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EXECUTIVE AID FOR CRISIS MANAGEMENT: TECHNICAL REPORT

MAY 1978

Prepared for:

Cybernetics Technology Office
Defense Advanced Research Projects Agency
Arlington, Virginia 22209

Prepared by:
Policy Sciences Division
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Contract N00014-77-C-0135

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CHAPTER 1. INTRODUCTION

This report summarizes CACI, Inc.-Federal's progress in developing prototype executive aids for crisis managers. The research is funded by the Defense Advanced Research Projects Agency's Cybernetics Technology Office (ARPA/CTO) as part of its Crisis Management Program. The first part of this chapter briefly discusses the goals of the ARPA Crisis Management Program. The second part reviews CACI's role and the place of the executive aids in the Crisis Management Program. The development of the aid is discussed in the third section, while the next part outlines the aid's rationale. The final section summarizes the tasking required for this project and relates activities in each task to the rest of the report.

THE ARPA CRISIS MANAGEMENT PROGRAM

The ARPA Crisis Management Program is a major undertaking to develop, test, and transfer technologies in three areas:

- Computer-based early warning and monitoring systems.
- Computer-based executive aids for crisis managers.
- New quantitative methods for advanced warning, monitoring, and crisis management.

Wide-ranging research has been directed toward each of these areas by ARPA since 1974. Initial work through 1976 was directed toward basic research themes that are prerequisites for effective technology development in the social sciences. Characteristic of this type of research was CACI's research to inventory past U.S. crises (CACI, 1975) and to identify the major patterns of problems encountered in past U.S. crises (CACI, 1976).

By 1976, however, a corner had been turned in the research needs for crisis management. Significant new information had been developed that was directly applicable to producing user-oriented, computer-based aids to

- Assist defense operations centers in identifying what indicator and warning patterns signal the onset of a crisis; and
- Develop option generation and evaluation aids to assist crisis managers after the crisis has begun.

Continued research and testing along these two lines will provide the basis for future efforts in the program. Attention to systematic evaluation of the analysis products (including software) will also increase as ARPA field tests the various aids in command centers throughout the Department of Defense.

CACI'S ROLE IN THE CRISIS MANAGEMENT PROGRAM

CACI's efforts within the Crisis Management Program contribute to three classes of research products:

- Computer-based decision aids applicable to national and major command centers during crisis management activities.
- Data bases on the changing nature of crises, problems likely to be encountered, the types of objectives sought, actions taken, and the results achieved.
- Reports summarizing the problems of crisis management, the opportunities for improving crisis management techniques and decision-making, and research gaps in the field of planning for better national security crisis management.

Figure 1 illustrates the relationships among these various classes of products in ARPA's Crisis Management Program. CACI's initial attempts to

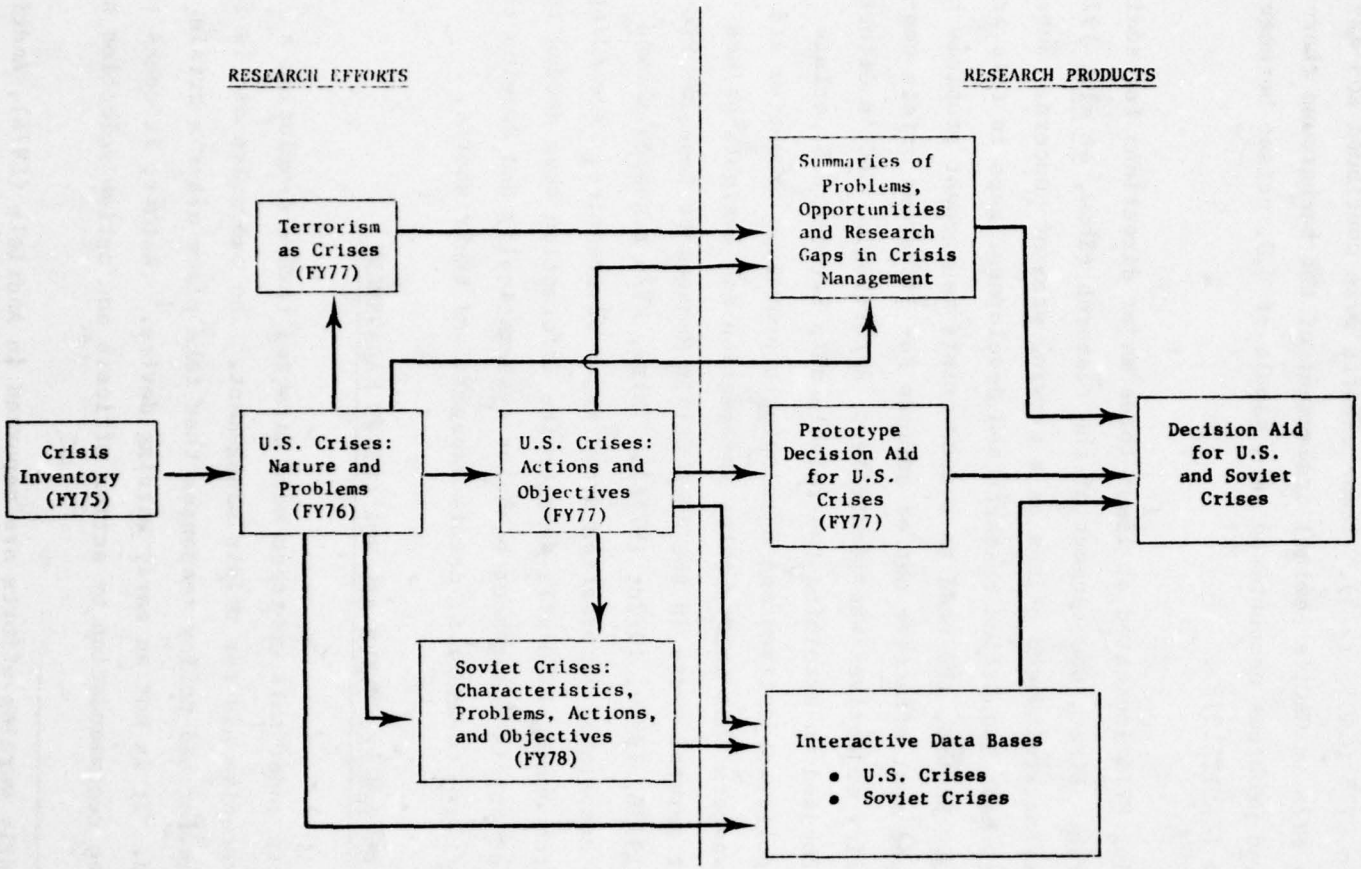

Figure 1. Research Efforts and Research Products

reconceptualize crises as "extraordinary military management activity" instead of the more common "threat, surprise, limited decision time" definition and to develop an inventory of U.S. crises using this definition began in FY75 (CACI, 1975). These efforts were continued and expanded during FY76 in CACI's seminal assessment of the background characteristics and problems encountered in a sample of U.S. crises between 1946 and 1975 (CACI, 1976).

Analysis during FY76 indicated at least three major directions for additional research. First, one tangent of the research (Shaw, et al., 1976) identified terrorist-induced crises as a growing area of concern. Subsequent analyses have identified research and development gaps in this area (CACI, 1977a). Second, the need to reduce crisis management problems by determining the most effective set of actions for different crisis contexts and policy objectives was identified. Accordingly, CACI's efforts during FY77 focused on examining the relationship between U.S. crisis actions and policy objectives and developing a prototype executive aid for crisis managers that incorporates information and insights gained over the past several years in the ARPA Crisis Management Research Program (CACI, 1977b, 1977c, 1977d, 1977f). Third, FY76 research showed the need for comparable information about major adversaries. Accordingly, CACI's research during FY78 will develop the information base needed to examine Soviet crisis management behavior systematically and develop interactive software to aid U.S. crisis managers and their staffs.

DEVELOPMENT OF THE EXECUTIVE AID FOR CRISIS MANAGEMENT

CACI's efforts under this contract were directed toward developing a prototype executive aid for crisis management. The executive aid is focused on behavior and policy responses that take place after a crisis has occurred. It is not an early warning device.[1] Rather, it seeks to inform option recommendation by action officers and option selection by

[1] ARPA's early warning efforts are reported in Andriole (1976), Andriole and Young (1977), Wittmeyer (1976), and Daly (1977).

decision-makers in the Department of Defense (DoD) once extraordinary military management activity has begun.

The executive aid incorporates several aspects of ARPA-sponsored crisis management research into three crisis data files. Crises are identified according to CACI's crisis definition that emphasizes the decision-making perspective within which the Department of Defense approaches crises (CACI, 1976). Thus a "crisis" is

> a period of increased military management activity at the national level that is carried on in a sustained manner under conditions of rapid action and response resulting from unexpected events or incidents that have occurred internationally, internally in a foreign country, or in the domestic United States and that have inflicted or threatened to inflict violence or significant damage to U.S. interests, personnel, or facilities.

Further refining this definition, each incident identified as a crisis had to meet at least one of the following criteria: (1) direct involvement of U.S. military forces in the incident; (2) a military decision on the incident required or made; (3) any subsequent military involvement of U.S. forces; (4) an existing threat of violence or significant damage to U.S. interests, personnel, or facilities; or (5) the need for rapid military action and response. Moreover, instances of humanitarian assistance or military action during a war (such as Korea or Vietnam) after initial commitment of major U.S. forces were not included in the crisis listing. Once these criteria were established, an inventory of incidents since 1946 that met the definition was developed.

Using this definition, 307 crises involving the United States were identified over the period 1946-1976. Detailed analysis of these crises resulted in the development of the three crisis data bases that are included in the prototype executive aid. These play an integral role in the aid's operations and provide users with accurate information concerning past U.S. crisis operations that can be used in the course of developing

options for new crises. Each file focuses on a different aspect of U.S. crisis management experience.

- A set of 307 U.S. crises over the period 1946-1976, which provides descriptive information concerning U.S. military management during each incident and presents a selected set of general crisis descriptors.
- A sample of 101 U.S. crisis operations over the period 1956-1976 that focuses on U.S actions and objectives during the responses. Crisis responses are coded on 57 U.S. actions and 48 U.S. objectives.
- A sample of 41 crises involving the United States during the period 1946-1976, which presents the major crisis management problems that the United States encountered in these operations. Eighteen major crisis management problems are identified.

RATIONALE FOR THE EXECUTIVE AID

The crisis literature indicates that individuals placed under stress (as they are by definition in international crises) display reduced information search, consider fewer alternatives, overreact to isolated pieces of information, and generally engage in suboptimal choice generation and selection. The executive aid for crisis management is intended to assist DoD crisis managers in overcoming these problems by providing them with ready access to the historical record of post-war U.S. crisis operations. The data file manipulation capabilities of the aid allow crisis managers to search rapidly for historical precedents and analogies in the course of considering crisis management options. This permits them to make crisis decision choices informed by systematic historical evidence on the relationship between declared U.S. policy objectives and actions taken to achieve those objectives. Similarly, it allows them to use historical experience to evaluate actions in the context of multiple sets of policy objectives.

In noncrisis periods the executive aid can serve as an instructional and planning tool for crisis management personnel. For example, it can be used to outline the history of U.S. crisis management activity since World War II, to summarize crisis problems that the United States has faced in the past, and to identify recent trends in problems faced by U.S. crisis managers.

OUTLINE OF THE REPORT

This final technical report on Contract No. N00014-77-C-0135 describes the development and structure of the crisis management executive aid. Chapter 2 presents the structure of the executive aid and reviews the characteristics and uses of the three data files that are available for analysis. Chapter 3 describes the data used in the aid, while Chapter 4 reviews the findings of analyses that have been performed to date on the data files. Chapter 5 describes procedures used to evaluate the executive aid and to transfer it to locations accessible to the U.S. Government and other users. The operation of the executive aid itself is described in detail in several separate volumes, a User's Guide (CACI, 1977c), a Program Documentation Manual (CACI, 1977d), a Sample Output (CACI, 1977f), and a Codebook (CACI, 1977g).

CHAPTER 2. STRUCTURE OF THE CRISIS MANAGEMENT EXECUTIVE AID

The six sections of this chapter describe the structure of CACI's executive aid for crisis management. The first section discusses the design characteristics of the aid. The second part presents an overview of system operation and program structure. The next three sections outline the operation of the aid's three major analysis programs. Finally, a special feature of the aid, the HELP program,[1] is described.

DESIGN CHARACTERISTICS OF THE CRISIS MANAGEMENT AID

As indicated in Chapter 1, CACI's executive aid will increase the capability of DoD crisis managers to evaluate and select response options during crises. The aid is structured to

- Provide additional historical analogies by identifying past U.S. crises in which the United States pursued similar policy options, undertook similar actions, or encountered similar problems;
- Present empirical evidence on the relationships between a user-designated policy objective and the actions which have been historically most closely associated with achieving that objective; and
- Enable crisis managers to evaluate the appropriate sets of policy objectives.

In addition to these assistance goals, CACI's prototype executive aid is designed to be empirically based, user-oriented, portable, and transferable across comparable computer systems.

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[1] A User's Guide (CACI, 1977c) outlines the structure, operations, and capabilities of the executive aid in greater detail.

Empirical Base

CACI's executive aid for crisis management is based on the historical record of past U.S. responses to crises. Although most social science research indicates fewer than 20 crises since 1946 involving the U.S. Department of Defense, CACI's crisis inventory identified 307 incidents between 1946 and 1976 that met the definition of "crises" as extraordinary military management activity. Using this base, three major crisis data sets were developed for the aid; each focuses on a specific range of analytical problems and user requirements:

- A set of 307 U.S. crises from 1946 to 1976 that provides descriptive information concerning U.S. military management activity during each incident and presents a selected set of general crisis descriptors.
- A file of 101 U.S. operations over the period 1956-1976 that focuses on U.S. actions and objectives during the responses.
- A sample of 41 crises involving the United States from 1946 to 1976 that presents the major crisis management problems that the United States encountered in these operations.

Each data base is stored separately in the executive aid along with appropriate analysis programs. The aid is designed to guide the user to the most appropriate section for his or her requirements. The three data bases are described in detail in Chapter 3.

User-Oriented Software

The executive aid's interactive computer system is self-prompting and user-oriented. Users do not need to resort to auxiliary materials or manuals, although a User's Guide (CACI, 1977c) is available. The system is designed to guide even completely unfamiliar users through the sequences, step by step.

Program Portability and Transferability

As part of its research effort, CACI developed the program on an ARPA-owned Tektronix 4051 microcomputer. These programs also operate, in slightly different form, on the PDP-11/70 at ARPA's Demonstration and Development Facility (DDF). Accordingly, the program has been designed to minimize the problems likely to be encountered in transferring it from one computer system to another.[2] The program has been written in standard BASIC language. It requires limited computer core and can be run on interactive operating systems with quite different program size ceilings. A UNIX FORTRAN version has also been developed.

System Operation

A separate User's Guide (CACI, 1977c) describes in considerable detail the operation and output from the executive aid for crisis managers as implemented on a Tektronix 4051 with 32K memory. To initiate the program, the user

- Turns on the Tektronix 4051,
- Turns on the Tektronix 4631 (for paper copies of the output),
- Inserts the program cassette into the tape slot at the right of the screen, and
- Presses the AUTO-Load key located at the upper right-hand side of the keyboard.

Program execution then begins. The user controls program flow by responding to the questions posed by the executive aid using either the keyboard or the control keys located at the upper left-hand side of the keyboard. The system is designed so that no computer experience is required. All instructions and commands are given in English.

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[2] CACI (1977d) documents the Tektronix version of the programs.

PROGRAM STRUCTURE AND SYSTEM OPERATION

The executive aid for crisis managers is modularized into nine independent computer programs. Some provide information and assistance to the user, while others access the historical data bases:

- ARPA Logo Program
- Introductory Program
- Main Control Program
- System Section I: U.S. Actions/Objectives; Program No. 1. Search for Cases With Specified Actions/ Objectives
- System Section I: U.S. Actions/Objectives; Program No. 2. Listing of Actions/Objectives in a Specific Case
- System Section I: U.S. Actions/Objectives; Program No. 3. Presentation of Actions Associated Historically With a Set of Objectives
- System Section II. Crisis Management Problems
  - Program Option 'C': Search for Cases With Specified Problems
  - Program Option 'P': Listing of Problems Encountered in a Specified Case
- System Section III. General Crisis Descriptors
  - Program Option 'A': Search for Cases With Specified Descriptors
  - Program Option 'B': Complete Description of Specified Crises
- "HELP" Program -- Additional Instructions for the User and Information on the System

While each program can be executed separately, the programs are linked as shown in Figure 1 so that the user can move from program to program within the executive aid by responding to questions or pressing the program-defined keys.

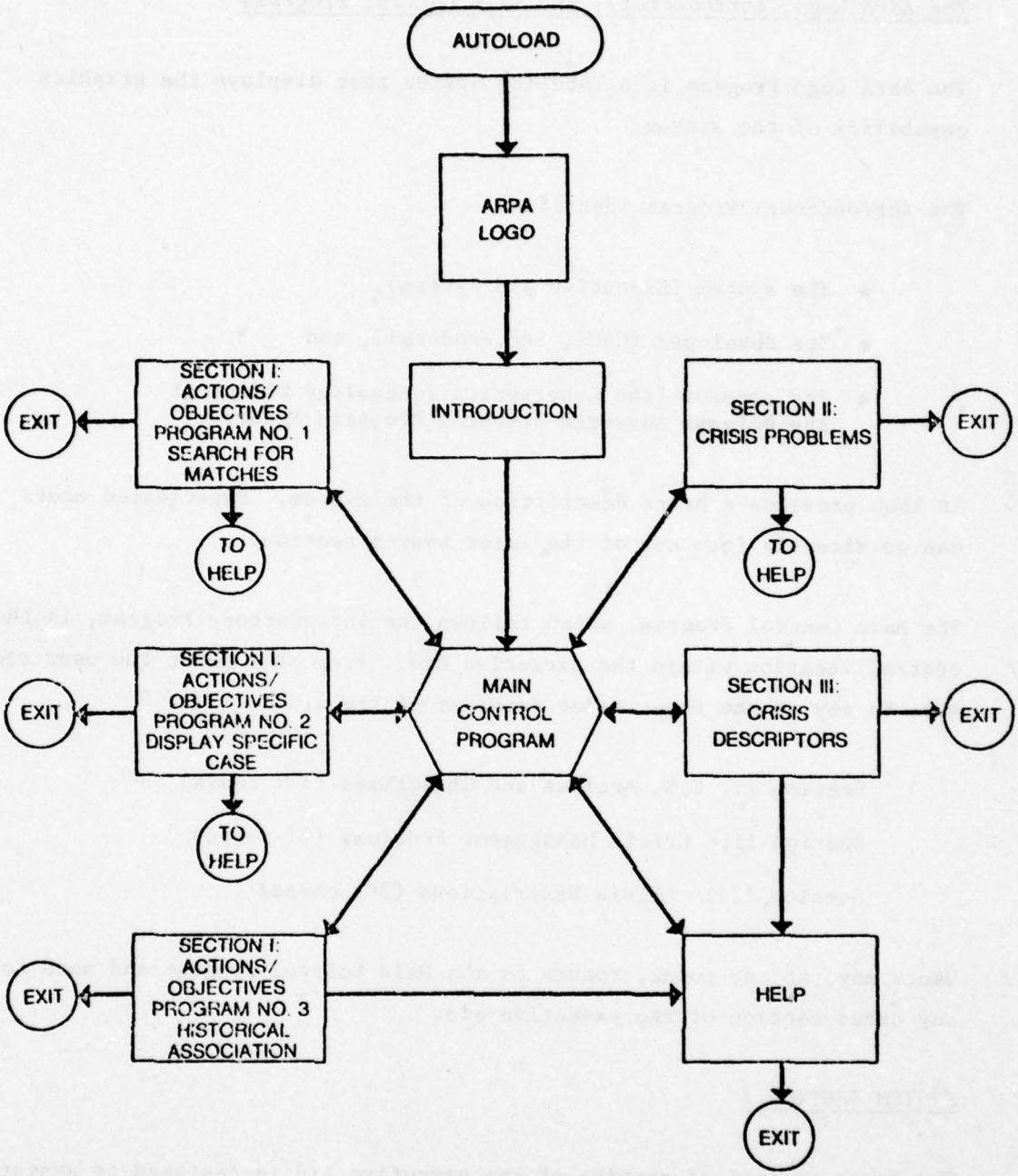

Figure 1. The Executive Aid for Crisis Management

The ARPA Logo, Introductory, and Main Control Programs

The ARPA Logo Program is a labeling device that displays the graphics capability of the system.

The Introductory Program identifies

- The system (Executive Aid System),
- Its developer (CACI, Inc.-Federal), and
- Its sponsor (the Cybernetics Technology Office of the Defense Advanced Research Projects Agency).[3]

It then provides a brief description of the system. Experienced users can go directly into one of the later system sections.

The Main Control Program, which follows the Introductory Program, is the central location within the executive aid. From this point the user can move to any of the three major sections of the aid:

Section I: U.S. Actions and Objectives (101 cases)

Section II: Crisis Management Problems (41 cases)

Section III: Crisis Descriptions (307 cases)

Users may, at any point, return to the Main Control Program and move to any other section of the executive aid.

SYSTEM SECTION I

The first analytical section of the executive aid is designed to assist DoD crisis managers in evaluating proposed courses of action and sets

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[3] The ARPA Logo Program, which precedes the Introductory Program, also identifies the Cybernetics Technology Office of the Defense Advanced Research Projects Agency as the sponsor of the executive aid.

of U.S. objectives based on data from 101 crises involving the United States between 1956 and 1976. The three programs in this section allow the user to

1. Search for cases having user-specified U.S. actions or objectives,
2. List U.S actions or objectives in specific historical cases, and
3. List the U.S. actions which were most commonly associated with selected U.S. objectives.

The crisis data base includes information on the presence or absence of 57 types of U.S. actions and 48 types of objectives (Tables 1 and 2) during each crisis. The 101 crises included in this file are described in Chapter 3.

The first and second programs in this section of the system allow users to search for analogies and historical precedents in the course of considering crisis options. For example, Program 1 would provide an answer to questions such as: "In what previous cases has the United States had the objectives of restoring a regime and denying political and military access to some other power?" Program 2 would identify "What were U.S. actions and objectives in 1975 after Cambodian forces seized the S.S. Mayaguez?"

Program 3 allows users to identify the historical association between U.S. actions and objectives. This can be done for one objective or for any set of objectives. The measure of association used in this program is conditional probability, based on the frequency with which actions and objectives were associated in the 101-case sample of crises. The program prints, and displays graphically, all conditional probabilities greater than 0.50.

The user is also given the option of weighting objectives. By weighting the user can attach greater relative importance to some subset of the

TABLE 1

U.S. Actions

1 Commit Land Forces To Combat
2 Commit Sea Forces To Combat
3 Commit Air Forces To Combat
4 Commit Support Services (Land)
5 Commit Support Services (Sea)
6 Commit Support Services (Air)
7 Reposition Land Forces
8 Reposition Sea Forces
9 Reposition Air Forces
10 Threaten Nuclear Forces As A Deterrent
11 Redeploy Nuclear Forces As A Deterrent
12 Change Alert Status Of Nuclear Forces As A Deterrent
13 Threaten Nonnuclear Forces As A Deterrent
14 Redeploy Nonnuclear Forces As A Deterrent
15 Change Alert Status Of Nonnuclear Forces
16 Redeploy Peacekeeping Forces
17 Show Of Military Force
18 Military Blockade Or Quarantine
19 Isolated Military Contact
20 Military Forces Used In Search And Rescue Operation
21 Military Intelligence Collection
22 Military Intelligence Dissemination To An Ally
23 Military Intelligence Dissemination To An Antagonist
24 Military Maneuvers Or Training Exercises
25 Improve, Maintain Force Readiness
26 Covert Military Operation
27 Military Intervention Between Combatants
28 Airlift Personnel And/Or Supplies And Equipment
29 Provide Military Advisory Assistance
30 Provide Military Training For Combat Troops
31 Provide Other Military
32 Draw Down Military Equipment From U.S. Depots
33 Provide Supplies From U.S. Depots
34 Provide Supplies From Nonmilitary Sources
35 Provide Military Maintenance Assistance
36 Provide Other Military Logistics Assistance
37 Provide Other Military Assistance
38 Make Pol/Eco Commitment Implying New Mil Mission
39 Undertake A New Military Mission
40 Accept A New Military Cost
41 Modify An Existing Defense Treaty
42 Modify An Existing Base Rights Treaty
43 Modify An Existing Status Of Forces Agreement
44 Seek Assistance In Decision-Making
45 Take No Military Action
46 Employ Diplomacy
47 Mediate A Dispute
48 Threaten To, Or Actually, Withdraw Support
49 Advocate/Support Peacekeeping Efforts
50 Improve Scientific/Technical Capabilities
51 Reaffirm Existing Political/Military Commitment
52 Lodge Protest(s)
53 Other
54 U.S. Acts Alone
55 U.S. Acts With One Other Nation
56 U.S. Acts With Two Or More Other Nations
57 United Nations Involved

TABLE 2

U.S. Objectives

1	Deter Imminent Attack
2	Improve Or Rectify Deterrence Posture
3	Put Down Rebellion
4	Restore A Regime
5	Regain Access To Economic Resources
6	Restore Peace
7	Restore Territorial Integrity
8	Restore Military Balance Of Power
9	Restore Readiness
10	Preserve Readiness
11	Preserve Peace
12	Confirm Or Reestablish Prestige
13	Preserve Territory And/Or Facilities
14	Preserve Regime From External Threat
15	Preserve Regime From Internal Threat
16	Preserve, Restore, Or Improve Alliance
17	Protect Legal And Political Rights
18	Induce Maintenance Of Current Policy
19	Dissuade From A New Policy
20	Protect A Military Asset
21	Support A New Government
22	Induce National Reorientation
23	Induce Adoption Of A New Policy
24	Bring About The Fall Of A Regime
25	Support Insurgency
26	Deny Political Access
27	Deny Military Access
28	Assure Continued Economic Access
29	Preserve Or Regain Control Of The Sea
30	Preserve Or Regain Control Of The Air
31	Deny Success To Terrorists Or Hijackers
32	Protect Human Life
33	Provide Sanctuary Or Asylum
34	Support Critical Negotiations
35	Discover Intentions Or Actions
36	Prepare For Alternative Missions
37	Support Efforts By The United Nations
38	Contain Opponent(s)
39	Prevent Spread Of War
40	Preserve Line Of Communications
41	Regain Technical Advantage
42	Restore Prestige
43	Preserve Balance Of Power
44	Prevent Spread Of Communist Influence
45	Prevent Nuclear Proliferation
46	Insure Self-Sufficiency
47	Avoid Direct Involvement
48	Preserve Secrecy

objectives. After this has been done, the program calculates new conditional probabilities which take the relative weights assigned to each objective into account.[4]

SYSTEM SECTION II

The second major analytical section of the executive aid uses a data base dealing with the crisis management problems that were encountered in 41 U.S. crisis operations form 1956 to 1976.[5] The crisis management problems have been organized into 18 categories, with more specific types of problems existing within each category (Table 3). As was the case in the first system section, problems are coded as being present or absent for each of the 41 cases.

Programs in Section II allow the user to search for historical precedents and analogies by listing the problems encountered in a user-specified case or by searching for all cases having a selected set of problems. The user can also instruct the aid to list the 41 cases and the set of 18 problem categories.

SYSTEM SECTION III

This section of the executive aid is based on a data file covering 307 crises involving the United States over the period 1946-1976. Users can employ this portion of the aid to identify trends, historical precedents, and patterns in U.S. crisis operations. The program allows the user to select crises by year(s), location (JCS regions), and by any of 20 general crisis descriptors (Table 4).

Like the other components of the aid, during crises this section can be employed by crisis managers in their search for historical precedents and

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[4] The algorithms employed are described in Chapter 3.

[5] These cases are described in Chapter 3.

TABLE 3

Categories and Types of Crisis Management Problems

1. System-Related Delays in Decision-Making/Action

Delayed Decision on Action
Delayed Transmission of Decision/Orders
Extensive Interagency Coordination Required for Action
Concurrence(s) Legally Required for Proposed Action
Referral to Internationl Agencies (UN, NATO, OAS) Required
President Involved as Decision-Maker

2. System/Procedural Constraints on Actions

Security/Sensitivity
Misperception of Constraints
Constraints on Military Action
Consideration of U.S. Domestic Impact
Consideration of International Relations
Proposed Action Produces Domestic Policy Conflict
Proposed Action Produces Foreign Policy Conflict

3. Legal Issues Involved

Legality of Proposed Action Is an Issue
Presidential Approval Legally Required

4. Resources Inadequate for Decision-Making/Action

Inadequate Communication Facilities
Inability to Reinforce Local Units in Time
Inability to Provide Additional Logistical Support

5. Intelligence Failures at Decision-Making Level

Inadequate Intelligence Input for Decision-Makers
Delay in Securing Adequate Facts
Failure to Recognize Importance of Information Received

6. Emotional/Ideological Issues Involved in Decision-Making

Crisis Actions Affected by Ideological Issues
Crisis Actions Affected by Emotional Issues

7. Interpersonal Factors in Decision-Making

Multilingual Problems
Press Relations/Public Information on Significant Factors
Delay in Contacting Proper Individuals
Distracted Attention Due to Multiple Crises

8. Prolonged Crisis Problems

Boredom
Fatigue
Frustration
Turnover of Key Personnel

9. Problems in Selecting Action Personnel

Choice of Commander and Staff
Sudden Call-Up/Dispatch of Troops
Intermediate Headquarters/Chain of Command
No Clear Lines of Responsibility to a Single Commander
Loss or Transfer of Key Personnel

Continued

Table 3
Crisis Management Problems
Continued

10. Constraints on Operations

Joint Operation-Language
Action in Friendly Country (Area)
Action in Hostile Country (Area)
Delay in Receipt of Decision/Orders
Public Relations/Press Censorship
Inadequate Communications for Operating Forces

11. Physiological Problems for Operating Forces

Fatigue
Lack of Activity-Boredom

12. Information Failures by Operating Forces

Fail to Acquire Adequate Information in Time
Act on Inadequate/Incorrect Information
Delay/Fail in Transmission of Information

13. Failures in Taking Appropriate/Timely Action

Action Inadequate to Prevent Crisis
Action Inadequate to Solve Crisis
Forces Inadequate to Solve Crisis
Fail to Execute Action in Time
Inadequate Local Logistic Support to Accomplish Objectives
Inadequate Control of Local Forces

14. FORSTAT Problems

Readiness of Forces
Availability of Forces (Priority)
Choice of Units
Availability of Equipment
Availability of Lift (Sea/Air)
Consideration of Replacement Requirements in Deploying Units

15. Problems in the Operating Environment

Geography - Terrain - Climate
Distance to Crisis Area
Unique Logistics/Communications Requirements
Need for Additional/Special Intelligence
Security/Sensitivity a Factor

16. General Problems in Crisis Planning

No Appropriate Plans Ready for Crisis Contingency
Contingency Plans Exist But Are Inadequate
Contingency Plans Exist But Are Not Followed

17. General Problems in Crisis Handling

Situation Not Recognized Initially; Action Not Ti-ely
Situation Recognized; Actions Inadequate
Crisis Develops Despite Adequate Actions
Overreaction to Crisis
Late U.S. Military Involvement
U.S. Military Involved at Onset

18. General Problems in Crisis Timing

Situation Develops Over Time Before Crisis Level Is Reached
Situation Develops Over Time But Crisis Is Sudden
Crisis Occurs Without Warning
Sudden Crisis With Prolonged Action/Solution
Prolonged Crisis With Intermittent Peaks
Multi-Crises

TABLE 4

General Crisis Descriptors and Level of Crisis Activity[a]

A. Precrisis Period

1. Precrisis Activity
   1 = Routine-not focused on ensuing or related events
   2 = Tense-gradual escalation of focused activity
   3 = Increased Readiness-activities focused on crisis

2. Duration of Precrisis Activity
   1 = None-Crisis occurs without warning
   2 = Short (<30 days)
   3 = Extended (>30 days)

B. Crisis Period

3. Crisis Activity
   1 = Internal or domestic
   2 = International

4. Nature of the Crisis
   1 = Political
   2 = Military
   3 = Both

5. Duration of the Crisis Activity
   1 = Short (<7 days)
   2 = Moderate (7-30 days)
   3 = Extended (>30 days)

C. Postcrisis Period

6. Crisis Resolution
   1 = Quick (within 7 days after peak)
   2 = Moderate (within 30 days after peak)
   3 = Extended (over 30 days)

7. Crisis Outcome
   1 = Positive (U.S. objectives and interests advanced)
   2 = No Change.
   3 = Negative (U.S. objectives and interests damaged; U.S. influence lessened)

D. Crisis Descriptors

8. Awareness of Crisis Possibility
   1 = Anticipated-on basis of indications monitoring
   2 = Uncertain-abnormal activity seen; meaning not clear
   3 = Surprise-no forewarning of crisis

9. Threat to U.S. Interests
   1 = Low-no significant threat to U.S. interests, security
   2 = Moderate-some threat to U.S. interests, personnel, facilities, or relations
   3 = High-severe threat to U.S. interests

10. Threat Timing
   1 = Rapid (<7 days)
   2 = Extended (>7 days)

11. Decision Time
   1 = Short-rapid response required
   2 = Extended-attention demanded but not quick response

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[a] Each variable chosen to describe crises has two or more levels associated with it.

The following list of crisis descriptors includes definitions of the levels.

For example, for 'Duration of the Crisis Activity':
CODE '1' means short (<7 days)
CODE '2' means moderate (7-30 days)
CODE '3' means extended (>30 days)

Table 4
General Crisis Descriptors and Level of Crisis Activity
Continued

E. Nature of Confrontation or Crisis

12. Direct-Two or More Large Powers
    0 = Not applicable
    1 = U.S. involved
    2 = U.S. not involved

13. Direct-Two or More, One a Large Non-U.S. Power
    0 = Not applicable
    1 = One party vital to U.S. interests
    2 = No participant vital to U.S. interests

14. U.S. and One or More Small Powers
    0 = Not applicable
    1 = Another large power has vital interests
    2 = No large power has vital interests

15. Two or More Small Powers
    0 = Not applicable
    1 = One party vital to U.S. interests
    2 = No participant vital to U.S. interests

16. Internal Crisis or Civil War
    0 = Not applicable
    1 = Occurs in a country vital to U.S. interests
    2 = Occurs in a country where U.S. has no vital interests
    3 = Occurs in U.S.

F. *Crisis Location*

    1 = North America
    2 = Central and South America
    3 = Western Europe, Mediterranean, Atlantic
    4 = Eastern Europe and Soviet Union
    5 = Middle East and North Africa
    6 = South Asia, Indian Ocean, and Sub-Saharan Africa
    7 = Pacific and East Asia
    8 = Polar Regions (Arctic and Antarctic)
    9 = Space
    0 = Multiple, the World

G. U.S. Involvement

17. U.S. Response, Participation
    1 = Noninvolvement
    2 = Mediation
    3 = Providing assistance (military or political)
    4 = Direct (U.S. personnel beyond advisor level involved)
    5 = Direct confrontation with another nation

18. U.S. Objectives in Crisis Resolution
    1 = None
    2 = Maintain/restore status quo ante
    3 = Change previous status

19. Strategic Implications
    1 = Nonnuclear
    2 = Nuclear

analogies in the course of considering crisis options. During noncrisis periods it can be used as a teaching device that outlines U.S. crisis management experience since World War II.

THE "HELP" PROGRAM

A user may at any time request assistance by pressing the key marked "HELP," which activates the HELP program. HELP provides several different types of information. It prompts the user by asking simple questions that can be answered with "yes" or "no."

The first segment of HELP is designed for new system users. This section

- Provides general information about the system, for example, the use of the keyboard,
- Presents the program-defined keys (REPEAT, MAIN, EXIT, and HELP), and
- Describes the standard keyboard keys (RETURN, CLEAR, BREAK, HOME/PAGE).

Subsequent segments of HELP provide additional descriptive information concerning the three major system sections and associated data files.

CHAPTER 3. DATA USED IN THE EXECUTIVE AID

INTRODUCTION

CACI's crisis management aid is based on data from past U.S. international crises. These data guide the user in selecting and evaluating potential responses to international crises. Rather than deriving information from the user's subjective assessments, the aiding system gives the user an historical perspective on the course(s) of action being considered for a current crisis and the types of crisis management problems that might be encountered. It provides a form of institutionalized memory to expand the range of information and analogies available to the user.

Data on past U.S. crises or data-based analyses of past U.S. crisis behavior are used to assist decision-makers in three ways:

- Basic information concerning precedent crises is presented to expand the range of alternative analogies available to the user. This broadens the consideration given to alternative responses to the crisis when time, organizational, and individual pressures to exclude options from consideration are likely to be the greatest.
- Empirical parameters, derived from past U.S. behavior in crises, are used to help the analyst/planner to evaluate how well certain actions might contribute to the achievement of a particular objective.
- Analogies based on combinations of historical occurrences are available to help the user determine the most advantageous means to achieve sets of objectives.

DATA BASES

The executive aid is based on three distinct data files, each tailored to a specific range of analytical problems. The data sets are:

- A set of variables dealing with 307 U.S. crises over the period 1946-1976 which provides descriptive information concerning U.S. military management during each incident and presents a selected set of general crisis descriptors.
- A file of 101 U.S. crisis operations over the period 1956-1976 that focuses on U.S. actions and objectives during the crises. Crises are coded on 57 U.S. actions and 48 U.S. objectives.
- A sample of 41 crises involving the United States during the period 1946-1976 which presents the major crisis management problems that the United States encountered in these operations. Eighteen major crisis management problems are identified and coded.

Each of these data files corresponds to one of the aid's major System Sections discussed in Chapter 2.

Crisis Descriptor Data

A review of public sources resulted in the identification of 307 domestic and international crises involving the United States over the period 1946-1976. Each of these "crises" met the operational definition of "crisis" as a form of extraordinary military management activity, as presented in Chapter 2.

After these cases were identified, they were coded on 19 crisis descriptor variables (these variables were presented in Chapter 2, Table 4). Public sources were used for the coding. An initial analysis of the quality of information on problems encountered in U.S. crises between 1946 and 1975 (CACI, 1976) suggested that public reporting on U.S. crisis behavior provided sufficient information to allow for reliable coding.

Additional study of a number of official (but unclassified) U.S. Government publications, such as command histories, reports to the Congress, and annual reports by the Secretary of Defense and the secretaries of the three services, suggested that sufficient information for binary coding (that is, the identification of the presence or absence of a characteristic, action, objective, or problem) was available in the open source materials.[1]

The data manipulation features of the aid allow users to search for sets of precedent crises in the course of considering crisis options (for example, the identification of the set of Middle Eastern crises since 1967). Analyses of the data contained in this file are presented in CACI (1976). Highlights of this earlier analysis are summarized in Chapter 4 of this report.

Crisis Actions and Objectives Data

The actions and objectives data file consists of 101 crises involving the United States over the period 1956-1976. Unlike the crises contained in the other two data bases, only international crises are included in the sample. Case selection for the file also considered some of CACI's major empirical findings on crisis behavior (CACI, 1976). Most of the crises selected were politico-military since this type of incident was the variety of crisis most commonly encountered in recent U.S. history. Major power crises were emphasized, as were crises completed in less than 7 or more than 30 days. Geographical location and time of occurrence were also stressed, with an oversampling of more recent (1970-1976) crises and an undersampling of 1950's era incidents.

Table 1 in Chapter 2 lists the 57 types of U.S. crisis actions that were coded for the 101 cases. Table 2 in Chapter 2 presents the 48 varieties of objectives that were coded for the same set of incidents. Both types of variables were coded in a binary (applicable/nonapplicable) fashion.

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[1] The data found in the other two crisis data files are also based on open source materials.

The United States seldom pursues only one objective in a crisis. Instead, a number of objectives, some of which may be inconsistent, are pursued simultaneously. To respond to a very real crisis management problem -- how response options should be evaluated given multiple policy objectives -- the executive aid includes an algorithm for evaluating the association between actions and objectives in the 101-case sample.

The actions and objectives data were used to generate empirical parameters for the executive aid's algorithm. These parameters serve two purposes. First, they aid analysts in evaluating the relationship between one or more actions that the United States might take in a crisis and any single objective that the United States might wish to pursue in that incident. Second, they are used to develop information on a set of actions across a set of user-specified objectives.

Initial attempts to develop parameters linking actions to objectives using regression or regression-like solutions (such as probit analysis) proved unsuccessful given the often skewed data distributions. Accordingly, all of the parameters included in the model are conditional probabilities of the occurrence of any of the 57 U.S. actions given any of the 48 U.S. objectives. The probabilities were developed from simple frequencies of occurrence drawn from contingency tables for all 57 actions and all 48 objectives.[2]

Crisis Management Problems Data

The crisis management literature consists largely of case studies and has not, for the most part, systematically identified general categories

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[2] The executive aid uses all probabilities of 0.50 or larger. Since probabilities for each action and objective pair have been computed by CACI, this 0.50 cutoff value can be readily modified. Users are also given the option of weighting actions to produce new sets of conditional probabilities.

of crisis management problems.[3] Accordingly, one phase of CACI's analysis of U.S. crisis behavior focused on the identification of the types of crisis management problems that the United States has encountered and is likely to encounter in the future.

The 307-case crisis inventory served as a base for identifying a sample of 41 cases. Detailed analysis of these data, reported in CACI (1976), revealed that more than 70 types of problems variables tended to cluster in 18 major problem areas (Table 3 in Chapter 2 presents both the problem variables and the clusters).[4] The clusters focused on

- Crisis event and reaction problems occurring at all command levels,
- Operational problems encountered in echelons below the National Command Authority (NCA), or
- National-level problems occurring at the highest command levels and at the interface of the different services and civilian and military crisis managers.

DATA GENERATION

Three analysts from CACI's professional staff (two with Ph.D.'s and military backgrounds, one with a Ph.D. and some military service) coded the data on crisis characteristics, actions, objectives, and problems. As noted previously, each variable was coded in a binary (present/absent) form, and only unclassified sources were used for the coding.

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[3] This literature has most recently been reviewed for ARPA in Shapiro and Gilbert (1975). Other major discussions of this research are found in Zinnes (1976), Hoole and Zinnes (1976), Holsti (1972), Janis (1972), Hermann (1972, 1969), Tanter (1974), Candela and Tanter (1974), Holsti, et al. (1968), Allison (1971), and many, many others. Attempts to develop organizational guidelines from this literature are found in Shapiro and Cummings (1976), Havron and Blanton (1977), Hermann (1975, 1974), Milburn (1969), and Phillips (1977).

[4] This data base is currently being increased to 100 international crises to provide a stronger basis for statistical analyses.

Within each of the three data files, each case was coded by one coder, who conducted a "mini-case study" on the crisis to provide a basis for coding. After sets of crises had been coded in this fashion, the three coders met and each justified his codings. This form of "consensus" or "confrontational" coding was used in preference to blind independent coding of the same crises because the requirement to conduct a mini-case study for each crisis made it impractical to blind-code enough cases for reliable statistical comparisons.

CHAPTER 4. ANALYSES OF THE CRISIS DATA SETS

INTRODUCTION

CACI's executive aid provides crisis planners and decision-makers with analytical tools that can be used to examine precedent crisis characteristics, actions, objectives, and problems in the course of considering crisis action options. This chapter presents analyses of the three crisis data bases. Because the crisis descriptors and crisis problems data bases have been analyzed in considerable detail in a previous ARPA-sponsored report (CACI, 1976), only selected highlights from that volume are presented here. Primary attention is given to analysis of the 101-case data base dealing with crisis actions and objectives.

CRISIS CHARACTERISTICS

Over the period 1946-1975, there were 289 crises of concern to the United States.[1] An examination of the frequency of these incidents over time (Figure 1) suggests that post-war involvement in international crises fell into three periods. The first period, from 1946 to 1953, was marked by a generally steady increase in the number of incidents up to 1953 and a sharp decline in 1954. This is the early Cold War phase of post-war U.S. political-military policy. The end of this phase is coincident with the death of Stalin. The second crisis period, 1954-1965, was characterized by an increase in the number of crisis events involving Third World nations. The third period, from 1966-1975, was characterized by a general decrease in the number of crises involving the United States. A fourth period may have been initiated in 1976, when 17

[1] This presentation focuses on the period 1946-1975, the span analyzed in CACI (1976). Seventeen crises that occurred in 1976 are included in the data base, plus one other case that has been added in the other years because of research performed since 1976. As noted in the text, it is not clear whether 1976 was an exceptional year or the beginning of a new phase in U.S. crisis involvement.

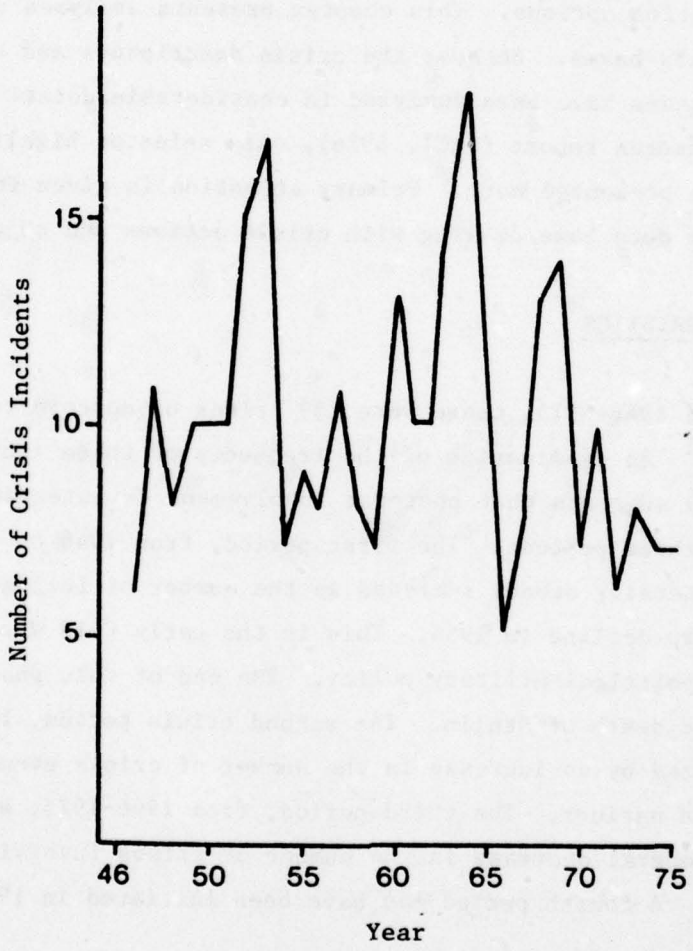

Figure 1. Time Plot of Crisis Incidents

crisis events were recorded. However, it is possible that this is simply an exceptional year.

A number of trends stand out over time when the most recent period (1966-1975) is contrasted to the earlier two phases:

- The geographic focus of the crises has shifted; there are relatively fewer events in the Eastern Europe-Soviet Union and East Asian regions and proportionately more Southeast Asian, Western European/Mediterranean, and domestic U.S. crises.
- The United States has increasingly become directly involved in the crises.
- At the same time, however, the outcomes of the crises have become relatively less favorable to the United States, with a substantial increase in the number of cases that result in lessened U.S. influence.
- There has been a bifurcation in the speed of crisis resolution: Crises tend to be resolved in either 7 days or less (40 percent) or in a period greater than 30 days (48 percent), with relatively few cases falling into the intermediate range.
- There has been a decrease in the number of large power-large power confrontations and an increase in the relative number of cases involving the United States and one or more small powers.
- The number of domestic (intranational) crises has increased.
- The percentage of crisis incidents involving both political and military factors has increased to the point where such events make up more than half of the cases in the 1966-1975 period.

CRISIS MANAGEMENT PROBLEMS

Eighteen clusters of crisis management problems were identified in CACI (1976). These clusters of problems, in turn, formed three general sets of problem types:

- Crisis event and reaction problems.
- Operations problems occurring at all command levels.
- National-level decision-making problems.

Forty-one cases were included in the crisis management problems data base. As a result, trend analyses are more difficult because of the small number of cases in each subperiod (11 in 1946-1953; 16 in 1954-1965; 14 in 1966-1975). The clearest trends exist for the operational problems set, with the 1966-1975 period characterized by increases in the relative frequency of support and logistics, force status, information, and communications problems.

Statistical analyses were performed to identify the characteristics of the crises that were most strongly associated with crisis management problems. Five variables from the crisis descriptors data base were significantly related to at least one-third of the crisis management clusters:

- Limited time for crisis decision-making.
- Severe threat to U.S. interests.
- Crisis buildups occurring in less than 30 days.
- Direct involvement of U.S. personnel in the crisis operation.
- Crisis activity lasting more than 30 days.

Moreover, it was found that these five factors (plus a sixth -- crisis buildups occurring in more that 30 days) were related to different sets of crisis management problems. The strongest relationships between these crisis characteristics and the three sets of crisis management problems are summarized in Table 1.

EXAMINING U.S. ACTIONS AND OBJECTIVES DATA

An important element of crisis management decision-making is understanding what actions or combinations of actions are most likely to promote desired objectives in different crisis environments. The actions and objectives data file of the CACI crisis management executive aid is intended to enable the crisis manager to examine what actions have been most strongly associated with any single objective over a sample of U.S. crises since 1956. While this does not provide an assessment of the efficacy of the actions for achieving the objectives, it does supply information that can assist decision-makers and planners in selecting action options.

In conjunction with development of the executive aid actions and objectives data file, CACI examined the frequencies and cross-sectional relationships between U.S. actions and objectives in 101 crises. The analyses covered the 101 crises as a set and subsets of crises drawn to cover the date of occurrence and type of U.S. adversaries involved. Date of occurrence was examined to test for shifts in U.S. crisis behavior over time in response to changes in the international system (such as increased system complexity, greater economic interdependence, and diffusion of power throughout the system). Accordingly, the 101 crises were divided into 54 crises that occurred between 1956 and 1965 and 47 crises between 1966 and 1976.[2] As a second subset criterion, CACI identified 45 of the 101 crises that involved one or more Communist countries or

[2] Previous analyses (CACI, 1976; Blechman and Kaplan, 1977; Mahoney, 1976b) indicate that 1966 was a watershed year in U.S. involvement in international crises.

TABLE 1

Summary of Regression Results by Type of Crisis Management Problem

	Crisis Event and Reaction Problems	Operations Problems	National-Level Decision-Making Problems
Crisis buildup occurs in less than 30 days		X	
Crisis buildup occurs in more than 30 days			X
Precrisis monitoring not focused on ensuing or related events		X	
Limited time available for crisis decision-making		X	
Severe threat to U.S. interests	X	X	
Crisis activities last more than 30 days			X
U.S. personnel directly participate in the crisis response	X		

groups. These 45 cases were examined for variations in crisis behavior as a result of activities by a major U.S. adversary.

U.S. policy objectives and actions were examined separately. Frequency distributions for all 101 cases were examined. Subsets of cases were then analyzed. The data were factor analyzed to search for latent patterns in 101 cases and in the various subsets.[3] Analyses for U.S. policy objectives are presented first, followed by U.S. actions.

U.S. Policy Objectives in Crises

Data were coded for 48 U.S. policy objectives. For ease of analysis, 30 of these 48 objectives are examined in this section. The 30 objectives reported here are those that showed the clearest definition and the most consistent patterns.

Frequency Distributions. Table 2 lists the frequency distributions for 30 key U.S. policy objectives in the full sample of 101 crises and in the subsets of crises selected by date group and crisis adversary. The first column, showing U.S. objectives in all 101 crises, indicates that protection of legal and political rights (50 cases), protection of military assets (40), preserving a regime from external threat (34), preventing the spread of Communist influence (32), and preserving territory or facilities (31) were the most common U.S. policy objectives. Least frequent U.S. objectives were regime restoration (1), insuring self-sufficiency (2), preventing nuclear proliferation (3), restoring military readiness (5), and regaining access to economic resources (5).

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[3] Principal components with varimax orthogonal rotation were derived. Rotated solutions are presented in this section, although unrotated solutions had an almost identical structure.

TABLE 2

Frequency Distribution of U.S. Objectives

	1956-1976 Crises	1956-1965 Crises	1966-1976 Crises	Crises With Communist Adversaries	Crises Without Communist Adversaries
Deter imminent attack	13	08	05	07	06
Improve or rectify deterrence posture	25	15	10	15	10
Put down a rebellion	09	06	03	03	06
Restore a regime	01	01	00	01	00
Regain access to economic resources	05	01	04	01	04
Restore peace	28	18	10	13	15
Restore territorial integrity	14	08	06	09	05
Restore military balance of power	21	09	12	14	07
Restore readiness	05	02	03	03	02
Preserve readiness	24	08	16	06	18
Preserve peace	28	13	15	14	14
Confirm or reestablish prestige	32	14	18	19	13
Preserve territory or facilities	31	19	12	20	11
Preserve regime from external threat	34	22	12	20	14
Preserve regime from internal threat	24	16	08	10	14
Preserve, restore, or improve alliance	27	15	12	11	16
Protect legal and political rights	50	28	22	24	26
Induce maintenance of current policy	21	16	05	11	10
Dissuade from a new policy	23	11	12	11	12
Protect a military asset	40	24	16	19	21
Assure continued economic access	19	11	08	03	16
Preserve or regain control of sea	09	05	04	07	02
Preserve or regain control of air	08	03	05	07	01
Contain opponents	16	08	08	11	06
Prevent spread of war	20	11	09	10	10
Preserve lines of communication	13	06	07	02	11
Preserve balance of power	29	11	18	13	16
Prevent spread of Communist influence	32	17	15	15	17
Prevent nuclear proliferation	03	02	01	02	01
Insure self-sufficiency	02	02	00	02	00
Number of Crises	101	54	47	45	56

For the most part, U.S. policy objectives during crises appear to have changed little over the 20-year period. In only a small number of instances are the changes notable:

- Preserve balance of power increased from 11 cases in 1956-1965 to 18 cases between 1966-1976.
- Preserve readiness increased from 8 cases in 1956-1965 to 16 cases over the next 10 years.
- Confirm or reestablish prestige grew from 14 to 18 cases over the two time periods.
- Restore military balance of power occurred in 9 cases in the first time period and in 12 cases after 1966.

In short, the objectives that changed most over the two periods are those more consistent with a defensive policy in which global deterrence predominates. More offensive policy objectives, such as regional uses of military force, are less commonly observed.

Table 2 also presents variations in policy objectives by type of adversary. To simplify these variations Table 3 displays variations in the 10 most common U.S. objectives (across all 101 crises) by type of adversary. Among the 30 policy objectives, four appear to vary significantly depending on whether the United States is confronting a Communist adversary.

1. Preserve territory or facilities (found in 20 crises in which the United States faced Communist adversaries and 11 when it did not).
2. Preserve a regime from external threat (present in 20 crises involving Communist adversaries and 14 crises when Communist adversaries were not present).
3. Confirm or reestablish prestige (19 cases with Communist adversaries and 13 cases without a Communist adversary).
4. Preserve, restore, or improve alliance (11 with Communist adversaries and 16 without).

TABLE 3

Most Frequent U.S. Objectives by Type of Adversary, 1956-1976

	Crises in Which U.S. Faced Communist Adversaries	Other Crises	Total
Protect legal and political rights	24	26	50
Protect military asset	19	21	40
Preserve regime from external threat	20	14	34
Confirm or reestablish prestige	19	13	32
Prevent spread of Communist influence	15	17	32
Preserve territory or facility	20	11	31
Preserve balance of power	13	16	29
Preserve peace	14	14	28
Restore peace	13	15	28
Preserve, restore, or improve alliance	11	16	27
Number of Cases	45	56	101

In all other cases, the frequency of objectives did not vary significantly across the different types of adversaries.

Patterns of Objectives. The 30 core U.S. policy objectives were factor analyzed across the 101 crises and the various temporal and adversary subsets. Table 4 presents the results of these analyses for 101 crises. Using a factor loading of 0.40 or higher to guide interpretation suggests that the first factor is a containment of communism dimension, the second a preservation of U.S. military capability and protection of U.S. interests factor, and the third a preservation of stability and peace dimension. The fourth factor is a mixed pattern involving restoration of control or readiness.

Factor analysis of subsets of crises (Table 5) varied substantially. Containment, the major policy objective during 1956-1965 and when the United States faced Communist adversaries, declined in importance after 1966 and when non-Communist adversaries were faced. Between 1966-1976 containment was the second most important policy objective cluster. In crises with non-Communist adversaries, containment was the third most important factor. Similarly, preserve stability moves from fourth to first in importance over the two time subsets and over the different types of adversaries.

Tables 6 and 7 compare the highest loading items for the first factor in each of the subsets reported in Table 5. Thus, Table 6 shows the highest loading items from the first factor extracted for the 1956-1965 data (containment) and the 1966-1976 data (preserve stability). Table 7 compares the same information for the first factor derived using data in which the United States faced Communist adversaries (containment) with the first factor for the non-Communist adversaries (preserve stability). The clusterings of major factor loadings clearly show wide differences in the structure of the first factor among the four crisis subsets.

TABLE 4

Factor Structure of U.S. Objectives in 101 Crises, 1956-1976[a]

Variables	Factor 1	2	3	4
Prevent spread of Communist influence	.69	.21	.07	.09
Preserve balance of power	.64	.22	-.08	.02
Contain opponents	.57	-.04	.18	.05
Restore military balance of power	.51	.11	.11	.28
Prevent spread of war	.46	-.16	.26	.54
Preserve regime from external threat	.46	-.14	.21	.16
Preserve, restore, or improve alliance	.43	-.04	.04	.21
Deter imminent attack	.40	.09	-.14	.35
Protect a military asset	-.19	.68	-.16	.24
Preserve lines of communication	.10	.60	-.12	-.11
Protect legal and political rights	.01	.52	-.06	.14
Improve or rectify deterrence posture	.26	.45	-.03	.23
Preserve readiness	.25	.45	-.25	-.35
Confirm or reestablish prestige	-.06	.41	-.14	-.09
Put down a rebellion	-.07	.03	.80	.05
Restore territorial integrity	.16	.14	.58	.01
Preserve regime from internal threat	.10	-.15	.48	.00
Restore peace	.30	-.12	.47	.37
Preserve or regain control of sea	-.06	.11	-.12	.50
Restore readiness	.06	.08	.05	.46
Preserve or regain control of air	.05	.11	.03	.41
Restore a regime	-.02	-.09	.21	-.04
Regain access to economic resources	-.03	-.13	-.07	-.08
Preserve peace	.25	.22	-.19	-.18
Preserve territory or facilities	.29	.24	.01	.29
Induce maintenance of current policy	.21	.05	-.14	.11
Dissuade from a new policy	.22	.06	-.21	-.26
Assure continued economic access	-.00	.09	.09	-.30
Prevent nuclear proliferation	-.07	-.22	-.06	.01
Insure self-sufficiency	.03	.00	.04	.08
Percent variance explained	39	30	18	13

[a] Variance structure, orthogonal rotation. Variables with small cell sizes were dropped to minimize distortion.

TABLE 5

Major Factors of U.S. Objectives for Selected Subsets of Crises

Factors of U.S. Objectives	Percent Variance Explained
1956-1965 Crises	
1. Containment	41
2. Preserve capability/ protect interests	28
3. Preserve capability/ preserve stability	16
4. Preserve stability	14
1966-1976 Crises	
1. Preserve stability	39
2. Containment	27
3. Protect interests/ preserve capability	19
4. Miscellaneous	15

Factors of U.S. Objectives	Percent Variance Explained
Crises With Communist Adversaries	
1. Containment	41
2. Protect interests/ preserve capability	25
3. Preserve capability/ preserve stability	21
4. Preserve stability	14
Crises Without Communist Adversaries	
1. Preserve stability	34
2. Preserve capability/ protect interests	28
3. Containment	23
4. Preserve capability/ deterrence	16

TABLE 6

Comparing Dominant Objectives Factors
for 1956-1965 and 1966-1976 Crises

U.S. Objectives	Factor Loadings for First Factor After Orthogonal Rotation: 1956-1965 Crises	1966-1976 Crises
Deter imminent attack	.71	.57
Preserve regime from external threat	.56	.47
Preserve territory or facility	.55	.42
Preserve or regain control of air	.54	.01
Prevent spread of war	.53	.74
Prevent spread of Communist influence	.52	.25
Preserve balance of power	.49	.26
Preserve or regain control of sea	.49	.02
Improve or rectify deterrence posture	.45	.07
Induce maintenance of current policy	.40	.17
Preserve peace	.16	.46
Preserve regime from internal threat	-.00	.50
Restore territorial integrity	-.06	.53
Restore peace	.35	.78
Percent variance explained	41	39

TABLE 7

Comparing Dominant Objectives Factors by Type of Adversary

U.S. Objectives	Factor Loadings for First Factor After Orthogonal Rotation: Crises With Communist Adversaries	Crises Without Communist Adversaries
Prevent spread of Communist influence	.85	-.07
Contain opponents	.67	-.05
Restore military balance of power	.63	.09
Prevent spread of war	.63	.61
Preserve balance of power	.60	.01
Restore peace	.59	.63
Preserve regime from external threat	.54	.13
Preserve territory or facilities	.51	.11
Preserve, restore, or improve alliance	.47	-.07
Deter imminent attack	.45	.06
Improve or rectify deterrence posture	.44	.23
Restore territorial integrity	.41	.72
Preserve regime from internal threat	.23	.40
Restore readiness	-.02	.59
Regain control of air	.18	.62
Put down a rebellion	.27	.71
Percent variance explained	41	34

Table 6 indicates that the primary high loading items for the 1956-1965 crises (the containment factor) were a variety of actions that involved deterrence, status quo, and defensive policies. In the first factor in the 1966-1976 data, however, the highest loading items involved U.S. efforts to restore peace and government stability and prevent conflict. Relative to the earlier period, containment of Communist adversaries was given less emphasis. This finding is consistent with a number of commentaries on changes in the international system during this time period. U.S. actions focused more on peace and stability over the last 10 years and less on containing communism.

The primary clustering of U.S. policy objectives in crises with Communist adversaries (Table 7) consisted of containing Communist influence, maintaining balance of power, and preventing the spread of conflict. On the other hand, crises without Communist adversaries emphasized preserving peace and stability and maintaining U.S. military capability as the major policy objectives. Thus, some overlaps exist in the U.S. policy objectives pursued in crises, regardless of the nature of the adversary.

U.S. Actions in Crises

Data were coded for 57 U.S. crisis actions. This analysis uses 33 of these categories. Most of those excluded represent successive refinements of the categories covered in this analysis.

Frequency Distributions. Table 8 lists the frequency of occurrence of 33 U.S. actions in all 101 crises, sets of crises divided by time of occurrence, and sets of crises divided by nature of the adversary. In the 101 crises (the left-most column on Table 8), 8 actions occurred 20 times or more: employ diplomacy (74 instances), redeploy nonnuclear forces (31), reaffirm existing politico-military commitments (31), provide other military assistance (30), provide supplies from U.S. depots (29), lodge protests (23), reposition sea forces (20), and reposition air forces (20). Least frequent U.S. actions in the 101 crises included

TABLE 8

Frequency Distributions of U.S. Actions

U.S. Actions	1956-1976 Crises	1956-1965 Crises	1956-1976 Crises	Crises With Communist Adversaries	Crises Without Communist Adversaries
Commit land forces to combat	05	05	00	02	03
Commit sea forces to combat	03	02	01	02	01
Commit air forces to combat	04	02	02	03	01
Commit land support	17	10	07	07	10
Commit sea support	17	07	10	04	13
Commit air support	19	12	07	11	08
Reposition land forces	13	04	09	09	04
Reposition sea forces	20	13	07	12	08
Reposition air forces	20	09	11	16	04
Threaten nuclear forces	02	02	00	02	00
Redeploy nuclear forces	08	01	07	08	00
Change nuclear alert status	02	00	02	02	00
Threaten nonnuclear forces	15	10	05	05	10
Redeploy nonnuclear forces	31	17	14	19	12
Change nonnuclear alert status	10	07	03	06	04
Provide military advisory assistance	14	10	04	08	06
Provide training for combat troops	08	07	01	06	02
Provide other military training	06	03	03	03	03
Draw down equipment from U.S. units	02	00	02	01	01
Provide supplies from U.S. depots	29	17	12	14	15
Provide supplies from nonmilitary sources	09	04	05	04	05
Provide military maintenance assistance	04	03	01	01	03
Provide other military logistic support	15	10	05	10	05
Provide other military assistance	30	15	15	12	18
Employ diplomacy	74	38	36	30	44
Mediate a dispute	07	02	05	02	05
Threaten or do withdraw support	03	01	02	00	03
Advocate/support peacekeeping efforts	11	05	06	06	05
Improve scientific/technical capabilities	04	01	03	02	02
Reaffirm existing political/military commitment	31	18	13	16	15
Lodge protests	23	13	10	14	09
Other U.S. actions	07	04	03	04	03
Number of Crises	101	54	47	45	56

threatening nuclear forces (2 instances), drawing down equipment from U.S. units for assistance in the crisis (2), changing nuclear alert status (2), committing sea forces to combat (3), committing air forces to combat (3), and threaten to or actually withdrawing support (3).

The least frequently taken actions are extreme moves that are used only as a last resort. Their low frequency of use reflects the reluctance of decision-makers to take extreme measures in crises. In contrast, the most frequent categories mainly include low risk responses that do not foreclose peaceful conflict resolution and that are not likely to escalate the conflict. They are not irrevocable but they do signal U.S. resolve and capabilities in a crisis.

Analysis of the crises between 1956-1965 and those between 1966-1976 suggests that the United States became more careful in its use of military force over time. All instances of U.S. commitment of land forces occurred before 1966. At the same time, nuclear deterrent forces were increasingly used in strategic and tactical roles after 1966. A comparison of most common actions in crises with Communist adversaries and crises without Communist adversaries (Table 9) shows few variations across the two crisis subsets. Air forces were repositioned approximately four times more frequently in crises involving Communist adversaries than in crises without Communist adversaries.[4] Sea support forces were committed more than three times as often against non-Communist adversaries in crises than against Communist adversaries in crises. Many of these uses of sea support forces were to evacuate U.S. nationals in times of crisis. Other uses of sea power in crises involving less-developed countries brought forth cries of modern day "gunboat diplomacy." Repositioning air power in crises involving Communist adversaries is a highly visible and relatively low cost manipulation of force to achieve a desired outcome.

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[4] Blechman and Kaplan (1977) concluded that land-based, long-range air power was the most effective U.S. military force in crises.

TABLE 9

Most Frequent U.S. Actions by Type of Adversary, 1956-1976

U.S. Actions	Crises With Communist Adversaries	Crisis Without Communist Adversaries	Total Number of Crises
Employ diplomacy	30	44	74
Redeploy nonnuclear forces	19	12	31
Reaffirm existing political/ military commitment	16	15	31
Provide other military assistance	12	18	30
Provide supplies from U.S. depots	14	15	29
Lodge protests	14	09	23
Reposition sea forces	12	08	20
Reposition air forces	16	04	20
Commit air support	11	08	19
Commit sea support	04	13	17

Patterns of Actions. Table 10 presents the factors derived from U.S. actions taken in 101 crises between 1956-1976. Four interpretable factors result. First, a show of force factor built around various types of force redeployment and repositioning emerges. Second, a military aid and assistance factor is present. Third, a commitment to combat factor is identified, composed of commitment of air, sea, and land forces to action. Finally, a fourth direct involvement factor involving either "supplies from nonmilitary sources" (that is, a covert operation or assistance) or U.S. land forces is extracted.

Factor analyses were also completed for the subsets of crises by time period and by type of adversary (Table 11). The factor structures of U.S. actions change significantly over time as the importance of military aid and commitment of forces to combat declines from the first to the second time period, while deterrence became most important in the post-1966 time period.[5] Similarly, the predominant clusters of U.S. actions differed greatly depending on whether Communist adversaries were involved in the crisis. Against Communist countries or groups, the United States tended to reposition military forces (often as a deterrent). Against non-Communist adversaries, on the other hand, the United States more frequently committed military forces to combat situations.

Tables 12 and 13 compare the highest loading items for the first factor in each of the crisis subsets reported in Table 11. Table 12 shows the highest loading items from the first factor extracted for the 1956-1965 data (military aid) and the 1966-1976 data (deterrence). Table 13 compares the same information for the first factor derived using data in

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[5] U.S. military aid has declined in scope over the 1956-1976 time period. The value of U.S. military aid has increased for only a limited number of countries (such as Israel and South Korea) over the same period. Unambiguous historical support for the increased importance of deterrence is difficult to identify, however. Since the Dominican intervention of 1964, U.S. policy has involved far less actual or threatened use of force in crises at least as measured by the number of cases in which such uses occurred. The rise of the deterrence factor after 1966 may summarize this pattern.

TABLE 10

Factor Structure of U.S. Actions in 101 Crises, 1956-1976[a]

Variables	Factor 1	2	3	4
Reposition air forces	.80	.27	-.11	-.09
Reposition sea forces	.64	-.05	-.06	-.04
Redeploy nonnuclear forces	.55	-.10	.01	.11
Redeploy nuclear forces	.54	.04	-.04	.23
Change nuclear alert status	.51	-.11	.08	.20
Reposition land forces	.51	.03	-.15	-.06
Provide training for combat troops	.02	.70	-.06	.11
Provide military advisory assistance	.11	.65	-.07	-.13
Provide supplies from U.S. depots	.21	.62	.00	.09
Provide other military logistic support	.16	.58	-.05	-.07
Provide military maintenance assistance	-.08	.40	.06	-.05
Commit sea forces to combat	-.00	-.04	.74	.17
Commit air forces to combat	-.05	-.05	.69	.13
Commit land forces to combat	-.03	.15	.51	-.22
Provide supplies from nonmilitary sources	.05	.17	-.02	.41
Commit land support	-.12	.21	.39	-.41
Advocate or support peacekeeping forces	.36	-.03	.21	.38
Commit sea support	-.16	-.05	.01	-.35
Employ diplomacy	.07	.16	-.28	.35
Improve scientific-technical capability	-.09	-.05	-.03	-.31
Commit air support	-.18	.31	.13	-.30
Threaten nuclear forces	.25	.06	-.00	-.02
Threaten nonnuclear forces	-.02	.22	.13	.02
Change nonnuclear alert status	.37	-.12	.39	.04
Provide other military training	.05	.38	-.11	.21
Draw down equipment from U.S. depots	.09	.13	-.07	-.26
Provide other military assistance	.08	.30	.01	.05
Threaten to or do withdraw support	-.15	-.04	-.04	-.27
Reaffirm existing political-military commitment	.32	.23	.07	.03
Lodge protest	-.06	.04	.09	.23
Other U.S. actions	-.22	-.04	-.06	.12
Mediate a dispute	.18	-.06	-.07	.13
Percent variance explained	37	28	21	14

[a] Varimax solution, orthogonal rotation.

TABLE 11

Major Factors of U.S. Actions for Selected Subsets of Crises

Factors of U.S. Actions	Percent Variance Explained
1956-1965 Crises	
1. Military aid	36
2. Commit forces to combat	25
3. Reposition forces	21
4. Miscellaneous	17
1966-1976 Crises	
1. Deterrence	43
2. Commit military support	22
3. Reposition forces	19
4. Military aid	17

Factors of U.S. Actions in Crises	Percent Variance Explained
With Communist Adversaries	
1. Reposition forces	34
2. Military aid	28
3. Commit forces to combat	24
4. Miscellaneous	13
Without Communist Adversaries	
1. Commit forces to combat	29
2. Commit military support	27
3. Military aid	24
4. Reposition forces	20

TABLE 12

Comparing Dominant Actions Factors for 1956-1965 and 1966-1976[a]

	1956-1965 Crises	1966-1976 Crises
Provide military advisory assistance	.82	-.15
Provide training for combat troops	.81	-.05
Provide supplies from U.S. depots	.68	.05
Provide other military logistic support	.50	-.02
Reposition air forces	.49	.44
Provide military maintenance assistance	.48	-.04
Provide other military training	.42	-.01
Provide supplies from nonmilitary sources	.21	.50
Redeploy nonnuclear forces	-.06	.54
Reposition sea forces	-.02	.55
Change nonnuclear alert status	-.12	.61
Redeploy nuclear forces	.27	.64
Change nuclear alert status	--	.76
Advocate/support peacekeeping effort	-.05	.83
Percent variance explained	36	43

[a] Action categories with loadings less than 0.40 in both cases are not shown.

TABLE 13

Comparing Dominant Actions Factors by Type of Adversary[a]

U.S. Actions	Crises With Communist Adversaries	Crises Without Communist Adversaries
Advocate/support peacekeeping force	.76	-.05
Change nonnuclear alert status	.71	.06
Change nuclear alert status	.67	--
Reposition sea forces	.65	-.05
Reposition air forces	.62	-.05
Redeploy nonnuclear forces	.51	-.08
Redeploy nuclear forces	.51	--
Mediate a dispute	.45	-.09
Reaffirm existing political-military commitment	.40	-.10
Commit land support	-.15	.40
Commit land forces to combat	-.06	.65
Commit sea forces to combat	.11	.96
Commit air forces to combat	.03	.96
Percent variance explained	34	29

[a] Action categories with loadings less than 0.40 in both cases are not shown.

which the United States faced a Communist adversary (reposition forces) with the first factor for the non-Communist adversaries (commit forces to combat). As with the factors of U.S. policy objectives, the U.S. actions factors differ widely across the various subsets of crises.

Giving military aid was the dominant U.S. action prior to 1966. After 1966 the United States tended to redeploy, reposition, and increase the alert status of its forces.[6] In addition to clear changes in U.S. aid policy, the switch to repositioning may come from both changes in policy and changes in clarity with which "signals" to adversaries could be transmitted. Once aid is removed, manipulation of existing forces is a logical alternative means to show concern and resolve. Moreover, as worldwide monitoring capabilities of powers increased after 1966 (with the use of various types of electronic and photographic reconnaissance capabilities), repositioning of forces was more likely to be monitored and interpreted as a crisis-related activity.

Variations in U.S. actions in crises with Communist adversaries and without Communist adversaries are shown in Table 13. The clear differences in most common U.S. action clusters for differing types of adversaries are seen in this table. Against Communist adversaries, the United States sends signals and gestures with its forces, apparently depending on the extensive monitoring capabilities of these states to check such force positioning. Against non-Communist adversaries, the United States has more commonly committed forces in an effort to achieve U.S. objectives in the crisis. Sea and air forces are both very high loading items in these crises.

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[6] The highest loading item for 1966-1976, "advocate/support peacekeeping efforts," is coded to include actual commitment of support and the desire to support these efforts. Hence, it loads higher than any other action by including both words and deeds.

SUMMARY

This chapter has reviewed analyses performed to date on the three data files included in the CACI crisis management executive aid. The results of detailed analyses of the 307-case crisis descriptor data file and the 41-case crisis management problem data file, reported in CACI (1976), were summarized to provide the reader with an overview of the variety of research questions that may be approached through the executive aid. Finally, the results of analyses of the 101-case U.S. actions and objectives data were reported in considerably greater detail. The final chapter of the report discusses the evaluation and transfer of the executive aid.

CHAPTER 5. EXECUTIVE AID EVALUATION, TRANSFER, AND AVAILABILITY

EVALUATING THE PROTOTYPE EXECUTIVE AID

After the executive aid for crisis management was developed and tested internally at CACI, its performance as a crisis management tool was evaluated by demonstrating the aid to action officers throughout the Department of Defense (DoD). Given the operational constraints of a crisis center (significant threat, short decision time, involvement of senior personnel from the Department of Defense), the aid could not be tested and evaluated in "real time" crisis conditions. But individuals who have been involved in prior crisis center operations were shown the aid to help evaluate its usefulness for the crisis management aid. This evaluation assessed the crisis management aid along three dimensions.

1. Validity. Did the executive aid evaluate decision options in the same way as did action officers who saw the aid operate? Did the aid produce counter-intuitive results?

2. Reliability. Was the executive aid viewed as a means to enhance option evaluations? Did its results seem reproducible, precise, and accurate given the information available to the action officers?

3. Acceptance. Do those who have used the aid tend to evaluate it positively, particularly by concluding that it improved the speed and quality of decision-making?

Retired military personnel at CACI worked closely with the programming staff to ensure that the format and output from the prototype executive aid would best meet the needs of action officers in DoD command centers throughout the world. Additionally, researchers, program managers, action officers, and other interested personnel in a number of agencies in the national security community were briefed on the characteristics

of the aid. Demonstrations of the interactive software and the output format were also held. Individuals from the Defense Advanced Research Projects Agency (ARPA), the Office of Naval Research, U.S. Navy OP 942, Center for Naval Analyses, Joint Chiefs of Staff (JCS)/J-5, JCS/J-3, National Military Intelligence Center, Defense Intelligence Agency, U.S. Air Force/Studies and Analysis, and the Central Intelligence Agency were all briefed on one or more versions of the executive aid.

Comments from individuals in each of these agencies have been incorporated into the current version of the executive aid. Additional revisions are likely as the aid is put into a test context at one or more major command centers in DoD facilities around the world. These uses of the prototype executive aid in more realistic crisis or crisis-like conditions will constitute the ultimate assessment of its usefulness.

Projects are currently underway to enhance the executive aid system further. The goal is to provide a richer crisis data base by coding additional U.S. crises for the crisis management problems variables and by developing a coordinate data base/aiding system dealing with the Soviet crisis management experience from 1946 to 1975. These enhancements will assist crisis managers who use the aiding system to evaluate crisis operations.

TRANSFER AND AVAILABILITY

The initial version of the prototype executive aid for crisis management was developed on a commercial time-sharing computer system. A second, more advanced and appreciably more elaborate prototype was developed on an ARPA-owned Tektronix 4051 minicomputer. The Tektronix version of the prototype executive aid has been described in this report and in the accompanying documentation (CACI, 1977d), User's Guide (CACI, 1977c), and Sample Output (CACI, 1977f).

The Tektronix 4051 can be demonstrated to interested DoD personnel and used in command centers. It has been transferred to the ARPA Demonstration and Development Facility (DDF) of the ARPA Cybernetics Technology Office. The executive aid system is presently available on the DDF computer system (a PDP 11/70).

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Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
CAC008		

4. TITLE (and Subtitle)

Executive Aid for Crisis Management

AD49954

5. TYPE OF REPORT & PERIOD COVERED
Final Technical Report
Dec. 1, 1976 - Sept. 30, 1977

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
Leo Hazlewood, Robert Mahoney, Farid Abolfathi, Janice Fain, John Hayes, John McIlroy, Paul Davis, Margaret Hayes

8. CONTRACT OR GRANT NUMBER(s)
N00014-77-C-0135 ARPA Order 2928

9. PERFORMING ORGANIZATION NAME AND ADDRESS
CACI, Inc.-Federal
1815 North Fort Myer Drive
Arlington, Virginia 22209

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
ARPA Order No. 2928,
Amend. 5, Program Code 7W10

11. CONTROLLING OFFICE NAME AND ADDRESS
Defense Advanced Research Projects Agency
1400 Wilson Boulevard
Arlington, Virginia 22209

12. REPORT DATE
15 May 1978

13. NUMBER OF PAGES
63

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)
Office of Naval Research
Department of the Navy
800 North Quincy Street
Arlington, Virginia 22217

12 68 P.

15. SECURITY CLASS. (of this report)
Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Recommended for Public Release, Distribution Unlimited

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

407 171

18. SUPPLEMENTARY NOTES

Final technical rept. 1 Dec 76-30 Sep 77,

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Crisis, Crisis Management, Decision Aids, Executive Aids, National Security, International Politics, International Relations

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This final technical report on Contract No. N00014-77-C-0135 describes the development and structure of CACI's crisis management executive aid developed for the Cybernetics Technology Office of the Defense Advanced Research Projects Agency. Chapter 2 presents the structure of the executive aid and reviews the characteristics and uses of the three data files that are available for analysis, which deal with crisis characteristics, actions and objectives, and crisis management problems; Chapter 3 describes the data used in the aid; while Chapter 4 reviews

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

407 941

the findings and analyses that have been performed to date on the data file; and Chapter 5 describes procedures used to evaluate the executive aid and to transfer it to locations accessible to the U.S. Government and other users. The operation of the executive aid itself is described in detail in several separate volumes, a User's Guide, a Program Documentation Manual, a Sample Output, and a Codebook.