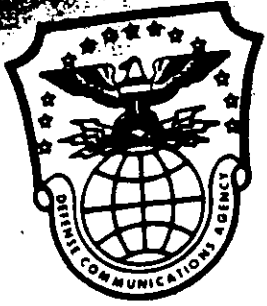


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Command and
Control
Technical Center

Post-Attack Reconstitution of Communications Phase II Report (U)

October 1979

| | |
|---|--------------------|
| FOI CASE NO. | <u>86-FOI-1504</u> |
| Document <u>1</u> of <u>1</u> Documents | |

Classified by ASD (C³ I)
Review on 31 October 1990

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**Post-Attack
Reconstitution
of Communications
Phase II Report (U)**

October 1979

**Defense Communications Agency
Command and Control Technical Center**

CCTC 01339-79

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ABSTRACT

(U) This document and its annexes present the results of the analyses pertaining to the reconstitution of military command and control communications with strategic nuclear reserve forces following a major nuclear exchange. It defines the post-attack communication support requirements, identifies the post-attack situation and deficiencies, and recommends specific programmatic actions for their resolution.

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GLOSSARY

| | |
|------------------------|--|
| ABNCP | Airborne Command Post |
| ACA | Automatic Conference Arranger |
| AFSAT | Air Force Satellite |
| AHF | Adaptive HF |
| AJ | Anti-jam |
| ANMCC | Alternate National Military Command Center |
| ARINC | Aeronautical Radio, Incorporated |
| ASAT | Anti-Satellite |
| ASD (C ³ I) | Assistant Secretary of Defense (Communications, Command, Control and Intelligence) |
| AT&T | American Telephone and Telegraph |
| AUTODIN | Automatic Digital Network |
| AUTOSEVOCOM | Automatic Secure Voice Communications |
| AUTOVON | Automatic Voice Network |
| C ² | Command and Control |
| C ³ | Command, Control and Communications |
| CBR | Chemical, Biological, Radiological |
| CCIS | Command and Control Information System |
| CCTC | Command and Control Technical Center |
| CINC | Commander-in-Chief |
| CINCAD | CINC, Aerospace Defense |
| CINCLANT | CINC, Atlantic |
| CINCMAC | CINC, Military Airlift Command |
| CINCPAC | CINC, Pacific |
| CINCRED | CINC, Readiness Command |
| CINCSAC | CINC, Strategic Air Command |
| CONUS | Continental United States |
| COOP | CINC Continuity of Operations Plan |
| DCA | Defense Communications Agency |
| DCS | Defense Communications System |
| DDD | Direct Distance Dialing |
| DEFCON | Defense Condition |
| DSARC | Defense System Acquisition Review Committee |
| DT&E | Development Test and Evaluation |
| EAM | Emergency Action Message |
| ECM | Electronic Countermeasure |
| EMATS | Emergency Message Automatic Transmission System |
| ESS | Electronic Switch System |
| FAA | Federal Aviation Agency |
| FLTSAT | Fleet Satellite |
| FOC | Full Operational Capability |

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GLOSSARY (Continued)

| | |
|--------|--|
| HEMP | High Altitude Electromagnetic Pulse |
| HF | High Frequency |
| HF/SSB | High Frequency Single Sideband. |
| ICBM | Intercontinental Ballistic Missile |
| IEMATS | Improved EMATS |
| IOC | Initial Operational Capability |
| JCMC | Joint Crisis Management Capability |
| JCS | Joint Chiefs of Staff |
| JCSAN | JCS Alerting Network |
| JCSE | Joint Communications Support Element |
| LCC | Launch Control Center |
| MEECN | Minimum Essential Emergency Communications Network |
| MHz | Megahertz |
| NCA | National Command Authorities |
| NCS | National Communications System |
| NEACP | National Emergency Airborne Command Post |
| NFCS | Nuclear Forces Communications Satellite |
| NMCS | National Military Command System |
| OJCS | Organization of the Joint Chiefs of Staff |
| PAC | Pacific |
| PACCS | Post-Attack Command and Control System |
| PSI | Pounds per Square Inch |
| R&D | Research and Development |
| RI | Routing Indicator |
| RISOP | Red Integrated Strategic Offensive Plan |
| ROC | Required Operational Capability |
| RP | Restoration Priority |
| SAC | Strategic Air Command |
| SAMSO | Space and Missile Systems Organization |
| SATCOM | Satellite Communications |
| SIDAC | Single Integrated Damage Analysis Capability |
| SIOP | Single Integrated Operational Plan |
| SRF | Secure Reserve Force |
| SSB | Single Sideband |
| SSBN | Fleet Ballistic Missile Submarine |

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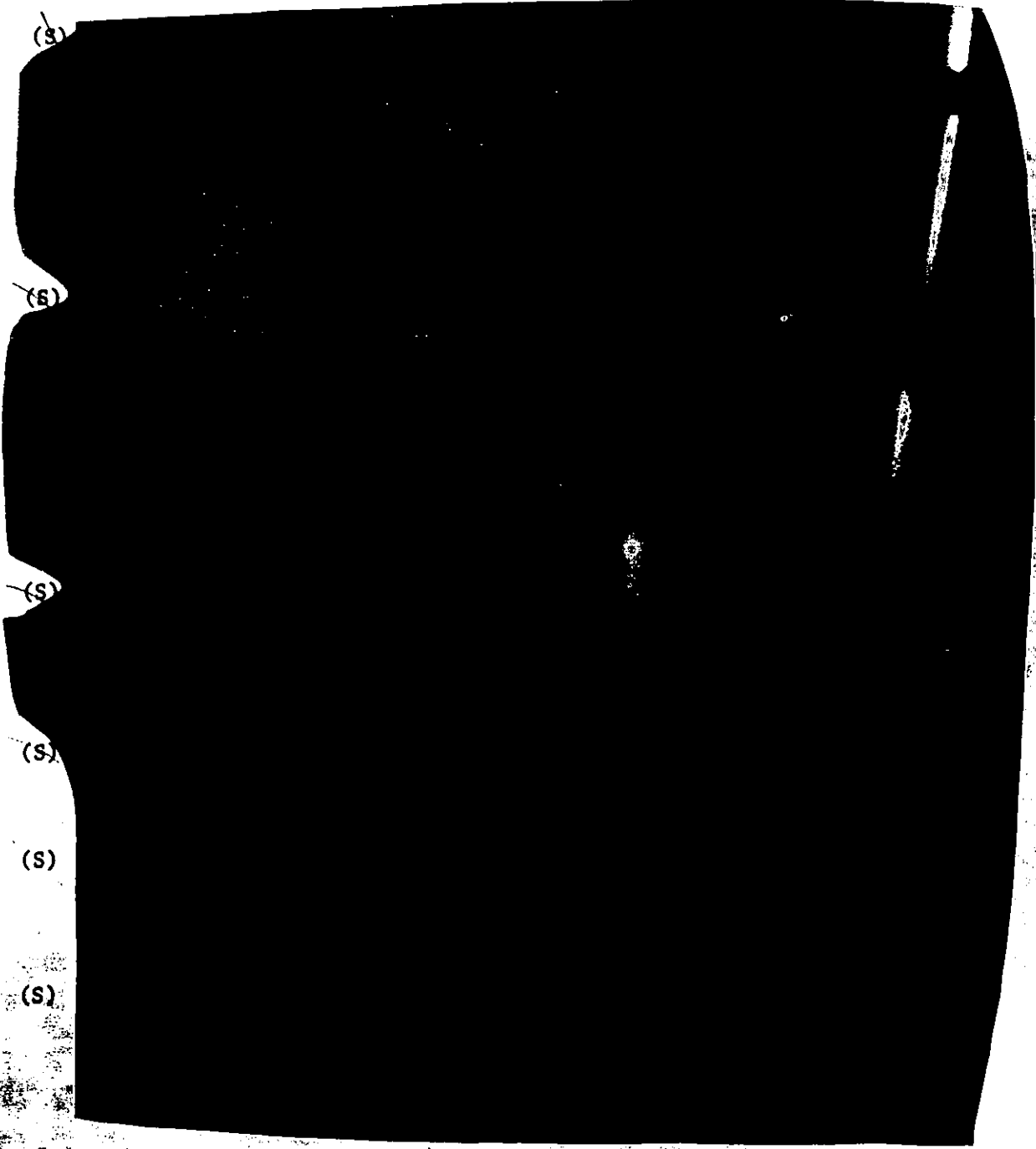
GLOSSARY (Concluded)

| | |
|---------|---|
| TACAMO | Take Charge and Move Out |
| TBD | To Be Determined |
| T&E | Test and Evaluation |
| TTY | Teletypewriter |
| UHF | Ultra-High Frequency |
| USN | U.S. Navy |
| VHF | Very High Frequency |
| VLf/LF | Very Low Frequency/Low Frequency |
| WSEO | WWMCCS System Engineering Organization |
| WWABNCP | Worldwide Airborne Command Post |
| WWMCCS | Worldwide Military Command and Control System |

1.0 INTRODUCTION (U)

1.1 Background (U)

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(S) The Phase I effort also included definition of the ground rules and assumptions, and development of a program plan for continuation of the effort (Phase II). This document, the Phase II Final Report, presents findings and recommendations for Post-Attack W/MCCS Communications Reconstitution.

1.2 Phase II Objectives (U)

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1.3 Ground Rules and Assumption (U)

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1.4 Phase II Study Approach (U)

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(U) To determine potential solutions to the shortfalls, various reconstitution mechanisms as well as common carrier restoration practices were assessed. Those found to be the most viable, from the performance and cost points of view, were selected for detailed analysis and development of reconstitution concepts. These concepts served as the basis for proposing solutions to the post-attack communication shortfalls in terms of specific programmatic actions.

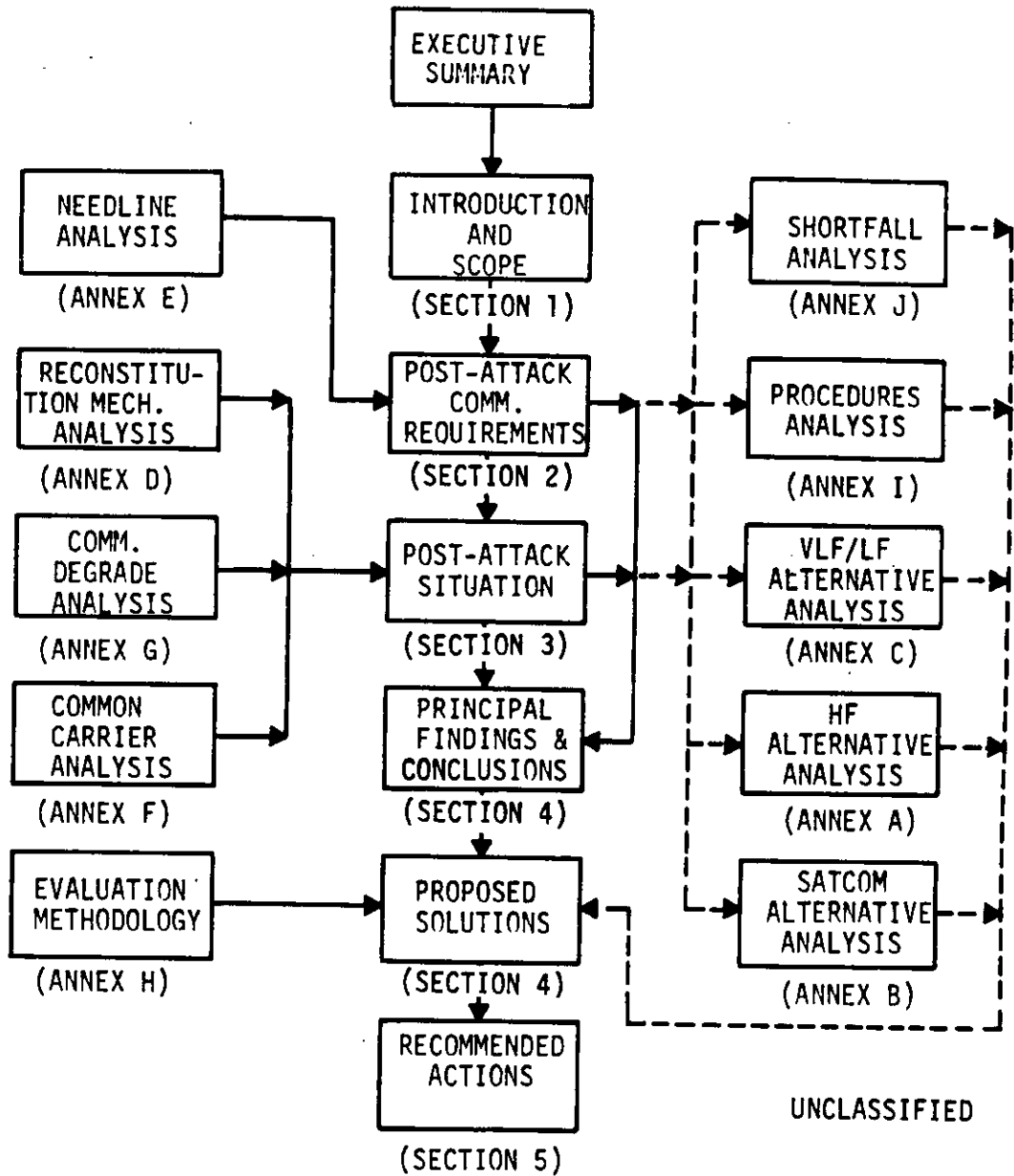


FIGURE 1
(U) PHASE II STUDY APPROACH AND REPORT STRUCTURE

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(U) Section 2 addresses post-attack requirements. Section 3 addresses the situation, residual assets, shortcomings, respectively. Proposed solutions are presented in section 4. Section 5 presents conclusions and defines proposed actions in terms of specific programmatic recommendations.

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2.0 POST-ATTACK REQUIREMENTS (U)

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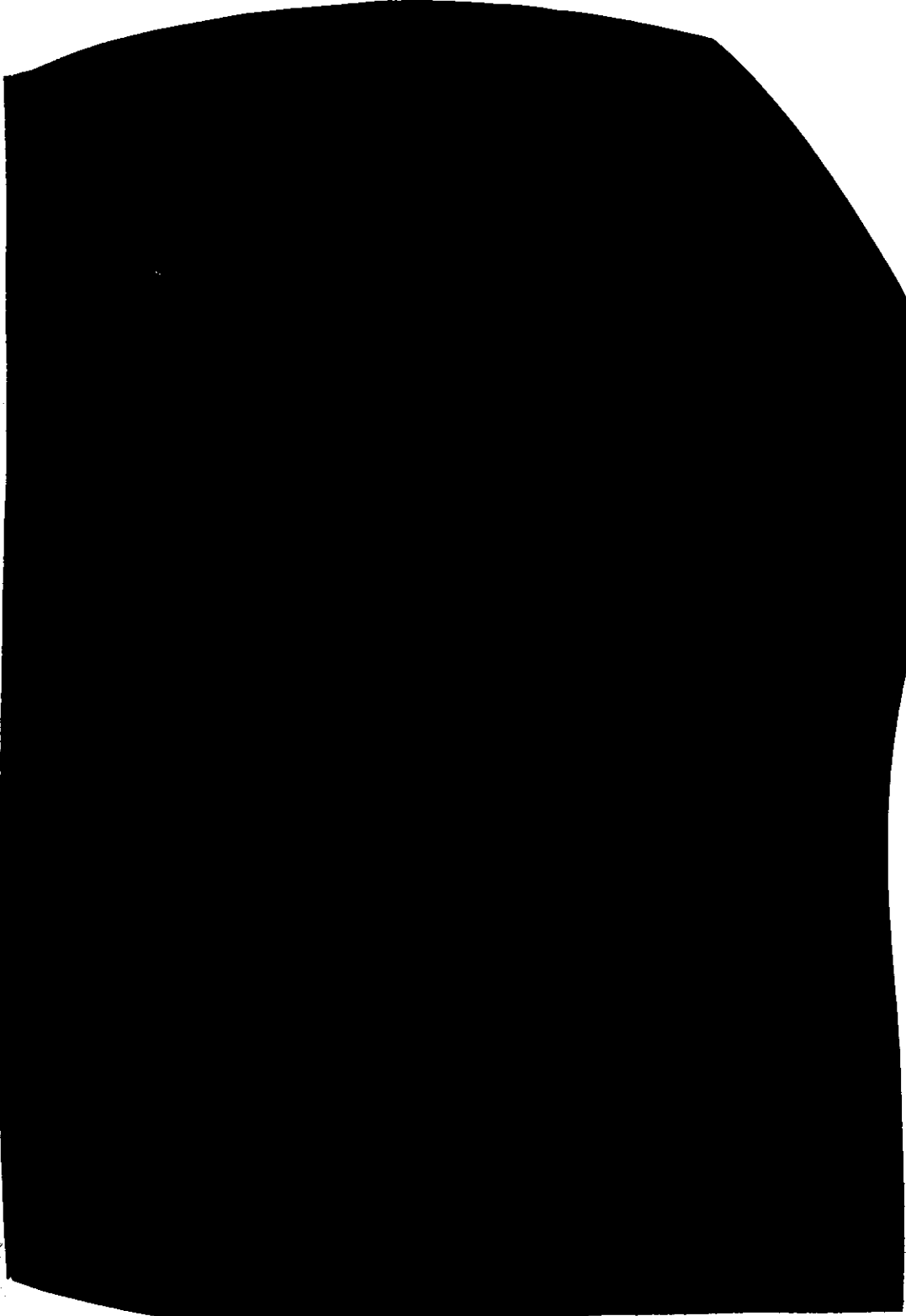
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FIGURE 2

(U) ORGANIZATIONAL RELATIONSHIPS

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* (U) Based on critical functions identified in JCSM 2510/611.

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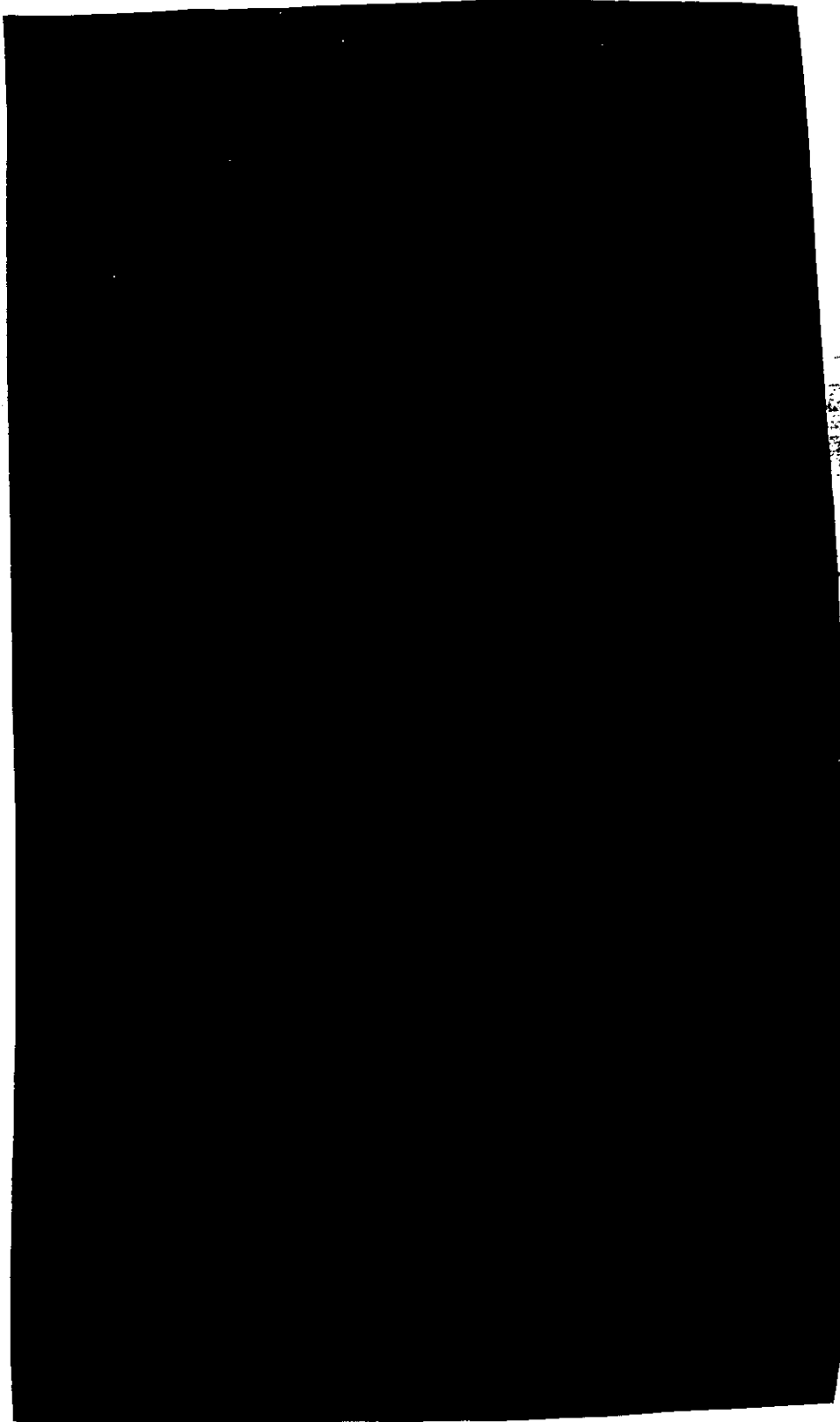


FIGURE 3

(U) POST-ATTACK COMMUNICATION REQUIREMENTS VOICE TRAFFIC

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POST-ATTACK COMMUNICATION REQUIREMENTS
RECORD TRAFFIC

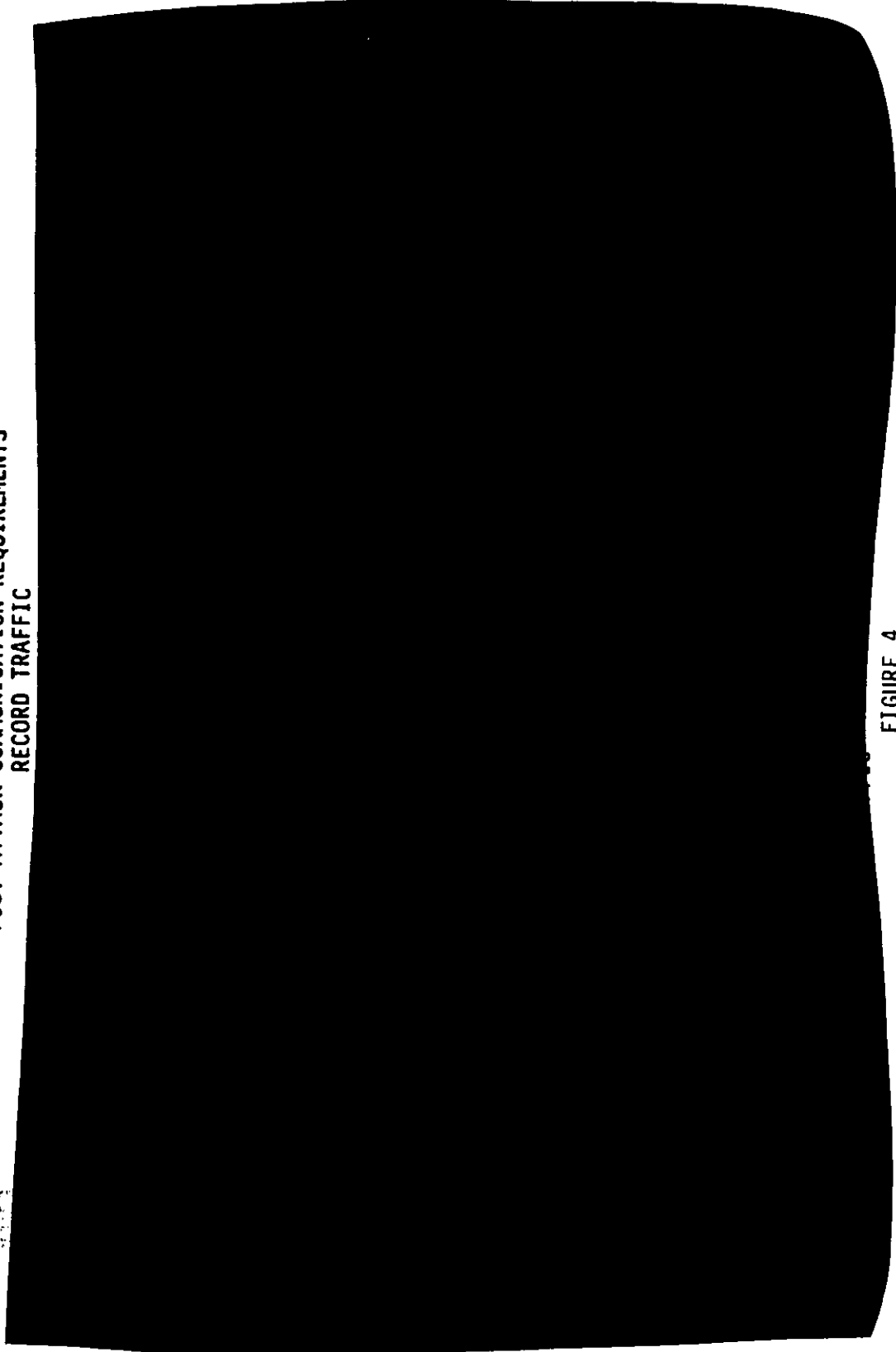
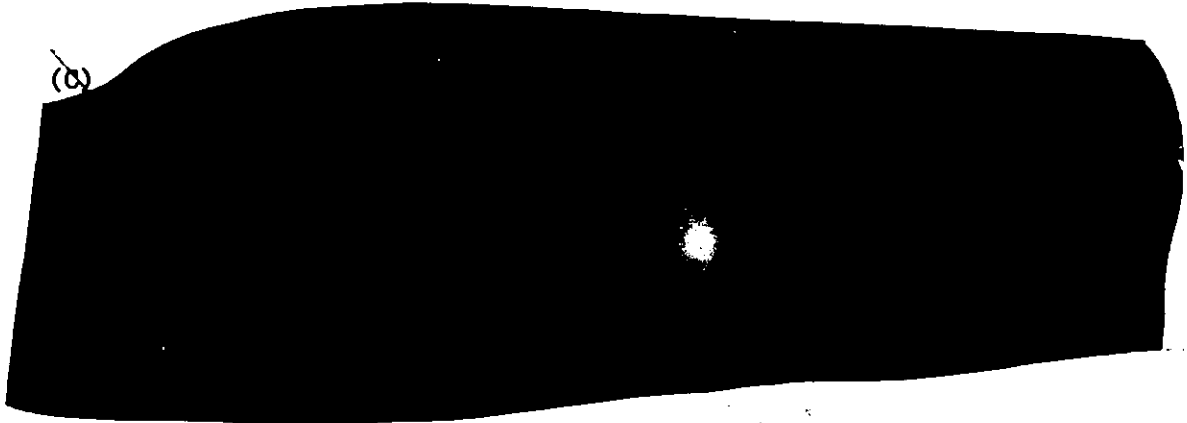


FIGURE 4

(U) POST-ATTACK COMMUNICATION REQUIREMENTS RECORD TRAFFIC

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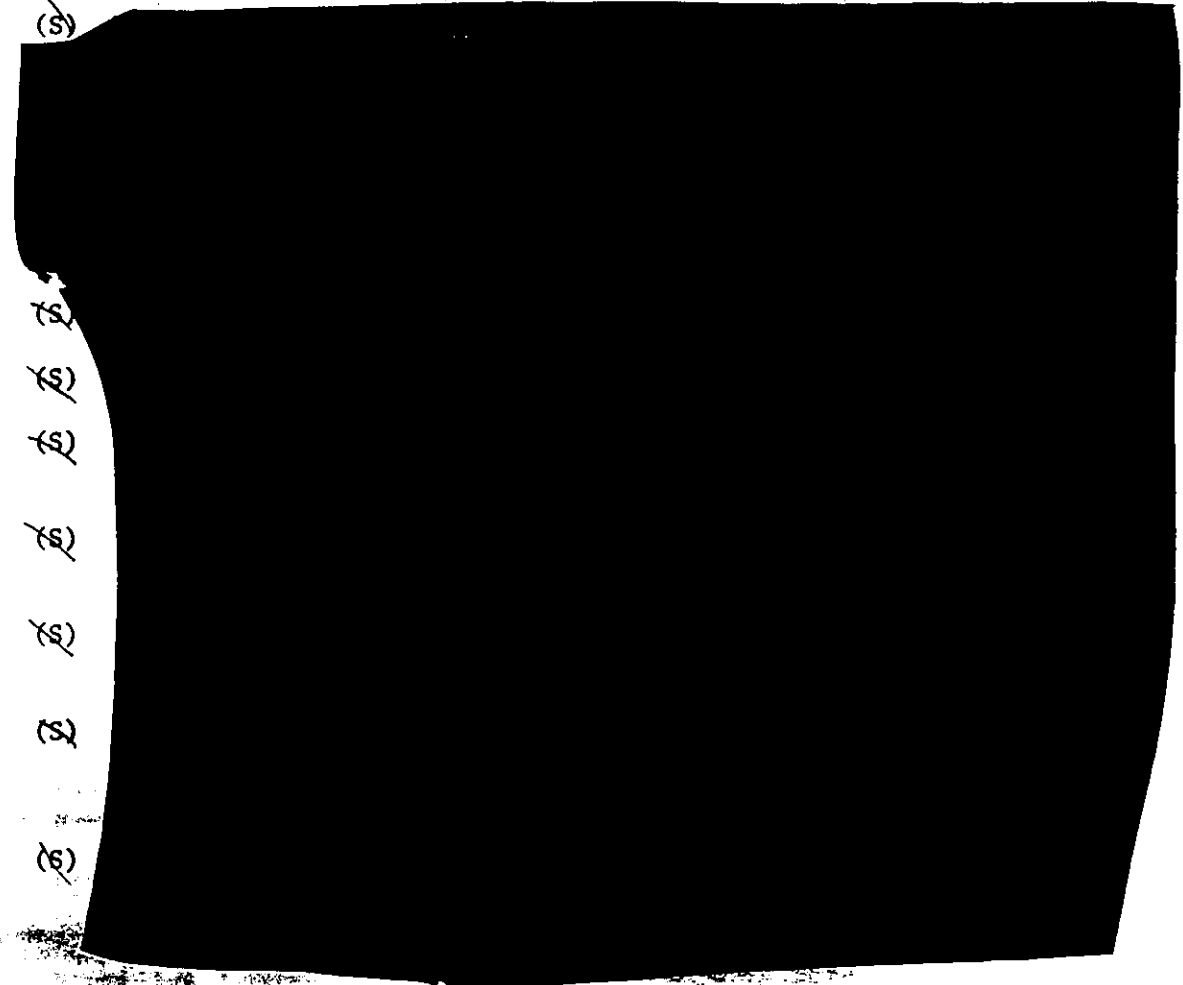
3.0 POST-ATTACK SITUATION ANALYSIS (U)

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3.1 Communications Baseline Degradation (U)

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* (U) DCS is currently implementing SATCOM terminals at selected AUTOVON switch sites to improve connectivity between switches with a high probability of survival.

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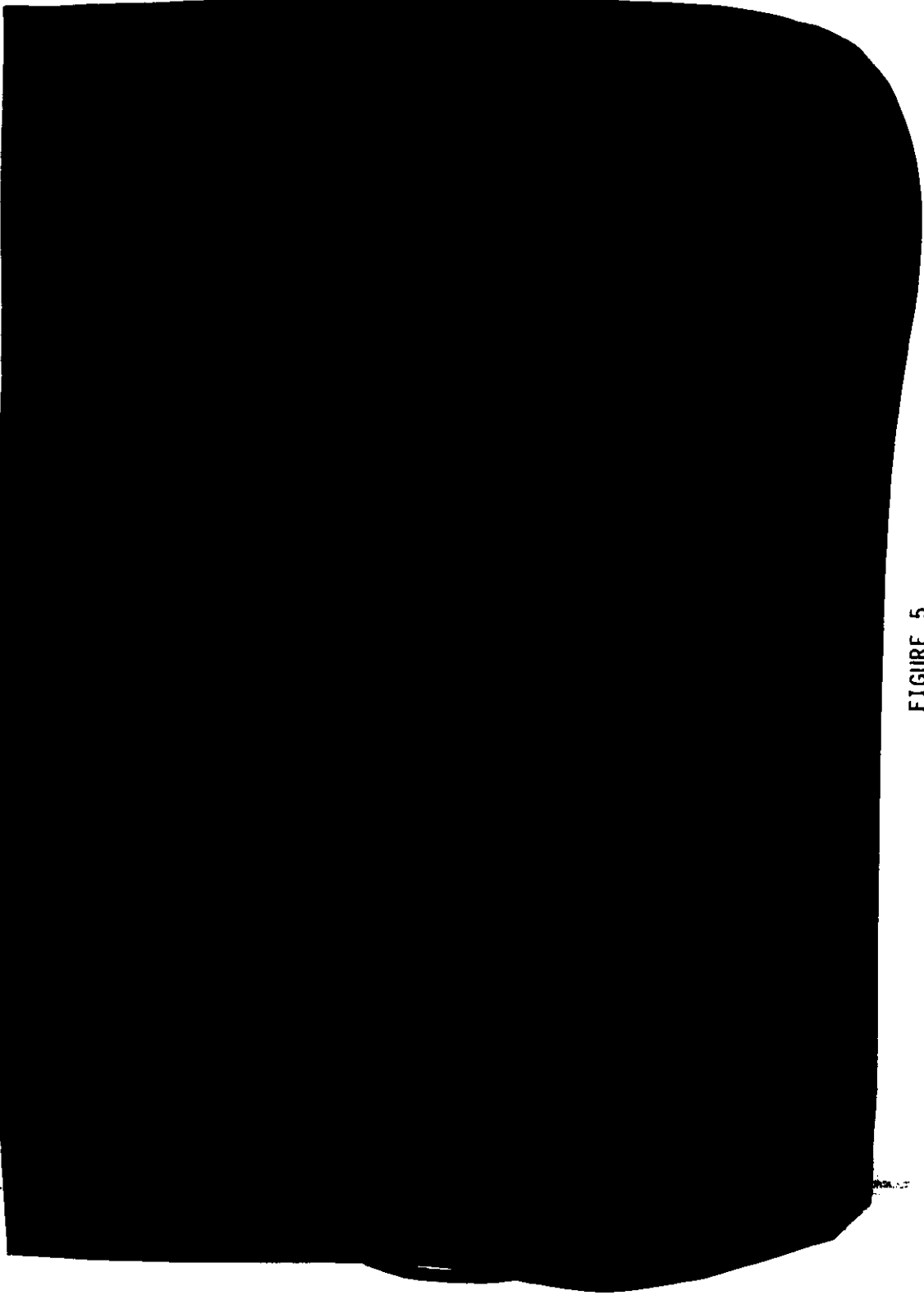
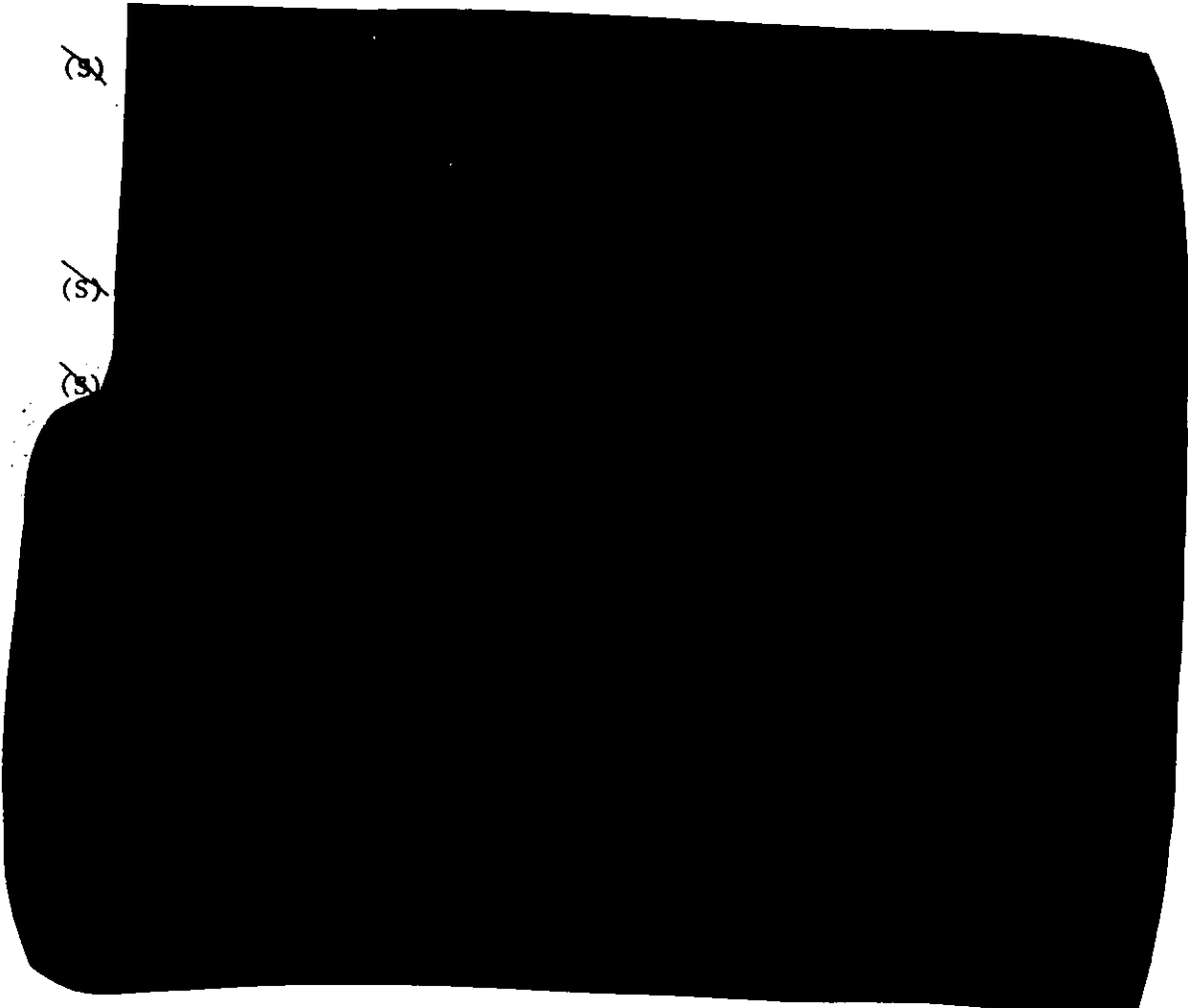


FIGURE 5

(U) TRANSITION TO POST-ATTACK

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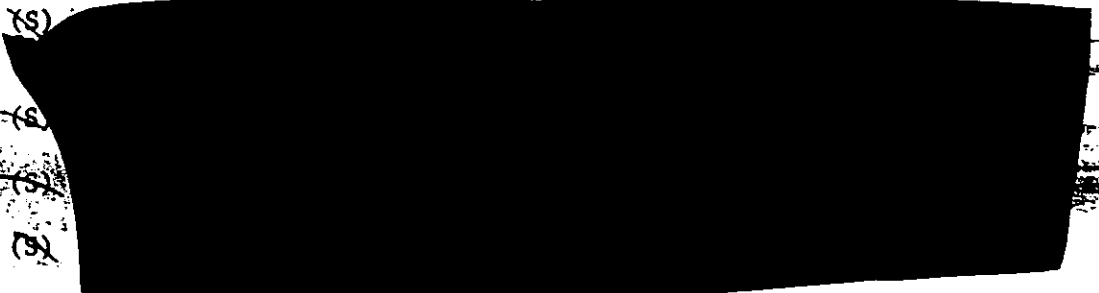
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3.2 Post-Attack Situation (U)

(U) The post-attack situation is defined in terms of surviving forces, residual assets, and lightly damaged areas designated as surviving enclaves.

3.2.1 Forces (U)



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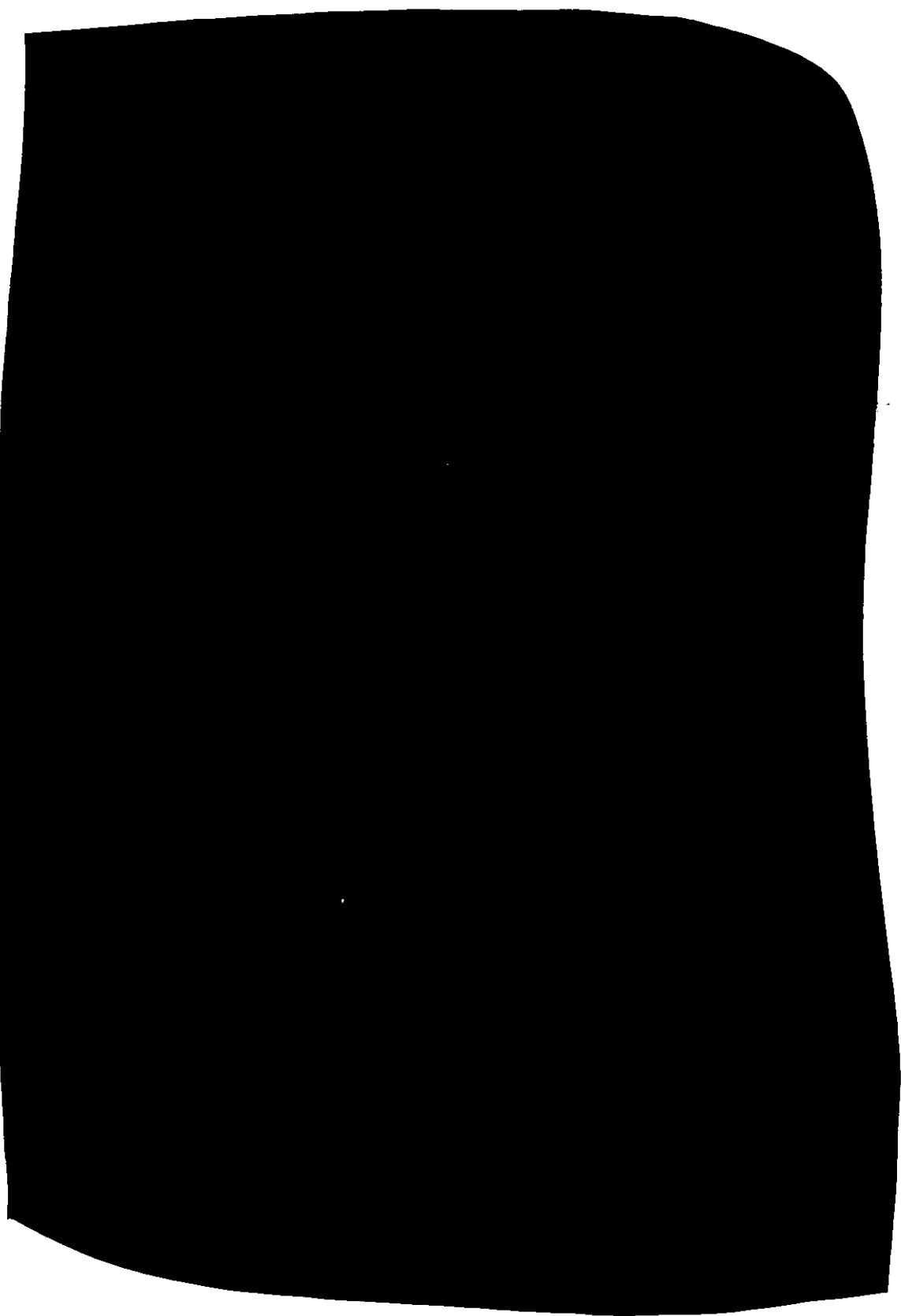


FIGURE 6

(U) PEACETIME MEECN.

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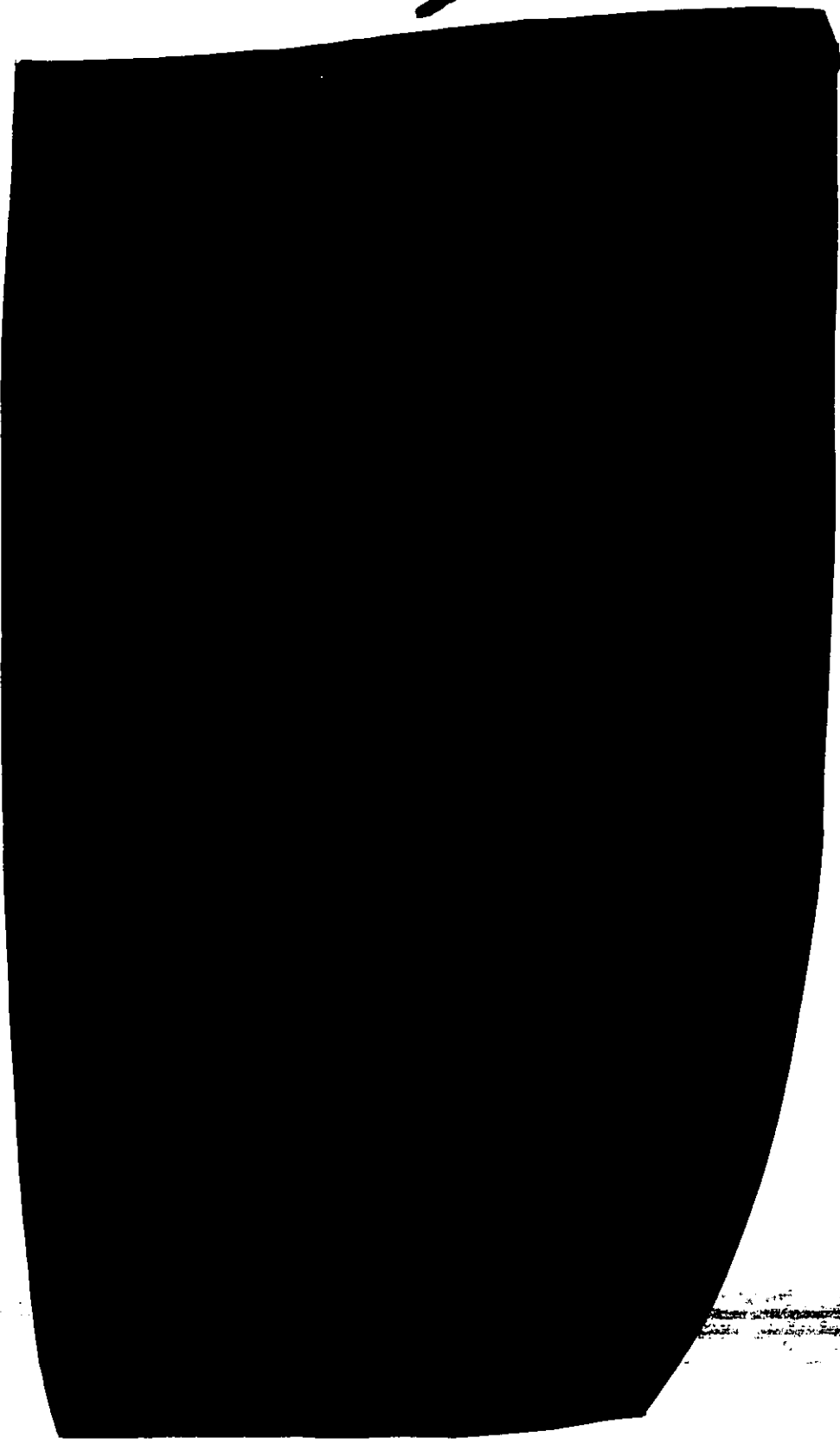


FIGURE 7

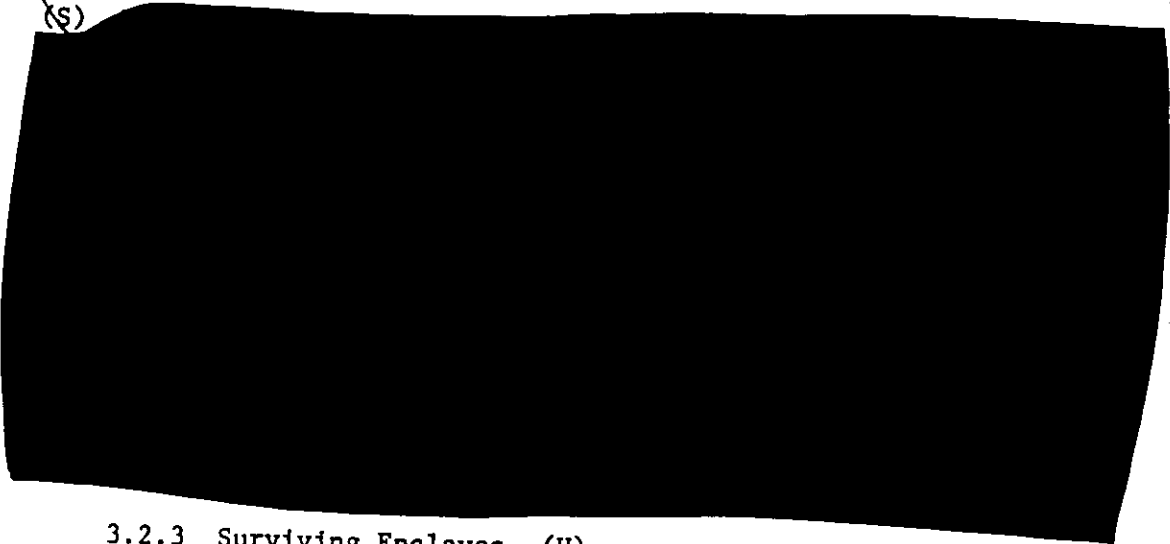
(U) POST-MISSILE ATTACK (MEECN
GENERATED SCENARIO)

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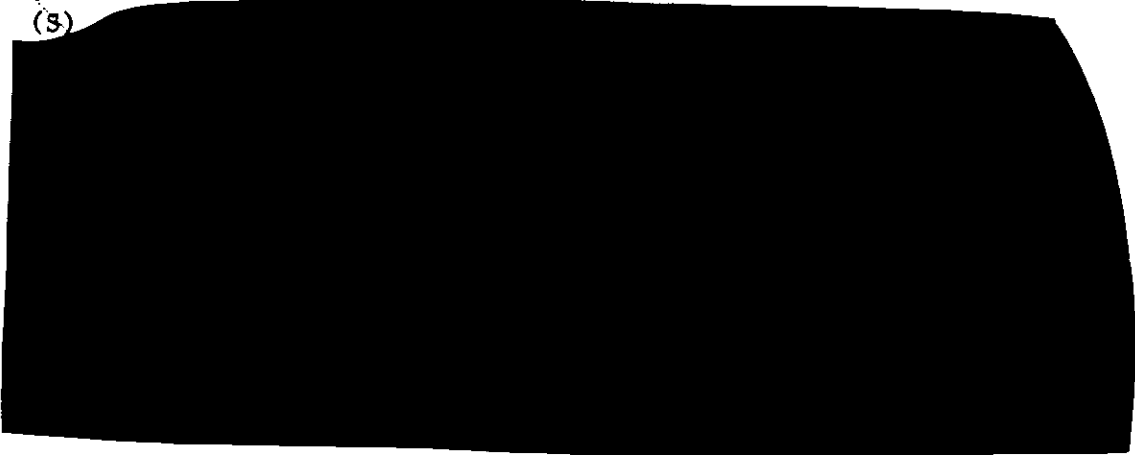
3.2.2 Surviving Communications Assets (U)

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3.2.3 Surviving Enclaves (U)

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TABLE I

(U) RESIDUAL COMMUNICATION ASSETS

| WWMCCS NODES | VLF/ LF | HF | VHF/ UHF | UHF SATCOM | SHF SATCOM |
|---------------------------|-------------|----|-------------|---------------|---------------|
| Airborne Command Centers | | | | | |
| (Grounded Mode)* | | X | | X | E-4B only |
| (Airborne Mode) | X | X | X | X | E-4B only |
| Relocated Command Centers | | X | | | |
| Strategic Aircraft: | | | | | |
| Bombers | | X | X | X | |
| Tankers | | X | X | X | |
| Missile LCC's | RCV Only | X | X | X (AFSAT) | |
| Missile Submarines | RCV Only | X | X | X (FLTSAT) | |

* (U) Auxiliary power must be provided.

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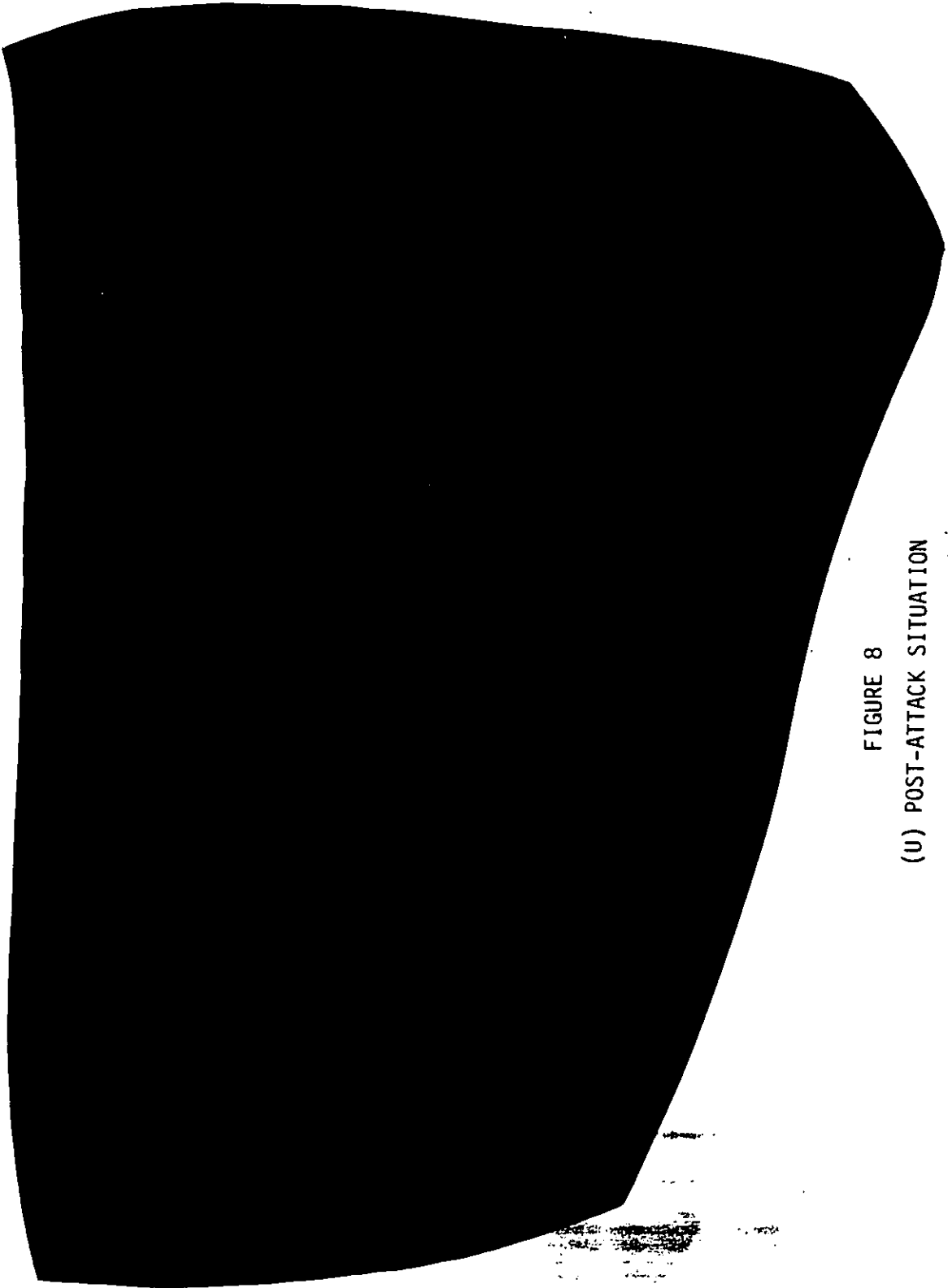
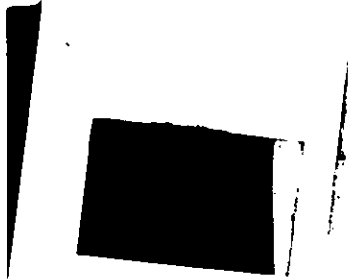


FIGURE 8
(U) POST-ATTACK SITUATION

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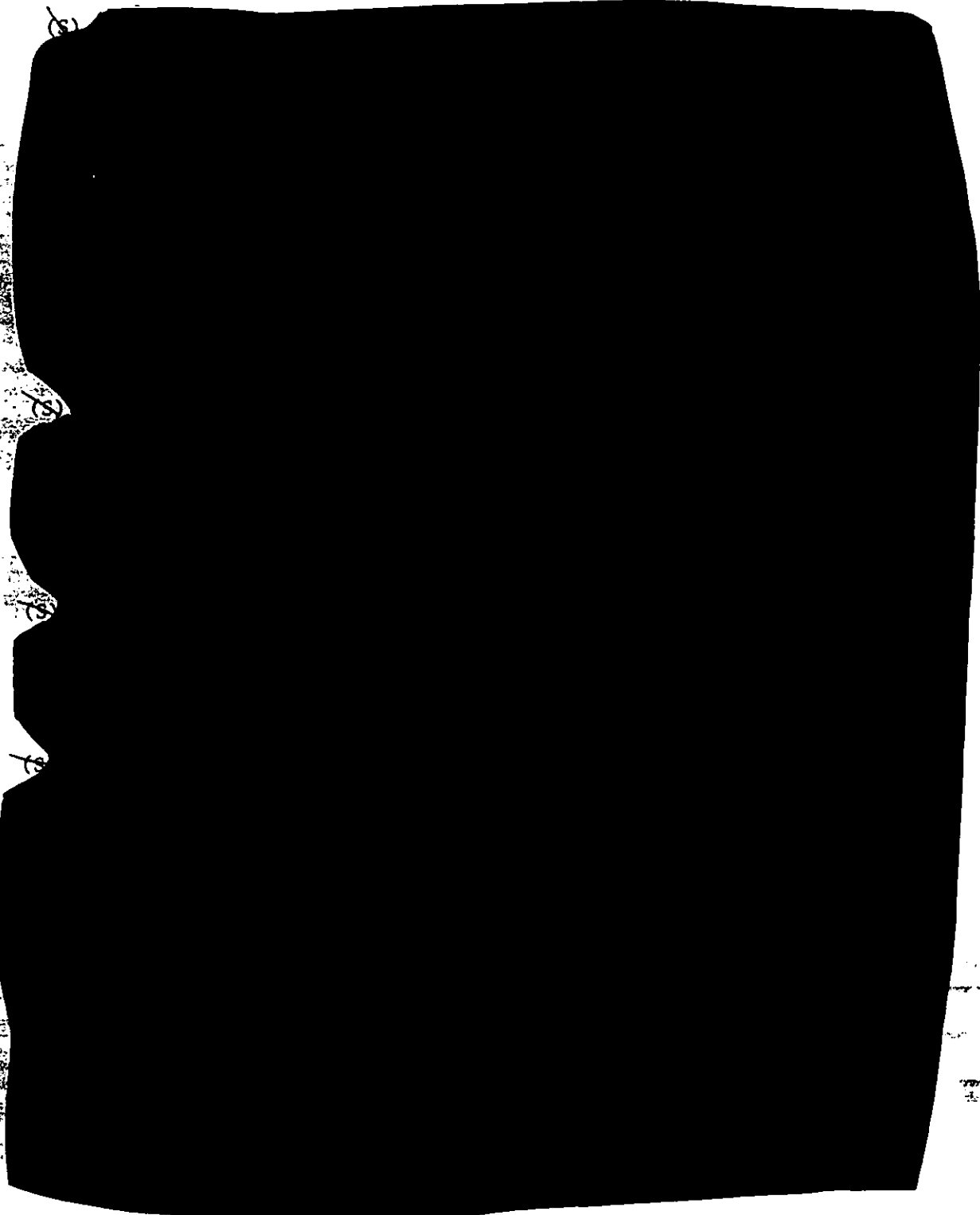


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3.3 Strategic Node Connectivity (U)



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FIGURE 9
(U) STRATEGIC NODE CONNECTIVITY REQUIREMENT

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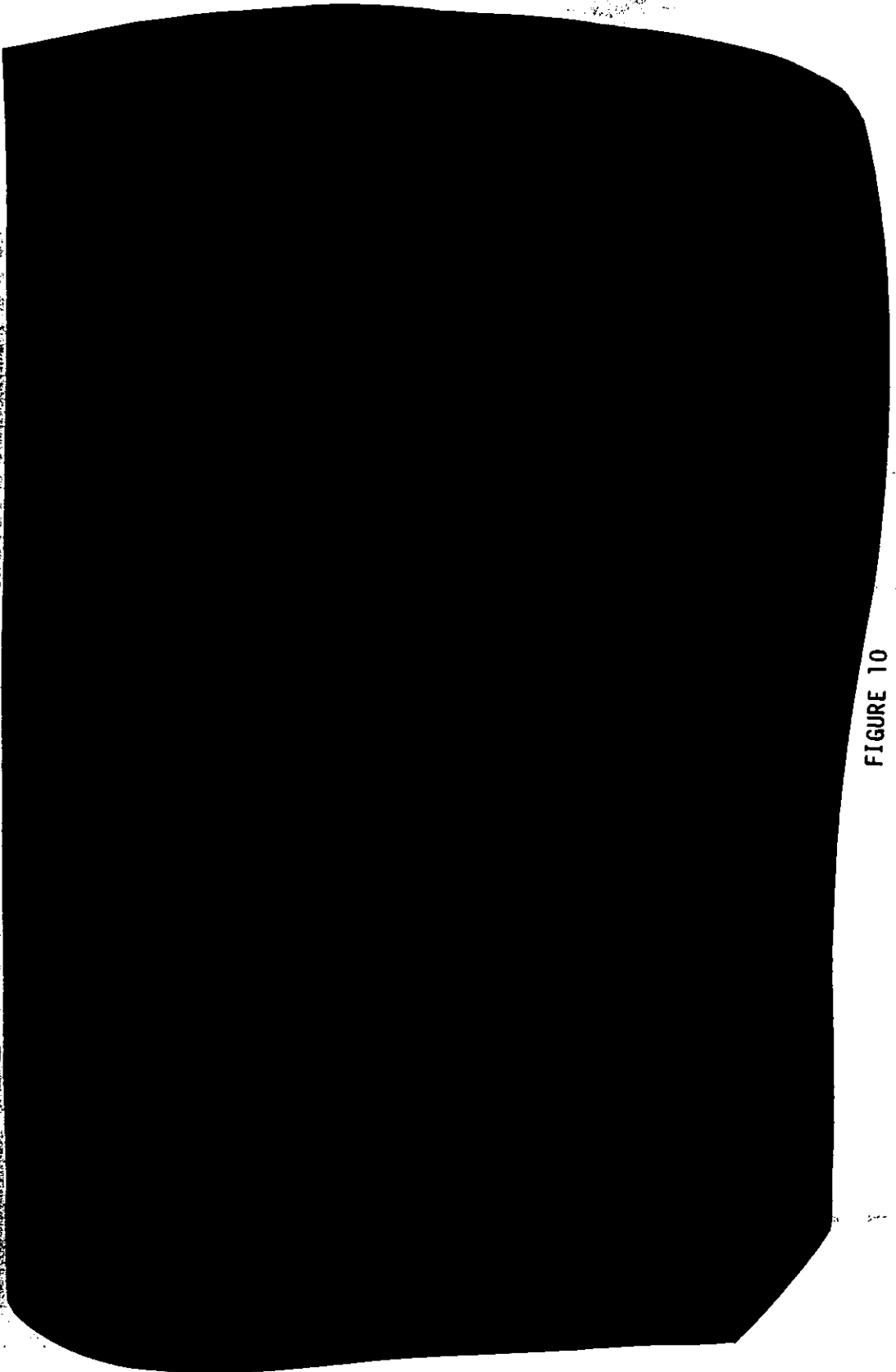


FIGURE 10

(U) POTENTIAL STRATEGIC HF NETWORK

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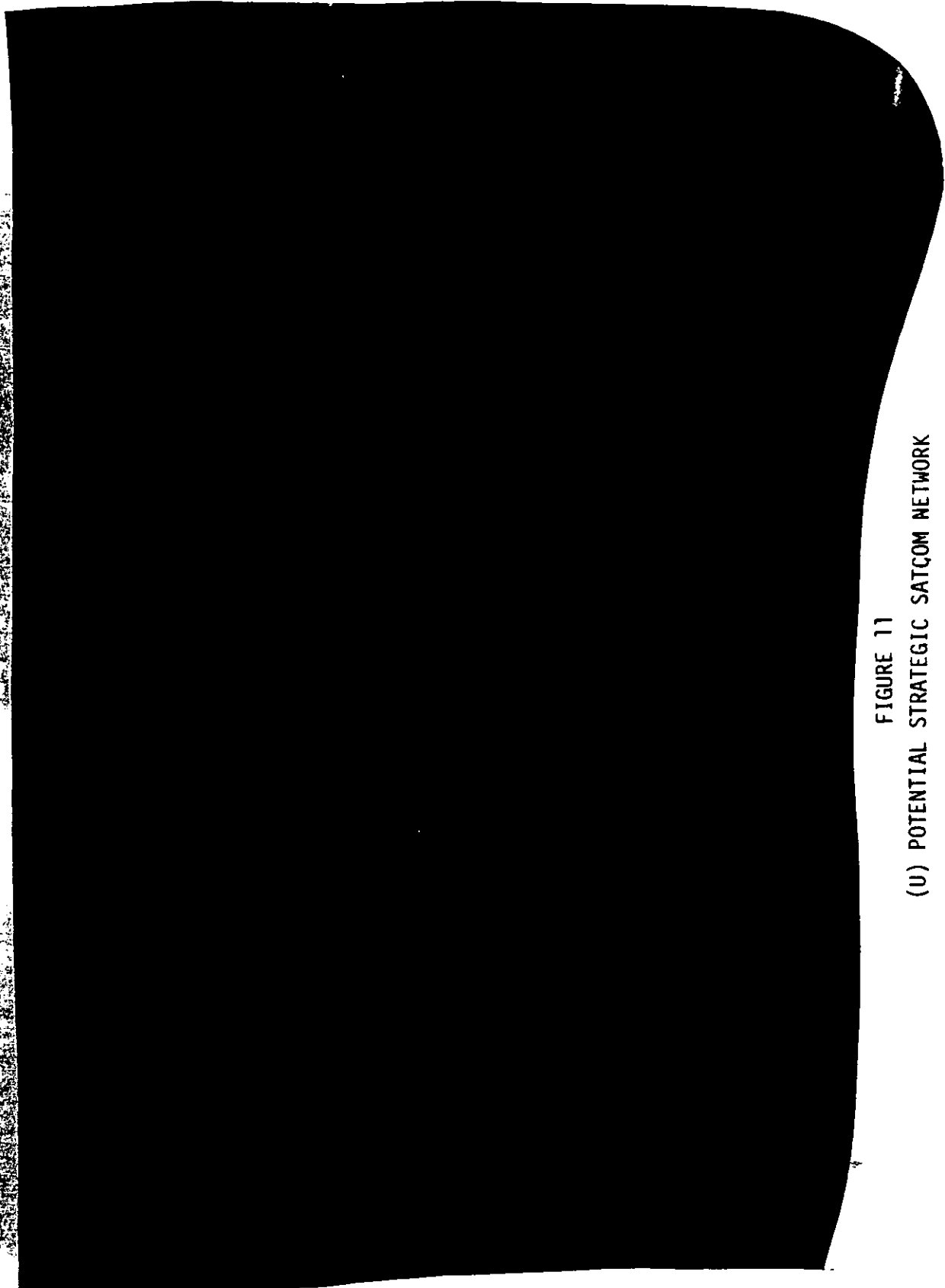
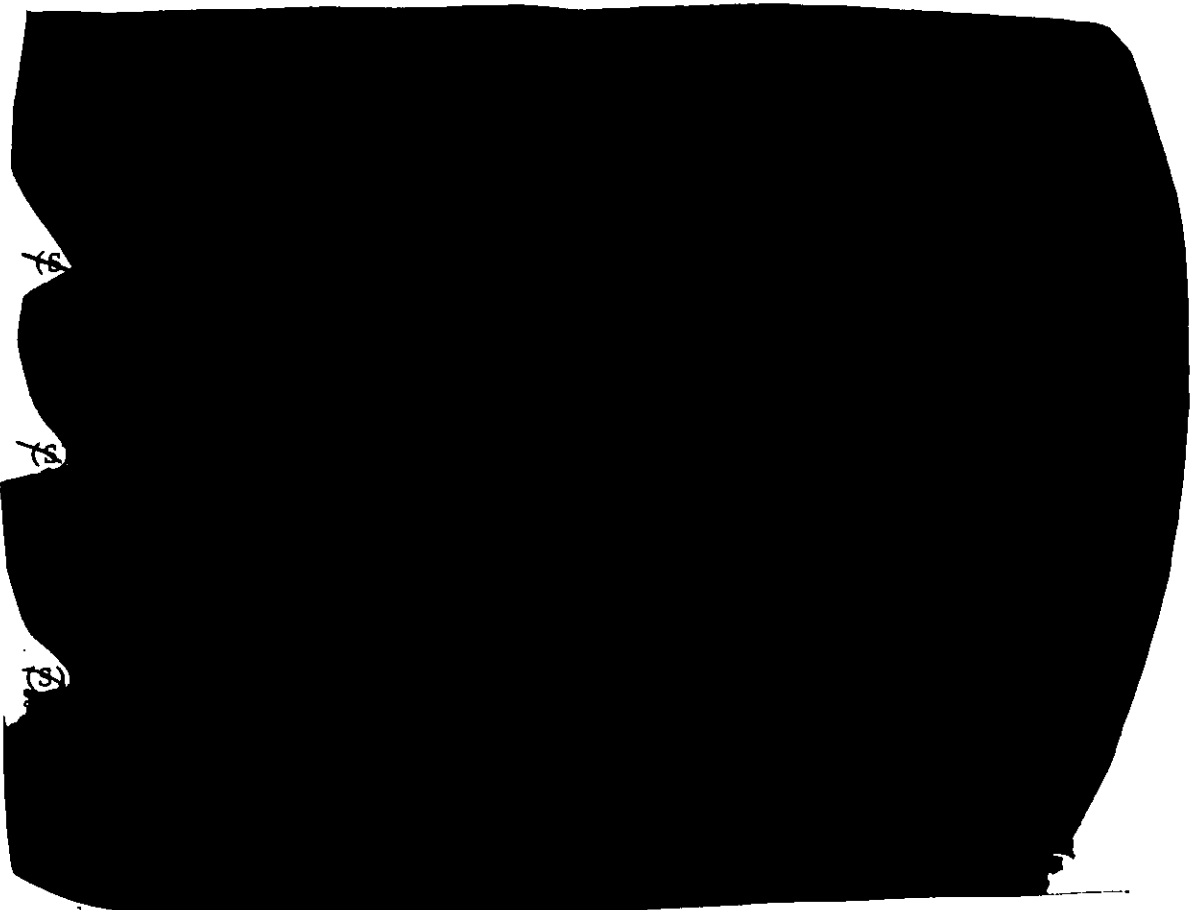


FIGURE 11
(U) POTENTIAL STRATEGIC SATCOM NETWORK

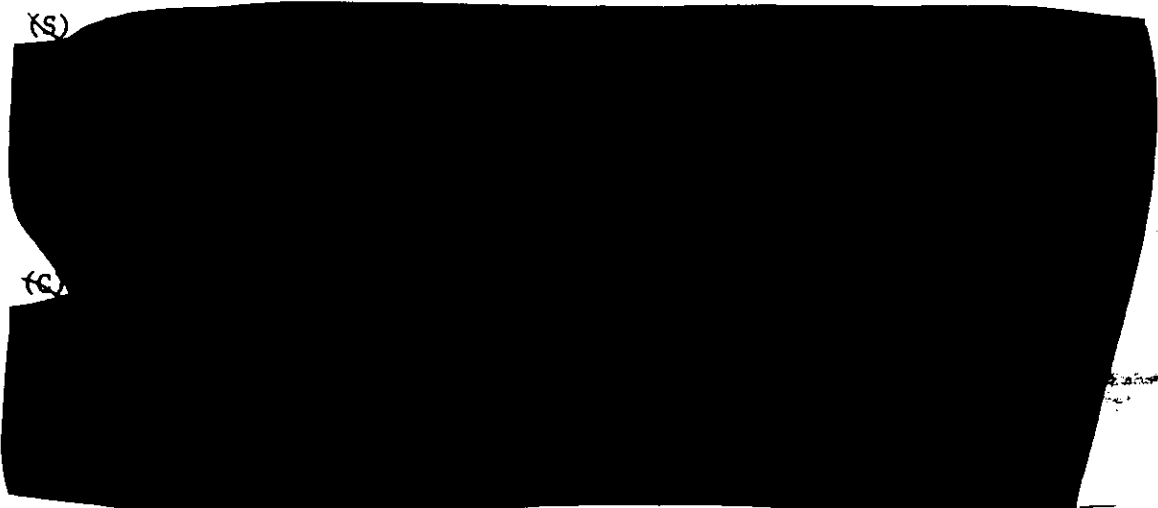
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(U) Annexes A and B present the detailed HF and SATCOM analyses.

3.4 Enclave Connectivity (U)



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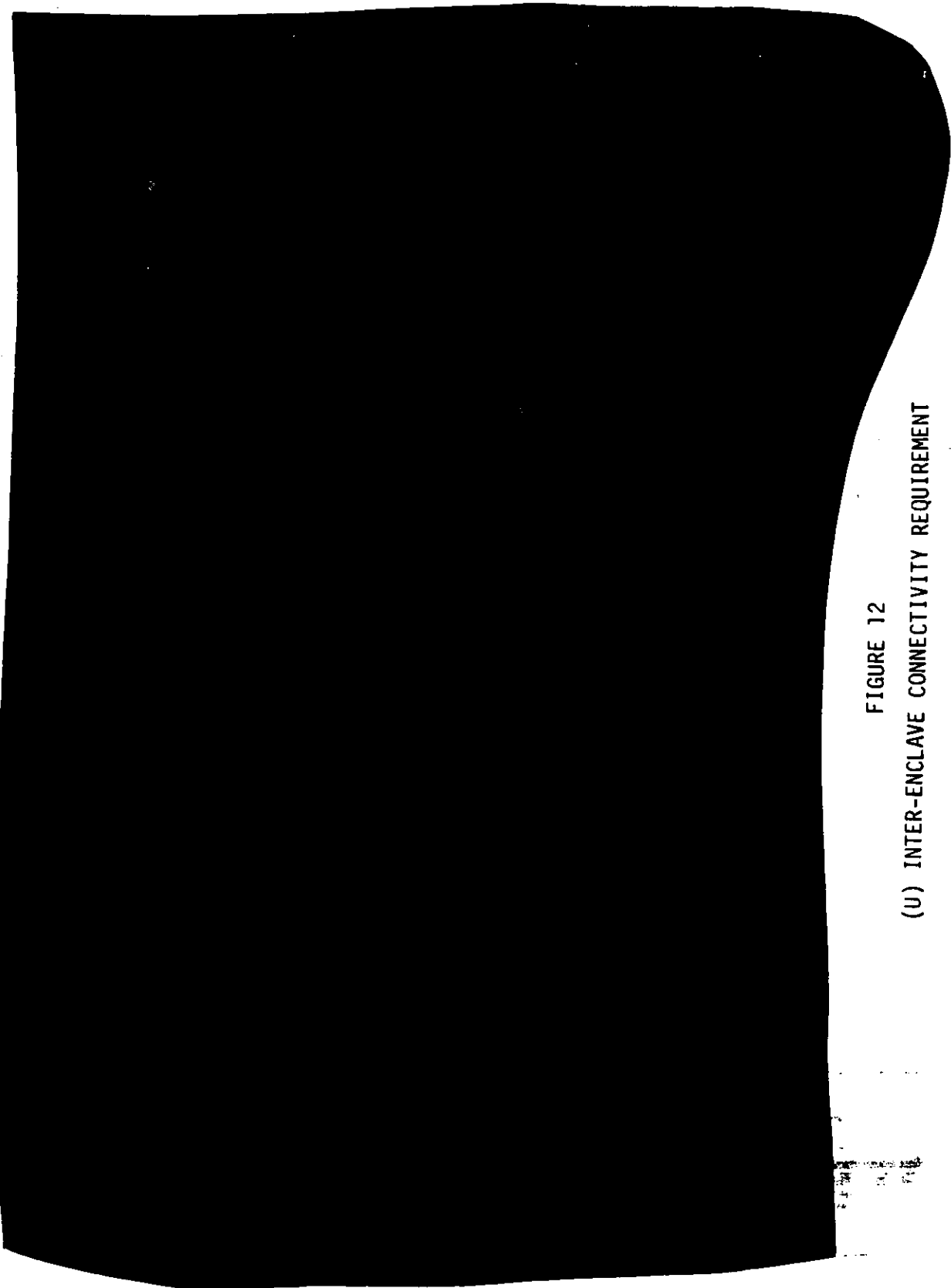
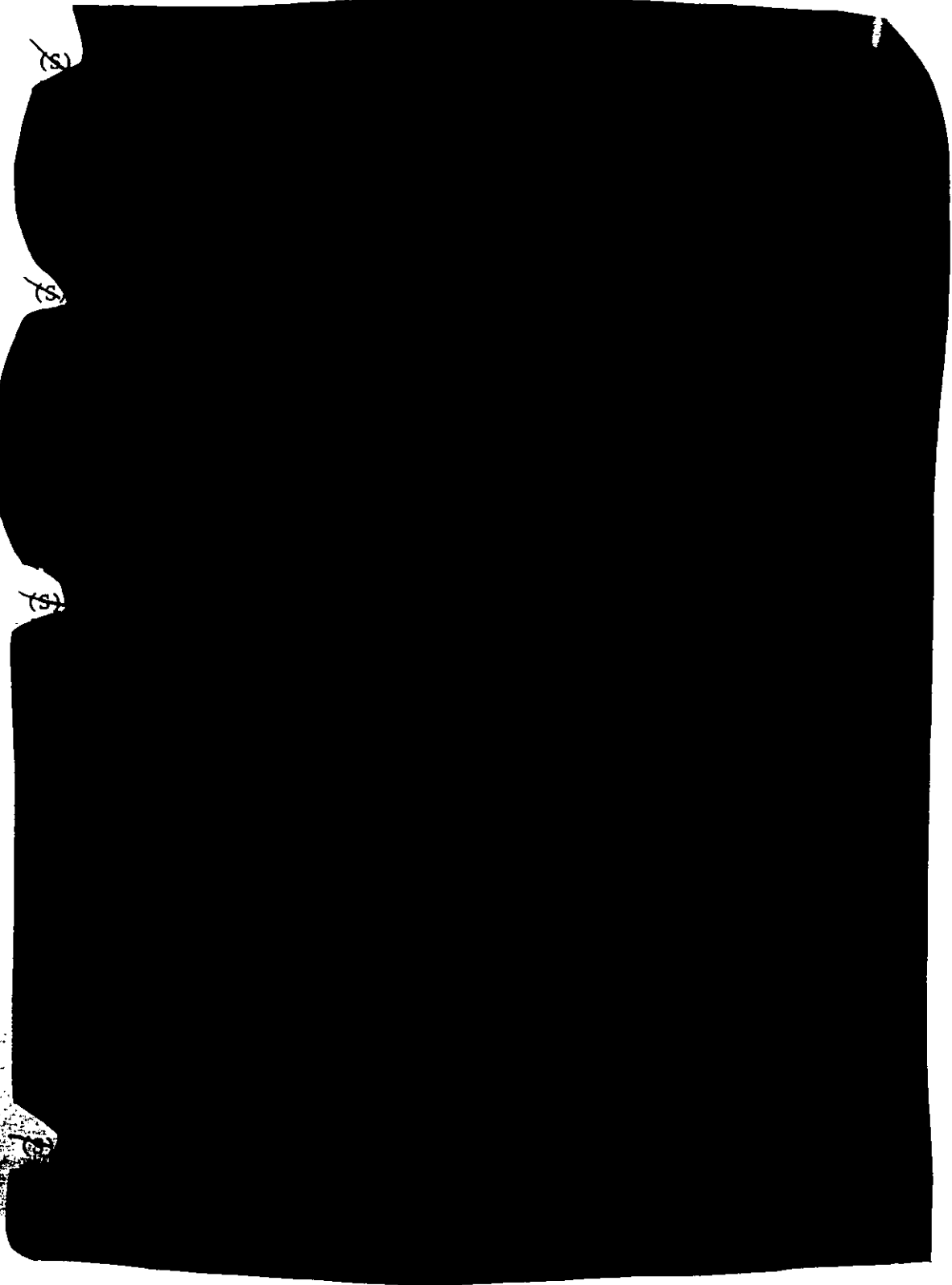


FIGURE 12
(U) INTER-ENCLAVE CONNECTIVITY REQUIREMENT

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3.5 Principal Findings and Conclusions (U)

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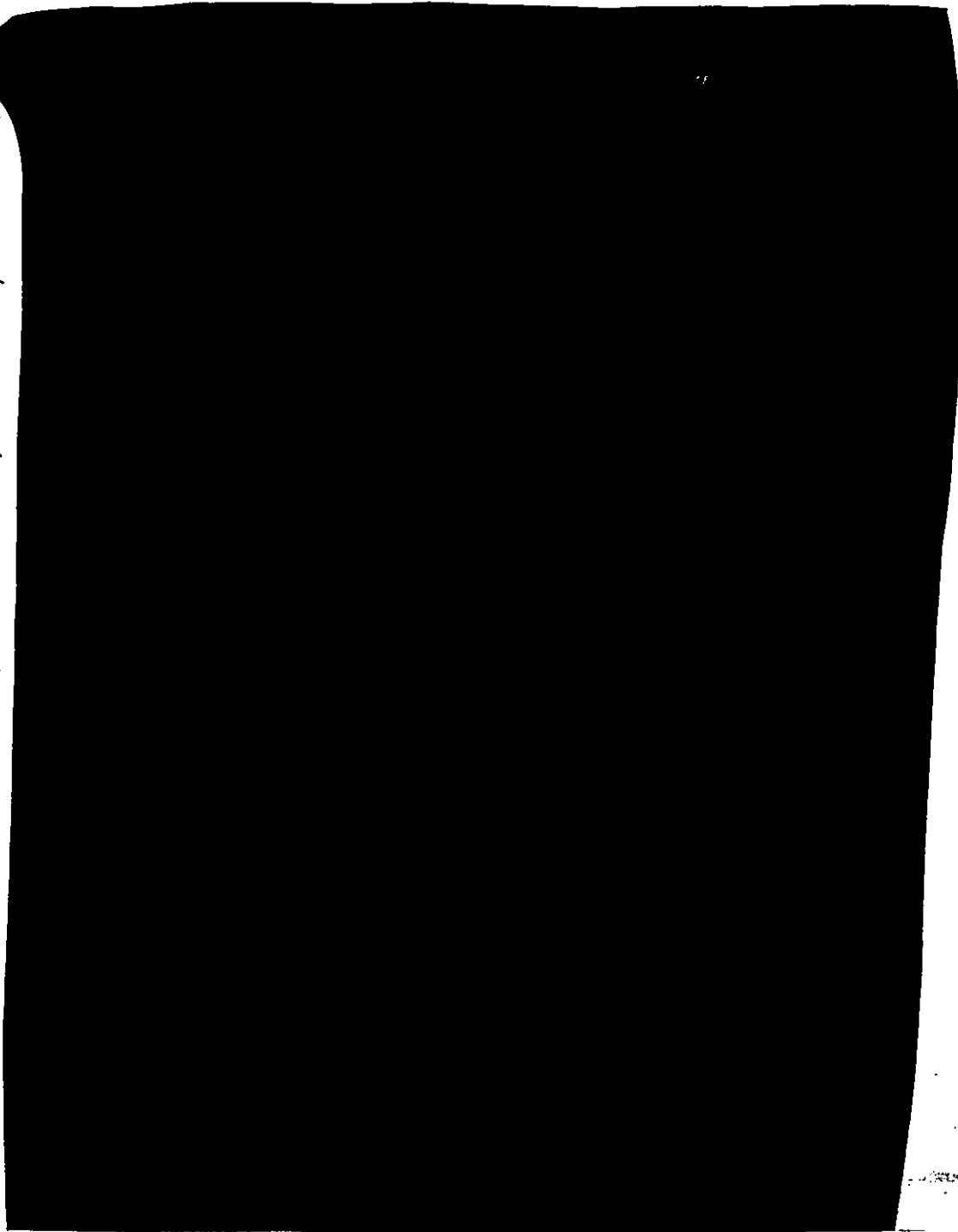
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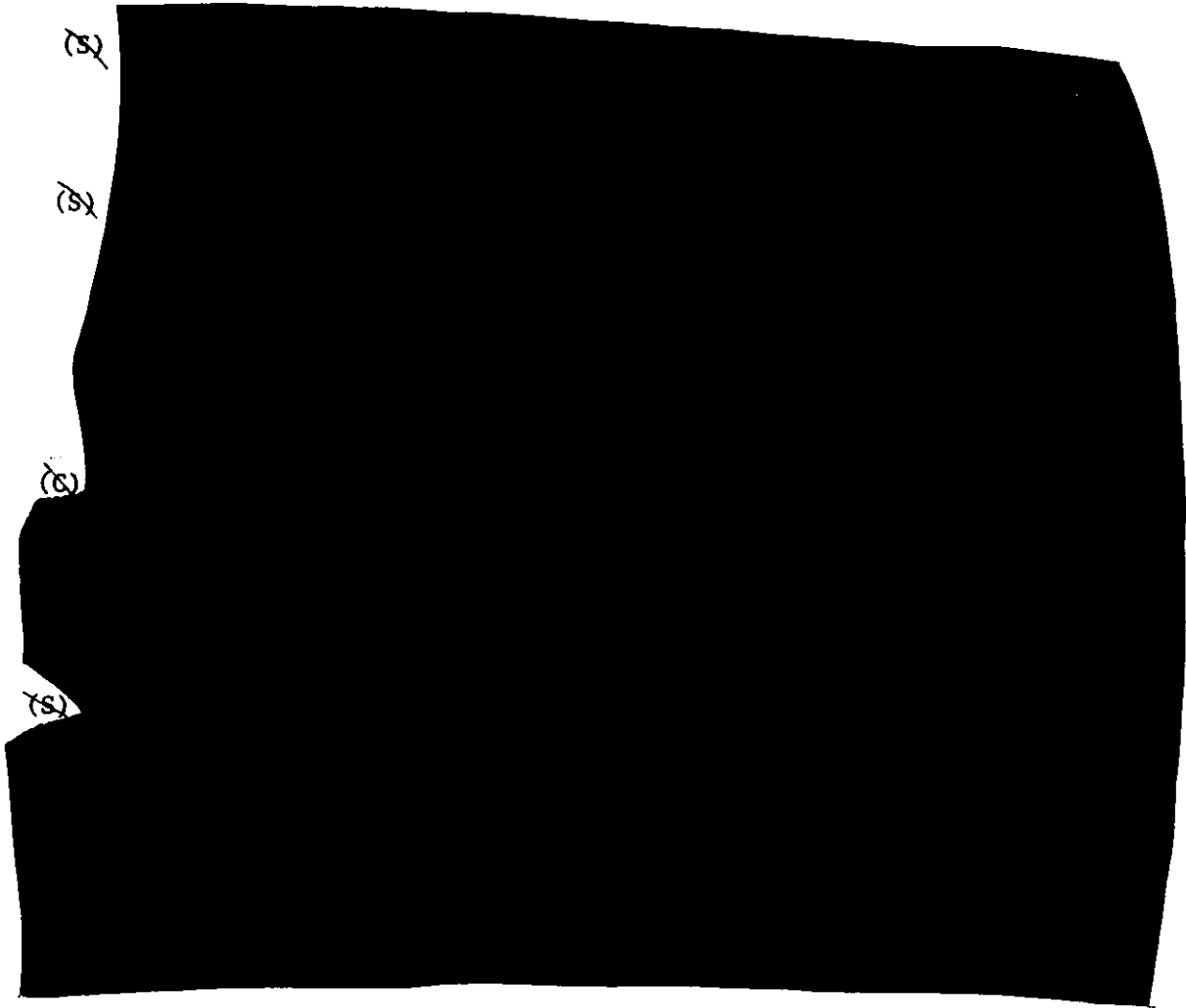
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* (U) NOTE: The terms used in the capability matrix are defined as follows:

- (U) 1. Satisfactory - Reliable connectivity and sufficient capacity to satisfy minimum, critical communication needs.
- (U) 2. Marginal - Connectivity available, but deficiencies exist either in reliability or capacity.
- (U) 3. Unsatisfactory - Neither connectivity nor requisite capacity is available.

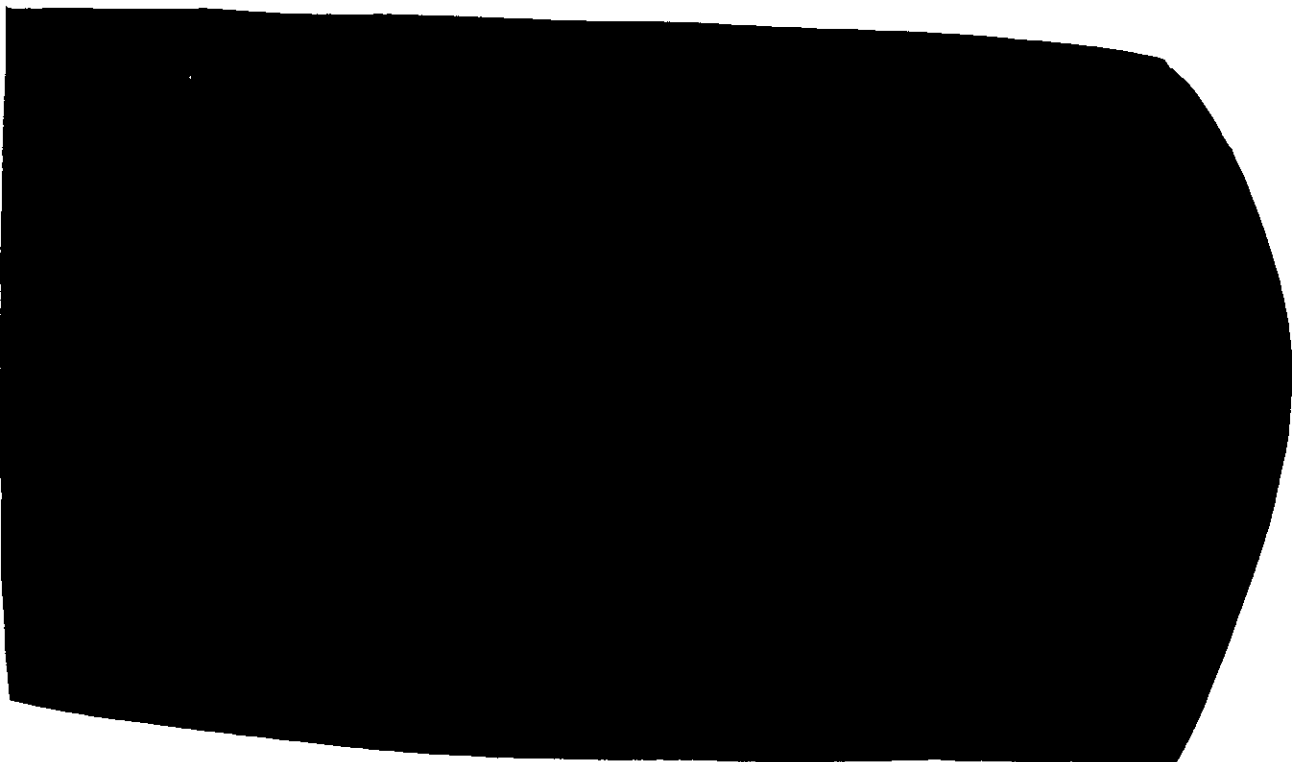


FIGURE 13

(U) POST-ATTACK COMMUNICATIONS CAPABILITY BASED ON CURRENT USE OF RESIDUAL ASSETS

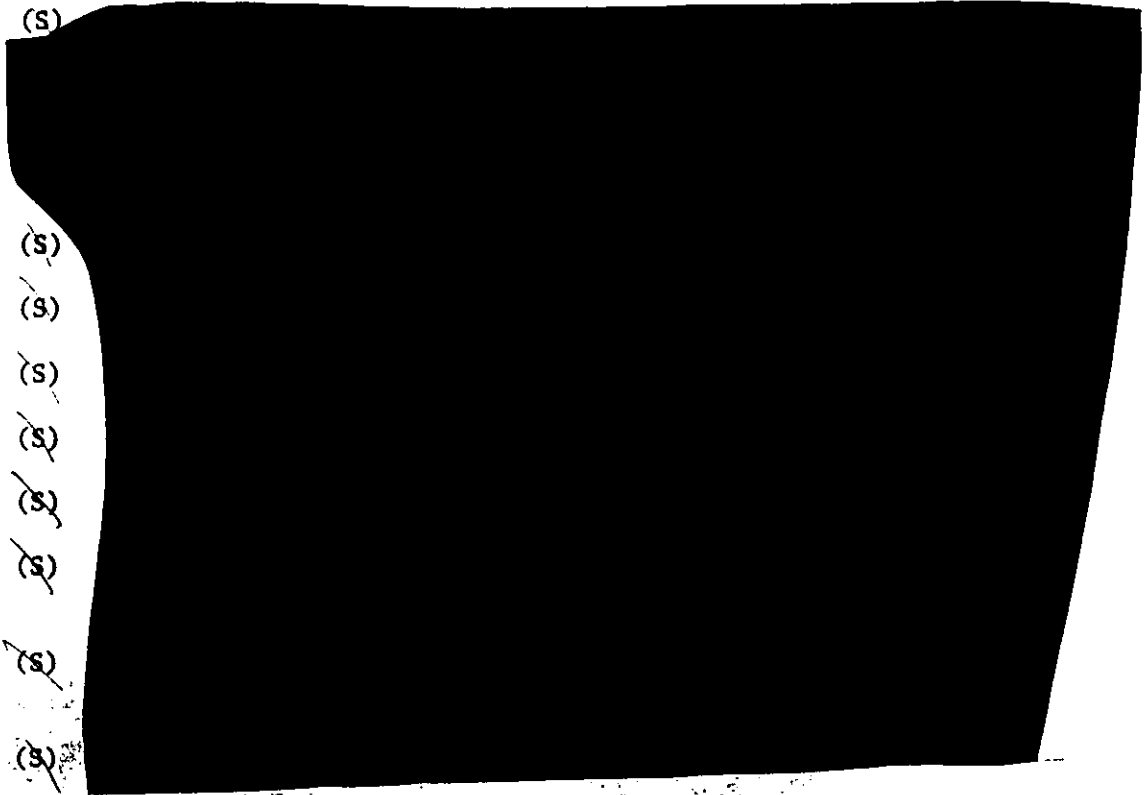
4.0 PROPOSED SOLUTIONS (U)

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4.1 Communications Shortfalls (U)

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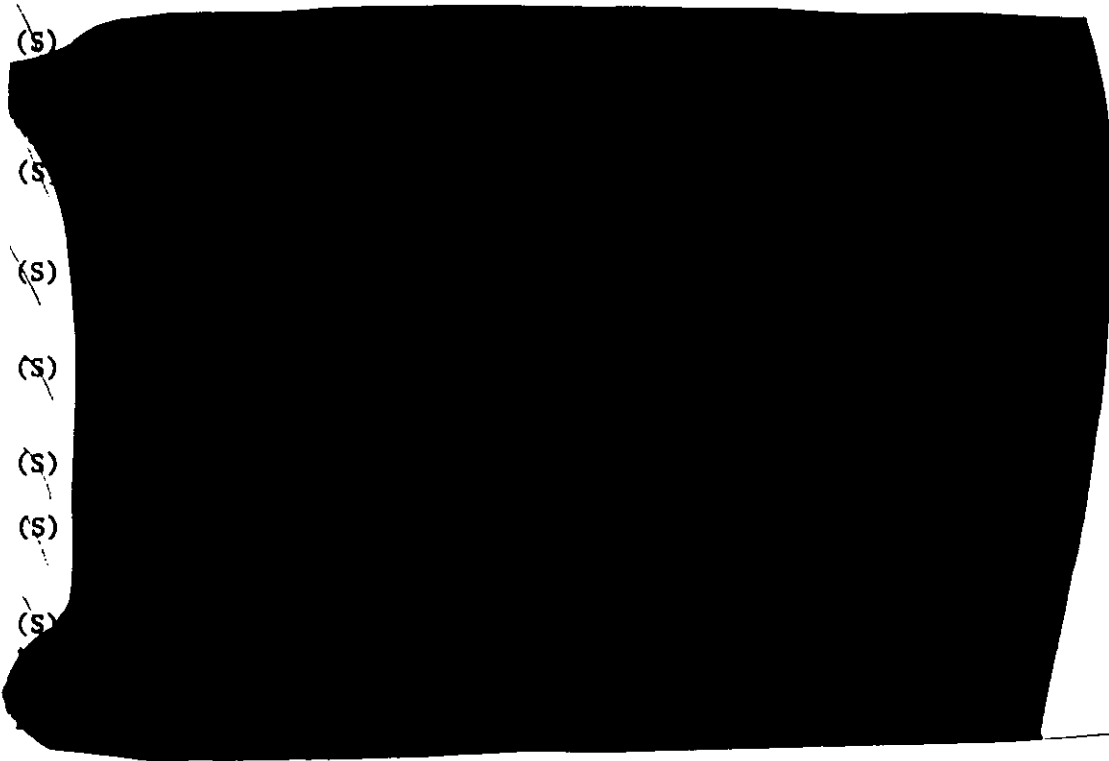
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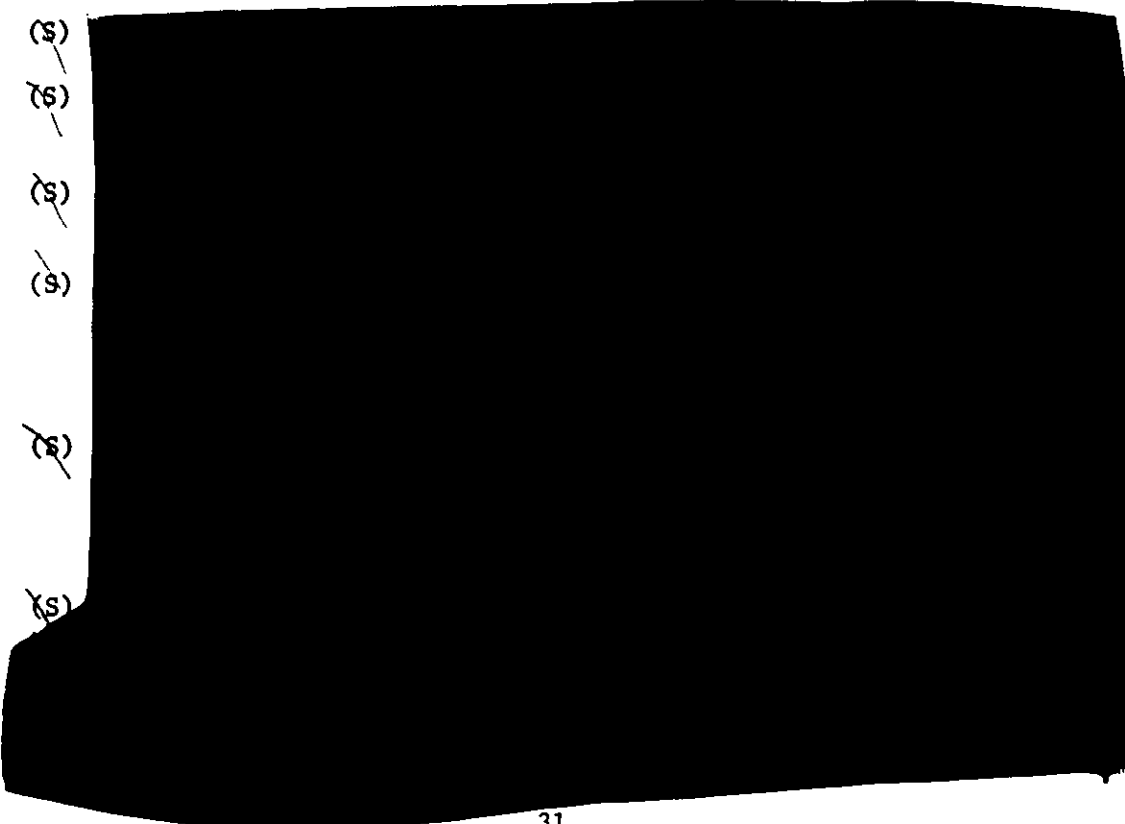
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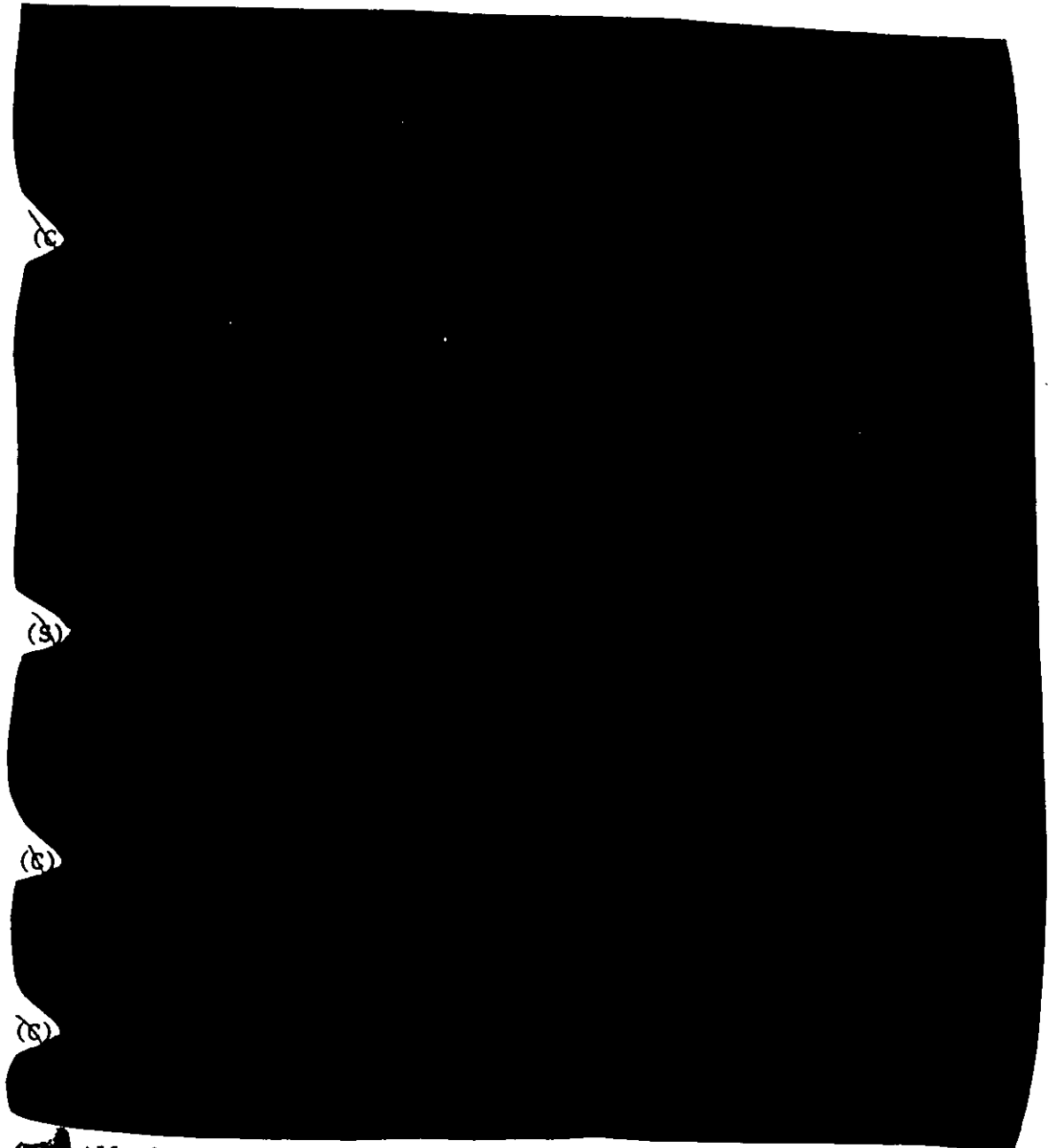


4.2 Solution Description (U)

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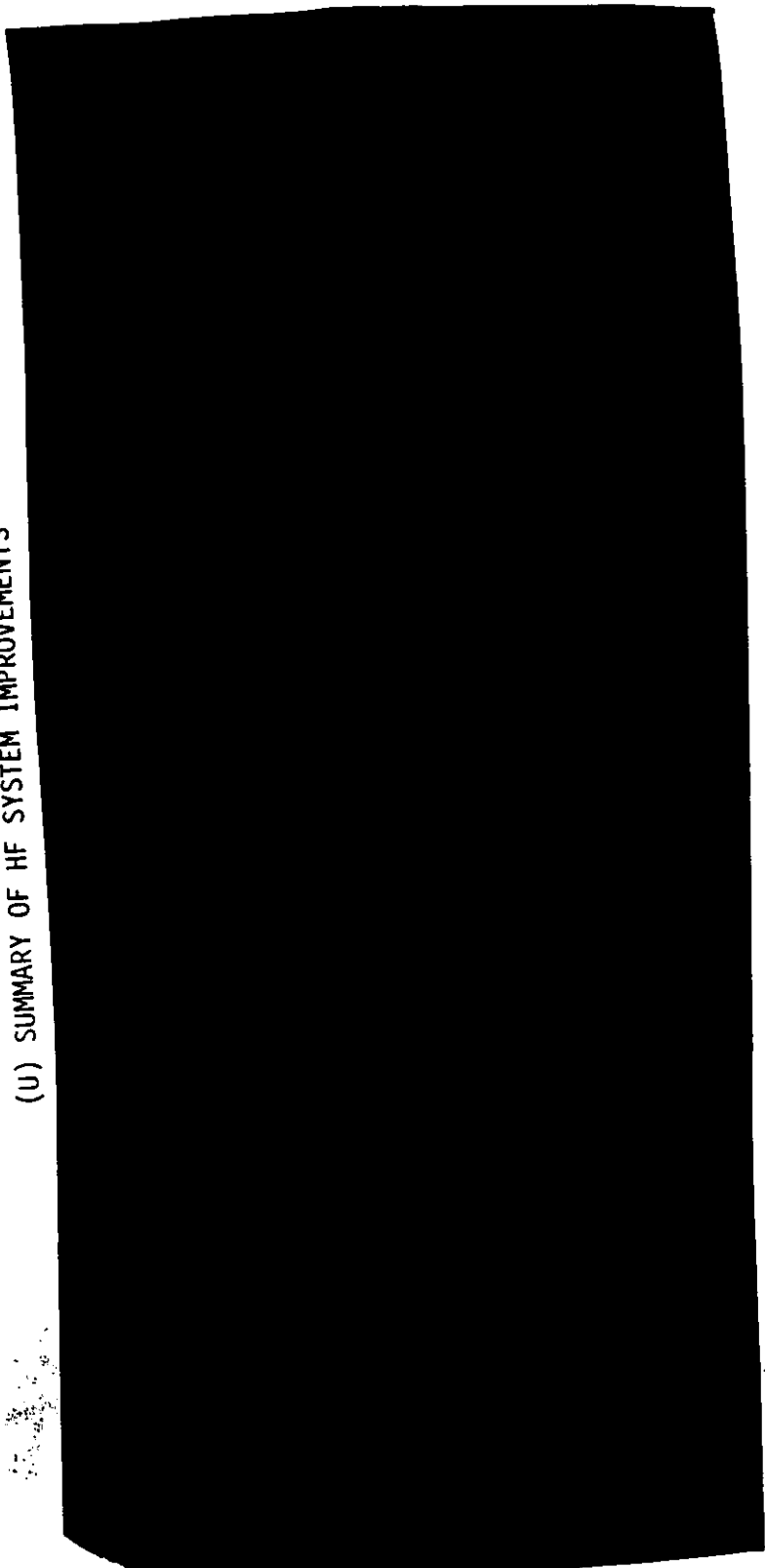


(U) All three approaches require detailed evaluation and cost analyses. Detailed discussions of the three approaches and alternatives applicable to each are contained in Annex A, to be published separately. The final solution may be a combination or hybrid of all of the above in a configuration which provides the best probability for survival and response.

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TABLE II
(U) SUMMARY OF HF SYSTEM IMPROVEMENTS



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4.2.2 Satellite Communications (U)

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A technical analysis is required before a definitive recommendation can be developed.

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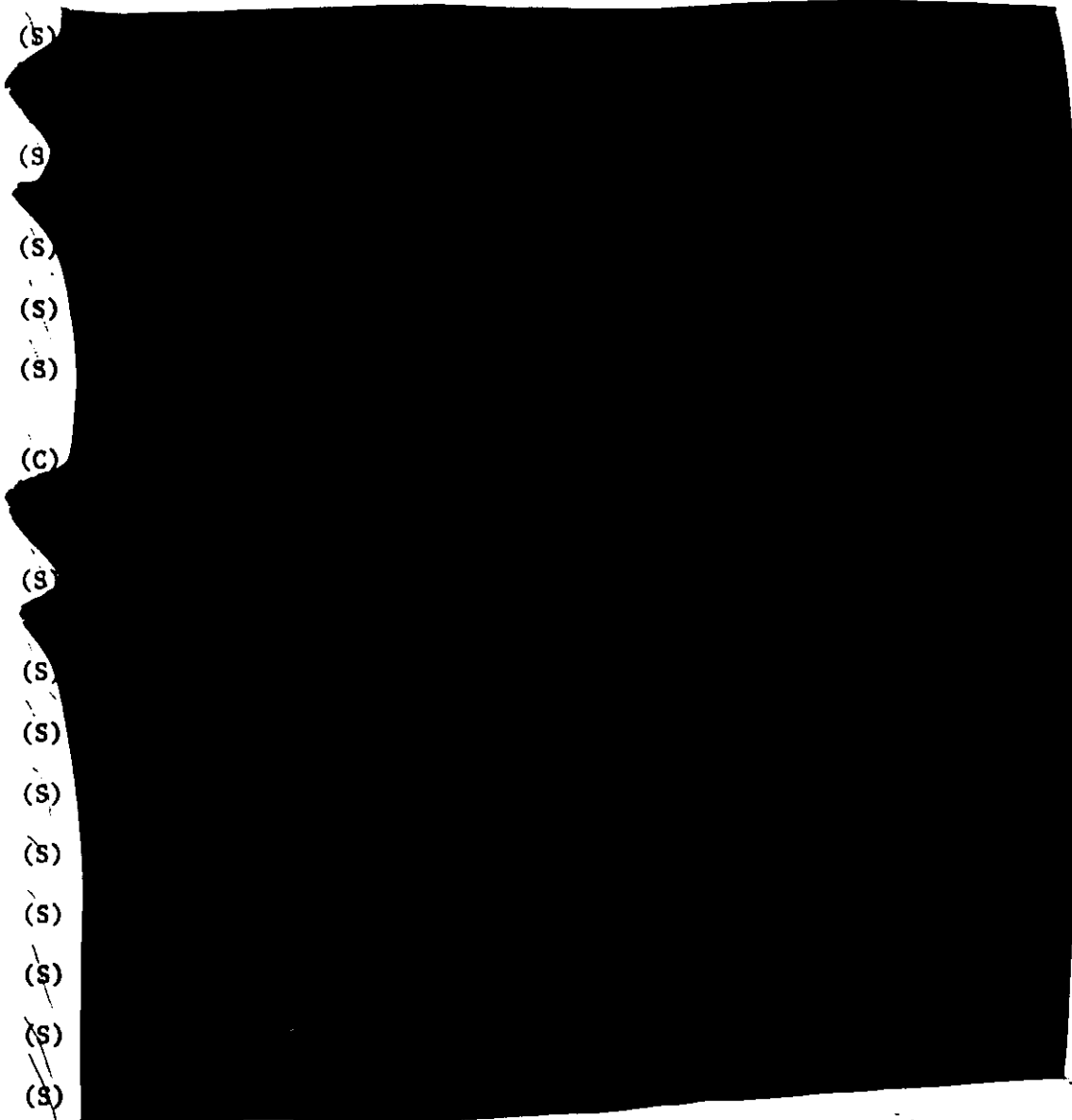
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~~SECRET~~ detailed presentation of the SATCOM alternatives that led to the solutions proposed above is contained in Annex B.

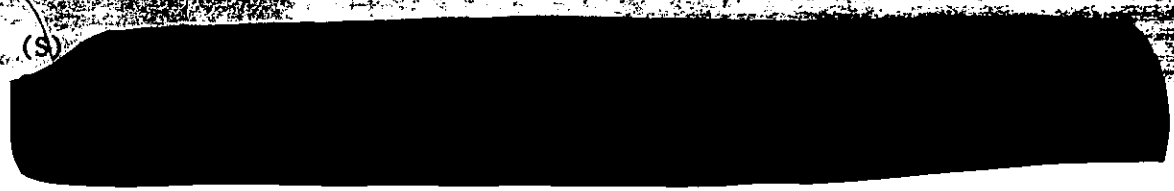
4.2.3 Plans and Procedures (U)

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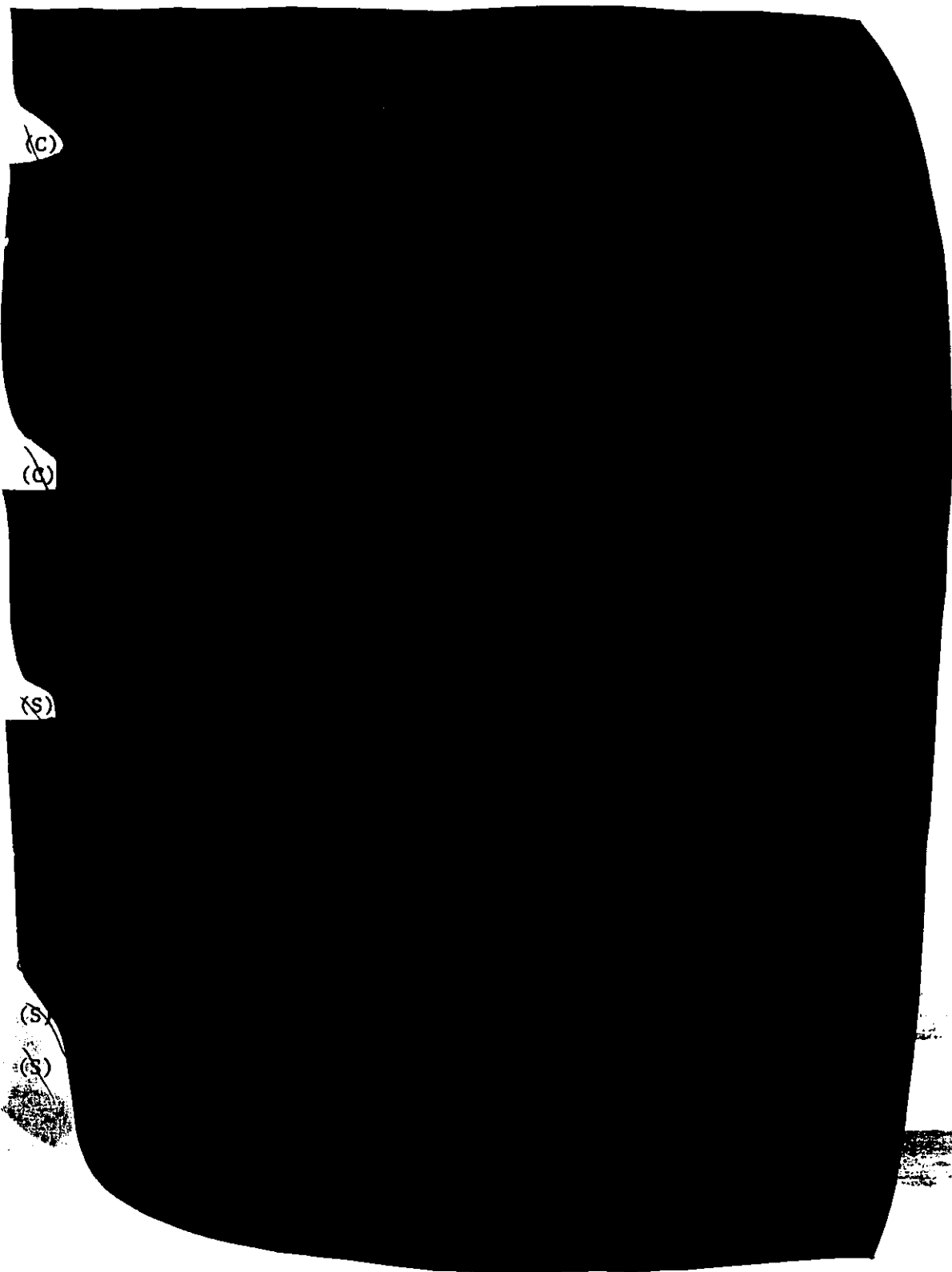


4.2.4 Common-Carrier Restoration (U)

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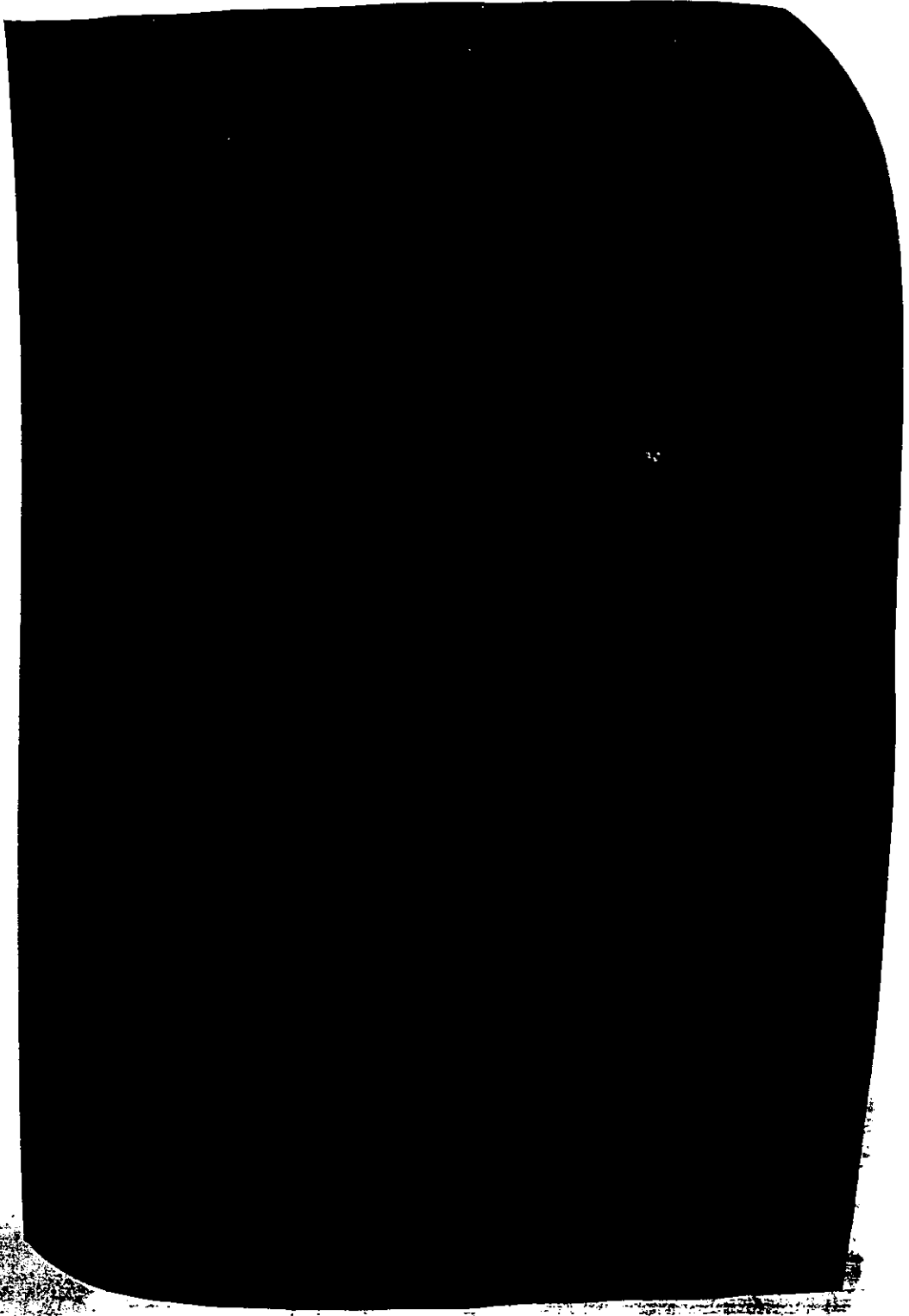
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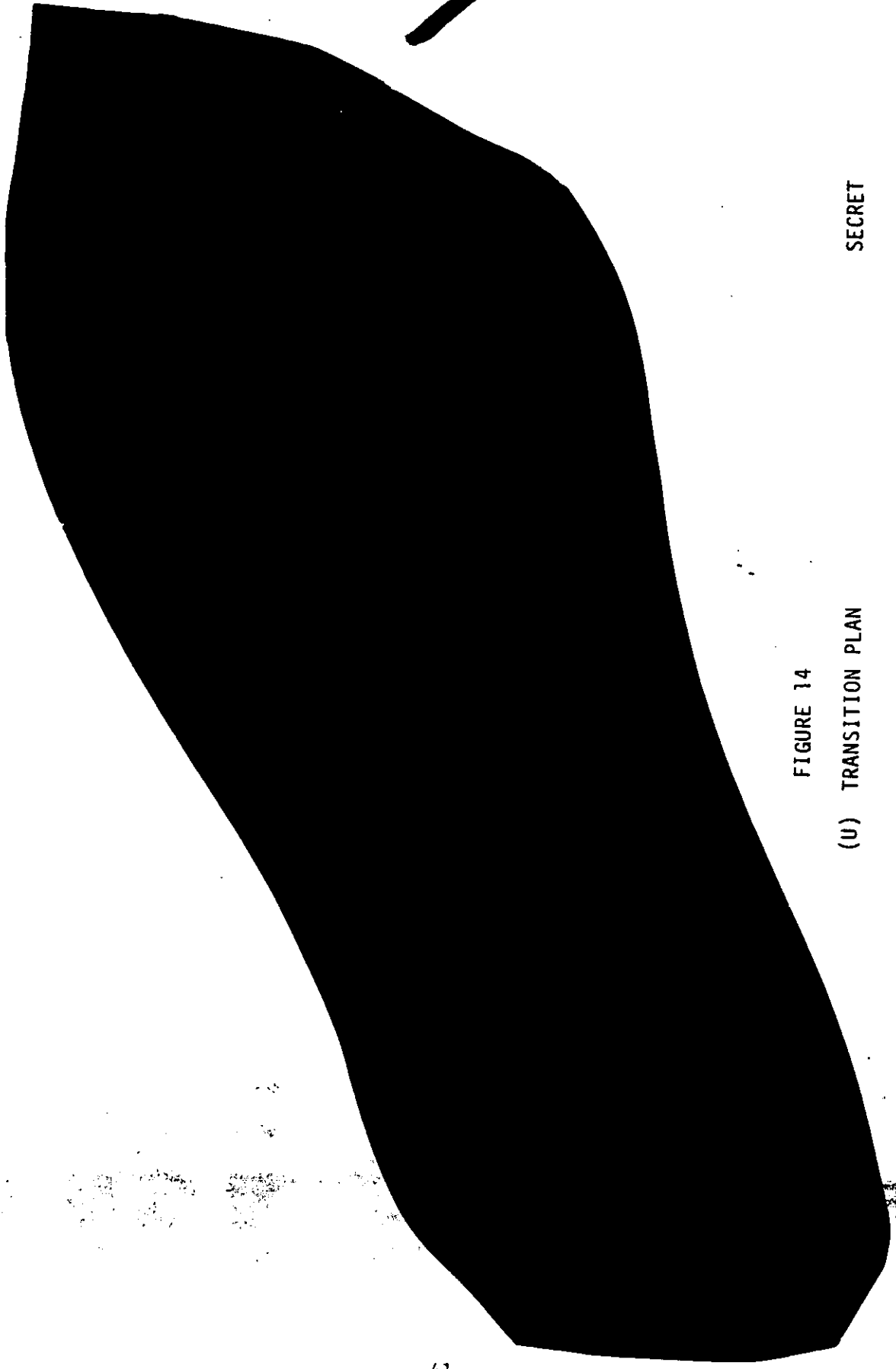
4.3 Transition Plan (U)

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4.4 Near-Term (Pre-1985) Improvements (U)

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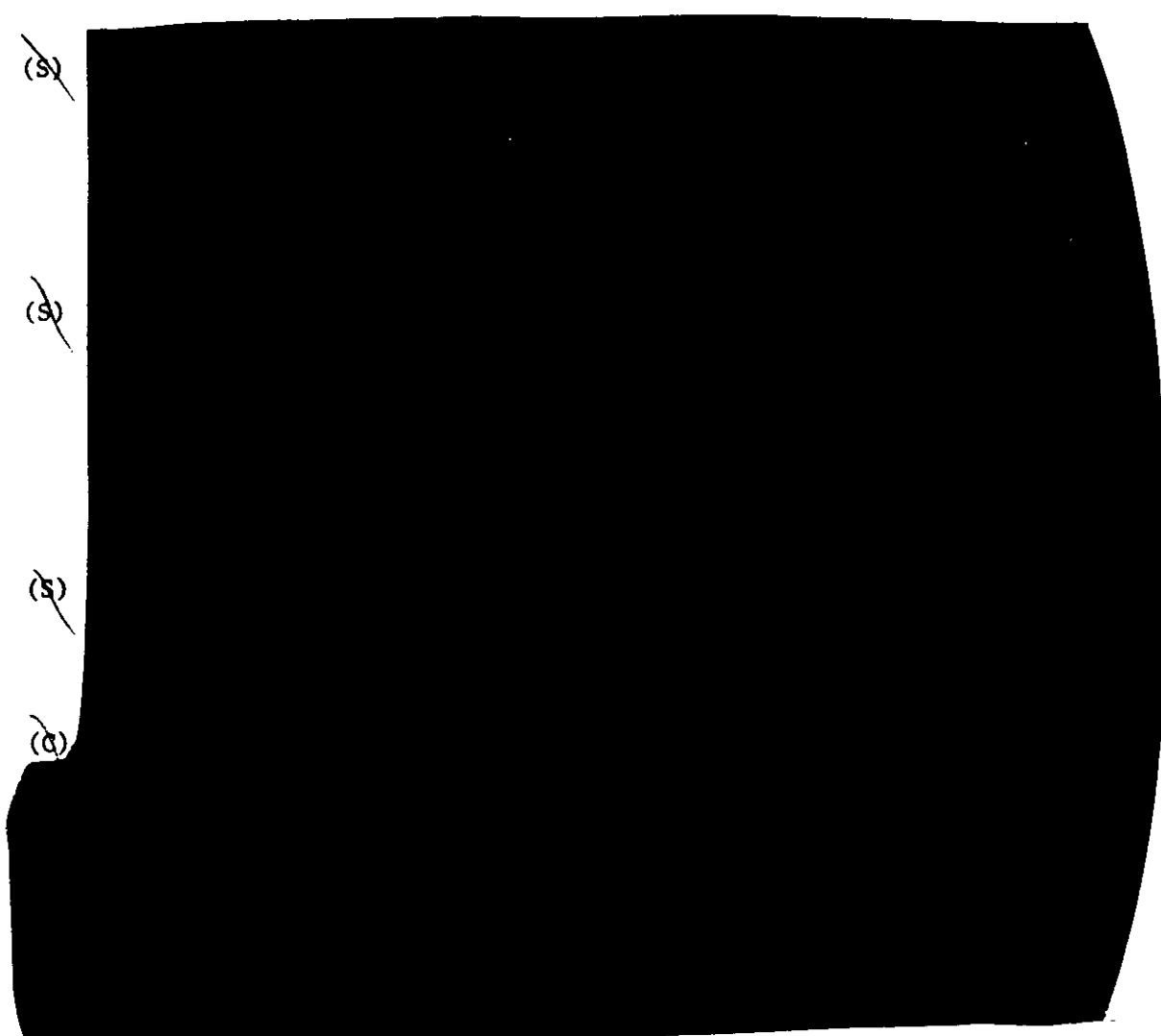


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FIGURE 14

(U) TRANSITION PLAN

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4.5 Longer Range Improvements (U)

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(U) POST-ATTACK COMMUNICATIONS CAPABILITY
BASED ON RESIDUAL ASSETS

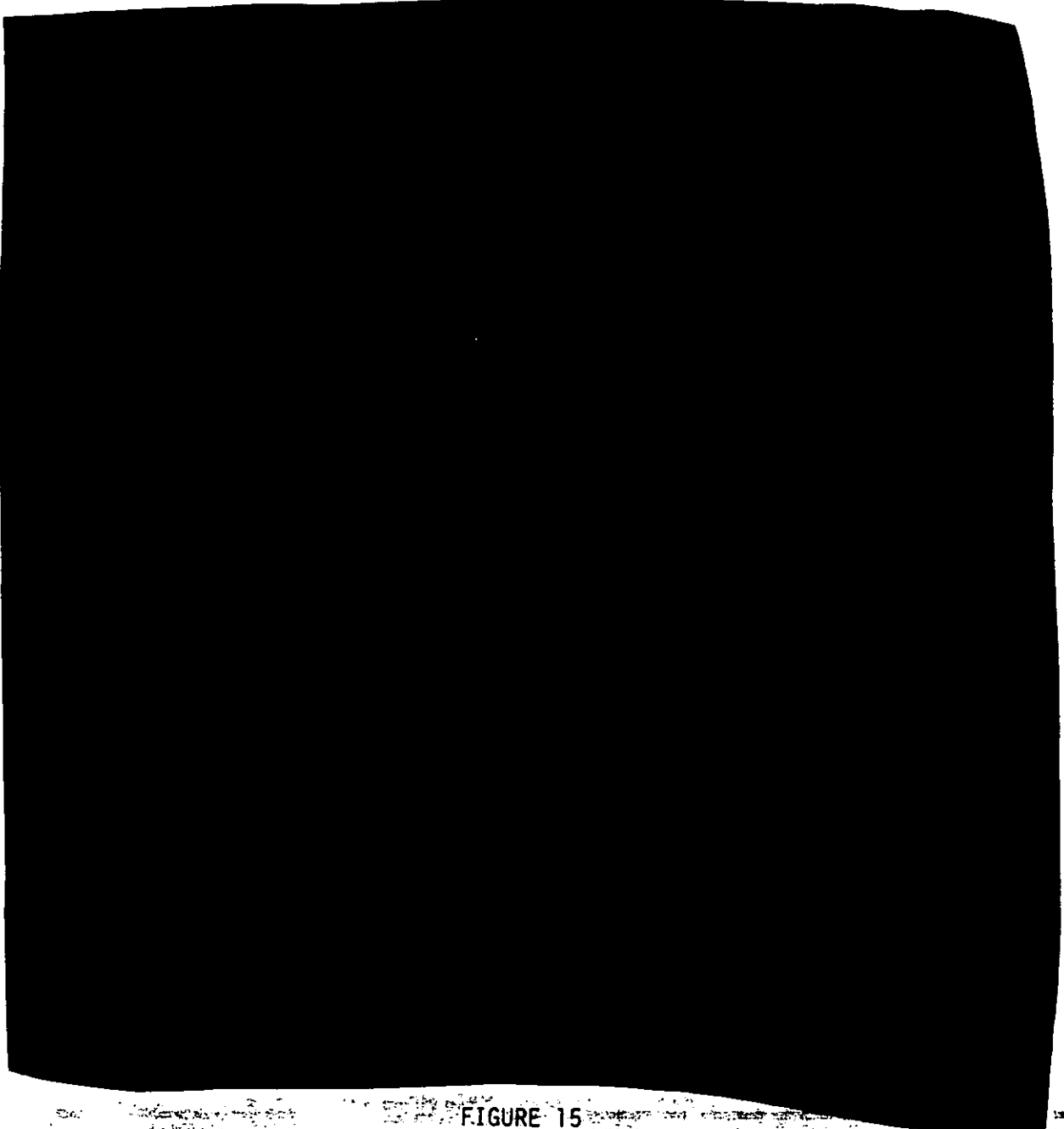


FIGURE 15

(U) POST-ATTACK COMMUNICATIONS CAPABILITIES BASED ON
NEAR-TERM (PRE-1985) IMPROVEMENTS

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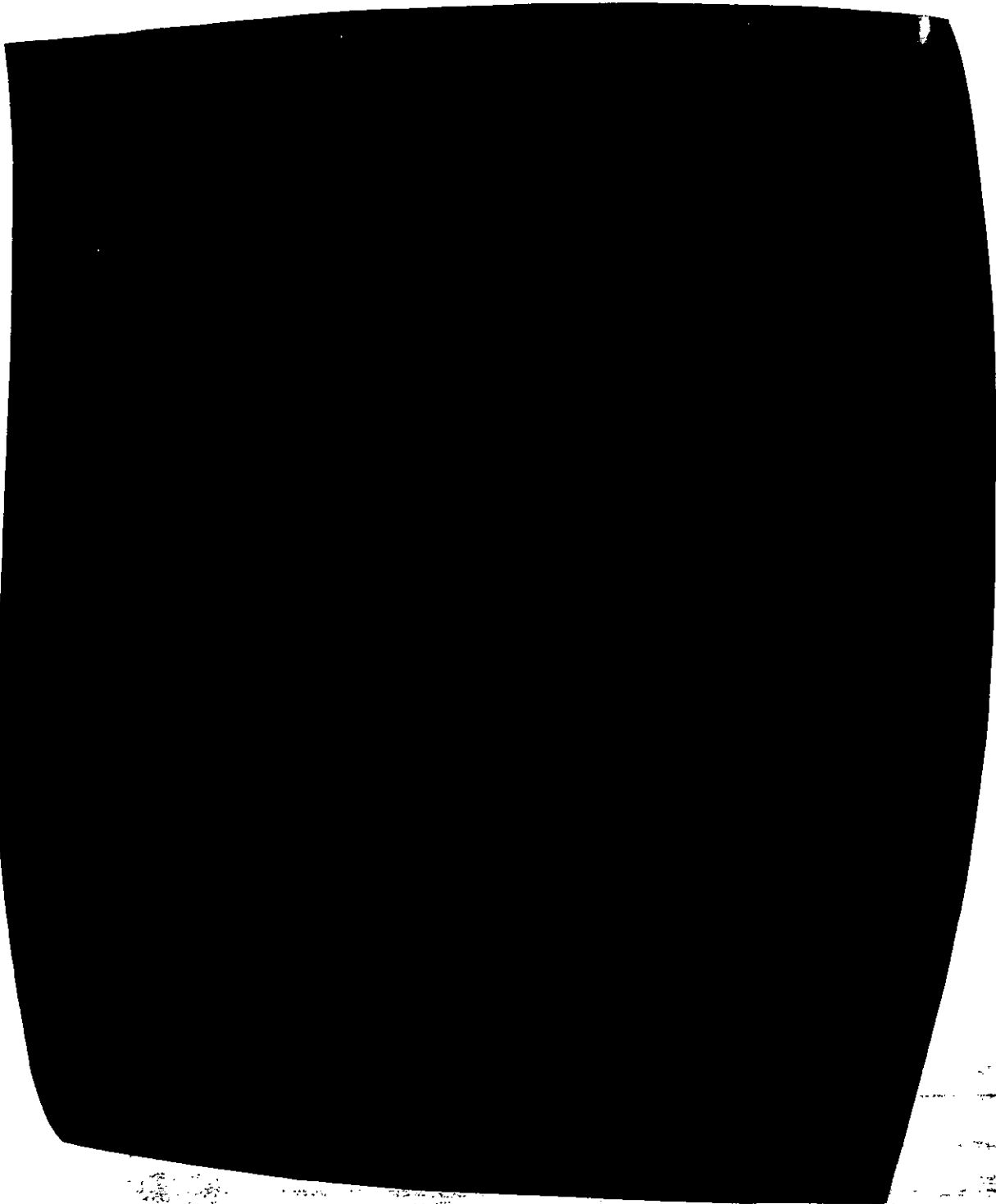
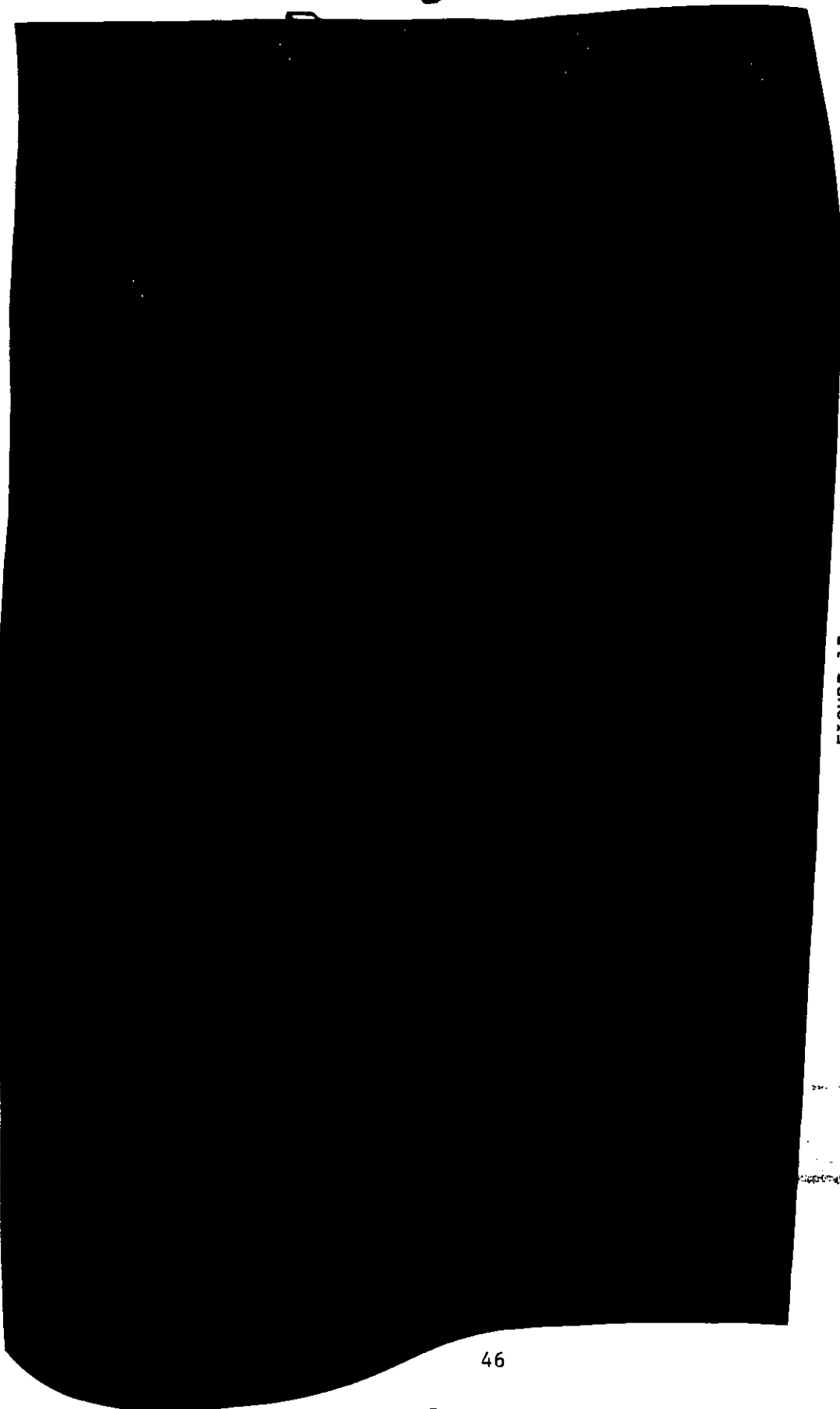


FIGURE 16

(U) GROUNDWAVE NETWORK

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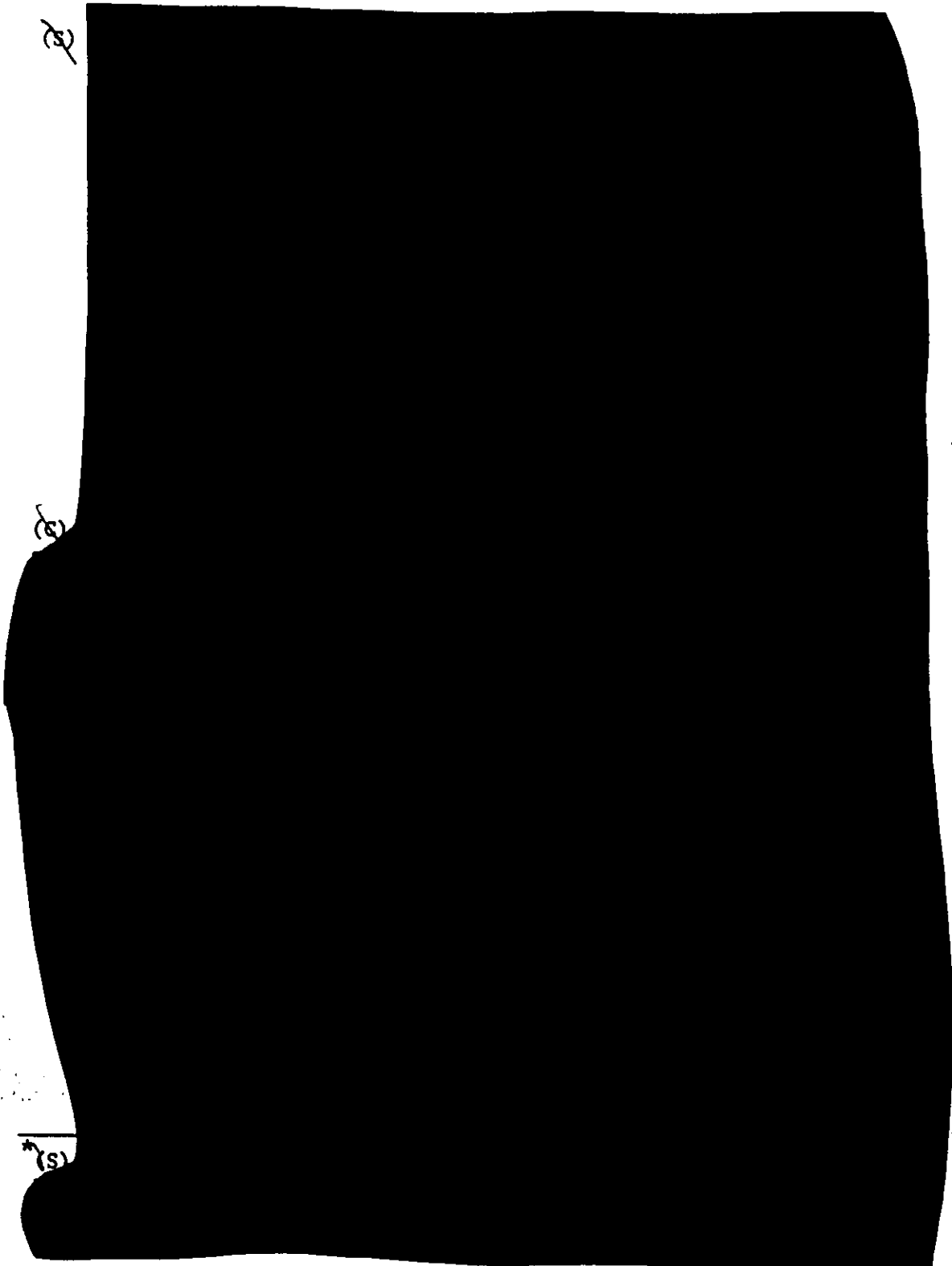
FIGURE 17

(U) EXAMPLE FORCE MANAGEMENT CONFIGURATION

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(U) POST-ATTACK COMMUNICATIONS CAPABILITY BASED
ON NEAR-TERM (PRE-1985) SOLUTION IMPLEMENTATION

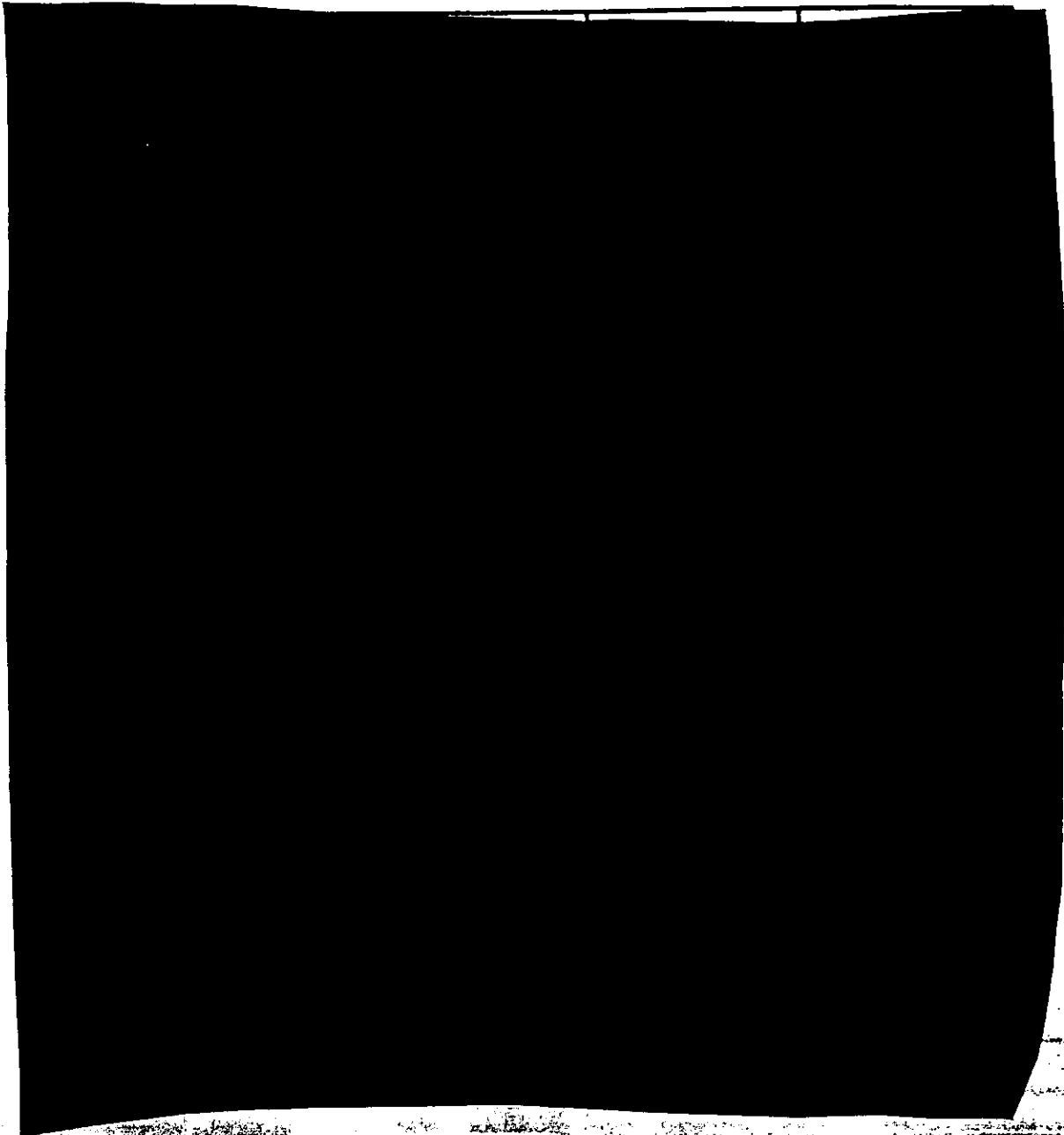



FIGURE 18

(U) POST-ATTACK COMMUNICATIONS CAPABILITY BASED
ON LONGER-RANGE (POST-1985) IMPROVEMENTS

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5.0 RECOMMENDATIONS (U)

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5.1 System Modifications and Development (U)

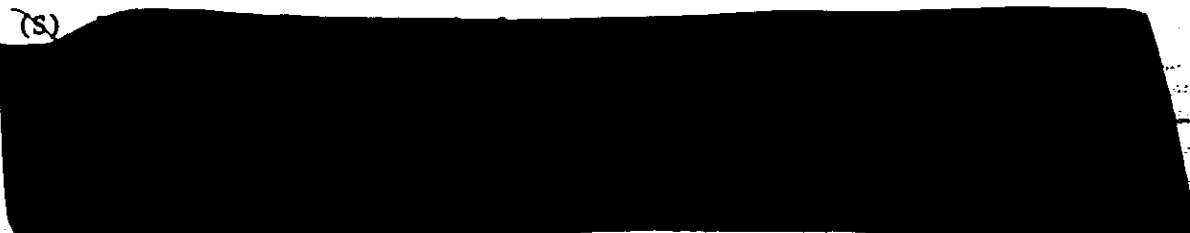
Recommendation 1, SATCOM Interoperability (U)

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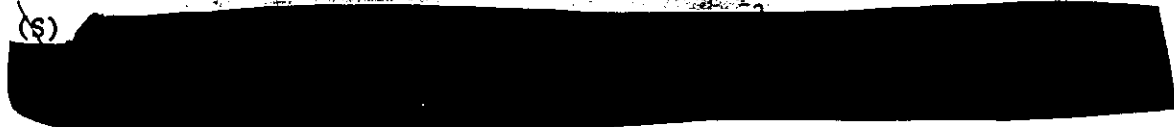
Recommendation 2, SATCOM Terminals (U)

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Recommendation 3, Adaptive HF Radio (U)

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(S) [Redacted]
(S) [Redacted]
(S) [Redacted]

Recommendation 4, SATCOM Survivability and Endurance (U)

(S) [Redacted]

Recommendation 5, Proliferated HF Network (U)

(S) [Redacted]

Recommendation 6, Land-Mobile Command and Control Centers (U)

(S) [Redacted]

5.2 Operational Planning and Procedures Recommendations (U)

Recommendation 7, Post-Attack Concept of Operations and COOP Update (U)

(S) [Redacted]

Recommendation 8, WWMCCS Post-Attack Communications Plan (U)

(S) [Redacted]

Recommendation 9, Reconstitution of the Post-Attack DCS (U)

(S) [Redacted]

5.3 Test, Exercise, and Evaluation Recommendations (U)

Recommendation 10, Test and Evaluation (T&E) for Post-Attack Communications (U)

(S) [Redacted]

Recommendation 11, Exercise Procedures (U)

(S) [Redacted]

5.4 System Analysis and Engineering Recommendations (U)

Recommendation 12, System Engineering (U)

(S) [Redacted]

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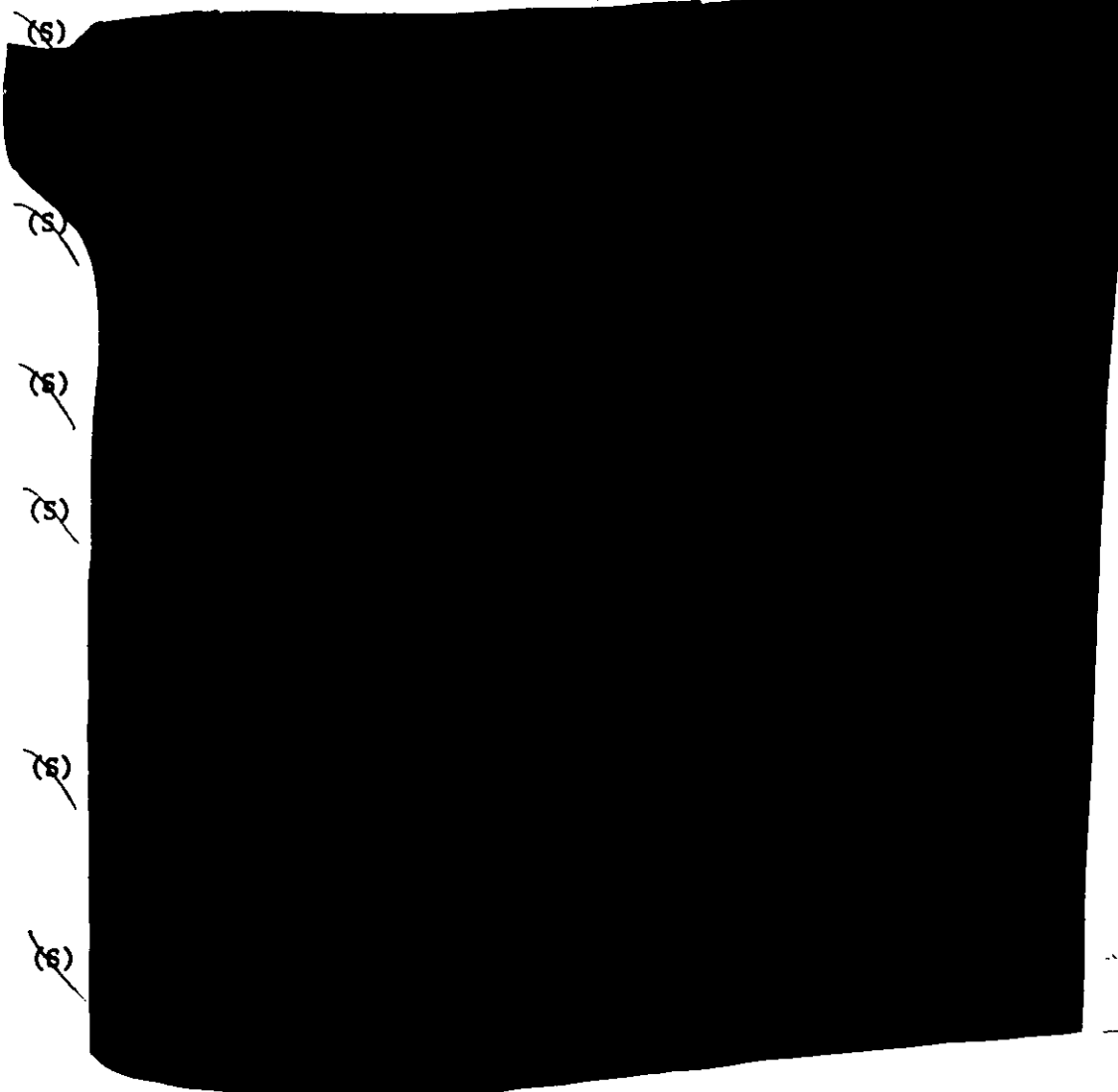
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5.5 Schedule of Recommended Actions (U)

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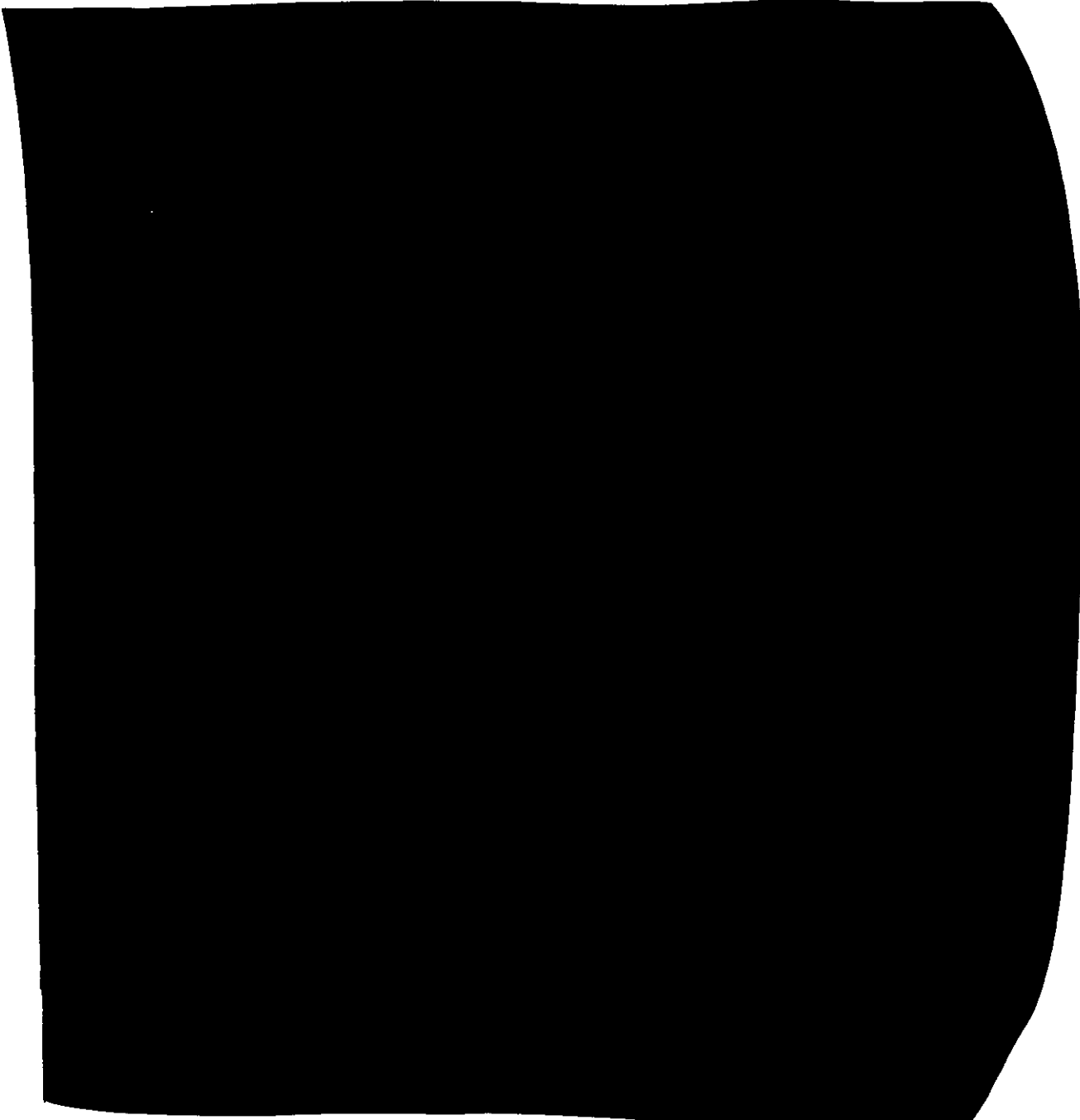


FIGURE 19

(U) SCHEDULE OF RECOMMENDED ACTIONS

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5.6 FY 80 Resource Requirements (U)

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(U) ...Contingent upon ASD (C³I) approval of the recommendations in this report, DCA should be prepared to assist on the formulation of more specific programmatic implementation guidance concerning the above mentioned follow-on activities and funding shortfalls.

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