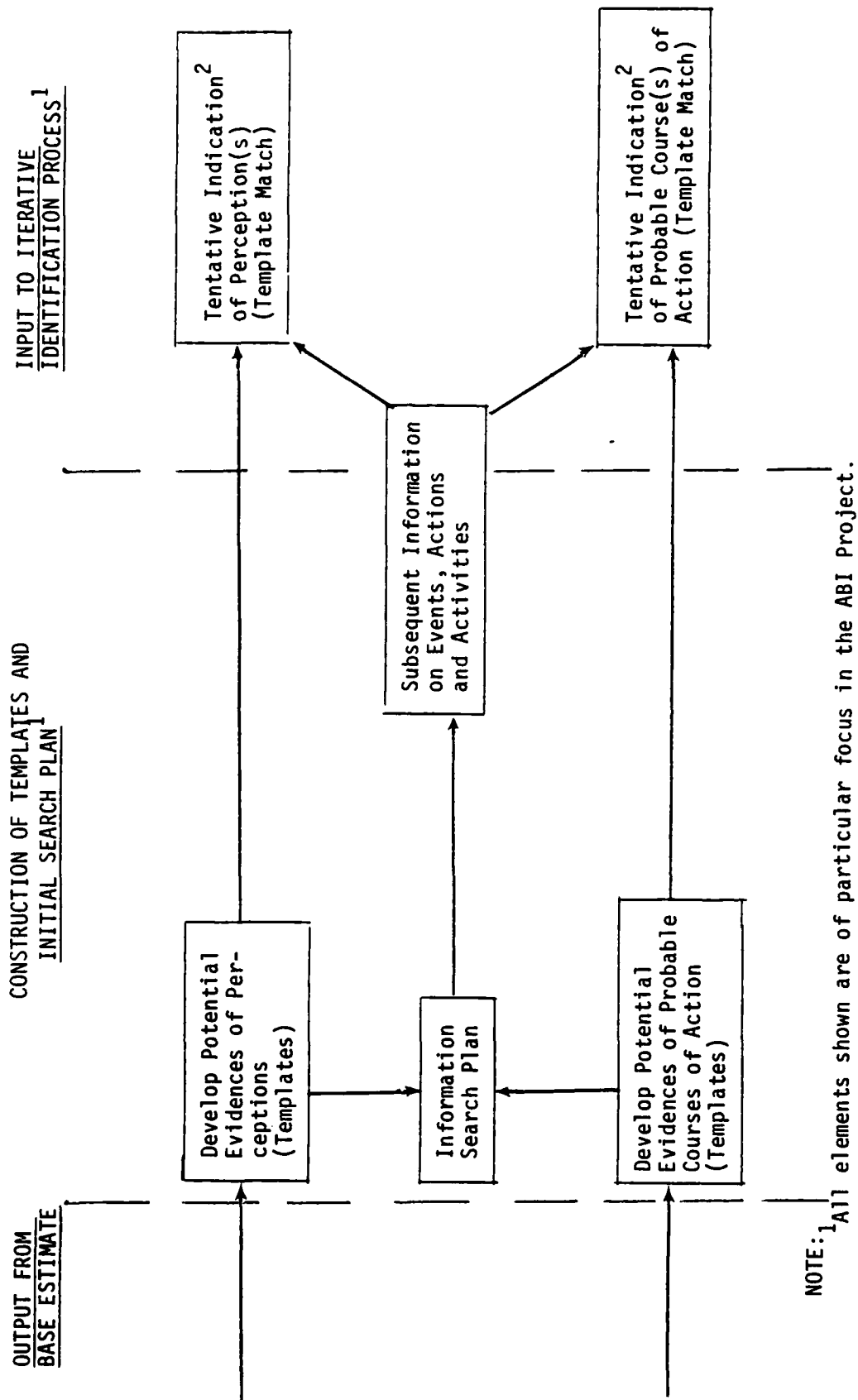
NOTES: ¹As described in Figure 1-2.

²Probable Alternative Perception and refer to those of Key Actors who are targets of the information-gathering operation.

In all such cases, the first concern of the AIA process in the base estimate is to ascertain by the best available behavioral intelligence methodologies (integrated with information concerning relevant material, equipment, technology, and other appropriate subjects) what the perceptions and probable courses of action of key actors (e.g. foreign decision makers) are. This estimate would be made in terms of alternatives associated with some probability estimate where possible.

1.4.3.2. Construction of Templates and the Initial Search Plan. (Figure 1-7) The base estimate produces an initial set of probable perceptions and courses of action. The initial search plan of the AIA is designed to provide the human analyst with indications as to which of the projected perceptions and probable courses of action of the Key Actor(s) is (or is the most likely to be) valid under the given circumstances. This is done by first developing patterns of indicators (templates) reflecting on a continuing basis, or over a specified time interval, expected evidences of likely perceptions and probable courses of action. These evidences may be behavioral (verbal or non-verbal). They may also involve changes in information concerning materiel, equipment, technology or the physical environments. And they will normally involve events, actions, or other activities. A pattern of such evidences which, considered in conjunction with previously held information, provides any indication of a perception held or of a planned course of action, constitutes an AIA template. In seeking to forecast behavior, goals or objectives, and the ideology and beliefs providing the matrix in which those goals are incorporated, are essential components of required information. Development of planned courses of action and perceptions are considered to include ideology and beliefs. One other consideration applicable to probable courses of action is the existence of a time-ordered heirarchy; probable courses of action may range from resolution of immediate short range problems to attainment of ultimate millenial goals. In specifying

Figure 1-7 Initial Search Plan.



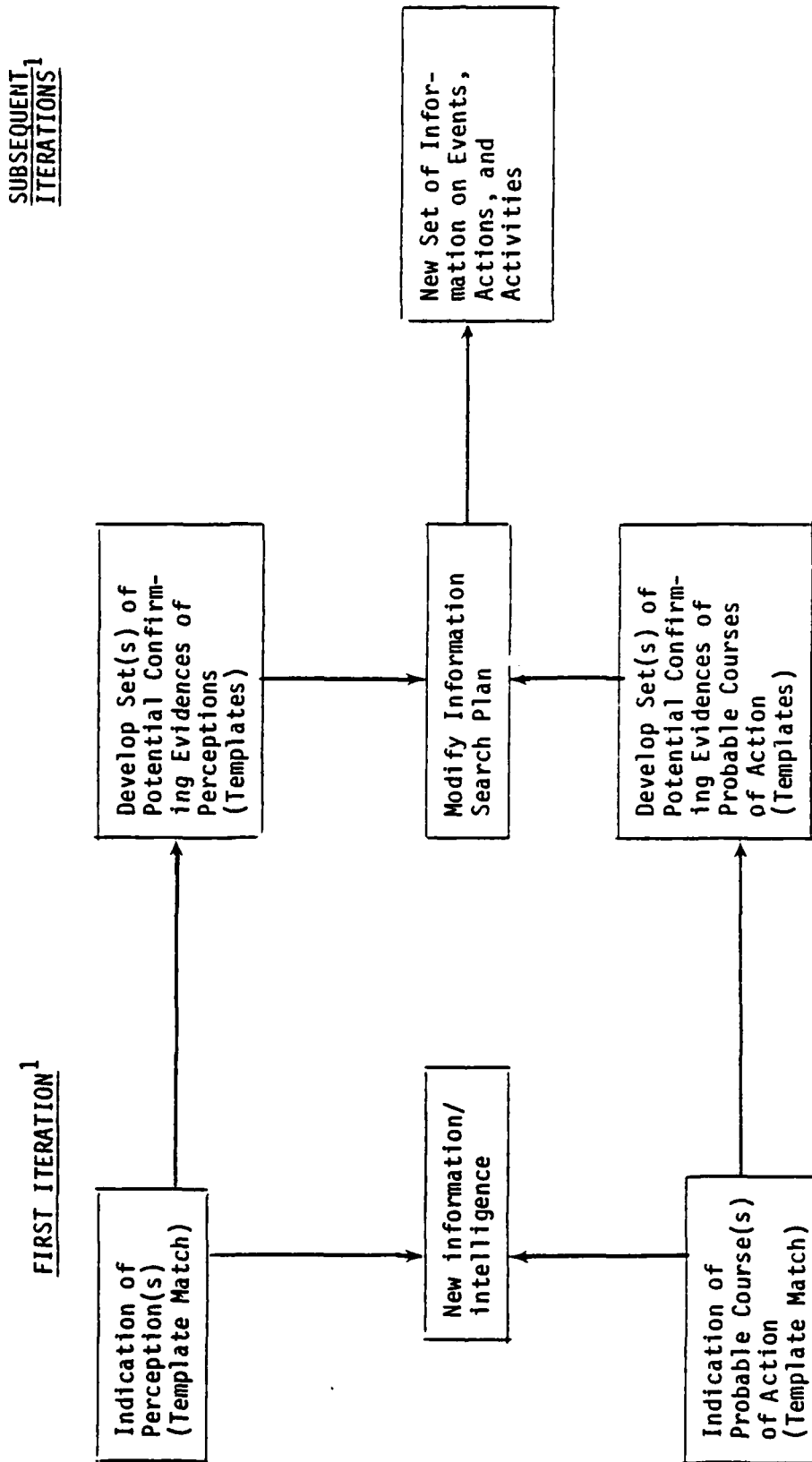
normally be necessary to specify in some manner the segment of this time-ordered heirarchy which is of interest.

The initial templates providing the human analyst with indications of perceptions and probable courses of action are used as building blocks in the construction of the initial search plan. This plan specifies when and where the information collection process must look, and what it must look for to provide the desired indications. The initial search plan will be integrated into the ongoing information collection process to produce tentative indications of perceptions and probable courses of action.

1.4.3.3. The First Iteration of the Iterative Identification Process. As indicated in Figure 1-8, the indications of perceptions or probable courses of action will themselves constitute new information to be processed into intelligence. In addition, except in those few cases where the initial indications stand alone as conclusive, they will provide the basis for analyst-controlled selection of "confirmatory templates". These templates are designed to guide the information process to seek those types of information at those times and places best suited to confirm the initial indications of perceptions and probable courses of action. This leads to modification of the information search plan and a new set of information on events, actions, and activities.

1.4.3.4. Subsequent Iterations. This process continues as shown in Figure 1-9. As reflected there, initial indications of perceptions and probable courses of action may be going on concurrently with confirmation of previously detected indications of perceptions and probable courses of action. This may involve alternative or concurrent sets of perceptions and probable courses of action.

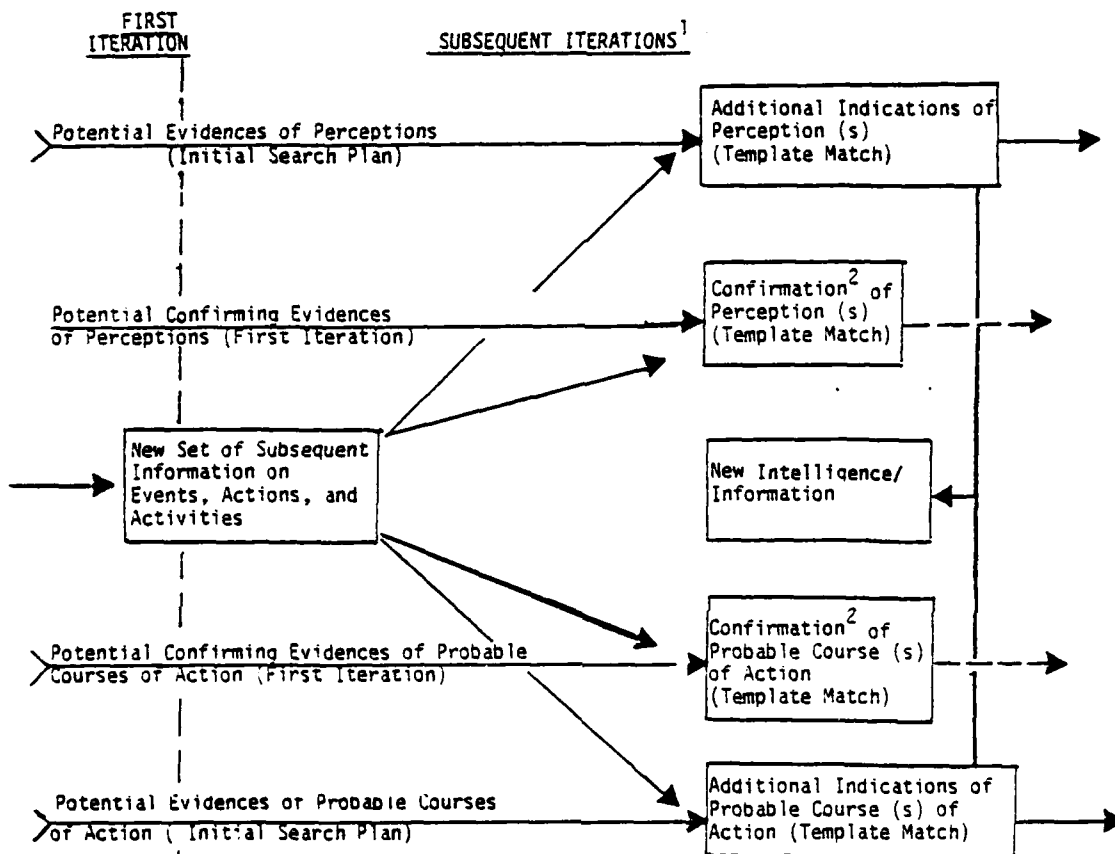
Figure 1-9. Iterative Identification Process: First Iteration.



NOTE:

¹All elements shown are areas of particular focus in the ABI Project.

Figure 1-¹⁰~~8~~ Iterative Identification Process: Subsequent Iterations



NOTE:

¹ All elements shown are areas of particular focus in the ABI Project.

² Full or partial confirmation or disconfirmation; with full confirmation or disconfirmation, action does not go forward from this box.

16
1-29

1.4.3.5 Automation and Human Intervention. The AIA process will be interactive, providing for automated match of incoming information with templates, and for automated application of the behavioral analysis techniques, all under interactive human analyst guidance. It will be constructed to indicate the basis for all automated actions involving choices, and to permit human judgmental intervention at appropriate places. It will also include points in the base estimate process, in the construction of the information search plan, and in template match evaluation (as appropriate) where it will request human intervention to affirm or modify choices, and to interject actions best performed by human analysts.

SECTION 2

RESEARCH CONTROLS

SECTION 2

RESEARCH CONTROLS

2.0 GENERAL

There are two problems of particular concern in establishing research controls for the ABI Project. First, it is necessary to ensure that the different approaches to information acquisition and processing selected for development as part of the ABI project are the ones best suited to the purposes of the Project. Second, it is necessary to provide quality control of on-going research to ensure the necessary degree of methodological soundness and user acceptability.

2.1 SELECTION OF APPROACHES TO BE DEVELOPED.

This has two facets. The first facet is the initial selection of approaches to be pursued. That is addressed in the remaining sections of this research design. The second facet is to monitor the disciplines involved and suggestions received for substitutions or additions to the approaches selected for development in the initial research design. This includes being aware of potential substitutes for any initial approaches which, as they are pursued, fail to meet the standards of methodological soundness.

2.1.1 Application of Controls on Approaches Being Developed. It is proposed that the control of ABI approaches being developed as described above, in addition to being an ongoing process throughout the year, be the subject of a specific scheduled annual review in conjunction with consideration of concept papers and proposals for the new fiscal year. It is proposed that this review be accomplished by the responsible

DARPA Program Manager using input as appropriate from the Program Manager's operational and academic consultants, an internal evaluation monitor (contractor) for the ABI project, and user points of contact. This involves the concept of "inside" and "outside" evaluation of ABI studies. "Inside" evaluation will be accomplished by the Program Manager and such other contractor or in house personnel as the DARPA program manager may designate. "Outside" evaluation will be accomplished by operational and academic consultants responsible for this function directly to the program manager rather than to any contractors under the program. When requested by the Program Manager, user points of contact will also participate in this review.

2.2 PROJECT EVALUATION (QUALITY CONTROL)

Project evaluation ensuring quality control is necessary in order that ABI techniques as developed are soundly based and valid from both technical and operational viewpoints. It will also provide a basis for timely, but not premature, termination of studies and elimination of undesirable approaches. The principal tools for quality control gate hypothesis structures and the associated review procedures, to include the "Mr. X" concept (para. 2.2.2.1).

2.2.1 The Gate Hypothesis Concept. The ABI project is designed to produce an integrated multi-method aggregation of techniques for acquiring information through collection, interpretation, and/or analysis. To represent sound, scientifically based research, the project requires a control device to ensure that each component technique meets proper standards of validation. The concept of gate hypotheses is designed to provide this control. The gate hypotheses will cause each project to include analyses which demonstrate that the techniques being developed have a sound theoretical and empirical basis, make use of valid, replicable procedures in a laboratory, or other non-operational environment, and, when appropriate, can also

be used effectively and reliably in the operational environment. These hypotheses should be satisfactorily validated at specified stages of the research prior to proceeding to the next stage. The validation procedures for each gate hypotheses will be drawn so as to provide a baseline and several distract time phased elements in each annual contractor study effort which an evaluation can be made to ensure that satisfactory progress toward hypotheses confirmation/disconfirmation is being achieved. For lines of research currently in progress, it will be necessary to establish the gate hypotheses, and determine if the work which has been done constitutes satisfactory validation. Particular care will be taken to keep the gate hypotheses few, but basic; and to avoid introduction of any workload that is not essential to conduct of valid scientific research.

2.2.2 Gate Hypothesis Structures. It is not considered practical to try to specify as part of the research design gate hypotheses for every approach considered. What can be specified, however, are gate hypothesis structures giving guidance as to how to formulate such hypotheses for the various types of approaches considered. This has the advantage of providing uniformity in approach, yet letting the researcher form his own gate hypotheses. There is a separate gate hypothesis structure for physiologically oriented research, for cognitively oriented research, for automation research and for other research. Figures 2-1 through 2-4 provide these structures. Figure 2-5 provides a purely fictional example of application of gate hypotheses to a research effort -- both research effort and facts to go with it being designed to illustrate certain points rather than to reflect reality.

2.2.3 Use of Gate Hypotheses. In considering the use of gate hypotheses in project evaluation, it should be noted that over their lifetime most lines of research (approaches) will probably require

Figure 2-1: Gate Hypothesis Structure for Physiologically Oriented Research

Gate 1: Existence of a Physiological Phenomenon Potentially Useful for ABI. Types of hypotheses which must be satisfactorily* supported:

- (1) Hypotheses postulating the existence of the physiological phenomenon in question, and the conditions under which it exists.
- (2) Hypotheses postulating a consistent capability to detect and describe the physiological phenomenon.

Gate 2: Feasibility of Converting the Physiological Phenomenon into Inferences Concerning Intentions and Perceptions Under Laboratory Conditions. Types of hypotheses which must be satisfactorily* supported:

- (1) Hypotheses postulating the consistency and validity of the psychophysiological inferences involved.
- (2) Hypotheses postulating the consistency and validity of the cognitive inferences involved.**

Gate 3: Operational Feasibility and Utility of the ABI Process Using the Phenomenon to Inferences as to Intentions and Perceptions. Types of hypotheses which must be satisfactorily*** supported:

- (1) Hypotheses postulating that the technique and the specified conditions for its use are valid in and compatible with significant user and target operational environments.
- (2) Hypotheses postulating an advantage for the proposed technique over relevant current procedures, to include related cost/effort considerations.

*To the satisfaction of DARPA

**To include other policy relevant behavioral characteristics

***To the satisfaction of DARPA, or of DARPA and one or more user representatives, as appropriate.

Figure 2-2. Gate Hypothesis Structure for Cognitively Oriented Research.

- Gate 1: Existence of a Cognitive Inference Capability Potentially Useful for ABI. Types of hypotheses which must be satisfactorily supported:*
- (1) Hypotheses postulating the probable existence of the cognitive phenomenon** in question, and the verbal or non-verbal sources from which it can be inferred.
 - (2) Hypotheses postulating a consistent capability to make appropriate inferences concerning the cognitive phenomenon.
- Gate 2: Feasibility of Converting the Cognitive Phenomenon into Inferences Concerning Intentions and Perceptions under Non-Operational Conditions. Types of hypotheses which must be satisfactorily supported:**
- (1) Hypotheses postulating the consistency and validity of the inferences of perceptions and intentions involved.***
- Gate 3: Operational Feasibility and Utility of the ABI Process Using the Techniques Developed to Provide Inferences as to Intentions and Perceptions. Types of hypotheses which must be satisfactorily supported:****
- (1) Hypotheses postulating that the technique is valid in and compatible with significant user and target operational environments.
 - (2) Hypotheses postulating an advantage for the proposed technique over relevant current procedures to include relative cost/effort considerations.

*To the satisfaction of DARPA.

**To include all non-physiological, cognitively relevant behavioral phenomena.

***To include other policy relevant behavioral characteristics.

****To the satisfaction of DARPA, or of DARPA and one or more user representatives, as appropriate.

Figure 2-3. Gate Hypotheses Structure for Automation Research

Gate 1: Existence of (a) Suitable Algorithm(s) for Automation. Types of Hypotheses Which Must be Satisfactorily Supported.*

- (1) Hypotheses postulating the existence and validity of each algorithm involved.**
- (2) Hypotheses postulating the suitability for automation of each algorithm.

Gate 2: Compatibility and Utility of the Automation Process in the Projected ABI Operational Environment. Types of Hypotheses Which Must be Satisfactorily Supported.***

- (1) Hypotheses postulating that the automation process will be a practical, contributing element of an operational ABI project(as described in paragraph 1.4).
- (2) Hypotheses postulating that the automation process will be acceptable, useful, and will have an advantage over relevant current procedures, to include cost/effort considerations.

*To the satisfaction of DARPA.

**This may be a brief, simple process of citation where the algorithm being used has been soundly established.

***To the satisfaction of DARPA, or of DARPA and one or more user representatives, as appropriate.

Figure 2-4. Gate Hypothesis Structure for Other types of Research.

Gate 1: Definition of a Condition or Phenomenon Warranting Investigation. Types of Hypotheses Which Must be Satisfactorily Supported.*

- (1) Hypotheses postulating that the condition or phenomenon of interest exists and may affect some significant aspect of the ABI project.
- (2) Hypotheses postulating that this condition or phenomenon has specified characteristics.

Gate 2: Demonstration That a Proposed Action to be Taken With Respect to the Condition or Phenomenon Will Benefit the ABI supported:**

- (1) Hypotheses postulating that the proposed action will have some specified effect in the operational environment.
- (2) Hypotheses postulating that this specified effect will significantly benefit the ABI Project.

*To the satisfaction of DARPA.

**To the satisfaction of DARPA, or of DARPA and one or more user representatives, as appropriate.

Figure 2-5. Illustrative Application of Gate Hypotheses to a Fictional Project Using Fictional Data.

RELEVANT GATE HYPOTHESES	VALIDATION STATUS BASED ON CURRENT REPORT
1. If high quality color videotape of the human face is taken during an oral presentation, then sequential coloration patterns can be defined which will indicate stress related words or phrases.	Biological studies and tests have established that stress increases blood pressure which expands capillaries which changes skin color. This occurs on a sequential basis on various portions of the face depending on the increase in blood pressure. In other studies, increase in blood pressure have been convincingly, but not quantitatively, related to stress.
2. If trained coders are shown high quality color videotapes of the human face taken during an oral presentation, then they can accurately code the sequential color patterns indicating stress according to a six point numerical scale.	Consistency checks on coders accomplishing this task show highly acceptable results on fair skinned, well shaven, individuals; highly acceptable results in terms of a two point scale for fair skinned, bearded individuals; and increasingly less acceptable results as individuals become more swarthy.
This hypotheses, and its lack of full validation, establish limits on but do not negate the utility of the technique.	
3. If individuals are coded according to their sequential face coloration patterns during an oral presentation, then their levels of stress during the speech can be determined over time.	Tests with individuals produce graduated ratings. However, there is no validated scale for measurement of stress in humans against which to validate these ratings.
This hypothesis and its lack of full validation limit the technique to measuring relative levels of stress in susceptible individuals without being able to associate a meaningful absolute value of stress with those levels.	
4. If relative levels of stress in a susceptible individual are measured using the sequential coloration pattern technique, then it is possible to identify those themes in his oral presentation which are least stressful to him.	Tests with individuals and with videotape of absent individuals indicate that it is possible to identify themes associated with low relative stress. However, since many other factors than spoken theme content were also identified as potentially causing stress during an oral

Figure 2-5. Illustrative Application of Gate Hypotheses to a Fictional Project Using Fictional Data.

RELEVANT GATE HYPOTHESES	VALIDATION STATUS BASED ON CURRENT REPORT
	presentation, it was not possible, except when the individual was available for immediate post speech review, to ascertain which were the least stressing themes, or which relatively high stress ratings were due to other than theme content.

This provides a further limitation on the utility of this technique. At this point a decision would need to be made as to whether to turn to research addressing some of the basic problems currently limiting the utility of this technique, or to explore with user representative the potential operational worth of the validated capabilities of the technique, or do both.

only five to ten gate hypotheses. It is proposed that the gate hypotheses and related project evaluation procedures be used as controls in the following manner:

- FY 81 ABI proposals and from all proposals initiating new line of research in subsequent years, should contain gate hypotheses from gate 1 to whatever level is appropriate to the research being proposed. The proposal should indicate which hypotheses are considered previously validated and why; and should indicate that those hypotheses not previously validated will be validated as part of the research being proposed.
- All proposals, starting with FY 1981 research, should include the validation status as of the completion of the previous year's research for all gate hypotheses listed in the proposal as subject to further validation. This validation status, once accepted by DARPA, will constitute the baseline condition for project evaluation. The validation of the hypotheses to be tested in the research proposed is to be broken down into time-phased elements. These elements will permit each on-going annual study under the ABI project to be evaluated at least twice prior to completion to ensure the adequacy of progress. At least one of these evaluations will be during the first half of the study period, and at least one more by the three-quarter point.
- All proposals in subsequent years which continue ongoing research, should summarize current gate hypothesis status, providing a baseline from which progress may be eliminated. They should also indicate the additional gate hypotheses or elements thereof to be addressed in the ongoing research along with the time phased elements cited above permitting evaluation as a minimum at the half and three quarter points of study progress.
- It is proposed that review of the gate hypotheses be accomplished in the same manner as for controls on approaches; by the responsible DARPA Program Manager using input as appropriate from the Program Manager's internal and external review advisors and consultants (paragraph 2.2.1).

- Of particular importance in review of the Gate Hypothesis confirmation/disconfirmation data is recognition that lack of full confirmation does not necessarily mean reflection of all work on that approach. It means, rather, that a careful judgment be made weighing possibility of full confirmation in terms of cost and effort required against consequences of lack of full confirmation; and evaluating the probability in the absence of full confirmation, that the hypotheses are valid (see below). These judgments may dictate continuation, redirection or termination of efforts.

2.2.4 Evaluating the Support Developed for the Gate Hypotheses. In evaluating the support offered to validate the gate hypotheses it may be necessary at times to address the question of whether the support provided for the hypothesis is too "soft" to warrant proceeding to subsequent gate hypotheses. In such cases, considerations of momentum, relevance, potential utility, and judgmental evaluations of the probability that the hypothesis is valid, despite the softness of support, may warrant going ahead concurrently with or in lieu of continued effort to firm up the support. Examples of the types of problems characteristic of political science analysis which are likely to lead to such situations include:

- Among the terms used in analysis of verbal content are such words as democratic, freedom, liberty, and coexistence. Such words have very different symbolic meanings when used by different actors on the international scene. These terms used by, for example, President Carter, Politburo member Suslov, and The Ayatollah Khomeini express very different values, have very different connotations. Consequently, statistically significant findings involving the use of such words must be rational in the context of the difference in meaning to provide a sound basis for inferring the possibility of causality from the statistical relationships. Inasmuch as such determinations may involve subjective judgments on which there is considerable disagreement, a full explanation of the consideration given to alternative views should be given.

- In tests designed to confirm hypotheses using human subjects, there is, for a variety of reasons, an urgency to move on to testing and reporting results in terms of the operational environment. This can introduce significant flaws in the rationale in support of the hypotheses being tested. For example, in measuring the reaction of an American student pretending to be a South African official who is lying, it is necessary to specify that that is what is tested, no more. Inferences as to what a South African official's behavior might be under such circumstances are subject to question in terms of the difference between actual lying and pretending to lie, between a student and a government official, and between a South African and an American. Until these differences can be explained on a supportable basis, inferences drawn involving these differences are inadequately supported. It may, however, be useful to address interpretation of operational target reactions, even before controlled type testing to permit adequately supported interpretation of the results has been completed. This is because, until analysis of such targets has been tried, the researcher may not be aware of all the questions which need to be addressed in the controlled testing phase of the research. But, in such a case, care should be taken not to infer from the operational target more than can be properly supported in the way of inferences. For example, with someone of very different culture and ideology it may be very difficult to know objectively what he considers to be truth, or what impact deceitfulness has on him in terms of stress reactions (is viewing use of deceit as a source of concern tending to induce stress a culturally or environmentally conditioned characteristic, or not, for this individual?).

2.2.4.1 The use of Mr. X's. As a means of keeping control on the projection of developing techniques into use with real world information acquisition targets, the use of the Mr. X concept is proposed. A Mr. (or Ms.) X is a designated individual (or group, for group analyses) to be used by all ABI research projects in analyzing contemporary individuals. Several Mr. X's are specified to provide essential variation in the type individual and type of material available on

the individual. The proposed Mr. X's are:

Individual Mr. X's:

Mu'ammarr Quadhafi	Libya, General Secretary General People's Congress
Indira Gandhi	India, Prime Minister and Leader of Congress (I) Party
Fidel Castro Ruz	Cuba, President of the Council of State
Robert Mugabe	Zimbabwe, Prime Minister
Dimitriy Ustinov	USSR, Minister of Defense and Member, Politburo CPSU

Group X's:

The Soviet Politburo
The current Nicaraguan Ruling Junta.

The Mr. X's (group X) will normally be used in the order set forth above. The Mr. X's (group X) to be used in a specific study will be recommended in the concept paper preceding the proposal for the study, with justification for the recommendation in terms of technique/methodology development objectives. In order to have satisfactorily validated the hypotheses pertaining to the last gate of the applicable gate hypothesis structure, it will be necessary to demonstrate the practical applicability (or lack thereof) of the technique to each of the Mr. X's (group X) listed. This does not necessarily mean a full scale application of the technique to each Mr. X (group X). If the technique cannot be applied except to visually recorded presentations, then explanation of the relative inapplicability of the technique on this basis would suffice. Likewise, if the technique applies only to individuals, it is necessary only to note this to explain failure to apply it to groups.

SECTION 3

AUTOMATED, INTEGRATED ANALYSIS (AIA) PROCESS

SECTION 3

AUTOMATED, INTEGRATED ANALYSIS (AIA) PROCESS

3.0 GENERAL

This section provides a more detailed explanation of the Automated, Integrated Analysis (AIA) process described earlier in paragraph 1.4. as an aid to the human analyst.

It covers:

- development of automated procedures to optimize the effectiveness of individual information acquisition and analysis processes currently used or to be developed through the ABI project
- automated integration of all available information into an iterative analyze/search/confirm/analyze routine designed to provide optimum real-time intelligence

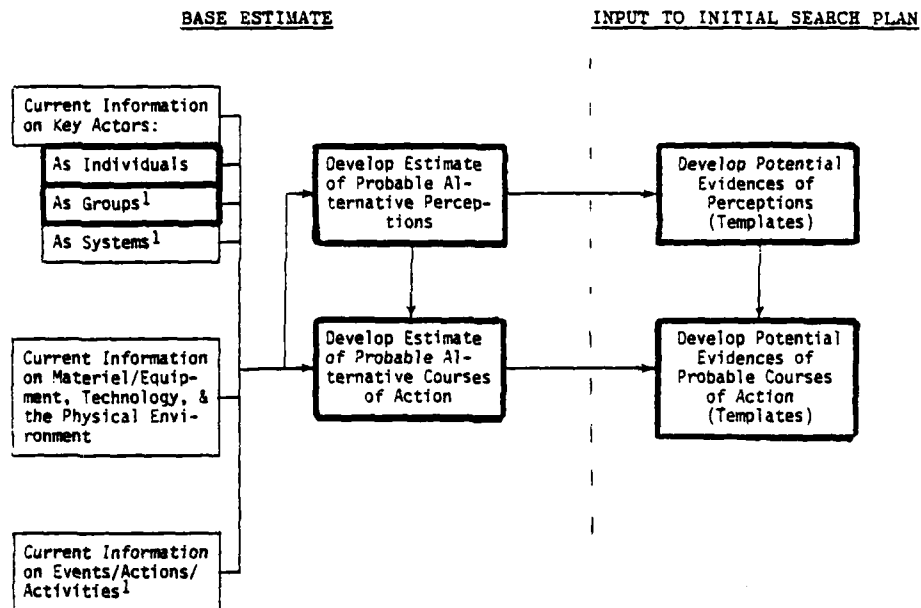
It does this in terms of:

- the base estimate (para. 4.1)
- the initial search plan (para 4.2)
- the iterative identification process (para 4.3)
- integration/with other automated applications (para 4.4)

3.1 BASE ESTIMATE

Figure 3.1 recaps the base estimate and the types of issue areas to which it may be applied. As noted earlier, the first concern of the AIA process in the base estimate is to make initial estimates as to what the perceptions and the probable courses of action of key actors are. This would be accomplished by using the best available

Figure 3-1. Base Estimate, With Input to Initial Search Plan and Illustrative Issue Areas.



LEGEND: Heavy black outlines indicate areas of particular focus in the ABI Project.

NOTES: ¹As described in Figure 1-2.

²Planned Courses of Action (and Alternative Perceptions) referred to are those of Key Actors who are targets of the information-gathering operation.

ILLUSTRATIVE ISSUE AREAS

The AIA process will usually be applied to some specific issue area defined by one or more factors such as:

- activities of a specific country or group of countries (e.g., an alliance)
- activities of a specific group (e.g., ruling clique, politburo, negotiating team, etc.)
- activities of a specific leader or other individual
- a specific process (e.g., a set of negotiations, a condition of hostilities)
- a specific functional or geographic area (e.g., expansion of foreign influence in Southwest Asia, global nuclear proliferation, etc.).

behavioral intelligence methodologies, integrated with information concerning relevant material, equipment, technology, social characteristics, and other appropriate subjects. This determination would be in terms of probably alternatives, associated with some probability estimate where possible. In order to accomplish these things, the AIA process integrates all available information on:

- human beings (including societal institutions)
- material/equipment, technology, and the physical environment
- events/actions/activities

The latter two types of information will be obtained primarily through existing procedures. The following subparagraphs will discuss:

- The approach to be taken to integrate ABI-enhanced analysis of the behavior of individuals and groups into the AIA process.
- The integration of other information with that on individual and group behavior.

3.1.1 Integrating ABI-Enhanced Behavioral Analysis Into the AIA Process. The principal existing mechanism for the integration of ABI-enhanced behavioral analysis into the AIA process is the POLITICS system which is still in early stages of development.¹

¹The POLITICS system is a set of closely cooperating computer programs that simulate human ideological understanding of international political events. In its current state of development, POLITICS assumes either a U.S. conservative ideology, or a U.S. liberal ideology, and uses ideological beliefs to guide its understanding and its responses to various types of international conflict situations. The programs use political/ideological goal trees which reflect ideological reasoning; separate goal trees which reflect human personality traits; goal-based scripts of relevant political situations which trigger context-dependent inference rules and are, in turn, themselves activated and deactivated by context switching rules; and dictionary expectations which are rules used to analyze English sentences pertaining to political events. Goal trees represent the ideological beliefs of the understander with respect to the intentions and underlying motives of every political actor. Counterplanning strategies (used for planning and counterplanning) contain very general,

POLITICS is a computer model of political/ideological reasoning which recognizes (and provides for the interjection of) the goals (to include objectives and planned courses of action) of the target individual or group, including reflection of their ideology and their personality traits. It also reflects a critical element in estimates of this nature which is always present, but often unacknowledged, and seldom placed in proper perspective. This critical element is the sum of the perceptions of the analyst with respect to the target -- the reflection of the ideological outlook of the viewer. Consideration of the viewer's outlook permits the building of alternative political/ideological goal trees reflecting a full spectrum of ideologies or views with respect to the target. It is then possible to use retrospective analysis to determine over time the percentage accuracy of prediction and explanation associated with each goal tree. It should also permit determinations of events (changes in personnel, discontinuities in the political or social environment) which cause a change in the percentages of accuracy associated with each goal tree. The result is to provide a tool for timely, systematic, documented analysis of foreign perceptions and probable courses of action in a depth and breadth not feasible without automation. In terms of future development of an AIA process capability, two lines of approach are considered relevant:

- First, continued development of the POLITICS model as a set of closely cooperating computer programs, with further development oriented toward a capability to perform the functions called for in the AIA process.
- Second, the development and use of inputs required to provide substantive development and testing of POLITICS capabilities. This approach would focus on the methodologies and information required to demonstrate in real world terms with appropriate problems what types of information the AIA process could be expected to provide.

high level knowledge on how to thwart one's adversaries and how to achieve one's goals in spite of intentional interference by adversaries. The situational scripts contain detailed, domain-specific, episodic knowledge of stereotypical political situations.

The continued development of the POLITICS model as a set of computer programs can be accomplished to some extent in terms of development to meet general capability objectives, as has occurred in the past. Shortly, however, cost effective development will require detailed specification of the objective system as applied in the AIA process.² Hence, development of detailed specifications must occur early in the ABI project. The second line of approach which requires consideration -- the provision of the methodological and information bases required to demonstrate what the AIA process could accomplish in terms of real world types of problems -- involves two levels of analysis: group and individual. It is proposed to address this in terms of developing for Qadhafi and for the Soviet Politburo³ the necessary background data to permit retroactive forecasting analyses. These analyses will indicate which among a carefully selected spectrum⁴ of relevant variable values (goals, perceptions, personality traits, others) produce what percentage correspondence to actual events in terms of predictions and explanations. This will be done by using the methodological approaches indicated in Section 4.

3.1.2 Integration of Other Types of Material Into the Base Estimate.

Much information other than individual and group behavioral information is necessary if one is to produce a base estimate from which indications of probable courses of action and perceptions can be deduced. Probable courses of action are conditioned by capabilities, which in large part depend on other than human behavioral factors. For example, no matter what the desire,

²These might include, for example, development of changes in counter-planning strategies or goal trees; or changes to reflect information obtainable by non-verbal techniques.

³The first priority "Mr.X" and "Group X" from paragraph 2.2.2.1.

⁴Selected on the basis of analyzing the potential spectrum of variable values to insure logical coverage, making sure in this process that popular ideological postures (e.g. liberal/conservative moderations are adequately represented).

the lack of nuclear weapons obviates a course of action that involves waging nuclear warfare. In fact, one of the best indicators that a probable course of action is being adopted is evidence that steps are being taken to acquire the means to pursue that course of action, but not required to pursue the other probable courses. Unfortunately, such actions often will enhance several probable courses of action rather than just one. But it may frequently be possible to find patterns in more complex situations which will indicate one course over another. Often here, as with behavioral information, the significance of an action taken to alter materiel, equipment, technological or even environmental status will depend on the viewpoint of the analyst.⁵ The same item of equipment may have both offensive and defensive capabilities. This makes it imperative to embed single and multiple nonbehavioral actions in the AIA process, where patterns and combinations of behavioral and nonbehavioral activities can be analyzed across a spectrum of possible analyst interpretations of the target over a large number of incidents, to permit determining the probabilities associated with each such interpretation as to its accuracy and the correctness of its projections and explanations.

3.2 THE INITIAL SEARCH PLAN.

The initial search plan in the AIA process is built from templates - projections of what types of information would be considered to constitute evidences of perceptions or probable courses of action. Many of these evidences will be of a nature such as those just discussed - evidences of an attempt to create a new or strengthen an existing capability. These evidences are analogous to those used in current tactical intelligence templating systems. All currently-available templating techniques will be used to contribute to the AIA process to the extent that they are relevant and transferable. It is expected, however, that the automated capability

⁵The "understander" from the POLITICS viewpoint.

evolving from the POLITICS model and the methodologies/techniques discussed in Section 4 as contributing to the AIA process will permit a much more comprehensive development of templates than would be possible without these tools. Further, they will permit construction of much more discriminating patterns into which template-developed information will fit. This will enable more rapid and accurate determination (on a probabalistic basis) of which courses of action are likely to be pursued, and of what perceptions are held by the foreign decision-makers. It should be possible through retrospective analysis to build a rich data base of past evidences of perceptions and courses of action using the AIA process. This data base should be able to indicate which type of evidence gives what degree of assurance that a given course of action is being followed or that a given perception is held. As individuals change in a group, or as conditions affecting an individual or group change, their belief structures, goals, and perceptions may undergo significant change. Again, the retrospective analysis should be able to provide a relatively rich data base as to what kinds of change may occur as the result of given types of events. Effective, efficient development and exploitation of such data bases is possible only by use of computers because of the mass of information and of the number of microanalyses involved. Even when an individual decision-maker or decision-making group is new on the scene, use of relevant cultural, ideological, and environmental analogues would permit rapid construction of an initial set of goal trees, personal belief systems, and other relevant information. This would permit prompt use of the AIA process to provide early, albeit initially somewhat tentative, results (after some time using the system, it should become possible to establish the level of confidence applicable even in these circumstances). The resultant degree of understanding of the foreign decisionmaker should also enhance the US capability to send signals, through actions and words, to foreign actors which will result in their holding the perceptions which we desire.

evolving from the POLITICS model and the methodologies/techniques discussed in Section 4 as contributing to the AIA process will permit a much more comprehensive development of templates than would be possible without these tools. Further, they will permit construction of much more discriminating patterns into which template-developed information will fit. This will enable more rapid and accurate determination (on a probabalistic basis) of which courses of action are likely to be pursued, and of what perceptions are held by the foreign decision-makers. It should be possible through retrospective analysis to build a rich data base of past evidences of perceptions and courses of action using the AIA process. This data base should be able to indicate which type of evidence gives what degree of assurance that a given course of action is being followed or that a given perception is held. As individuals change in a group, or as conditions affecting an individual or group change, their belief structures, goals, and perceptions may undergo significant change. Again, the retrospective analysis should be able to provide a relatively rich data base as to what kinds of change may occur as the result of given types of events. Effective, efficient development and exploitation of such data bases is possible only by use of computers because of the mass of information and of the number of microanalyses involved. Even when an individual decision-maker or decision-making group is new on the scene, use of relevant cultural, ideological, and environmental analogues would permit rapid construction of an initial set of goal trees, personal belief systems, and other relevant information. This would permit prompt use of the AIA process to provide early, albeit initially somewhat tentative, results (after some time using the system, it should become possible to establish the level of confidence applicable even in these circumstances). The resultant degree of understanding of the foreign decisionmaker should also enhance the US capability to send signals, through actions and words, to foreign actors which will result in their holding the perceptions which we desire.

3.3 THE ITERATIVE IDENTIFICATION PROCESS

The iterative identification process consists of:

- the repeated use of templates derived from the base estimate procedures to search for evidences of probable courses of action or perceptions;
- the use of these results to modify the base estimates and produce additional templates used to search for further evidences of probable courses of action or perceptions;
- and so on in a continuing process.

The techniques and methodology used would be continuations of those used in developing the base estimate and the initial search plan. The automation process, to be of maximum assistance to the human analyst, would need to have software developed facilitating integration of initial and confirming evidences, and of other relevant information developed in the search/find/analyze/search process into the base data files of the AIA process. The automation process, to be of help, must also display, in a form understandable to the analyst, the basis for the predictions and explanations it makes. In addition, it must provide ready access to information on inputs (e.g. goal trees) and other relevant data required to permit the human analyst to either adjust inputs or adapt results as may be required to reflect information at variance with that entered earlier or outside the processing capabilities of the model.

3.4 INTEGRATION WITH OTHER AUTOMATED APPLICATIONS

Development of the AIA process is the most significant step towards a fully automated behavioral intelligence (ABI) system. The fully automated ABI will provide access to all the common data base intelligence discussed as an end objective in Section 5. This access should be provided for both analysts and operational users, with analysts having reserved data bases for those items which they feel are not yet ready to enter the common base. This expanded system (the Phase II of Figure 1-3) will be explored

in the early to mid phases of the ABI project , but will not be intensively developed until after the AIA process (Phase I of Figure 1-3) is well in hand. An example of the early exploration would be the linking into the AIA process of SIPER⁶ or any other automated process in existence or capable of development with relatively little time and effort, if that process could contribute significantly to the improvement of the ABI system. This might include such programs as EWAMS if appropriate linkages could be developed. The goal of the eventual system should be to make available on a real time basis to any authorized intelligence analyst or operational user that information which he should have in order to perform his duties. This involves considerations of computer security systems to permit compartmentalization of information as required, of special uses, such as during negotiations, or for PSYOPS purposes, or for special data bases. Specification of detailed design requirements for the full ABI system should be accomplished after sufficient progress has been made on other ABI projects to provide a good, user-supported feel for what can realistically be accomplished and be most useful.

⁶See Section 5 for discussion of SIPER and other candidate systems.

SECTION 4

ACQUISITION AND ANALYSIS OF BEHAVIORAL INFORMATION
RELEVANT TO FOREIGN PERSONNEL

SECTION 4

ACQUISITION AND ANALYSIS OF BEHAVIORAL INFORMATION RELEVANT TO FOREIGN PERSONNEL

4.0 GENERAL

As noted in the general conceptualization of the ABI project in paragraph 1.4, the behavioral information acquisition and analysis techniques developed in the ABI project, and the existing techniques which they supplement, are incorporated in the automated integrated analysis (AIA) process. This section discusses the research design considerations applicable to these techniques as follows:

- Roles of behavioral information acquisition and analysis techniques in the AIA process (Paragraph 4.1);
- Types of information sources for behavioral information (Paragraph 4.2);
- Potential types of methodologies (interpretive techniques) for acquisition and analysis of information from these sources (Paragraph 4.3);
- State of the art of relevant types of methodology (Paragraph 4.4);
- Development of multi-method approaches and relevant predictive models (Paragraph 4.5);
- Identification and evaluation of the most promising avenues of research (Paragraph 4.6).

4.1 ROLE OF BEHAVIORAL INFORMATION ACQUISITION AND ANALYSIS TECHNIQUES IN THE AIA PROCESS

As indicated earlier in Figure 1-2, the focus of ABI is particularly on individuals, but also on groups (e.g., organizational, bureaucratic, cultural). The focus on individuals emphasizes individuals

with roles of significant interest to the U.S.: decision-makers, negotiators, and others, depending on the situation (e.g., individual lower-ranking foreign officials when considering them as prospective HUMINT sources). The focus on groups is particularly concerned with group influences on individual behavior, and with groups in roles similar to those of interest for individuals (e.g., as decision-makers in a Politburo or a cabinet meeting, as a group targeted for psychological warfare, etc.). The individual(s) or group(s) of interest in a specific AIA process will be dictated by the issue area of concern.¹

4.1.1 Information Acquisition/Analysis Techniques and the Estimates Process. Improved information acquisition and analysis techniques pertinent to these types of individuals and groups are of primary interest in the AIA process in the preparation of base estimates of alternative perceptions and probable courses of action of foreign personnel (see paragraphs 1.3.1 and 3.1). Through the use of templates, these techniques are also the means of establishing and confirming evidences of which of the estimates of alternative perceptions and planned courses of action is accurate in a given situation. To accomplish

¹Paragraph 1.4.3.1 indicates that issue areas are defined by one or more factors such as the following:

- behavior of a specific country or group of countries (e.g., an economic or military alliance);
- activities of a specific group (e.g., ruling junta, Politburo, negotiating team);
- behavior of a specific individual (e.g., head-of-government, diplomat, military commander);
- a specific process (e.g., a set of negotiations, a *condition of military hostilities*; the response to specific U.S. policy initiatives);
- a specific functional or geographic area (e.g., the global buildup of military capabilities, the expansion of outside influence in Indochina, etc.).

these purposes, information pertinent to individual and group factors affecting perceptions and courses of action will be supplemented by information on external events/actions/activities and by information on the resource capabilities and the physical environment affecting the foreign personnel's perceptions and courses of action. Application of existing and new candidate information acquisition and analysis techniques to this estimates process requires a thorough understanding of the capabilities, limitations, and methodological characteristics of each candidate technique.

4.1.2 Information Acquisition/Analysis Techniques and the Information Search Plan. The development of information search plans for a specific AIA process is dependent on the results of the initial application of information acquisition/analysis techniques. For example, as discussed in paragraph 3.1, behavioral analysis might suggest that the decision of a group of foreign policy-makers to acquire certain capabilities (e.g., a nuclear weapon) is indicative of which of several alternative courses of action is under consideration (e.g., deterrence of a perceived expected threat or aggression against a neighboring state). If the initial application of information acquisition/analysis indicated that such a decision has been made or is contemplated, an optimum information search plan would then be developed specifically targeted to provide evidence for alternative associated perceptions and possible alternative or subsequent courses of action. Again, application of candidate acquisition and analysis techniques for this purpose is dependent on a thorough understanding of the capabilities, limitations, and methodological characteristics of each candidate technique.

4.2 TYPES OF INFORMATION SOURCES FOR BEHAVIORAL INFORMATION

Several types of indicators of behavioral information, each with accompanying information sources, have been addressed, as indicated

in Figure 4-1. These were considered as follows:

- Cognitive (non-physiological), Indicators From Recorded Data, to include:
 - indicators from primary source verbal data;
 - indicators from secondary source verbal data;
 - indicators based on nonverbal/paralinguistic data.
- Cognitive (non-physiological) Indicators From Unrecorded Data, consisting of subjective analysis of:
 - direct subject observation, and
 - subject interview/interrogation
- Physiological Measures, to include:
 - proximate measures requiring contact with the subject (at the current state-of-the-art); and
 - remote measures not requiring physical contact with the subject.

4.3 POTENTIAL TYPES OF BEHAVIORALLY RELEVANT METHODOLOGIES (INTERPRETIVE TECHNIQUES) FOR ACQUISITION AND ANALYSIS OF INFORMATION

This paragraph discusses the types of behaviorally-relevant methodologies listed in Figure 4-2. The primary focus of the discussion is on the adaption of the latest state-of-the art techniques to the AIA process, thereby enhancing current practices (as described, paragraph 1.0).

4.3.1 Verbal - Recorded Primary Sources. This involves analysis of the contextual meaning of words in recorded verbal presentations, both written and oral, to include analysis of the responses in in-depth interviews of the subject. The basic problem addressed by the techniques in this group is the reasonably parsimonious assembly of as much

Figure 4-1. Types of Indicators and Data Sources Considered.

<u>TYPES OF INDICATORS</u>	
<u>RECORDED DATA:*</u>	<u>INFORMATION SOURCES CONSIDERED</u>
Verbal - Primary Sources	Verbal presentations (published and unpublished) including In-Depth-Interviews Survey Data: Questionnaires Survey interviews Statistical surveys Standardized tests
- Secondary Sources	Expert Intuition Secondary documents, including statistics and Second hand reports of direct observation
Nonverbal/paralinguistics	Auditory recordings Audiovisual recordings (e.g., videotape) In-depth interviews Handwritten documents Coded records of direct observations
NON-RECORDED DATA:**	Direct subject observation** Subject interrogation/interview**
PHYSIOLOGICAL MEASURES:	
Proximate***	Direct measurement of physiological change Tissue, fluid, other samples
Remote***	Medical records Hi-fidelity visual/auditory recordings Remote physiological monitoring Subject observation (direct and videotape)

* Excluding purely physiological measures.

** To include in an interactive environment such as negotiating sessions and social occasions as well as non-interactive environments such as formal speeches.

*** Proximate generally involves contact with the subject; remote does not involve physical contact.

Figure 4-2 Potential Types of Behaviorally Relevant Methodologies
(Interpretive Techniques)

TYPES OF INDICATORS	INFORMATION SOURCES CONSIDERED	TYPES OF METHODOLOGIES/TECHNIQUES
<p>RECORDED DATA:*</p> <p>Verbal - Primary Sources</p>	<p>Verbal presentations (published and unpublished) including In-Depth Interviews</p> <p>Survey Data: Questionnaires Survey interviews Statistical surveys Standardized tests</p>	<p>Content analysis: Thematic content analysis Symbolic content analysis/paralinguistic analysis Value analysis/operational code identification Cognitive mapping Personality profiles, including actuarial analysis Remote psychoanalytic techniques Subjective, experience based judgement Survey-based content and biographical analysis Audience survey analysis PAI and other standardized test analysis PAS Soft skill tests</p>
<p>- Secondary Sources</p>	<p>Expert Intuition Secondary documents, including statistics and Second hand reports of direct observation</p>	<p>Elite communality identification Events data analysis Decision modeling/decision-making simulation Long range forecasting Quantitative analysis of secondary biographic source Subjective, experience based analysis Supplementation of other techniques, especially those associated with verbal and statistical content</p>
<p>Nonverbal/paralinguistic</p>	<p>Auditory recordings Audiovisual recordings (e.g., videotape) In-depth interviews Handwritten documents Coded records of direct observations</p>	<p>Psychological Stress Evaluator (PSE) Non-verbal behavior monitoring Eye movement monitoring Psychoanalytic techniques Handwriting analysis (graphology) Subjective, experience based judgement Subjective, experience based judgement</p>
<p>NON-RECORDED DATA:**</p> <p>PHYSIOLOGICAL MEASURES: Proximate***</p>	<p>Direct and secondary subject observation** Subject interrogation/interview**</p> <p>Direct measurement of physiological change Tissue, fluid, other samples</p>	<p>Diagnostic/prognostic analysis EEG (electroencephalogram) ECG (electrocardiogram) Biochemical/pathological analysis GSR (galvanic skin response) Pulse rate measurement Biological temperature measurement</p>
<p>Remote***</p>	<p>Medical records Hi-fidelity visual/auditory recordings Remote physiological monitoring Subject observation (direct and videotape)</p>	<p>Dianostic/prognostic analysis Genetic analysis Computer-based physiological simulation Subjective, experience based judgement</p>

* Excluding purely physiological measures.

** To include in an interactive environment such as negotiating sessions and social occasions as well as non-interactive environments such as formal speeches.

*** Proximate generally involves contact with the subject; remote does not involve physical contact.

behaviorally-significant information as possible on an individual from the individual's own words, and the conversion of that information into inferences concerning his or her perceptions and probable courses of action. Choices among these techniques will focus on their contribution to the resolution of this problem and their adaptability to the needs of the AIA process, given the state-of-the-art in the development and application of each technique.

4.3.2 Verbal - Recorded Secondary Sources. Analysis of behaviorally-relevant information presented in verbal form by individuals allegedly having special insight on the target subject, to include statistical reports, negotiation post-mortem reports, published historical accounts, etc. In addition to the basic problem cited for verbal primary sources, the use of secondary sources also involves the problem of the extra "filter" inherent in second-hand observations, i.e., analyzing the perceptual biases of the reporter. While this does not eliminate the use of secondary verbal sources of data on foreign personnel, it suggests extreme care in the use of such data if unsupported by other sources.

4.3.3 Nonverbal/Paralinguistic Techniques Applied to Recordings. These techniques attempt to provide supplemental information relevant to cognitive mapping of foreign personnel which, when combined with information from the preceding categories, provides significantly enriched inferences concerning perceptions and probable courses of action. This enrichment is generally based on inferences as to the presence or absence of mental states and traits such as stress, resolution, uncertainty, and deception in the target individual during a recorded oral or (in the case of graphology) hand-written verbal expression. Particular attention will be paid to integrating input obtained by these techniques into the algorithms of the AIA process. A definitive indication by one of these techniques will normally be considered to apply across all goal trees or other relevant elements of the AIA process algorithms.

4.3.4 Techniques for Non-Recorded Indicators. The technique of applying subjective, experience-based judgment to unrecorded direct subject observation and/or subject interrogation/interview has traditionally been used in the analysis of the psychological characteristics of foreign leaders.² The key problems associated with the use of this valuable interpretive technique in the AIA process are:

- ensuring the credibility and accuracy of the judgment;
- focusing such judgments on characteristics of interest;
and
- adapting the technique for inclusion in the AIA process.

4.3.5 Physiological Techniques. These techniques, like nonverbal and paralinguistic techniques, attempt to provide supplemental data which, when combined with other information in the AIA process, provides significantly enriched estimates of perceptions and probable courses of action.

4.3.5.1 Physiological variation and the AIA process. The type of physiological variations which can be monitored through the application of remote and proximate physiological (psychophysiological) indicators offers two potential contributions to the development and elaboration of the AIA process. First, since certain emotional and psychological states can be linked to certain psychophysiological changes (e.g., psychological agitation linked to increased heart rate, stress linked to changes in galvanic skin response), measurement of physiological change through remote and/or proximate indicators contribute information relevant to the meaning and context of verbal and nonverbal behavior. Second, since changes in physiological condition due to biological stress, illness, or the ingestion of stimulants and medication can be linked to changes in mental state, some types of physiological variation may

²See CP³ study (1979) p. 4-4.

cause changes in the cognitive processes of the individual under study. For example, the use of some forms of medication used to counteract the effects of a fever are associated with drowsiness, an inability to concentrate (i.e., to rationally weigh alternative choices), and depression. All of these effects could have a major impact on the goal structures and, possibly, the counterplanning strategies reflected in the AIA process.

4.3.5.2 Proximate and remote indicators. Proximate physiological indicators are defined as those which generally involve physical contact with the subject; remote indicators do not. In general, the use of proximate physiological measures will produce more detailed and/or accurate results than the use of remote indicators, but generally require the active cooperation of the subject. Given the rapidity of change in medical technology, however, physiological indicators which can only be measured through physical contact in the current state-of-the-art (e.g., EEG variation) may eventually become available through remote means. For this reason, proximate physiological indicators should not be summarily eliminated from consideration in the ABI research design, even if the current operational constraints limit their immediate utility in addressing the problem of obtaining physiological information on foreign individuals.

4.4 STATE OF THE ART IN CANDIDATE BEHAVIORALLY-RELEVANT TECHNIQUES/METHODOLOGIES

Appendix A contains a detailed summary assessment of each ABI candidate behaviorally-relevant technique/methodology listed in Figure 4-2. Each entry provides, for each technique;

- Principal investigators/critics associated with the technique/methodology

- Citations of relevant (primarily scholarly) studies and documents
- Description of the technique/methodology (including major implicit assumptions)
- How the technique/methodology has been applied
- Whether the technique/methodology permits systematic and reliable encoding of data
- The kind of data the technique/methodology uses and how the data is normally obtained
- Whether the data-encoding process is resource efficient
- Whether the technique/methodology provides consistent, credible attribution of states and/or traits
- Whether the technique/methodology provides acceptable, credible inferences of intentions, perceptions, or capabilities
- Whether the technique/methodology is susceptible to computerization
- Whether the technique/methodology requires extensive training for use
- The methodological and research problems which have been identified
- Government agencies known to be using it, if any

Figure 4-3 provides a sample entry from Appendix A. Figure 4-4 summarizes Appendix A in terms of the state-of-the-art in each behaviorally-relevant technique/methodology.

4.5 DEVELOPMENT OF MULTI-METHOD APPROACHES AND RELEVANT PREDICTIVE MODELS

The development of research tasks envisioning multi-method approaches and relevant predictive models for acquisition and processing

Figure 4-3. Sample Entry of Appendix A

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Remote Psychoanalytic Techniques

PRINCIPAL INVESTIGATORS/CRITICS

Investigators include Barber, Courtney, Erikson, Esberry, Freud and Bullitt, Alexander and Juliette George, Lasswell, Leites, Mazlish, and Tucker.

Critics include Greenstein, Mazlish, Touhy, Winter and Stewart.

CITES

Lasswell (1930) *Psychopathology and Politics*; George and George (1956) *Woodrow Wilson and Colonel House*; Erikson (1962) *Young Man Luther* and (1969) *Gandhi's Truth*; Freud and Bullitt (1967) *Thomas Woodrow Wilson*; Barber (1972) *The Presidential Character*; Mazlish (1973) *In Search of Nixon*; Touhy (1974) "Psychology in Political Analysis"; Courtney (1976) "Prime Ministerial Character: An Examination of Mackenzie King"; Esberry (1977) *Personality and Politics: A Study of William Lyon Mackenzie King*; Winter and Stewart in Hermann (1977) *A Psychological Examination of Political Leaders*; Leites, a variety of works.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Uses published sources and content analysis to make inferences on the genesis of the dynamics of individual political behavior, usually for specific political leaders but occasionally for the "typical" leaders in a given national culture (see, for example, Pye's study on Burma and Leites' work on French, Chinese, and Soviet leadership). Classification of data varies from categories of leadership style (e.g., Barber's model and Lasswell's leadership types) to highly individualistic explanations of political behavior, including neurotic/compulsive drives (e.g., Mazlish) and psychopathic behavior (e.g., Freud and Bullitt, Tucker's studies of Stalin).

Assumes that political behavior is a relatively superficial and transitory manifestation of underlying character traits. Further assumes that statements and actions can be found to indicate a pattern of psychological responses to stimuli, based on experiences in childhood or early adulthood, and that it is possible to extrapolate from the pattern to determine the key influences shaping later political behavior. Pays special attention to defensive and adaptive mechanisms in determining behavior.

Figure 4-3 (continued)

HOW HAS THE TECHNIQUE BEEN APPLIED?

Applied in a retroactive focus, as in psychohistory. Barber's model has been used to predict President Carter's performance in office with inconclusive and controversial results. It has been occasionally used to link psychosomatic symptoms to political decisions. There is also some evidence that some form of remote psychoanalytic technique was applied to the prediction of Premier Khrushchev's probable responses to U.S. initiatives during the Cuban missile crisis; the evidence, however, is anecdotal in nature.

WHAT OF DATA DOES IT USE?

Memoirs, speeches, published histories, verbatim accounts of meetings, and other recorded verbal data.

HOW IS THE DATA OBTAINED?

Open, usually published sources.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

No. Identical data can be interpreted very differently by different coders and analysts (see, for example, the Courtney/Esberry controversy on Mackenzie King's character).

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

No. Data collection must be extremely thorough and carefully analyzed to ensure accurate results. In many cases (i.e., Soviet and Third World leaders), necessary data does not exist or has been doctored by the political censorship process.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Some applications have provided credible attributions of politically-relevant character traits, especially leadership style, but only on a retroactive basis.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Difficult to determine. Critics of the technique, such as Mazlish and Touhy, doubt that the techniques of remote psychoanalysis can predict anything.

Figure 4-3 (Continued)

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

No. The results of the application of the technique may be susceptible to computerization (i.e., the Barber and Lasswell classification schemes could conceivably be incorporated in the development of goal trees).

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Yes.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Very high resource costs for relatively low credibility yield.
- (2) Danger of reductionism: relegating conscious human thought and decision-making to a secondary plane.
- (3) Multiplicity of theories serving as a basis for encoding data.
- (4) Lack of adequate sources of data for most subjects of interest.
- (5) Research design is essentially retrodictive: starts from a given event and seeks to explain its origin and meaning.
- (6) The "general" classification schemes used in some forms of remote psychoanalytic techniques may not be applicable to all cases; i.e., Barber's model is criticized for being inapplicable outside the 20th century United States.
- (7) Many psychoanalysts believe that the construction of an individual's basic psychological model without direct subject observation is contrary to the basic principles of psychoanalytic practice.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

The Central Intelligence Agency appears to have applied the technique in assessing the more volatile (i.e., psychoneurotic) political leaders of interest. The FBI has created psychoanalytic profiles of terrorists and hijackers, used by the CIA and by law enforcement agencies. DoD has made use of some forms of psychoanalytic technique, including Leites' work, in support of PsyOps and Civil Affairs.

of behavioral information as reflected in Section 6 on the following considerations:

- The state-of-the-art in the candidate techniques/ methodologies as indicated in Figure 4-4;
- the operationally-relevant considerations summarized in Figure 4-5. These relate to the type of information received from a technique/methodology and the type of access to the subject which is required; and
- the utility of the approaches and models in the AIA process.

Figure 4-4. The State-of-the Art in the Candidate Techniques/Methodologies

Name of Technique/ Methodology	What Information Does It Seek to Provide?	Stage of Development/ Apparent Validity	Problems and Limitations	Apparent Existing Government Agency Uses
Pulse rate measure- ment	See EKG (above)	Less accurate (valid) than EKG.	See EKG (above)	See EKG (above)
Biological tempera- ture measurement	Deviation from presumed normal biological tempera- ture	Highly developed, both through direct measurement and through chromatographic (i.e., remote) techniques. Minute changes require accu- rate baseline (i.e., assess- ment of "normal" temperature for target individual).	(1) Direct measurement is in- trusive and requires sub- ject cooperation. (2) Links between biological temperature and emotions, cognitive processes, and capabilities require fur- ther research.	NASA and HH have developed links between temperature and behavioral variables. No application to foreign decision-makers is known.
Genetic analysis	Origins of behavior, per- sonality characteristics, and capabilities in gene- tic inheritance. Some at- tempt has been made to ex- plain cross-cultural poli- tically-relevant behavior through genetic analysis, i.e., "instinctive" ag- gression.	Basic research in genetic analysis as applied to poli- tically-relevant traits is still in infancy and is ham- pered by alleged low valid- ity of research results.	(1) Difficult to precisely es- tablish genetic inheri- tance for most foreign decision-makers. (2) Links between genetic in- heritance and politically- relevant traits are poorly defined. (3) Research in this field re- sults in emotion-laden re- jection of findings due to "eugenics" issue.	None identified.
Computer-based phy- siological stimula- tion	"Working" model of human individual subject to vari- ous physiological and/or psychophysiological stress.	Highly experimental. Re- search is limited to a very few medical institu- tions with requisite com- puter capabilities.	Unknown.	Unknown, although there is indirect evidence that NASA may be involved in research.
Subjective, experi- enced based human judgment.	Virtually all information provided by the techniques and methodologies listed above, plus integrative capabilities.	Validity varies widely, de- pending on the personal characteristics of the analyst. Surprisingly lit- tle research in use of this technique, in light of its widespread acceptance.	(1) High resource costs. (2) Possibility of subjective biases. (3) Limitations on the ability of humans to absorb and process information unaided (4) Potential for insufficient validity checks. (5) Wide variation in analyst skills, training, and know- ledge may result in some variation in validity of results achieved.	Virtually universal in all national security agencies.

Figure 4-4 (continued)

Name of Technique/ Methodology	What Information Does It Seek to Provide?	Stage of Development/ Apparent Validity	Problems and Limitations	Apparent Existing Government Agency Uses
Diagnostic/Prognostic Analysis	Physiological state of target individual, including diagnosis of physiological condition and probable future physiological condition. Assessment of subject's biologically-determined capabilities, including estimates of future capabilities.	In existence for approximately 2500 years as an organized technique. Validity is highly variable, depending on the skill, training, and other personal qualities of the diagnostician.	Essentially involves varying degrees of educated "guessimates." More basic research needs to be performed to link physiological condition to decision-making, perceptions, probable courses of action, etc.	Widespread use in government although rarely, if ever, for analysis of foreign decision-makers.
EEG	Cognitive states of the target individual, including limited assessment of psychophysiological capabilities, including physiologically-based impairments.	Basic and applied research underway, with particular reference to evoked brain potentials.	(1) Research linking EEG to politically-relevant factors is still very limited. (2) Currently requires direct links to, and careful preparation of subjects. (3) Requires subject cooperation. (4) Relatively high (but decreasing) resource costs.	DARPA, the Air Force, and the FAA have sponsored research in the use and application of EEG-based techniques.
EKG	Heart activity.	Highly developed and apparently capable of high validity.	Links between heart rate and decision-making, emotional state, perceptions, etc. need to be clarified.	Extensive use by NASA, DOD, others for measuring stress and physiological impairment
Biochemical/pathological analysis	Physiological condition, emotional state, physiological prognosis, limited assessment of subject's biologically-determined capabilities.	Highly developed and apparently capable of high validity.	(1) Intervening variables have affect results. (2) Requires either obvious direct tissue sampling or less valid, resource-costly indirect sampling. (3) Most research has emphasized physiological and not behavioral effects of biological variation.	NASA uses full range of analysis but has expressed little interest in behavioral states. The CIA is known to have used such techniques applied to foreign decision-makers. Law enforcement agencies use some forms of biochemical analysis for investigation purposes.
GSR (Galvanic skin response)	Supposedly indicates stress and/or use of deception in subject individuals.	Although highly developed and in use for several decades, the validity of the technique is still questionable.	(1) Usually requires direct physical contact with subject and subject cooperation. (2) Has come under considerable criticism as unreliable for indications of both stress and deception.	Widely used in government for law enforcement and security purposes; also used by private industry for security purposes.

Figure 4-4 (continued)

Name of Technique/ Methodology	What Information Does It Seek to Provide?	Stage of Development/ Apparent Validity	Problems and Limitations	Apparent Existing Government Agency Uses
Long-range forecasting techniques	Long-range forecasts and politically-relevant trends; scenarios of possible future situations, events, and capabilities.	Although in existence for 25 years, validity is highly variable	See Appendix A	Used in several DoD agencies and among the services.
Graphology (handwrit- ing analysis)	Personality stereotypes and/ or "soft skill" capabilities of target individuals.	In existence for over 30 years with Graphoanalysis currently the most popular version. Validity is low to non-existent. Has not been adapted for Cyrillic and other non-Latin hand- writing.	(1) Culturally biased. (2) Not grounded in modern psychological theory. (3) Stereotypes used have low empirical validity. (4) Unclear how handwriting-- a conscious effort of image projection--provides hidden character traits.	An application to Latin hand- writing by a U.S. government agency a number of years ago produced inclusive results. Somewhat more definitive re- sults obtained independent by a foreign service based on its own tests reflected the situation less accurately than the U.S. findings.
Psychological Stress Evaluator (PSE)	Presence or absence of relative stress levels at the moment of oral presen- tation of material.	The PSE itself is "per- fected," but its capability of revealing significant data is in doubt. Psycho- physiological links have yet to be developed to ex- plain its rationale.	(1) No consensus as to what the presence of stress means in terms of decision-making, etc. (2) Encoding of data is very resource-costly. (3) Definition of what "high" & "low" stress means needs to be clarified.	DARPA has helped to fund re- search. The PSE itself was developed from research con- ducted at DIA, although it appears that DIA has not proceeded with PSE applica- tions.
Non-verbal behavior monitoring	Cognitive and emotional states and traits of in- dividuals (including the presence/absence of stress).	Basic research underway.	Too early to determine signifi- cant problems and limitations. Cultural biases in the interpre- tation of non-verbal behavior is recognized as a potential prob- lem.	Under development in 70's by Air Force and FSI.
Eye movement moni- toring (including gaze analysis).	Cognitive and emotional states of target indivi- duals; task-related capa- bilities.	Basic research underway, primarily since 1975.	Current technology requires use of cumbersome equipment and sub- ject cooperation for detailed monitoring; remote observation of gross eye movements produced less satisfactory results.	Major Government research and application appears concen- trated in the Air Force, NASA and the FAA.
Psychoanalytic tech- niques.	Same as remote psychoana- lytic techniques, above. Also reveals some task- related capabilities, i.e., potential security risks.	Has been used in both pre- dictive and retrodictive analysis.	(1) Practitioners are bound by oath to protect subject's privacy. (2) Requires subject coopera- tion. (3) Data can be interpreted differently by different coders.	Used by several agencies for review of personnel subject to high stress and/or privy to highly classified material.

Figure 4-4 (Continued)

Name of Technique/ Methodology	What Information Does It Seek to Provide?	Stage of Development/ Apparent Validity	Problems and Limitations	Apparent Existing Government Agency Uses
Elite commonality identification	Politically-relevant shared characteristics among mem- bers of decision-making elite, including common bio- graphic and career patterns.	Highly developed, high level of apparent validity (with use of quantitative verifi- cation) providing source ma- terial is accurate and suf- ficiently inclusive.	Provides only indirect inferences related to perceptions, probable courses of action, behavior, etc. (There is no certainty that all individuals who share identical or similar career patterns, educa- tional or cultural backgrounds, etc. will behave similarly.)	Unknown. Various agencies have sponsored research using this technique, par- ticularly for Soviet deci- sion-makers, but applica- tion of the research is not discussed.
Events data analysis	Patterns of event/behavior interaction useful for pre- diction and analysis.	Events data systems under development and/or in operation since the early 1960's. Retrodictive validity for many systems appears good; predictive validity varies.	(1) Traditional data sources are inadequate in coverage for Third World events. (2) Type of events covered varies considerably among systems, because selection of "impor- tant" events is often ad hoc or atheoretical. (3) Predictive capability has been questioned.	DARPA has been the princi- pal government sponsor of events data analysis re- search, in conjunction with the EWAMS project. NSF has also sponsored some research in this area.
Decision modeling/ decision-making simulation	Predictive and/or analytic models of bureaucratic or individual decision-making.	Under development and/or in operation since 1950. Increasingly complexity of the models/simulations appear to be yielding im- proved validity through application of automation to the simulation process.	(1) Model/simulation design tends to be highly idiosyncratic, depending on researchers' pre- ferences among decision theo- ries. (2) Tendency to treat irrationality as an extraneous variable. (3) High resource costs required for development.	Used in training and, to a limited extent, in re- search by DoD and the U.S. Department of State. In- creased use of automated aids has increased the use of decision-making models and simulations for plan- ning in DoD.
Quantitative analy- sis of secondary biographic sources	Consensus interpretations of well-known, adequately- researched decision-maker personality traits.	Very early development; has been discussed as a possi- bility but little research conducted as yet. Initial research appears promising.	(1) Requires adequate quantity and quality of independently-re- searched biographic sources. (2) Basically retrodictive. (3) Coding of material requires high resource investment. (4) Based on subjective, expert judgment of authors of sec- ondary biographic sources.	None

Figure 4-4 (continued)

Name of Technique/ Methodology	What Information Does It Seek to Provide?	Stage of Development/ Apparent Validity	Problems and Limitations	Apparent Existing Government Agency Uses
Cognitive mapping	Similar to operational code evaluation, but in greater depth and detail (e.g., includes obsessive and/or physiological factors affecting decision-making).	Currently an eclectic collection of techniques; in effect, each researcher has an idiosyncratic definition of what constitutes "cognitive mapping." Consequently, overall validity cannot be determined.	(1) Poorly-defined, except in terms of a "whole man" approach to cognitive processes. (2) Eclectic nature of technique leads to considerable variation in results obtained.	None, except that CIA contacts have indicated limited agency experimentation with this approach.
Personality profiles (including actuarial analysis)	Inferences on politically-relevant personality and biographical traits, for individuals and elite groups, including life expectancy (i.e., estimate of foreign elite group turnover).	Highly developed and in widespread use; validity is dependent on quality of information sources.	(1) Often based on subjective impressions, unsupported by empirical data. (2) Variation in operational design leads to a lack of comparability between profiles. (3) Lack of agreement as to what constitutes "politically-relevant" traits.	Used extensively throughout the national security community, including DIA, CIA, U.S. Department of State, NSC staff, etc.
Survey data-based techniques (other than PAT, soft skill, and other standardized tests)	Same as all techniques cited above, depending on content of survey instrument.	Survey instruments are in active use within the US, but apparent validity varies widely among specific instruments. Many survey instruments appear to be poorly designed in the sense that they are culturally biased or otherwise produce invalid results.	(1) Requires cooperation of target individual or group, or sample of target group. (2) May be flawed by inherent biases (i.e., questions in survey instrument may be invalid or subject to widely varying respondent interpretations. (3) Lack of agreement as to what constitutes significant traits that can be accurately ascertained through surveys.	USICA uses survey methodology for foreign audience analyses, and Department of Commerce (Bureau of Export Promotion) uses survey on potential foreign customers. In both cases, foreign government permission is a prerequisite. USICA also uses unsystematic "audience response" surveys for Soviet bloc audience analysis.
PAT, soft skill, and other standardized tests.	Respondent capabilities, including personality traits related to specific job performance.	Highly developed. Validity of many standardized tests has recently come under severe criticism (especially those tests developed by ETS and supplied to the national security community with inadequate explanation for test instrument design).	Same as for other survey data-based techniques (above).	Extremely widespread application throughout the national security community.

Figure 4-4 (continued)

Name of Technique/ Methodology	What Information Does It Seek to Provide	Stage of Development/ Apparent Validity	Problems and Limitations	Apparent Existing Government Agency Use
Thematic Content Analysis	Inferences on the beliefs and issues dominating the atten- tion and interest of decision- makers, both as individuals and as collective decision- making groups.	One of the oldest forms of content analysis; known prob- lems of validity resulted in development of new (supplemen- tary or replacement) forms of content analysis.	(1) Availability of material to analyze. (2) Classification of content by themes often subjective. (3) Repetition of themes in con- tent dependent on situational context. (4) Question of whether repeti- tion of themes adequately indicates importance of theme to the decision-maker(s).	Currently or recently in use for analysis of foreign propaganda by USICA, State Department, other agencies. Also applied in "kremlinol- ogy" and similar analyses by several agencies.
Symbolic Content Analysis/Para- linguistic Analysis	Inferences on the beliefs and issues dominating the atten- tion, interest, and emotions of individual decision-makers.	Relatively new; basic re- search on symbolic value and paralinguistic inferences of verbal content still in pro- gress.	(1) Availability of material to analyze (particularly oral material for paralinguistic analysis). (2) Uncertain validity and pay- offs when applied to foreign cultures and languages. (3) Difficulty of obtaining accu- rate symbolic interpretation relevant to foreign cultures, including translation prob- lems.	Currently in use to a very limited extent by USICA and the Foreign Service Insti- tute.
Value Analysis/ Operational Code Identification	Inferences on values and/or consistent perceptions held by decision-makers.	In use for roughly 10 years; research reports indicate relatively high validity for operational code research but less validity for speci- fic forms of value analysis.	(1) Availability of material to analyze. (2) Classification of material is often subjective. (3) Expression of values and/or perceptions in content depen- dent on situational context. (4) One form of value analysis-- the Rokeach scale--employs a cross-cultural classification scheme of doubtful validity.	Studies of the validity and potential application of these techniques have been funded by several agencies, including DARPA and NSF. Operational use has not been determined.
Remote Psycho- analytic Techniques	Inferences on the genesis of the dynamics of politi- cal behavior, usually for the individual but occa- sionally for a culture as a whole.	Has been fairly extensively applied in a retroactive fo- cus, as in psychohistory. Has occasionally been used to link psychosomatic symptoms to political decisions.	(1) Data can be interpreted dif- ferently by different coders (analysts). (2) Required thoroughness and ac- curacy of data frequently un- obtainable for foreign tar- gets. (3) High resource costs yield low credibility due to multipli- city of theories. (4) Retrodictive nature; other factors limit credible appli- cations.	CIA appears to have used it for some (probably psy- choneurotic) political leaders; FBI and CIA have used it for counterter- rorism; DoD has also used, usually for groups in sup- port of PSYOPS and Civil Affairs.

Figure 4-5. Operationally Relevant Considerations Applicable to Methodologies/Technique

<u>METHODOLOGIES/TECHNIQUES</u>	<u>TYPE OF INFORMATION PRODUCED*</u>	<u>TYPE OF ACCESS REQUIRED*</u>
<u>Verbal - Primary Sources</u>		
Content analysis:		
Thematic content analysis	Cog	RV
Symbolic content analysis/paralinguistic analysis	Cog	RV
Value analysis/operational code identification	Cog	RV
Cognitive mapping	Cog	RV
Personality profiles, including actuarial analysis	p ² p ₀	RV
Remote psychoanalytic techniques	p ² p ₀	RV
Subjective, experienced based judgement	Cog, p ² p ₀	RV
<u>- Survey Data</u>		
Survey-based content and biographical analysis	Cog, p ² p ₀	PCSC
Audience survey analysis	Cog	PCSC
PAT and other standardized test analysis	Cog, p ² p ₀	PCSC
PAS	Cog	PCSC
Soft skill tests	Cog	PCSC
<u>Verbal - Secondary Sources</u>		
Elite commonality identification	Cog	RV
Events data analysis	Cog, p ² p ₀	RV
Decision modeling/decision-making simulation	Cog, p ² p ₀	RV
Quantitative analysis of secondary biographic sources	Cog, p ² p ₀	RV
Long range forecasting	Cog	RV
Subjective, experienced based analysis	Cog, p ² p ₀	RV
Supplementation of other techniques, especially those associated with verbal and statistical content	Cog, p ² p ₀	RV
<u>Nonverbal/paralinguistic</u>		
Handwriting analysis (graphology)	Cog, p ² p ₀	PCSC
Psychological Stress Evaluator (PSE)	p ² p ₀	RV, PV
Non-verbal behavior monitoring	Cog, p ² p ₀	RO, PNC
Eye movement monitoring	Cog, p ² p ₀	RO, PNC, PCSC
Psychoanalytic techniques	Cog, p ² p ₀	RV, RO, PNC
Subjective, experienced based judgement	Cog, p ² p ₀	RV, RO, PNC
<u>Non-recorded Data</u>		
Subjective, experience based judgement	Cog, p ² p ₀	All
<u>Physiological Measures, Proximate</u>		
Diagnostic/prognostic analysis	p ² p ₀	PNC, PCSC
EEG (electroencephalogram)	Cog, p ² p ₀	PCSC
EKG (electrocardiogram)	p ² p ₀	PCSC
Biochemical/pathological analysis	p ² p ₀	PNC, PCSC
GSR (galvanic skin response)	p ² p ₀	PCSC
Pulse rate measurement	p ² p ₀	PCSC
Biological temperature measurement	p ² p ₀	PCSC
<u>Physiological Measures, Remote</u>		
Videotape monitoring	p ² p ₀	RO
Diagnostic/prognostic analysis	p ² p ₀	RO
Genetic analysis	p ² p ₀	RO
Computer-based physiological simulation	p ² p ₀	RO
Subjective, experience based judgement	p ² p ₀	RO

*Legend: Cog = source of cognitive information; p²p₀ = source of psychophysiological or other information.

**Legend: RV = remote, verbal access required; RO = remote, other than verbal; PNC = proximate, non-contact access required; PCSC = proximate contact or subject cooperation required.

SECTION 5

INTERFACE WITH HUMAN EXPERTISE AND OTHER

RELEVANT RESEARCH REQUIREMENTS

SECTION 5

INTERFACE WITH HUMAN EXPERTISE AND OTHER RELEVANT RESEARCH REQUIREMENTS

5.0 GENERAL

This section is concerned with three different kinds of additional research requirements:

- The technology transfer issues involved in the ABI Project, particularly the psychological problems involved.
- Development of baseline capabilities applying to the use of subjective, experience-based judgment in all relevant methodological areas.
- Indication of a number of specialized activities in which the various ABI developed techniques may be of particular benefit.

5.1 TECHNOLOGY TRANSFER

The CP³ study cited earlier devotes considerable discussion to pointing out various constraints on the capability to develop user product satisfaction with ABI products. The more relevant of these constraints may be summarized as follows:

- The national decision-maker must be convinced that there is a practical use in the relevant environment for any new information provided by ABI. The decision-maker must also be convinced that the ABI-provided information will permit him to do his job more effectively; and must feel confident that he (she) understands and can accept the assumptions and perceptions involved in producing that information.

- The analyst or staff officer supporting the national decision-maker, in order to support the development and use of ABI techniques and information, must feel that, in addition to satisfying the concerns of the decision-maker, the ABI-provided information is easily used by the analyst. Further, to even greater depth than the decision-maker, the analyst must understand and be able to accept the assumptions and perceptions involved in producing that information.

Based on the perceived potentially critical problem of ensuring product acceptability, the CP³ study went on to recommend specific addressal of technology transfer issues, particularly the psychological and bureaucratic aspects thereof. It has become apparent that, as the AIA process and other elements of the eventual ABI system are developed, they must be designed in accordance with an understanding of the psychological aspects of technology transfer. Otherwise, for both the analyst and the decision-maker, ABI techniques are not likely to appear as the friendly "arm in arm" helper portrayed in Figure 1-1. Consequently, the psychological aspects of technology transfer for ABI need to be addressed early, and the results used in ABI technique development.

5.2 DEVELOPMENT OF BASELINE CAPABILITIES OF INTUITIVE, EXPERIENCE-BASED JUDGMENT.

In Section 4, the use of intuitive, experience-based judgement was noted as a technique under use of verbal primary and secondary sources, nonverbal/paralinguistic techniques, use of nonrecorded data, and use of remote physiological measures. It is the way operators - and often academicians - have analyzed information since time immemorial, even when alternative methods existed. It is necessary to establish a baseline in terms of the capabilities of intuitive, experience-based judgement, expressed by analysts and decision-makers in order to establish

the validity of new, complementary methods for purposes of facilitating acceptance by potential users and to avoid wasting effort on developing tools which perform at best no better than unaided subjective judgements. There is no point in continuing development of an ABI technique which is limited to 75% accuracy if unaided subjective judgement in addressing the same problem also gives 75% accuracy. It is possible that proper assessment of the capabilities of subjective judgement may find that it can complement other procedures in a synergistic fashion. Thus, the baseline capabilities of subjective judgement to process cognitive information, verbal and nonverbal, and other types of information as appropriate, needs to be developed in terms of the types of individuals who are analysts and decisionmakers. These are individuals who have self-selected for these careers, who have been trained in them, and who have been further selected based on performance over the course of their careers. Because these individuals are, by selection, training, and environmental conditioning, different from the average college student who is the subject of many studies, the baseline capabilities for the subjective judgement process need to be determined using current or past analysts and decisionmakers as subjects.

5.3 SPECIALIZED APPLICATIONS

The AIA Process discussed in Sections 1 and 3 addressed the principal focus of the ABI Project -- the prediction and explanation of foreign decision-maker perceptions and probable courses of action. There are, however, a number of other special types of intelligence activities in which ABI techniques can be particularly useful.¹ These activities and potential applications of ABI techniques to them, are summarized below. These applications are considered along with those

¹For further discussion of such activities, see the CP³ study.

in the preceeding sections of this report in determining the structure of the research design as expressed in the list of priority projects in Section 6.

5.3.1 Prediction and Explanation of Interactions Among Groups of Nations.

The AIA process addresses perceptions and probable courses of action at two levels of analysis -- for individuals and groups of individuals. Also of interest at a still higher level of analysis are interactions among nations -- the projection of probable outcomes of interactions in given situations. Harold Guetzkow's INS-II² simulation has been automated in a version called SIPER (Simulated International Processer) which uses characteristics of each of a group of nations (and of their decision-makers) involved in a given situation to project outcomes. It appears that considerable utility would be gained by taking sets of specific-decision maker characteristics which have known frequencies of accurate prediction in retroactive analyses employing the AIA process and using these characteristics in a suitable adaptation of SIPER. The resultant capability of explanation and prediction could significantly improve national capabilities to explain and anticipate outcomes of potentially troublesome international situations.

5.3.2 International Negotiations.

Negotiations are a frequent and vital activity which can use not only the comprehensive, near real time output projected for the first and second phases of ABI automation, but also can make particularly good use of certain of the non-verbal techniques if they live up to their

²Interactive Simulation of an International Political System

promise. For example if nonverbal behavior monitoring can demonstrate a capability under operational conditions to provide significantly better information concerning individuals than experienced negotiators can derive based on observation and judgement, then nonverbal behavior monitoring can become a particularly important information-gathering tool in negotiations, as well as being of use in general information-gathering from suitable targets. Other techniques such as eye movement monitoring and the PSE (or other stress detection techniques) hold similar promise.

5.3.3 Influencing Foreign Individual and Group Perceptions.

Almost everything done by U.S. individuals and groups in the national security establishment has an impact on the perceptions of the US by foreign individuals and groups. There are certain activities, however, which are targeted specifically at influencing those perceptions in specific ways. Two such activities are the practice of deliberately "signalling" intentions and perceptions by designated US policy-makers or agencies, (perception management--pm) and psychological operations (PSYOPS). These two activities provide examples of how ABI techniques may be useful in influencing foreign individual and group perceptions.

5.3.3.1. PM. This activity, which is designed to influence decision-makers, received considerable prominence during the 1960's in conjunction with the conflict in South Vietnam. PM is a responsibility of plans and operations type personnel, approved by the pertinent policy/decision-maker, supported by intelligence and counterintelligence agencies. It has been of concern currently in terms of attempts to stimulate or inhibit certain actions by the Soviet Union with respect to situations such as Afghanistan.

The effective development of the ABI capabilities discussed in the preceding sections should provide a major enhancement of the US ability to comprehend signals transmitted by other governments, and to design and evaluate the effectiveness of signals transmitted by the US Government abroad. In this context, the ABI project can have significant implications for policy-making operations, intelligence, and counterintelligence elements at virtually all levels of the national security structure. Of comparable importance the detection and conversion to US advantage of foreign attempts at perception management directed against the US represents the opposite side of the coin to the use of the ABI in perception management by the United States. The ability to signal accurately and convincingly depends first of all upon understanding the individual or group to whom you are signalling -- their perceptions prior to the signalling activity, the way in which they interpret actions, and their reactive tendencies.³ In addition to information on perceptions and goals provided by the AIA process, it appears that it would be particularly useful to concentrate on providing capabilities such as:

- an ability, using verbal or nonverbal techniques, assess reactions of foreign individuals (for example, using non-verbal monitoring, to detect evidences of contempt, disbelief, or acceptance in individuals);
- an understanding of foreign ABI type techniques (as discussed in subparagraph 5.3.4) permitting signals to be designed to convey perceptions to the foreign power through his own intelligence gathering apparatus in a convincing and accurate manner;
- development of foreign actor audience simulations (see subparagraph 5.3.6) to help analyze possible reactions to attempts to send signals;

³For example, if Russians, as part of their culture, are conditioned to look upon compromise as a sign of weakness, it would be very easy in attempting to transmit a perception of the US as strong and determined, but reasonable, to instead transmit a perception of the US as weak.

5.3.3.2. Psychological Operations (PSYOPS) The potential for use of ABI technique in PSYOPS, an age old discipline applied more broadly against foreign populations or elements thereof, is twofold:

- o techniques which help us to understand the perceptions and goals of foreign individuals and groups can be used to improve analysis of target audiences.
- o techniques which help us signal intentions and perceptions can be used to help in the framing and delivery of the PSYOPS message.

5.3.4 Counterintelligence and Security Applications

ABI techniques of particular interest for counterintelligence and security activities, but equally relevant to many intelligence activities, appear to be those having to do with monitoring cognitive states and recruiting human resources. These techniques, include nonverbal monitoring and both remote and proximate psychophysiological techniques. If they achieve their full potential, they may be able to give indications that individuals are under stress, dissembling, or in any other manner conveying information relating to, or providing a basis for inferences concerning the individual's cognitive state in a manner that may be at variance with their verbalizations. Also of interest are techniques involved in recruitment of human resources--by us or by foreign powers--as discussed in the next subparagraph, and for improving existing procedures for assessing, developing, training handling and testing HUMINT and counterintelligence-related personnel, including sources.

5.3.5 Recruitment of Human Resources.

Techniques indicating information concerning individuals which is at variance with their verbalizations is of course of use in recruitment of human resources, just as it is useful for intelligence and counterintelligence activities. Applications could include screening perspective employees, selection of personnel for agent or other specialized activities, and screening and testing emigres and defects. In addition, information concerning foreign individual traits, goals, and perceptions gained through the AIA process may be helpful for recruitment of certain foreign individuals.

5.3.6 Foreign Actor Simulation (Including RED⁴ Forces).

RED Force simulation is a normal practice at present, in varying degrees of sophistication and accuracy. Currently it is practiced primarily for military forces. Such simulation can be enhanced by addition of information concerning the characteristics of potential adversary forces, such as is anticipated as a result of operational use of ABI-developed techniques. In addition, particularly through the use of the AIA Process, and the potential extension of it through the use of the SIPER model discussed in paragraph 5.3.1, it is expected that foreign actor simulation at the level of foreign politico-military decision-making individuals and groups, and at the national level, can be made much more sophisticated and accurate, hence become more widely and profitably used.

5.3.7 Other Types of Specialized Activities. ABI outputs will be useful in many types of activities (e.g. crisis management, and counterterrorism), which could be listed along with negotiation, PSYOPS, and the other specialized activities listed above. The ones listed suffice, however, to illustrate the range of application of ABI techniques.

SECTION 6

PRIORITIZED, SCHEDULED LIST OF RESEARCH TASKS

SECTION 6

PRIORITIZED, SCHEDULED LIST OF RESEARCH TASKS

6.0 APPROACH TO DEFINING, PRIORITIZING, AND SCHEDULING, RESEARCH TASKS.

This section defines in priority the research tasks to be performed as part of the ABI Project, then indicates the first year effort based on these tasks, and the multiyear approaches to be used to bring them to fruition.

6.1 RESEARCH TASKS IN PRIORITY ORDER

Priority 1 Development of the AIA Process (short title - AIA Process).

This involves the following subtasks:

- A. Continued development of the POLITICS model, followed by tailoring of this model and supplementation as required to meet the detailed specifications for AIA software as discussed below.
- B. Assessment of the following techniques from Figures 4-2 and 4-5 and of any other techniques nominated by potential user agencies and not covered by the subtasks. This assessment will determine the utility of these techniques in constructing goal trees, providing personality traits, and otherwise furnishing relevant input elements of the AIA software (based on the POLITICS model); and, concurrently, their utility in meeting any of the special research requirements cited in Section 5:

Content analysis of verbal primary sources:

Thematic content analysis
Symbolic content analysis/paralinguistic analysis
Value analysis¹/operational code identification

¹Preliminary work on this subject is being accomplished in the current fiscal year.

Cognitive mapping

Personality profiles, including actuarial analysis

From verbal secondary sources:

Elite commonality identification

Quantitative analysis of secondary biographic sources

Survey data of all types (including testing)

This assessment is to be followed by adaptation for use in the AIA process of those techniques, elements of techniques, modifications of techniques, or combinations of techniques determined to be useful.

- C. Development of detailed AIA software specifications based on utilization of the POLITICS model modified to:

Perform all operations involved in all aspects of the AIA process.

Automate the techniques described in the preceding subtask as appropriate.

Accept inputs developed under, and produce outputs required by other, lower priority tasks.

Optimize interactive computer assistance to the human analyst and decision-maker.

- D. Development of AIA software to the above specifications, and concurrent development of accompanying human procedures.
- E. Integrated with the above subtasks, to the maximum extent possible from the beginning, testing of the techniques and software against the "Mr. X's" and "Group X's" specified in Section 2, starting the first year with Qadhafi and the Soviet Politburo.

The assignment of Priority 1 to this task is based on:

- the centrality of the AIA process in the ABI objective system as described in Section 1;
- the degree to which its outputs stand on their own in meeting the objectives of the ABI Project;
- the wealth of source material which the AIA Process can use;
- the importance of the AIA process in providing inputs or context for the techniques developed in other research tasks;
- the ability to take advantage of ongoing research on the POLITICS model, on value analysis, and to adapt various existing techniques for use within the context of the POLITICS system.

Priority 2 Development of Nonverbal/Paralinguistic Measures to supplement the information gained through verbal sources (short title Nonverbal Paralinguistic). This involves the following subtasks:

- A. Assessment of the following techniques from Figures 4-2 and 4-5 to determine their utility in providing inputs to the AIA Process, and in meeting the special research requirements cited in Section 5.

(Not included is the Psychological Stress Evaluator, which is the subject of a separate research task.)
Non-verbal behavior monitoring
Eye movement monitoring
Pupilometry and other related techniques
- B. Continued development of non-verbal behavior monitoring (which has already indicated sufficient potential utility if it achieves its promise to warrant development concurrent with a fuller assessment of its potential role).

- C. Development or, as appropriate, adaptation in a form suitable for ABI purposes, of all of the techniques listed in A above which are found to have significant utility in meeting the requirements of the AIA Process or of the special research requirements of Section 5.

The assignment of priority 2 to this task is due to its potential ability to provide critical information concerning context for information obtained through verbal analysis, not only in suitable circumstances for the AIA process, but also in special uses, particularly in negotiations; and due to the ability to take advantage of currently ongoing research.

Priority 3 Development of Baseline Capabilities of Subjective, Experience - Based Human Judgment. (short title - Human Judgment)

This involves the following subtasks:

- A. Determination of those techniques addressed in other research tasks which perform functions which can also be performed by analysts and decision-makers using trained, experience-based human judgment.
- B. Determination of the accuracy and resource costs of analysts performing those functions:
- C. Determination of techniques for which experience-based human judgment comprises a supplement capable of producing synergistic improvements in performance.
- D. Development of means for incorporating trained, experience-based human judgment both synergistically and directly, where its demonstrated effectiveness warrants, in meeting the requirements of the AIA Process; and of using it synergistically with other ABI techniques in meeting the special research requirements of Section 5.

The assignment of priority 3 to this task is based on:

- The inutility of developing means to supplement or replace analysis based on human judgment unless those

means demonstrably produce a significant improvement in results;²

- The expectation that in many cases a synergistic effect is likely to produce better results for the combination of experience-based human judgment and other techniques than for either alone;
- The fact that, while most social science testing is done with college students due to their ready availability and other factors, there is a demonstrable difference between such students and career personnel in the national security establishment³ a difference logically biased in favor of significantly higher performance in relevant tasks on the part of analysts and decision-makers.

Priority 4 Input to the AIA Process from Existing Automated Forecasting and Indicator models (short title-Forecasting/Indicator Models).

This involves the following subtasks:

- A. Assessment of the following techniques from Figures 4-2 and 4-5 to determine their utility in providing inputs to the AIA Process and in meeting the special research requirements of Section 5:
 - Events data analysis (e.g., EWAMS)
 - Decision modeling/decision-making simulation
 - Long range forecasting
- B. Adaptation for ABI purposes of all of the techniques listed in A above which are found to have significant utility in meeting the requirements of the AIA

²With respect to the two preceding research tasks in terms of priority, and with respect to all tasks with respect to first year effort (paragraph 6.2), a judgement has been made in terms of disruption of ongoing work and probability of payoff that it is more cost effective to have them going on concurrently with or in advance of this research task than to halt them pending its outcome.

³See discussion in paragraph 5.2 of this document, and paragraph 2.2.1.2 of the CP³ study.

process or in meeting the special requirements cited in Section 5.

The assignment of priority 4 to this task is based on:

- The existence of several advanced automated programs involving these techniques and developed through DARPA sponsored research;
- A perceived high potential for supplementing other inputs with this type of information, particularly in terms of providing information in response to templating requirements in the AIA Process.

Priority 5 The Use of Automation in Analyzing Interactions Among Nations (short title International Interaction Analysis). This involves the following subtasks:

- A. Assessment of the SIPER model (paragraph 5.3.1) to see if it (or any logical competitor) can provide significant improvement in explanation and prediction of international interactions using inputs as to national individual and group decision-maker characteristics from the AIA Process (or, pending its evolution, the POLITICS model upon which it is to be based).
- B. Assuming a positive assessment resulting from the preceding task, adaptation of SIPER to use outputs from the AIA Process and otherwise as may be required to make it effective in an ABI role.

The assignment of priority 5 to this task is based on the potential contribution that the successful accomplishment of the task could have in enhancing the overall value of the ABI system, of which it would be a part. It does not have a higher priority due to lack of previous involvement with the project, and consequent uncertainty as to its feasibility.

Priority 6 Technology Transfer This involves the following subtasks:

- A. Develop means of conveying to the potential user communities the substance of what the

ABI project is all about (an initial version of this is being developed currently; it will need updating as the project progresses).

- B. Develop from potential user viewpoints, specific design criteria applicable to ABI techniques which will:
 - enhance technique credibility
 - enhance the ease with which techniques can be used
 - enhance user perceptions of individual technique and overall system utility(in other words, which will help users to perceive the ABI contributions as constituting the friendly "arm in arm" helper of Figure 1)
- C. Coordinate with all groups performing ABI research to ensure use of the criteria developed in B above.
- D. Coordinate closely with user points of contact to ensure that the results of subtask B represent their viewpoints, solve their problems.

The assignment of priority to task 6 is based on the critical need for users to understand ABI techniques easily, and use them willingly if these techniques are to achieve their full potential.

Priority 7 Measurement and Attribution of Stress (short title - Stress Interpretation). This involves the following subtasks:

- A. Assess the probability that in the next 5-10 years measurement of stress can be accomplished in terms of consistent, accurately definable levels which can be linked to empirically verifiable impacts on individual performance, and which are measurable in sufficiently small increments to make stress measurement a useful tool in predicting behavior in the ABI environment.
- B. Assess the probability that it will be possible in the next 5-10 years to attribute stress causation accurately in terms of the factors likely to be impinging on the targets of ABI information acquisition activities.

- C. If either of the above assessments is positive, pursue the potentials uncovered for use with ABI nonverbal indicator techniques which have the potential for indicating stress.

The assignment of priority to task 7 is based on:

- The importance of stress in nonverbal indicator systems such as the PSE;
- the apparent lack of a capability to convert stress measurements into impacts on behavior except at the extremes (e.g., for clear stress overload, evidenced by the behaviors which we wish to anticipate);
- the multiplicity of factors (personal, physical, political, organizational, psychological, and other) which, under normal conditions, could operate to cause stress.

Priority 8 The Use of the Psychological Stress Evaluator (short title - PSE). This is listed as a separate research task from the priority 2 research task, Nonverbal/Paralinguistics, because it is a separate ongoing project. It involves the following subtasks:

- A. Based on results to date, provide a realistic assessment of the possibilities of:
- improving the validation of the basic phenomenon involved (including the meaningful measurement of stress levels).
 - meaningful interpretation of the results, given the many factors which can cause stress in an individual at any given time
- B. Based on the results of the preceding assessment, and on progress in the preceding research task, develop the use of the PSE in terms of its potential input to the AIA process and to the

special research requirements of section 5.

The assignment of priority to task 8 is based on:

- the high potential for making a unique contribution which PSE would have once adequately validated as a scientific phenomenon and subject to meaningful interpretation;
- the current difficulty with gaining wide-spread acceptance of the PSE as scientifically sound.
- The difficulty in determining what PSE readings mean in terms of stress levels (see also the preceding research project), and in nonspeculative attribution of the cause of the stress apparently indicated by the PSE.

Priority 9 Integration of Physiological (including Psychophysiological) Information into the ABI Processes (short title - Use of Physiological Information).

This consists of the following subtasks:

- A. Assessment of all of the means of obtaining physiological (including psychophysiological) information cited in Figures 4-2 and 4-5 to determine which ones are most usable to obtain information affecting behavior of interest in the ABI System.⁴
- B. Develop means for integrating this information into the AIA Process, the special uses discussed in Section 5, and into phase 2 of the objective ABI System.

⁴Some intelligence related applications exist at present, but these are not central to the techniques discussed for obtaining behavioral information on foreign decision makers.

- C. The monitorship of research in such physiological (including psychophysiological) areas as EEG, where progress has not reached a point where cognitive applications useful in the ABI System are imminent, but in which at some time there may be progress which will make it useful.

Priority 10 Development of Phase II of the ABI Objective System, an Automated System Built up from the AIA Process, and Integrating all Relevant Intelligence Information, Servicing all Relevant Users (short title - ABI Phase II Objective System). This ABI Phase II Objective System is indicated in Figure 1-3 and discussed briefly in Section 1.4.1. The purpose of this research task is to integrate existing intelligence data and techniques along with ABI research tasks to provide in one system:

- The AIA Process;
- A common repository of all relevant data bases accessible to all legitimate users (with individual analysts having their own limited access adjunct data material they are not yet ready to introduce to common access);
- Unique analytic procedures tailored to meet the requirements of special uses such as those discussed in Section 5.

The assignment or priority to this last research project is based not on importance -- it is the eventual capstone to the whole edifice -- but on sequencing. It is built upon the results of other research tasks, hence will be initiated later than the others.

6.2 FIRST YEAR TASKS AND MULTIYEAR APPROACHES.

The listing of first year tasks and multiyear approaches based on the research tasks of the preceding paragraph is accomplished in Figure 6-1.

Figure 6-1. First Year Tasks and Multiyear Approaches.

<u>Research Task</u>	<u>Priority</u>	<u>First Year Effort¹</u>	<u>Multiyear Approach</u>
AIA Process	1a	Continued development of the POLITICS model.	Continued development and modification of the POLITICS model progressively over several years to meet the detailed AIA software specifications.
	1b	Initial testing of the POLITICS model using Qadhafi and the Soviet Politburo.	Continued testing of the AIA Process as it evolves against Qadhafi and the Soviet Politburo until relatively optimal results are achieved. Subsequent testing with other Mr. X's, Group X. (2-3 years).
	1c	Further selection and continued adaptation for use in the AIA process of verbally based analysis techniques for production of relevant inputs.	Continued adaptation of verbally based techniques for use in the AIA process completed within one additional year.
	1d	Development of detailed AIA software specifications.	Development of the model to meet all of the AIA software specifications, and to provide a data base sufficient to test all of the specified Mr. X's and Group X's. When satisfactory results have been demonstrated, commence actions required to transfer to interested users.

¹In all cases, first year effort includes development and validation of initially-applicable gate hypotheses, including those relevant to prior work for research tasks which are continuations of ongoing efforts.

Figure 6-1 (Continued).

<u>Research Task</u>	<u>Priority</u>	<u>First Year Effort</u>	<u>Multiyear Approach</u>
Nonverbal/para- linguistic •	2a	Continued development of nonverbal behavior monitoring to include testing against Mr. X's.	Complete development of non-verbal behavior monitoring and adapt technique to use with AIA Process and/or special research requirements.
	2b	Assessment of ABI potential of other nonverbal behavior techniques.	Develop other nonverbal techniques (if any) found to have high potential for use. When satisfactory results have been demonstrated, commence actions as required to transfer to interested users.

Human Judgment	3	Development of baseline capabilities of subjective, experienced-based human judgment as permitted by state of development of proposed ABI approaches.	Completion of first year effort as dictated by resource constraints; obtaining of baseline with respect to new approaches (if any) not identified in testable form until after the first year.

Forecasting and Indicator Models	4	Assessment of the techniques and commencement of their adaptation to the AIA process if appropriate.	Continuation, if appropriate, of the adaptation of these techniques to the AIA process.

International Interaction Analysis	5	Initial assessment of the SIPER model's suitability for international interaction analysis in conjunction with output from the AIA process (minimum effort).	Adaptation of the SIPER (or other superior model) to work in conjunction with the AIA process to provide an int'l interaction analysis capability.

Figure 6-1 (continued).

<u>Research Task</u>	<u>Priority</u>	<u>First Year Effort</u>	<u>Multiyear Approach</u>
Technology transfer	6	Initial assessment of the problem at a low level of effort designed to isolate time sensitive problems and resolve them.	Completion of the necessary studies to provide for effective technology transfer. Basic study of the psychology of technology transfer followed by adaptations as required to transfer specific items of technology.
Stress interpretation	7	Initial assessments as to whether significant advances are possible in this area, at a low level of effort.	If significant advances are possible, pursuit of appropriate studies in this area.
PSE	8	Low level effort to establish what use can realistically be made of the work to date, after consideration of the results of evaluation of gate hypotheses.	If the phenomenon is adequately established and a capability for stress interpretation warranting further PSE studies is developed, pursue to the economic limits of the technology. When satisfactory results have been demonstrated, commence actions required to transfer to interested users.
Physiological Information	9	No first year effort other than minimal monitoring of the field.	Accomplishment of the necessary studies, evaluate development and permit use of promising techniques.
Phase II Objective System		No effort the first year	Develop over a 5-year period.

APPENDIX A

APPENDIX A
SUMMARY ASSESSMENT OF ABI CANDIDATE BEHAVIORALLY-RELEVANT
TECHNIQUES/METHODOLOGIES

1.0 GENERAL

The following is a summary assessment of ABI candidate behaviorally-relevant techniques/methodologies, based primarily on an examination of recent literature for each technique or methodology considered, supplemented with interviews of research and research administration personnel where appropriate. It should not be regarded as a comprehensive or (necessarily) authoritative appraisal of each technique; rather, the summary assessments highlight identified advantages and disadvantages of the techniques within the ABI context. The inclusion of a particular technique or methodology in this section does not constitute recommendation of the use of the technique or methodology, or its further development under asupices.

2.0 EXCLUDED TECHNIQUES/METHODOLGIES

Several techniques and methodologies discussed in Section 4 of the Research Design have been excluded from the detailed summary assessments which follow. The coverage of these techniques in table 4-4 of the basic report is considered to provide sufficient relevant information. These techniques are:

Events Data Analysis
Personality Profiles
Diagnostic/Prognostic Analysis
GSR
Subjective, experienced-based human judgment.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Content analysis/Operational Code Research

CITES

Leites (1951) *The Operational Code of the Politburo*. Berelson (1952) *Content Analysis in Communication Research*. Gerbner et al. (1969) *The Analysis of Communication Content*. Holsti (1969) *Content Analysis for the Social Sciences and the Humanities*. George (1969) "The 'Operational Code': A Neglected Approach," *International Studies Quarterly*. Rokeach et al. (1970) "A Value Analysis of the Disputed Federalist Papers," *Journal of Personality and Social Psychology*. Holsti (1970) "The Operational Code Approach to John Foster Dulles' Philosophy and Instrumental Beliefs," *Canadian Journal of Political Science*. Rokeach (1973) *The Nature of Human Values*. Frank (1973) *Linguistic Analysis of Political Elites: A Theory of Verbal Kinestics*. Hermann (1977) *A Psychological Examination of Political Leaders*. Marvick (1977) *Psychopolitical Analyses: Selected Writings of Nathan Leites*. Holsti (1977) *The Operational Code as an Approach to the Analysis of Belief Systems: Final Report to the National Science Foundation*. Heath and Fogel (1978) "Terminal and Instrumental: An Inquiry into Rokeach's Value Survey," *Psychological Reports*. Lasswell (1976) *Values and Development: Appraising Asian Experience*. Hopple (1978) *Mapping the Terrain of Command Psychophysiology*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Coding of content of written and/or verbal statements (including questionnaire responses, where applicable) according to a coding system relevant to the type of analysis performed, quantitatively or (in some coding schemes) qualitatively assessing the weight which the respondent consciously or unconsciously gives to various words, phrases, values, or concepts.

The operational code technique uses a construct devised by George to code content of verbal material according to a series of questions about the subject's politically-relevant beliefs. Additionally, some researchers have attempted to use the approach to code policy actions and/or nonverbal behavior.

A major assumption in all of these techniques is that statements by a subject reflect the psychological traits and/or states of the subject personally; a second major assumption is that beliefs, perceptions, values, operational codes, etc. provide a major basis for determining behavior. These assumptions are both open to some question and debate.

HOW HAS THE TECHNIQUE BEEN APPLIED?

Considerable variation, from determining the authorship of anonymous political tracts to attempting to predict long-range policy goals of the Soviet politburo. In general, thematic content analysis enjoyed its greatest popularity during the 1950's and 1960's, the Rokeach value survey achieved popularity during the mid-1970's but appears to be declining in use following considerable criticism of several of its key assumptions, and the operational code approach seems to have maintained a consistent "following" among researchers since the early 1970's. Other forms of content analysis, such as paralinguistic analysis, remain limited to experimental applications.

WHAT KIND OF DATA DOES IT USE?

Most versions of content analysis require verbal material, such as speeches, transcripts of interviews, etc. Lasswell's value dictionary and other forms of content analysis are applicable to the examination of policy actions.

HOW IS THE DATA OBTAINED?

A variety of means, including interceptions of radio and television transmissions, published sources, examination of the policy record of a given government, etc.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes. The various coding schemes are designed for that purpose.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Depends on the specific version used.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Varies widely depending on the specific form of content analysis in use. The "operational code" itself, for example, is a behaviorally-relevant trait, as are the values identified through the application of value analysis. Paralinguistic analysis makes attributions of the emotional and psychological state of the individual at the time of the verbal presentation. Credibility and consistency remains a problem for most types of content analysis.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Most forms of content analysis provide an interpretation of aspects of the subject's world-view on a post hoc basis. Credibility and accuracy is open to interpretation, depending on the apparent validity of the coding scheme used and the extent of the material available for analysis.

IS THE TECHNIQUE SUSCEPTIBLE TO COMPUTERIZATION?

Several forms of content analysis have been successfully computerized.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Most forms of content analysis require relatively little training for use. However, they depend heavily on the ability of the coder to capture the nuances of foreign languages when applied to foreign language content.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) There are often limitations on the availability of sufficient material to analyze (particularly oral material which can be subjected to paralinguistic analysis).
- (2) Classification of content is often subjective.
- (3) Quantification is occasionally distorted by the replication of similar situations which therefore result in repetitious content (i.e., public ceremonies often result in repetitive "canned" speeches). This is a particularly serious problem in value analysis and thematic analysis, because certain situations (e.g., the opening of a new school, the welcoming of a new foreign ambassador) almost always cause decision-makers to make reference to similar values and themes (e.g., "education as key to future progress and development," and "peace and friendship among all peoples," respectively).
- (4) Significant problems exist in cross-cultural applications of content analysis, due to the need for extremely accurate, culturally-relevant translation of material. Paralinguistic content analysis also suffers from uncertain validity and payoffs when applied to foreign cultures and languages.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

The USICA, the State Department, and the Central Intelligence Agency are all known to have applied various forms of content analysis to the examination of foreign press, foreign decision-maker statements, etc. Additionally, the National Science Foundation and DARPA have funded studies of the validity and potential application of both operational codes and value analysis, including one such study included in current ABI activities.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Remote Psychoanalytic Techniques

PRINCIPAL INVESTIGATORS/CRITICS

Investigators include Barber, Beisel, Courtney, Ebel, Erikson, Freud and Bullitt, Alexander and Juliette George, Lasswell, Leites, Mazlish, Pye, Rogow, and Tucker.

Critics include Greenstein, Mazlish, Touhy, Winter and Stewart.

CITES

The following are only representative of a fairly substantial literature: Lasswell (1930) *Psychopathology and Politics*. George and George (1956) *Woodrow Wilson and Colonel House*. Erikson (1962) *Young Man Luther* and (1969) *Gandhi's Truth*. Rogow (1963) *James Forrestal: A Study of Personality, Politics, and Policy*. Freud and Bullitt (1967) *Thomas Woodrow Wilson*. Barber (1972) *The Presidential Character*. Mazlish (1973) *In Search of Nixon*. Touhy (1974) "Psychology in Political Analysis," Courtney (1976) "Prime Ministerial Character: An Examination of Mackenzie King," *Canadian Journal of Political Science*. Beisel (1977) "Toward a Psychohistory of Jimmy Carter," and Ebel (1977) "But What Kind of Baby is Jimmy Carter?", in *The Journal of Psychohistory*. Esberry (1977) *Personality and Politics: A Study of William Lyon Mackenzie King*. Winter and Stewart in Hermann (1977) *A Psychological Examination of Political Leaders*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Uses published sources to make inferences on the genesis of the dynamics of individual political behavior through content analysis. This is usually done for a specific political leader, but occasionally for "typical" leaders in a given national culture (see, for example, Pye's work on Burma and Leites' work on French and Chinese leadership). Classification of data varies from categories of leadership style (e.g., Lasswell's leadership types and Barber's two-dimensional classification scheme) to highly individualistic explanations of political behavior, including neurotic/compulsive drives (e.g., Mazlish on Nixon).

Assumes that political behavior is a relatively superficial and transitory manifestation of underlying character traits. Further assumes that statements and actions can be found to indicate a pattern of psychological responses to stimuli, based on experiences in childhood or early adulthood, and that it is possible to extrapolate from the pattern to determine the key influences shaping later political behavior. Pays special attention to defensive and adaptive mechanisms in determining behavior.

HOW HAS THE TECHNIQUE BEEN APPLIED?

Primarily applied retroactively, as in psychohistory. Barber and Beisel attempted to predict President Carter's performance in office with inconclusive and controversial results. There is some evidence that a form of remote psychoanalytic technique was applied to the prediction of Premier Khrushchev's probable responses to U.S. initiatives during the Cuban Missile Crisis; the evidence, however, is anecdotal in nature.

WHAT KIND OF DATA DOES IT USE?

Memoirs, speeches, published histories, verbatim accounts of meetings, and other recorded verbal data.

HOW IS THE DATA OBTAINED?

Usually open, published sources.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

No. Identical data can be interpreted very differently by different coders and analysts (see, for example, the Courtney/Esberry controversy on Mackenzie King).

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

No. Data collection must be extremely thorough and carefully analyzed to ensure accurate results. In many cases--i.e., Soviet, Chinese, and Third World leaders--necessary data does not exist or has been doctored by the local censorship process.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Some applications have provided credible attributions of politically-relevant character traits, especially leadership style, but only on a retroactive basis.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Difficult to determine. Critics of the technique, such as Maslish and Touhy, doubt that the techniques of remote psychoanalysis can predict anything.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

No. The results of the application of the technique may be susceptible to computerization (i.e., Barber and/or Lasswell classification schemes could conceivably be incorporated into the AIA process in the development of goal trees.)

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Yes.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Very high resource investment yields relatively low credibility.
- (2) Danger of reductionism: relegating conscious human thought and decision-making to a secondary plane.
- (3) Multiplicity of theories serving as a basis for encoding of data.
- (4) Lack of adequate sources for most subjects of interest (Mr. X's).
- (5) Research design is essentially retrodictive: starts from a given event and seeks to explain its origin and meaning.
- (6) The "general" classification schemes (e.g., Barber and Lasswell) used in some forms of remote psychoanalytic techniques may not be applicable to all cultures; e.g., Barber's model has been criticized for being inapplicable outside the 20th century United States.
- (7) Many psychoanalysts argue that the construction of an individual's basic psychological model without direct subject observation is contrary to the basic principles of psychoanalytic practice.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

The Central Intelligence Agency appears to have applied the technique in assessing the more volatile (i.e., psychoneurotic) political leaders of interest. The FBI has created profiles of terrorists and hijackers, based on a combination of remote and direct psychoanalytic techniques, that are used by the CIA and by law enforcement agencies in addition to the FBI. DoD has made use of some forms of remote psychoanalytic technique, including much of Leites' early work, in support of PsyOps and Civil Affairs.

NAME OF BEHAVIORIALLY-RELEVANT TECHNIQUE/METHODOLOGY

Cognitive Mapping

CITES

Holsti (1976) "Cognitive Process Approaches to Decision-Making: Foreign Policy Actors Viewed Psychologically," *American Behavioral Scientist*; Nisbett and Temoshok (1976) "Is There An External Cognitive Style," *Journal of Personality and Social Psychology*. Hart (1977) "Cognitive Maps of Three Latin American Policy Makers," *World Politics*. Suedfeld and Rank (1976) "Revolutionary Leaders: Long-Term Success As A Function of Changes in Conceptual Complexity," *Journal of Personality and Social Psychology*. Kosslyn et al (1974) "Cognitive Maps in Children and Men," *Child Development*. Schneider (1979) "Conservatism and Cognitive Complexity," *Psychological Reports*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Through content analysis and psychological testing (where possible), the researcher attempts to structure the belief system, perceptions, and behavioral predispositions of the subject in the form of a "map" of the subject's cognitive processes. Ideally, this effort should take into consideration psychological predispositions to various types of action, in addition to predispositions relative to strictly political or military situations. Because the development of a complete cognitive "map" requires substantial effort, most recent studies have focused on the narrower issue of "cognitive complexity," i.e., the degree to which beliefs, perceptions, and behavioral predispositions are structured through stereotypes rather than through acceptance of reality in its full complexity. Thus, the simplistic identification of apparent stereotypes affecting decision-making has also been termed "cognitive mapping."

Major theoretical assumptions include the belief that individuals' actions are guided by a relatively stable, consistent world view.

HOW HAS THE TECHNIQUE BEEN APPLIED?

The technique has been applied recently primarily to identify the generic cognitive maps associated with particular ideologies (i.e., revolutionary socialism, conservatism) and with the retention of power by revolutionary leaders (see Suedfeld and Rank).

WHAT KIND OF DATA DOES IT USE?

Psychologically-oriented surveys, where possible. If not possible, speeches, memoirs, and other sources capable of being subjected to content analysis.

HOW IS THE DATA OBTAINED?

Either through the subject volunteering the information or through the use of content analysis of published sources.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

No. Data can be coded differently by different investigators, depending on their interests and their conception of what is "important" to include in a cognitive map.

IS THE DATA ENCODING PROCESS RESOURCE EFFICIENT?

Yes, when psychological questionnaires are used. No when content analysis is used.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

The technique produces attribution of "key" behaviorally-relevant and policy-relevant psychological traits, with varying degrees of credibility and consistency.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

The technique is designed to provide inferences of perceptions and, indirectly, of capabilities. The credibility and accuracy of the technique is highly dependent on the sources of data used, the biases of the researcher/coder, and the depth of analysis attempted.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

No.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Moderate. Prior expert knowledge with the subject is probably more useful to the application of this technique than formal training.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

Although the concept of cognitive mapping has been used in psychology for almost a decade, its applications to political decision-making is still relatively new. Further, because the methodology itself has not yet been well-defined and is still an eclectic collection of techniques, substantive criticism of the methodology has not emerged significantly at this time.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

There are indications that the Central Intelligence Agency and the State Department have experimented with the use of the methodology, either directly or through funding contract research.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

No.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Moderate. Prior expert knowledge with the subject is probably more useful to the application of this technique than formal training.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

Although the concept of cognitive mapping has been used in psychology for almost a decade, its applications to political decision-making is still relatively new. Further, because the methodology itself has not yet been well-defined and is still an eclectic collection of techniques, substantive criticism of the methodology has not emerged significantly at this time.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

There are indications that the Central Intelligence Agency and the State Department have experimented with the use of the methodology, either directly or through funding contract research.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Survey data-based techniques (Other than standardized tests)

SUMMARY OBSERVATIONS

A detailed summary discussion of the application of survey data to behaviorally-relevant data-gathering would itself require a separate report, since the survey has been a dominant technique/methodology in the social sciences for several decades. Almond and Verba (1968) *The Civic Culture* and Frey (1970) "Cross Cultural Research in Political Science" provide detailed discussion of the methodological and procedural problems and obstacles encountered in conducting surveys outside the United States. Within the ABI context, it should be noted that (1) surveys of foreign populations--including elite populations--are very costly in resource expenditure; and (2) because the respondent is aware that the researcher is conducting a survey, survey responses can be viewed as of questionable validity, particularly when the respondent is a foreign decision-maker interested in projecting a specific image at a given point in time.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Standardized tests

CITES

Tosi and Hoffman (1972) "A Factor Analysis of the Personal Orientation Survey," *Journal of Human Psychology*. Bruch (1977) "Psychological Screening Inventory As Predictor of College Student Adjustment," *Journal of Consulting and Clinical Psychology*. Eysenck (1977) "A Comparative Study of Personality in Nigerian and English Subjects," *Journal of Social Psychology*. The list of possible citations is nearly as long as the list of standardized psychological tests that have been developed.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Researchers design verbal tests which allegedly isolate the presence/absence of specific psychological perceptions, attitudes, mechanisms, and capabilities in the individual who submits to the test. Examples of such tests in wide spread use include the PAT (Personality Assessment Test), the soft skill tests developed for specific occupations, the Eysenck Personality Inventory, The California Psychological Inventory, the Army Alpha Examination (for intelligence), the Psychological Screening Inventory, the Maudsley Personality Inventory, The Orientation and Motivation Inventory, the Torrance Tests of Creative Thinking, and the Minnesota Multiphasic Personality Inventory (used for clinical purposes only). Each test is designed to examine a different set of traits and/or states, perceptions, and capabilities; each operate under a somewhat different set of theoretical assumptions. The basic assumption in all such tests, however, is that the respondent, by frankly and openly answering the test inquiries, will reveal discrete aspects of the personality, etc.

HOW HAS THE TECHNIQUE BEEN APPLIED?

Most research conducted in the use of standardized tests has been to determine the validity and reliability of the tests for measuring the desired aspect of the individual's personality. Results have varied widely, depending on the specific test examined and on whether the author of the test in question was conducting the research.

WHAT KIND OF DATA DOES IT USE?

Test scores and verbal responses to standardized questions.

HOW IS THE DATA OBTAINED?

Through the subject's cooperation

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Varies depending on the nature of the test.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Varies depending on the nature of the test

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Varies depending on the specific test under consideration. Virtually all standardized tests have been criticized for failure to consider cultural variation in responses; the Torrance Tests of Creative Thinking appear to be the most successful in defending the claim to cross-cultural application.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Yes, depending on the nature of the responses called for in the test instrument.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

No.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

See above.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

Virtually all government agencies use some form of standardized tests for specialized personnel functions; the CIA, for example, administers the PAT to all applicants for professional positions while the State Department administers soft skill tests to Foreign Service applicants.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Elite Commonality Analysis

CITES

Mills (1956) *The Power Elite*. Russett (1974) "Political Perspectives of U.S. Military and Business Elites," *Armed Forces and Society*. Barton (1974) "Consensus and Conflict Among American Leaders," *Public Opinion Quarterly*. Gehlen and McBride (1968) "The Soviet Central Committee: An Elite Analysis," *American Political Science Review*. Armstrong (1959) *The Soviet Bureaucratic Elite: A Case Study of the Ukrainian Apparatus*. Ciboski (1974) "Ambition Theory and Candidate Members of the Soviet Politburo," *Journal of Politics*. Robinson and Bell (1978) "Attitudes Toward Political Independence After 12 Years of Nationhood," *British Journal of Sociology*. Gurevitch (1978) "Who Knows Whom? Acquaintanceship and Contacts in the Israeli National Elite," *Human Relations*. Bers (1978) "Local Political Elites: Men and Women on Boards of Education," *Western Political Quarterly*. This is an extremely popular methodology among political sociologists, with dozens of additional cites.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Uses a wide variety of techniques--questionnaires, biographic data, surveys, interviews--to identify psychological and biographical relationships within the political and/or other social elites of a given society. Characteristic of the technique is the use of surveys and interviews to identify interlocking networks of acquaintanceships and contacts within a local or national elite hierarchy (e.g., Mills, Robinson and Bell, Gurevitch), which often identifies through factor analysis cohesive groups within the elite group.

The technique assumes that elite commonalities and intra-elite splits have relevance for the policy-making process, or for predicting the future membership of political elite groupings.

HOW HAS THE TECHNIQUE BEEN APPLIED?

See description of the technique (above). In particular, Krelinology can be cited as the best-known application of the technique/methodology.

WHAT KIND OF DATA DOES IT USE?

See description of the technique (above). In particular, Krelinology can be cited as the best-known application of the technique/methodology.

HOW IS THE DATA OBTAINED?

Either through subject cooperation or through analysis of published sources.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Depending on the data source, it can be.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Yes, in terms of commonalities and differences within an elite grouping.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Yes, in terms of the capability of an individual or group of individuals to be accepted by the existing elite at present or in the future. Certain forms of elite commonality analysis, such as those which attempt to isolate a common elite political culture or represent applications of ambition theory, can be used to infer specific intentions and/or perceptions of individuals on a probabilistic basis.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Yes.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

No.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Elite membership is often affected by severe discontinuities (e.g., Iran between 1978 and 1980; the U.S. cabinet between 1975 and 1977, etc.) Therefore, the technique is limited in capability.
- (2) Biographical data on elite subjects is not always available (i.e., the Ethiopian *Darg* does not list its members' names).
- (3) Danger of assuming that group consensus, shared biographical characteristics, etc., necessarily lead to similar behavior among the elite membership.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

Various agencies have sponsored research in this technique, especially for the Soviet decision-making elite, but with few exceptions the results of this research have not been widely disseminated on an unclassified basis.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Quantitative Analyses of Secondary Biographic Sources

CITES

Bass and Farrow (1977) "Quantitative Analyses of Biographies of Political Figures," *Journal of Psychology*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Major theoretical assumption is that serious political biography, based on rigorous study of letters, interviews, memoirs, etc., can provide valuable insights through quantitative analysis of various character traits exhibited by the political figure under study. The technique is relatively simple: researchers examine reputable political biographies based on original sources for discussion of the subject's psychological and political traits. The coders then place the subject's traits on a Likert scale--the work of several coders is then averaged for each Likert scale position. The result is a composite view of the subject's characteristics, based on recorded expert opinion.

The technique presumes that political biography is, in the words of James Barber, capable of providing the "general thrust" of the subject's attitudes and behavior in relation to various stimuli. It further presumes that there is some advantage in basing knowledge of the subject on several alternative sources of expertise rather than a single, "authoritative" source.

HOW HAS THE TECHNIQUE BEEN APPLIED?

It has been applied to test three hypotheses: (1) Are there significant differences in the attitude of U.S. Presidents toward political bargaining? (2) Are there significant differences in the level of Presidential policy-making activity under "normal" circumstances between different personality types? (3) Are there significant differences in the relations between political leaders and subordinates in foreign governments?

WHAT KIND OF DATA DOES IT USE?

Biographies of political leaders and other major figures who have attracted the interest of biographers. Could be adapted to use oral debriefings.

HOW IS THE DATA OBTAINED?

Published sources; library search.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Bass and Farrow claim both systematic and internally reliable encoding of data.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

No. The entire set of secondary sources must be read in entirety by at least two--and preferably more--coders.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Yes, according to Bass and Farrow. At least, it serves as a summary of expert attribution of the significant traits of major leaders. It cannot provide information on the current behaviorally-relevant state of a subject.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

No. The use of the technique--if valid--provides background information for such inferences.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

No.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

No, according to Bass and Farrow.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

The technique is too recently-developed for criticism to identify methodological and research problems. Clearly, however, the availability of serious biographies based on rigorous examination of historical sources is questionable for most living and active political leaders.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

No.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Long-Range Forecasting Techniques

SUMMARY OBSERVATIONS

Long-range forecasting techniques, including scenario construction, linear projection of existing trends, decision-based alternative future design, etc., have been in existence for over 25 years. Validity, accuracy, consistency, and reliability vary widely, depending on which of the several techniques is used and who is using it. Such techniques are not viewed as central to the first phase development of ABI; it is suggested that later phases of ABI research may investigate such techniques in detail to determine the practicality of coordination with ABI components.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Graphology (Handwriting analysis)

PRINCIPAL INVESTIGATORS/CRITICS

Investigators include Bunker, Crumbaugh, Secord, Stockholm, Zdep and Weaver, and several European scholars.

Critics include Vine and Vestewig.

CITES

P.F. Secord (1949) "Studies of the relationship of handwriting to personality," *Journal of Personality*. M.N. Bunker (1959) *Handwriting Analysis: The Art and Science of Reading Character by Graphoanalysis*. Zdep and Weaver (1967) "The Graphoanalytic Approach to Selecting Life Insurance Salesmen," *Journal of App. Psychology*. I. Vine (1974) "Stereotypes in the Judgment of Personality from Handwriting," *Journal of Social and Clinical Psychology*. R.F. Vestewig et al. (1976) "Validity and Student Acceptance of a Graphoanalytic Approach to Personality Assessment," and J.C. Crumbaugh (1976) "Reply to Vestewig," *Journal of Personality Assessment*. J.C. Crumbaugh (1977) "Validation of Graphoanalysis by Global or Holistic Methods," *Perceptual and Motor Skills*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Uses different forms of coding, of which the most popular form today is Bunker's Graphoanalysis, to generalize on the personality of the subject, based on characteristics of the subject's handwriting. Recent studies in Europe also use pressure sensitive paper to record pressure of writing as a means of determining the relative aggressiveness of the subject.

Theoretical assumptions include: (1) handwriting style reveals psychological characteristics unconsciously expressed in the writer's self-image as indicated by handwriting; and (2) relatively consistent, theoretically universal personality types (or stereotypes) display similar handwriting traits.

HOW HAS THE TECHNIQUE BEEN APPLIED?

Primarily applied to general personality assessment, e.g., personalities characterized by specific handwriting characteristics are presumed to perform well as insurance salesmen. Relatively strong stylus pressure is associated with evidence of relatively high aggressive tendencies.

WHAT KIND OF DATA DOES IT USE?

Handwriting samples, preferably a standard sample preselected by the coder. In some cases, pressure sensitive sheets are required. In popular--i.e., nonscientific--uses, a signature is deemed as sufficient. A facsimile signature can be used (e.g., that obtained through a signature machine) in theory.

HOW IS THE DATA OBTAINED?

In controlled experiments, it is obtained through voluntary sample submitted by the test subject. In uncontrolled uses, it is obtained through open sources.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes. There is relatively high inter-coder validity and reliability.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Yes. Apparently the handwriting characteristics associated with various personality types recur frequently within a relatively small sample of the subject's handwriting.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

No. The technique has been found to be poor at eliciting information on specific traits and it assumes that handwriting characteristics remain constant, regardless of psychological state. Instead, it offers attribution of stereotypical personalities outlined in the Bunker book, with low theoretical and empirical validity. The stereotypes used have no basis in contemporary psychological theory of personality.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Idep and Weaver and other proponents argue that it does provide credible inferences of "soft skill" capabilities associated with various personality types.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Perhaps. A machine has been demonstrated which allegedly performs graphoanalysis based on a signature sample, but no scholarly studies have been found which validate the results.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Gross personality assessments can be made with little training. More detailed assessments require some expertise.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) It is unclear how a technique which cannot reliably reveal specific traits can indicate general personality types.
- (2) Culturally-biased (e.g., assumes individualistic handwriting development in languages using the Latin alphabet--no known study has been performed using Cyrillic or other "exotic" alphabets.
- (3) Stereotypes used in Graphoanalysis are based on "pop" psychology of the late 1950's rather than modern psychological theory.
- (4) There is extensive controversy over accuracy of the technique and some claims of low subject acceptance of results.
- (5) The self-image revealed in handwriting is often a conscious effort, therefore the validity for identifying "hidden traits" is doubtful.
- (6) It has been noted that subjects who volunteer samples are usually believers in the technique.
- (7) Questionable as to whether handwriting samples from "Mr. X's" can be obtained.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

One government agency is known to have experimented with the technique, using Latin alphabet materials, with inconclusive results. It may be used by local government personnel offices in some areas.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

PSE

CITES

Wiegele (1978), "The Psychophysiology of Elite Stress in Five International Crises," *International Studies Quarterly* 22(4); Horvath (1978), "An Experimental Comparison of the PSE and the Galvanic Skin Response in Detection of Deception," *J of Applied Psych.* 63(3); Wiggins et al. (1975) *Journal of Nervous and Mental Disease* 160(6); Wiegele (1980), "Remote Psychophysiological Assessment of Elites During International Crises," *Final Report prepared for CTD, DARPA*

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

PSE is a device which produces patterns of muscularly-determined patterns for spoken words on a heat-sensitive strip from tape-recorded or videotaped speech. Certain variations in the pattern are believed to be associated with stress and/or deception. Wiegele has analyzed the voice patterns of American Presidents to identify stress points in their speeches. The overall percentage of high stress words in an oral document is used to indicate the general state of psychophysiological arousal in the subject at that point in time. Other researchers have used the PSE to identify the specific words which appear to exhibit high stress; supposedly these words are indications of intense psychological reaction to the word use or (perhaps) deception attempts involving the word.

The major theoretical assumption is that the PSE does what it claims to do; namely, it provides an indication of stress (or deception) associated with certain words.

In some of the research on PSE there are also significant assumptions as to the causes and intensity of the indicated stress.

HOW HAS THE TECHNIQUE BEEN APPLIED?

To determine suitability of technique as a replacement for the Galvanic Skin Response "lie detector" test.

To determine the degree of stress associated with certain themes in Presidential speeches and infer the implications of this stress.

To determine the themes associated with stress in interviews with psychotic individuals.

WHAT KIND OF DATA DOES IT USE?

Oral documents or statements, either "live" or recorded.

HOW IS THE DATA OBTAINED?

Tie-in between microphone and/or tape and the PSE device, followed by careful examination of the heat sensitive strip producing the charted variations in word pattern.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Apparently.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Not at present; the operation of transposing specific words onto the heat sensitive strip and analyzing the result is, to quote Wiegele, "a long, tedious, and laborious process."

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Credibility may be a problem. Horvath's work indicates that PSE does not perform better than random chance in determining deception. Wiggins et al. felt assured that the PSE does, in fact, test for the presence of some form of stress affecting the vocal muscles.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

No. In the 1978 article, Wiegele noted, for example, a serious disagreement on the interpretation of the presence of stress in one of Johnson's speeches. Serious questions have also been raised reference inferences in Wiegele (1980).

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Perhaps

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Yes

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Better certainly that PSE does, in fact, test for the presence of stress.
- (2) No consensus as to what the presence of stress means in terms of perceptions, intentions, etc. Wiegele presumes it is related to the perception of an international crisis, but this is a postulate rather than a fact.
- (3) Definite need for more efficient decoding of data.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

DARPA has helped to fund Wiegele's activities. The PSE itself was derived from research conducted at DIA, although it appears that DIA has not proceeded with its applications.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Eye Movement/Gaze Analysis

CITES

Argle and Graham (1976), "The Central Europe Experiment: Looking at Persons and Looking at Objects," *Environmental Psychology and Nonverbal Behavior*; Natale (1977), "Induction of Mood States and Their Effect on Gaze Behavior," *Journal of Consulting and Clinical Psychology*; Schulz and Barefoot (1977), "Anxiety, Interpersonal responses, nonverbal behavior and affiliative conflict theory," *Journal of Consulting and Clinical Psychology*; Bellinger and Kaufmann (1977) *Perception* (French)

This is an area of extensive research interest among psychologists, made possible by increasingly accurate and less difficult methods of measurement and monitoring. Approximately 25 cites per year in *Psychological Abstracts* since 1975.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Still in essentially experimental stage, determining relationships between gaze and various psychological and cognitive states. The assumption is that variation in gaze length, gaze direction, blinks, gaze shifts, etc. are not random but are associated with various environmental and psychological (also psychophysiological) factors.

Essentially, the methodology varies, depending on what aspects of eye movement is under investigation. Best results obtained from minute eye movement; less satisfactory results obtained from gross eye movement due to distraction, attention span, etc.

HOW HAS THE TECHNIQUE BEEN APPLIED?

There is a relationship between eye contact/gaze length and mood (elated, depressed, neutral) states.

There is a relationship between eye movement and information processing.

There is a relationship between gaze length and duration and anxiety, characterized by approach/avoidance syndrome (inconclusive results).

WHAT KIND OF DATA DOES IT USE?

Monitored gaze direction, duration, eye contact sought, blinks, shifts in direction, shifts in focusing, pupil contraction/expansion.

HOW IS THE DATA OBTAINED?

Gross measurement via videotape and/or participant observation.

Minute measurement via specially constructed apparatus requiring head constraints and four-eight calibration points.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes (high interjudge reliability and validity, except for participant observation).

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Yes

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

No. Most studies indicate that personality is an intervening variable. Background (distracting objects, etc.) are indicated as an intervening variable. Status and traits attributed from the technique include: anxiety, tension (induced by subject of discussion), affiliative response, information processing, interest, mood, etc.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Yes, to a limited degree: attention span, awareness, ability to follow complex visual and motor tasks.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Yes.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Training and equipment handling rather than analytical training.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Too many unknown effects of intervening variables, including background, inter-personal reactions with experimenters, personality, interest in topic, distance from desired focus of gaze.
- (2) For minute, accurate responses, cumbersome headgear and monitoring devices are required (this is gradually improving).
- (3) Unclear whether micromovements are due to physiological, psychological, or psychophysiological activity.
- (4) Measurement of gross eye movements is not resource efficient and is difficult to interpret.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

Yes, several Defense agencies have sponsored research in the field. Eye movement measurement is currently used for development of display panels, instrument panels, and task ability assessment in the defense fields.

Major Government applications appear concentrated in Air Force, NASA, and FAA research; some activities sponsored by Department of Transportation.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Psychoanalytic techniques

CITES

Messner (1977) "Psychiatric Observations of State and Local Politicians," *American Journal of Psychology*. Rogow (1963) *James Forrestal: A Study of Personality, Politics, and Policy* and (1971) "Some Psychiatric Aspects of Political Science and Political Life," in Abcarian and Soule (ed.) *Social Psychology and Political Behavior*.

DESCRIPTION OF THE TECHNIQUE (including major theoretical assumptions)

Essentially the same as remote psychoanalytic techniques (q.v.), except that direct observation is made of the subject and the psychiatrist/researcher is able to direct the psychoanalytic process to focus on areas of interest. Direct observation also enables the researcher to note paralinguistic and behavioral characteristics in the subject, viewed as extremely important for accurate psychoanalytic analysis.

HOW HAS THE TECHNIQUE BEEN USED?

The technique is generally used in specialized personnel operations to determine such characteristics as susceptibility to stress, the presence of debilitating psychological conditions, the psychological prognosis of the individual, etc. The technique has also been used to determine the psychiatric sources of policy behavior and political ambition among American political leaders.

WHAT KIND OF DATA DOES IT USE?

Verbal and behavioral cues of discrete psychological processes revealed by the subject during psychoanalysis.

HOW IS THE DATA OBTAINED?

Direct observation by trained psychoanalyst.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Not necessarily, although psychoanalysts who share similar training and belong to the same "school" of psychoanalytic thought will tend to report similar observations on the same patient.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Yes--discounting the fact that trained psychoanalysts are relatively expensive personnel resources. A psychoanalytic session designed to reveal general psychological traits and states is approximately 90 minutes in duration; thorough evaluative psychoanalysis may require several such sessions.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Yes, depending on the length of evaluative sessions and their frequency. After several such sessions, psychoanalysts believe that they can usually provide credible attributions of psychological state and/or general behaviorally-relevant psychological traits. The ability of psychoanalysis to reveal the origins of states and traits is more questionable.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Yes, in terms of general or probabilistic inferences of intentions, etc. For example, psychoanalysis can reveal that an individual is a likely candidate for a suicide attempt or for paranoid reactions to a perceived event, but can credibly determine that the subject will definitely attempt suicide or exhibit paranoid reactions.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

No.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Yes.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Danger of reductionism: relegating conscious human thought and decision-making to a secondary plane.
- (2) Multiplicity of theories serving as a basis for encoding of data.
- (3) Most subjects of interest are unwilling to submit to such examination.
- (4) The ethical code of most psychoanalysts prevent release of information revealed through psychoanalysis to the Federal Government, except under extraordinary conditions (i.e., competency hearings, etc.).

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

Nearly all of the national security agencies make use of psychoanalysis for evaluation of personnel in highly sensitive or extremely responsible positions. It is not known whether any agency has made use of psychoanalytic techniques for the study of foreign decision-makers.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

EEG monitoring

SUMMARY OBSERVATIONS

The monitoring of brain waves via electroencephlograph has progressed significantly during the past few years, with the application of computer technology to the measurement of minute variations in wave patterns. DARPA, the Office of Naval Research, and the Central Intelligence Agency have all recently sponsored research in this field, including the activities at the University of Florida and the University of Illinois. Research into the relationship between evoked brain potentials and psychologically-related behavior is still in its infancy; Professor Donchin of the University of Illinois recently commented that his activities did not include an examination of individual variation in evoked brain responses. Further, operational applications of such advanced research must take into consideration the fact that EEG measurement is still not possible without direct, cumbersome links to the individual subject. Experimental use of equipment designed to measure magnetic fluctuations rather than the electrical wave patterns themselves suggest that remote monitoring of brain waves may be possible before the end of the century.

Current research in progress concerning the application of EEG to nonverbal behavior research suggests that experimental applications of the EEG to ABI-related research may be currently feasible.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

EKG

CITES

Baskin (1978) "Scientific Assessment of the Accuracy of Detection of Deception," *Psychophysiology*. Hare, Frazelle, and Cox (1978) "Psychopathy and Physiological Responses to Threat of an Averse Stimulus," *Psychophysiology*. Chisholm et al. (1977) "Effects of Alpha Feedback Training on Occipital EEG, Heart Rate, and Experimental Reactivity to a Laboratory Stressor," *Psychophysiology*. Weldner and Matthews (1977) "Reported Physical Symptoms Elicited by Unpredictable Events," *Personality and Social Psychology*. Cacioppo (1979) "Effects of Exogenous Changes in Heart Rate on Facilitation of Thought and Resistance to Persuasion," *Journal of Personality and Social Psychology*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Direct, electrical measurement of wave patterns produced by heart activity.

HOW HAS THE TECHNIQUE BEEN APPLIED?

In most research, such as stress-related investigations, heart rate is used as the dependent variable. In conjunction with Galvanic Skin Response, blood pressure, and respiration rate, the EKG has been applied to the detection of deception, under the assumption that deception invokes increased stress levels which, in turn, invoke changes in these physiological measures. However, recent research in the control of heart rate has caused investigators to question the validity of these measures, either as stress indicators or as indicators of probable attempts at deception. At the same, the ability to control heart activity has led to new experimental research in which heart rate, as measured by the EKG, is the independent variable and some psychological characteristic--reaction to stressful events or resistance/lack of resistance to persuasion--is the dependent variable.

WHAT KIND OF DATA DOES IT USE?

Electrical variation induced by the placement of recording instruments in key positions on the subject's body.

HOW IS THE DATA OBTAINED?

Through direct links between the subject and the measuring device.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Yes, other than resources required for obtaining the equipment.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

It provides consistent, credible attribution of the state of the subject's cardiovascular system, including heart activity. Since the discovery that heart rate can be controlled, to some extent, through drugs or through specialized training, it has become increasingly doubtful that the technique can provide consistent, credible attributions of psychophysiological state.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

It can indicate that an individual is physically incapable of certain types of physical exertion.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Yes.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

The operation of the EKG recording device does not require extensive training. It is debatable whether accurate interpretation of the EKG requires more than moderate training.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) It requires the cooperation of the subject, and elaborate physical preparation of the subject.
- (2) Research using EKG has not had a focus directly relevant to the ABI project until recently, so that much experimental work of interest is still in progress or has not achieved a significant stage of empirically-valid findings.
- (3) The question of whether the EKG and other forms of heart activity measurement can be "fooled" by conscious control of heart rate by the subject remains controversial. In any event, it has definitely been established that ingestion of certain drugs, such as digitalis, can be used to confuse indications of psychophysiological stress measured by the EKG.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

The EKG is widely-used for personnel and medical purposes throughout the Federal government. Experimentation involving the use of the EKG for psychophysiological research has been sponsored by the Air Force, the Navy, NASA, and the National Institutes of Health.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Biochemical analysis

CITES

Jaros (1972) "Biochemical desocialization: Depressants and Political Behavior," *Midwest Journal of Political Science*; Ellis (1976), "The Biological Basis of Human Irrationality," *Journal of Individual Psychology*; Lidberg (1978) "Measurement of Adrenaline and Noradrenaline in Urine Samples," *Psychosomatic Medicine*; Stevens, Cropley, and Blattler (1975) "Intellect and Serum Uric Acid: An Optimal Concentration of Serum Urate for Human Learning?" *Social Biology*; NASA studies; Additional cites are extremely numerous.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Samples of blood, lymphatic fluid, urine, and excretia are subjected to minute biochemical analysis to determine variations from a baseline. These, in turn, are associated with controlled changes in behavior and/or task performance. Primary subjects examined are the presence/absence of hormones and/or acids in blood and other fluids; presence/absence of trace chemicals in stools; presence/absence of electrolytes in fluids; presence/absence of inert or foreign material (e.g., cholesterol, alcohol) in blood. Of these, the presence/absence of hormones may be most important for behavioral research, since hormonal activity is stimulated by various emotional states. Other biochemical analyses tend to treat the variation from the biological norm as the independent variable and behavior as the dependent behavior, e.g., lowered attention span and tendency to fainting among astronauts with deviant electrolyte count in blood samples due to weightlessness.

HOW HAS THE TECHNIQUE BEEN APPLIED?

Impact of changed biochemical state on behavior.

Impact of behavior on nature and level of hormonal activity.

Impact of ingestion of various drugs (e.g., alcohol, medication) on biochemical activity and cognitive processes, emotional state.

WHAT KIND OF DATA DOES IT USE?

Samples of blood, body fluids, urine, and excretia.

HOW IS THE DATA OBTAINED?

Primarily hypodermic samples; excretia collection in special containers.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Yes, for some biochemical processes. Advanced serum analysis and urine analysis, offering study of a large variety of potential anomalies simultaneously, involve use of expensive equipment and/or intensive labor and relatively large amounts of samples.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Yes. Drunkenness, physical illness, certain types of psychophysiological arousal. For determining more complex states (e.g., anger, excitement, boredom), personality variables appear to intervene and prevent easy attribution.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Yes, in terms of physical capabilities (e.g., astronauts with abnormally low electrolytes fall down a lot; drunken personnel cannot concentrate, etc.) Examination of past behavior correlated with physiological impairment to determine probable future behavior at x level of physiological impairment.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Yes. Computerized simulation of biochemical/psychophysiological interactions have been developed.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Yes.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Impact of intervening variables (e.g., environment, personality) affect results. Biochemical changes are not unicausal in most cases.
- (2) Direct sampling (data-collection) is readily apparent and often painful.
- (3) Indirect sampling is affected by environmental variables (e.g., water impurities distort results of excretia analysis). Microbiological methods to overcome this problem are very costly.
- (4) Lack of communication between social and medical scientists contribute to a research emphasis on biological change rather than behavioral effects and/or causation.
- (5) Problem of obtaining individual baseline.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

Yes. Police departments use urinalysis for indications of drug use/alcoholism. Coroners use more detailed analysis for determining causes of death. The CIA is believed to have used excretia and urinalysis for intelligence analysis. NASA uses a full range of biochemical analyses, but tends to treat behavior effects as a side issue.

NAME OF BEHAVIORIALLY-RELEVANT TECHNIQUE/METHODOLOGY

Pulse rate measurement

CITES

Vassileva, Melamed, and Minkova (1975) "Variability in the Emotional Reactions of Aviators Before Flight," *Agressologie* (USSR). Rickles et al. (1977), "A Psychophysiological Study of Autonomous Nervous System Response Patterns in Migraine Patients and Their Headache-free Friends," *Headache*. Erikson (1978) "Pulse Echo Ultrasonic Transducer Standardization and Quality," *American Journal of Roentgenology*. Yurevits and Yansune (1978) *Effect of Individual Human Characteristics on Physiological Reactions and Work Effectiveness*.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Heart action is measured indirectly through the careful quantitative measurement of changes in pulse rate and magnitude, and is associated scientifically with changes in psychophysiological stimuli or condition. Pulse rate and magnitude can be measured either directly or through remote means (i.e., "squiggie chair" or pulse echo ultrasonic transducer).

HOW HAS THE TECHNIQUE BEEN APPLIED?

Measurement of emotional response associated with specific high-stress tasks; measurement of the impact of various stimuli on heart rate. At present, the physiological change is virtually always the dependent variable.

WHAT KIND OF DATA DOES IT USE?

Human cardiovascular pulse.

HOW IS THE DATA OBTAINED?

See above.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Yes, although it tends to be less accurate than the EKG.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Yes.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Yes, in terms of the physiological change in heart activity. Indirectly, this can be used to attribute the presence/absence of stress, emotional excitement, etc.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

No.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

Yes

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

No

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

Current use of pulse rate measurement does not have a focus that would contribute directly to the ABI project.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

It is no longer extensively used in the United States for research purposes, having been generally replaced by the more accurate EKG. It is apparently used more extensively in Europe and the USSR, for reasons which are not clear in the literature.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Biological temperature measurement

SUMMARY OBSERVATIONS

Measurement of human biological temperature has greatly advanced in accuracy and convenience during the last decade. The use of electronic sensors and infrared-sensitive cameras permit rapid, remote measurement of relatively small changes in biological temperature. At the same time, conversations with research directors at NASA and NIH suggest that minute changes in biological temperature, under experimental conditions, have been successfully linked to changes in emotional state and stress impacts, in addition to purely physiological changes. However, the operational application of biological temperature measurement to data-gathering relevant to ABI requires further study before its advantages and disadvantages can be accurately assessed.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Genetic Analysis (Biopolitics)

PRINCIPAL INVESTIGATORS/CRITICS

Investigators include Baragh, Corning, Davis, Ellis, Gottesman, Hamilton, Harburg, Laborit, Sahlins, Somit, Van den Berghe, White, and Wilson.

Critics include Boulding, Greenstein, McBurnett and LaPointe, Sahlins.

CITES

Davis (1963) *Human Nature in Politics* and (1969) "The Psychobiology of Political Behavior: Some Provocative Developments," Annual Meeting of the Western Political Science Association; Gottesman (1963) "Heritability of Personality: A Demonstration," and (1966) "Genetic Variance in Adaptive Personality Traits," *Journal of Child Psychology and (1977) "Genetic Influences on the Organization and Development of Personality," Developmental Psychology*; Hamilton (1964) "The Genetical Evolution of Social Behavior," *Journal of Theoretical Biology*; Somit (1968) "Toward a More Biologically-Oriented Political Science," *Midwest Journal of Political Science*; Harburg et al. (1970) "A Family Set Method for Estimating Heredity and Stress," *Journal of Chronic Diseases*; Corning (1971) "The Biological Bases of Behavior and Some Implications for Political Science," *World Politics*; White (1972) "Genetic Diversity and Political Life," *Journal of Politics*; Wilson (1975) *Sociobiology: The New Synthesis*; Sahlins (1976) *The Use and Abuse of Biology*; Ellis (1976) "The Biological Basis of Human Irrationality," *Journal of Individual Psychology*; Baragh (1977) *Sociobiology and Behavior*; Laborit (1978) "The Biological and Sociological Mechanisms of Aggression," *International Social Science Journal*; Van den Berghe (1978) and Boulding (1978), debate on the new paradigm of sociobiology, *Social Science Quarterly*; Barner-Barry, ed. (1979) "Psychophysiology and Political Behavior," Annual Meeting of the American Political Science Association.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Attempts to determine causal relationship between hereditary traits and behavioral characteristics, using a variety of research designs involving longitudinal studies. Of particular interest are studies assessing personality similarities and differences between sets of twins separated during early childhood or infancy. Traits of interest include alleged species-specific traits (i.e., human aggression as an inherited characteristics), traits derived from a common ancestry (i.e., genetic basis for national character), and traits derived from closely-related gene pool (i.e., genetic inheritance of personality from parents and/or grandparents).

The techniques are based on the assumption that the theory of evolution should be applicable at every level of analysis, from the behavior of individuals to the international system. It places stress on physiological bases for behavior which could be inherited through the chromosomes. The most radical proponents argue that culture--including political culture--is the outcome of biological evolution, and that ethical precepts, ideologies, norms, and values are only comprehensible against a biological background of natural selection.

It should be noted that many of the assumptions of the more radical proponents of genetic analysis in the social sciences are based on philosophical rather than empirical beliefs, i.e., "A human group has yet to be found that does not exhibit a rampant ethnocentrism and, at the lower level, nepotism," (Van den Berghe, 1978).

HOW HAS THE TECHNIQUE BEEN APPLIED?

To identify alleged relationships between genetic inheritance and behavioral variables (and capabilities) including intelligence, aggressiveness, ethnocentrism, susceptibility to stress, and--in a critical study--position on the left/right ideological spectrum as determined by left-handedness.

WHAT KIND OF DATA DOES IT USE?

Questionnaires, psychological tests, historical data, and surveys, matched against data on family background.

HOW IS THE DATA OBTAINED?

Volunteered by subjects in individual analyses; open historical sources for analyses of species-specific and national-level analyses. Wilson has used mass survey and test results for some of his analyses.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

Only when the characteristics of the individual subject's family members can be determined through experimental methods.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

No.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS?

The technique itself does not provide this; rather it is based on other techniques (e.g., psychological testing, diagnostic analysis) which make attributions of psychological and physiological traits.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

The technique can provide limited inferences of the capabilities of specific individuals and (perhaps) their tendency to maintain certain general perceptions, provided that the researcher has sufficient knowledge about the characteristics of other family members. More broadly, the practitioners of the technique have advanced the claim that it can be applied to inferences generally applicable to the intentions, perceptions, and capabilities of large populations, such as the human species or specific national groupings.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

In its current, highly experimental state, the technique requires considerable training--or at least specialization--for effective use.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) Data is impossible to obtain for virtually all subjects of national security interest.
- (2) There is extensive controversy over the accuracy of the technique, particularly in light of the tendency of practitioners to base their theories on untested generalizations about human behavior.
- (3) Considerable danger of reductionism: tendency to relegate political behavior to the status of transient reflection of inherited psychophysiological characteristics, divorced from situational variables.
- (4) Experimental research other than that involving the comparison of twin siblings has very limited validity.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

No.

NAME OF BEHAVIORALLY-RELEVANT TECHNIQUE/METHODOLOGY

Computer-based Physiological/Psychophysiological Simulation

CITES

Pogady and Kocis (1975) "Psychopathological Changes in Epileptic Personality After Stereotactic Treatment," in Gillingham et al. *Stereotactic Treatment of Epilepsy Symposium, Bratislava, 1974*. Griep and Boon (1977) "Study of the Motor Unit Action Potential by Means of a Simulation Model," *Electroencephalographic Clinical Neurology*. Ezhov, Dan'shin, Potashnikov, and Sokol'ski (1976) *Bioactivity: The Function of Structure*. Miller (1979) "Computer Simulation of Immune Complex Diseases," *Scandinavian Journal of Rheumatology*.

Additional cites are reviews of East European--primarily Soviet--work in this field.

DESCRIPTION OF TECHNIQUE (including major theoretical assumptions)

Uses computer-based simulation, based on experimental knowledge of biophysical and psychophysiological responses to chemical and pathological intervention, to model and investigate changes. Major theoretical assumptions is that computer programs of sufficient complexity and interactive capability can be developed to accurately depict biological, physiological, and psychophysiological reactions of complex organisms. One problem is that most cites from Eastern Europe, where the application of the technique to human physiology appears most advanced, do not discuss the methodology in detail--instead, they emphasize the use of the simulation in support of experimental work.

HOW HAS THE TECHNIQUE BEEN APPLIED?

In the United States, the technique has been applied most extensively to simulation models of motor systems and muscle interaction; some application has been made to simulation models of small mammals and less complex organisms. In Europe and the USSR, the technique has been applied more extensively to analysis of human physiological and psychophysiological changes induced by drugs and by various diseases; one review of a Soviet article suggested that the impact of psychophysiological stress on pulmonary system interactions has been addressed.

There is anecdotal evidence that NASA, working through a New England university, has applied the technique using a simulation of the entire human system--or its significant components--to test hypotheses on the effects of space flight on the human body.

WHAT KIND OF DATA DOES IT USE?

Quantitative measurement of physiological and psychophysiological change transformed into mathematical models of interaction.

HOW IS THE DATA OBTAINED?

Unknown. Identified cites do not focus on methodological issues.

DOES THE TECHNIQUE PERMIT SYSTEMATIC AND RELIABLE ENCODING OF DATA?

It is likely that the technique emphasizes systematic encoding of data. The reliability of the encoding process is probably dependent on the nature of the program used.

IS THE DATA-ENCODING PROCESS RESOURCE EFFICIENT?

Unknown.

DOES THE TECHNIQUE PROVIDE CONSISTENT, CREDIBLE ATTRIBUTIONS OF STATES AND/OR TRAITS? WHAT KIND?

Ezhov et al. argue that computer-based simulation models of physiological activity have a high degree of correspondence to observed behavior in living organisms--which is logical, since the technique obtains its data from observed behavior of living organisms.

DOES THE TECHNIQUE PROVIDE ACCURATE, CREDIBLE INFERENCES OF INTENTIONS, PERCEPTIONS, OR CAPABILITIES?

Yes, in terms of strictly physiological capabilities. There is no evidence that the technique has been used to investigate physiological impacts on the psychological elements of intentions and perceptions--other than pathological impacts--but there is no evident reason why the technique cannot be used in this manner, given sufficient input data.

IS THE TECHNIQUE CURRENTLY SUSCEPTIBLE TO COMPUTERIZATION?

It is not clear from the identified cites that inputs can or cannot be computerized. The technique itself, of course, is computer-dependent.

DOES THE TECHNIQUE REQUIRE EXTENSIVE TRAINING FOR USE?

Yes, including training in the physiological sciences and in computer program design.

WHAT METHODOLOGICAL OR RESEARCH PROBLEMS HAVE BEEN IDENTIFIED?

- (1) U.S. applications have been limited to simulation of relatively simple physiological processes, without psychophysiological interactions.
- (2) Danger of reductionism: eliminating potentially important elements from the computer model.
- (3) European and Soviet applications have not been adequately detailed in identified, translated citations to make a determination of additional problems.
- (4) Technique at present state-of-development must be regarded as experimental and as a support tool for other research techniques.

ARE THERE ANY GOVERNMENT AGENCIES KNOWN TO BE USING IT?

Anecdotal evidence--an informal conversation with a physiologist at the University of Connecticut--suggests that NASA has supported development of a full-system computer-based model at a New England university during the last decade. No confirmation was obtained from NASA.

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Research Design For An Automated Behavioral Intelligence (ABI) Project		5. TYPE OF REPORT & PERIOD COVERED Final
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Dr. James R. Brownell, Jr. Dr. Michael Jon Stoil Col. Charles E. Thomann, USA (ret.)		8. CONTRACT OR GRANT NUMBER(s) MDA 903-80-C-0265
9. PERFORMING ORGANIZATION NAME AND ADDRESS KAPPA Systems, Inc. 1501 N. Wilson Blvd. Arlington, Virginia 22209		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS DARPA Order No. 3912
11. CONTROLLING OFFICE NAME AND ADDRESS Defense Advanced Research Projects Agency 1400 N. Wilson Blvd. Arlington, Virginia 22209		12. REPORT DATE 14 May 1980
		13. NUMBER OF PAGES 135
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Recommended for public release, unlimited distribution		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Automated Behavioral Intelligence Psychological Warfare Intentions Analysis Intelligence Psychophysiology Foreign Elites Templating Political Science Research Design Intelligence Templating Perceptions Analysis		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The ABI project is designed to encompass the development and use of advanced computer-based life and social science methodologies and technologies to: describe, explain, and predict planned courses of action (intentions) and perceptions of foreign decision-makers; integrate this and other intelligence information in a comprehensive automated system; and develop appropriate other uses for techniques involved. The research design describe the concepts involved in the ABI project; provides for research controls; discusses means of acquiring relevant behavioral information. (con't)		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 68 IS OBSOLETE
S/N 0102-LF-014-6601UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(Item #20 continued)

mation; describes the ABI interface with human expertise; lists special applications; and provides a prioritized, scheduled list of research tasks.