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PA-1-79



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 (C<sup>3</sup> 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 <sup>3</sup> 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 <sup>2</sup>	Command and Control
C <sup>3</sup>	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)

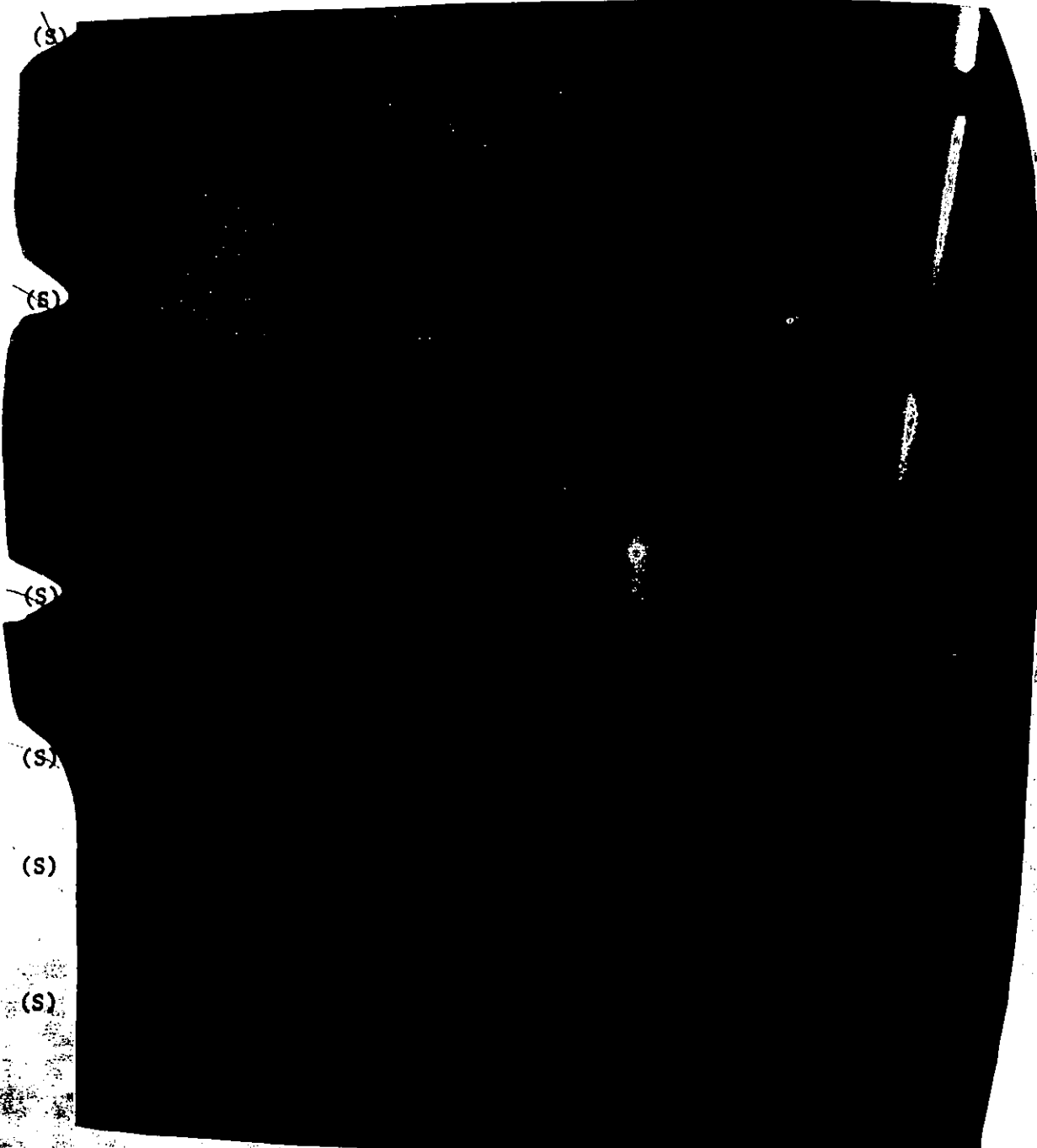
TACAMO	Take Charge and Move Out
TBD	To Be Determined
T&E	Test and Evaluation
TTY	Teletypewriter
UHF	Ultra-High Frequency
USN	U.S. Navy
VHF	Very High Frequency
VLf/LF	Very Low Frequency/Low Frequency
WSEO	WWMCCS System Engineering Organization
WWABNCP	Worldwide Airborne Command Post
WWMCCS	Worldwide Military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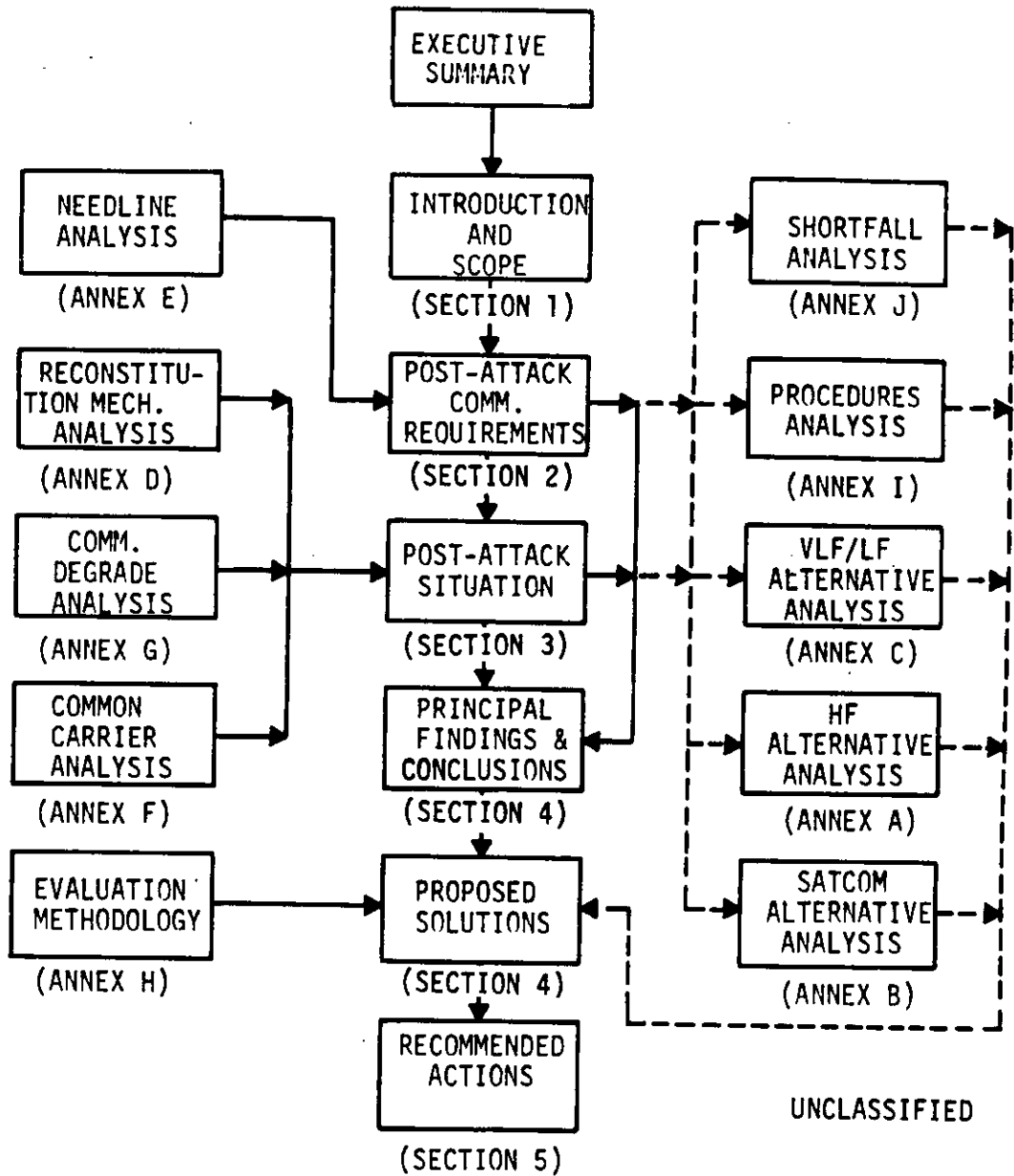
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1.4 Phase II Study Approach (U)

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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.



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FIGURE 1

(U) PHASE II STUDY APPROACH AND REPORT STRUCTURE

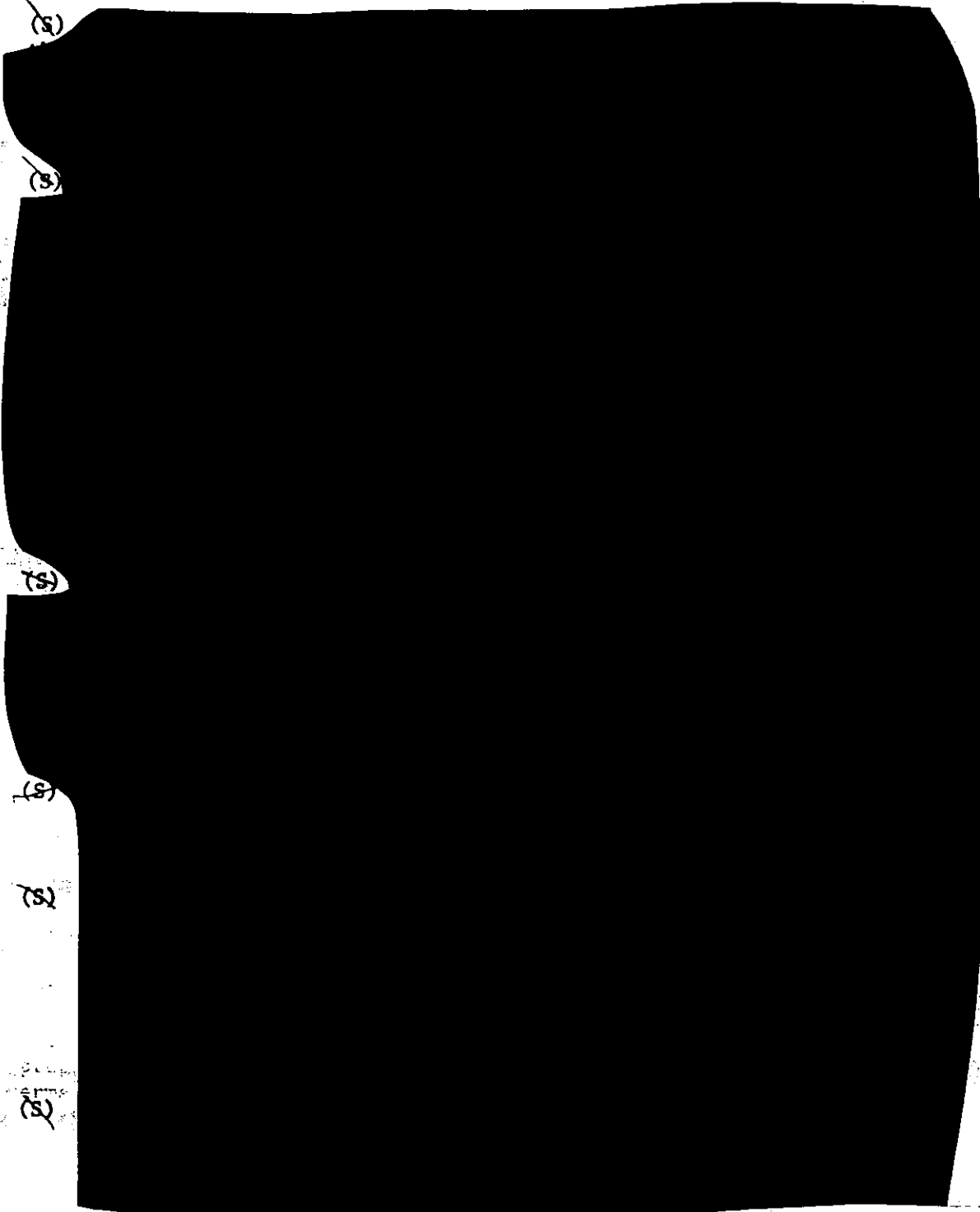
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(U) Section 2 addresses post-attack requirements. Section 3 addresses the situation, residual assets, shortcomings, respectively. Proposed solutions are presented in section 4. Section 5 presents conclusions and defines proposed actions in terms of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

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2.0 POST-ATTACK REQUIREMENTS (U)



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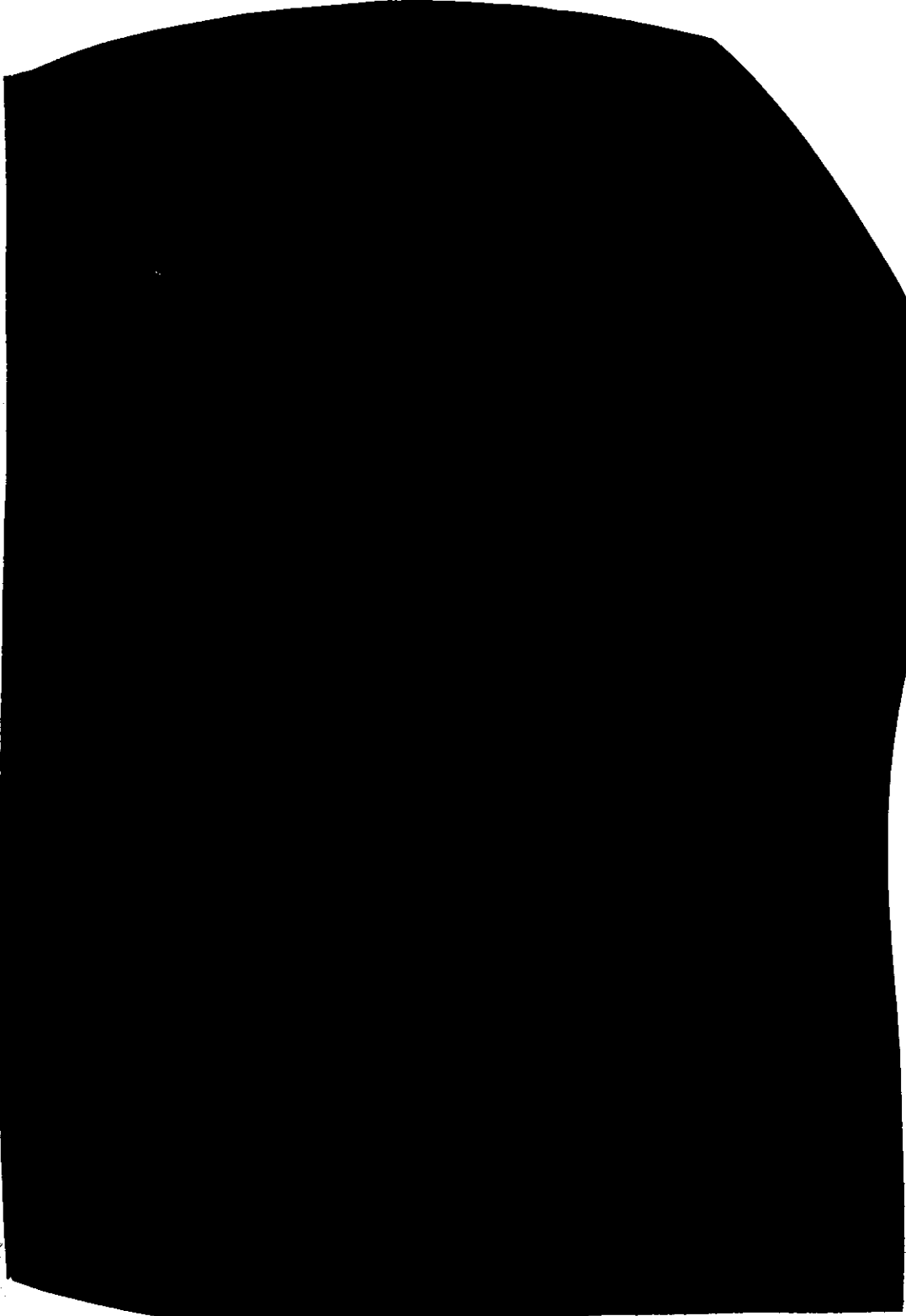
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FIGURE 2

(U) ORGANIZATIONAL RELATIONSHIPS

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



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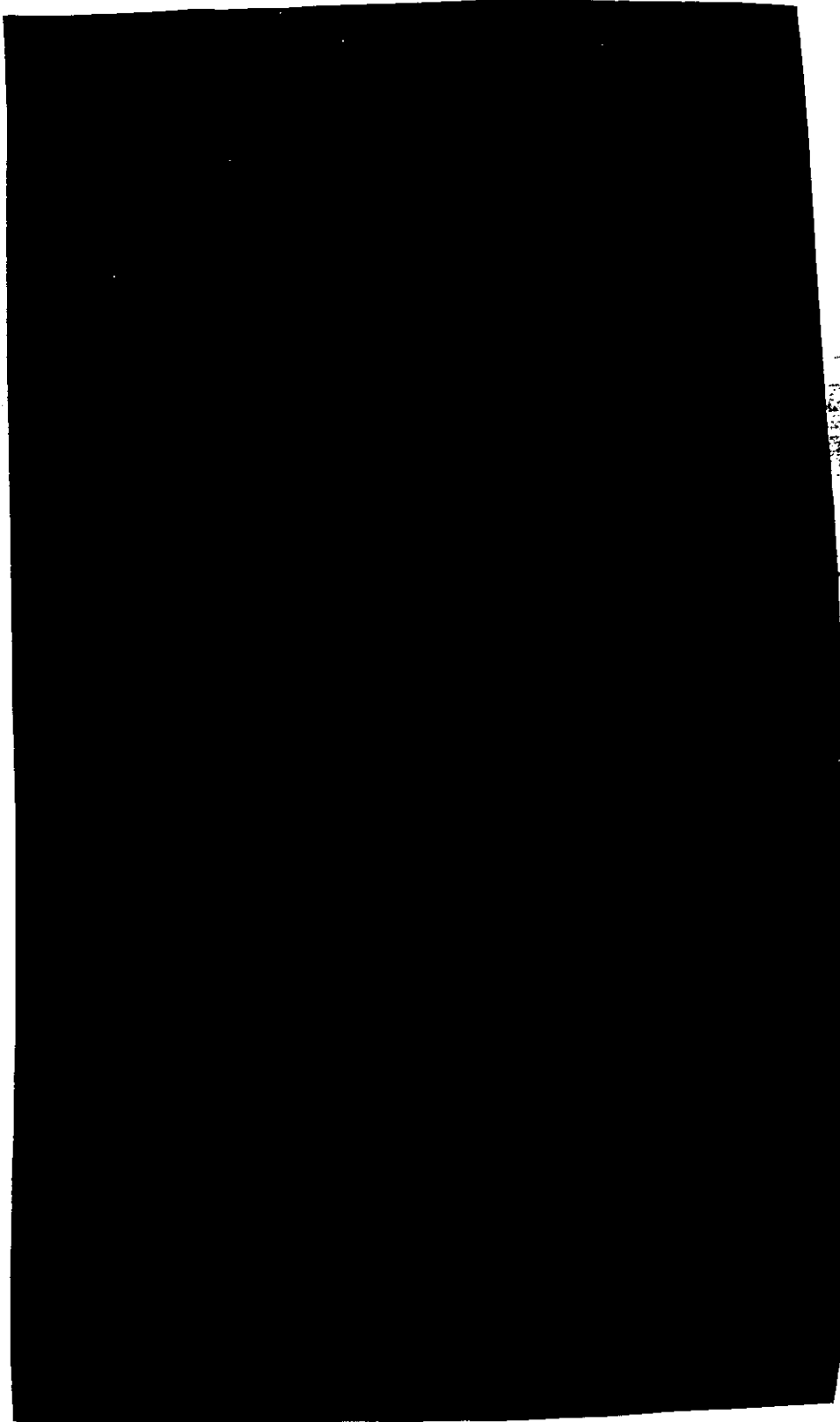


FIGURE 3

(U) POST-ATTACK COMMUNICATION REQUIREMENTS VOICE TRAFFIC

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POST-ATTACK COMMUNICATION REQUIREMENTS  
RECORD TRAFFIC

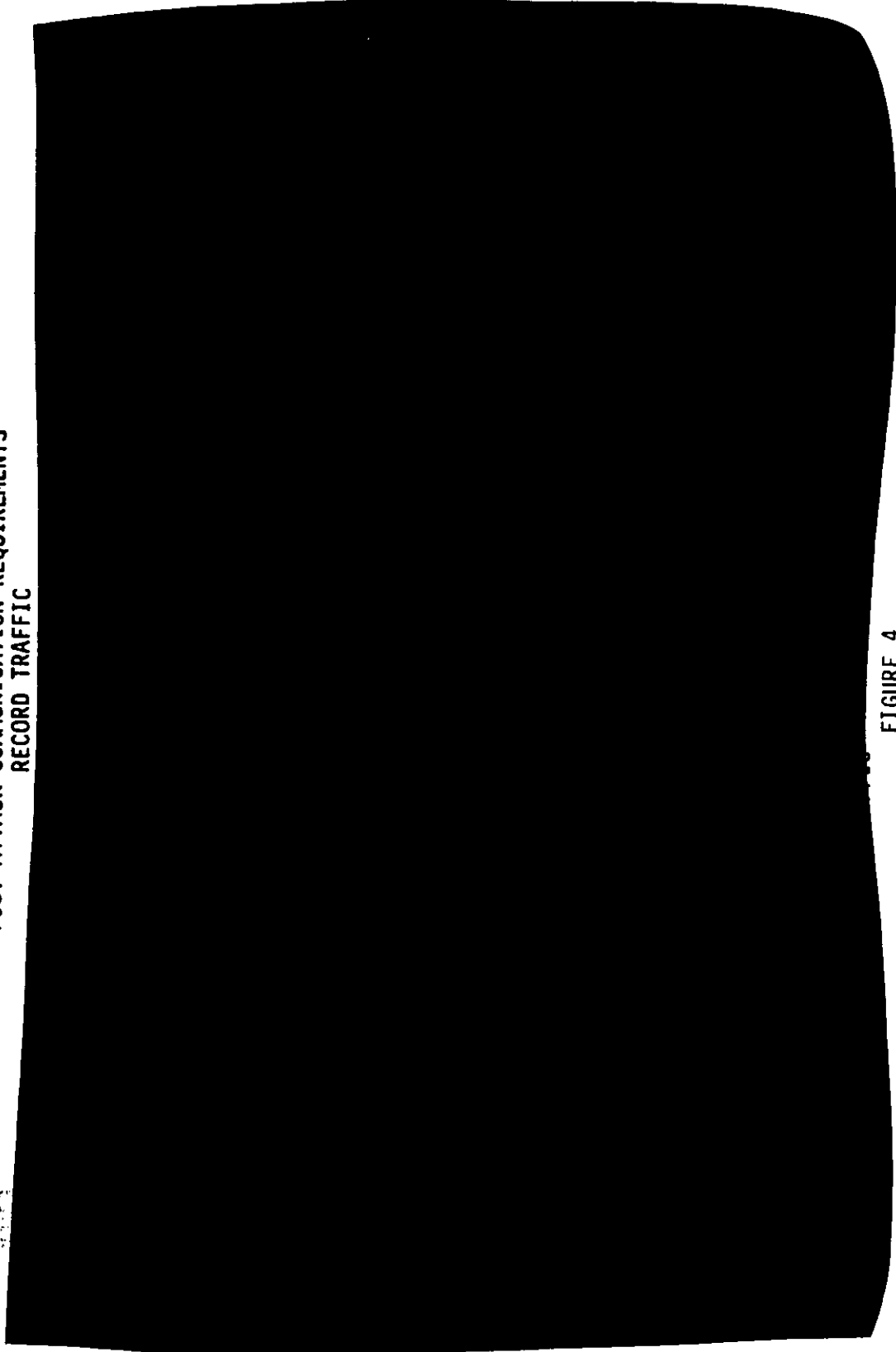
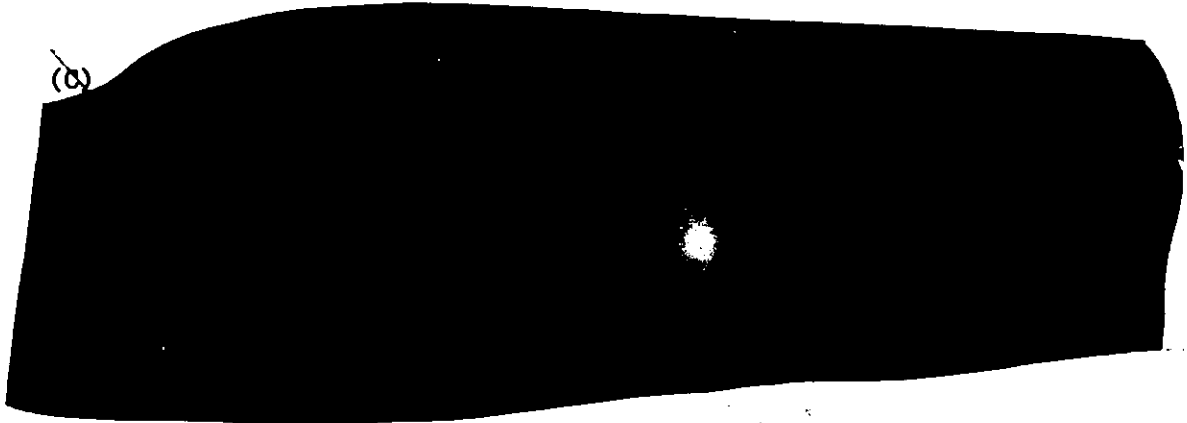


FIGURE 4

(U) POST-ATTACK COMMUNICATION REQUIREMENTS RECORD TRAFFIC

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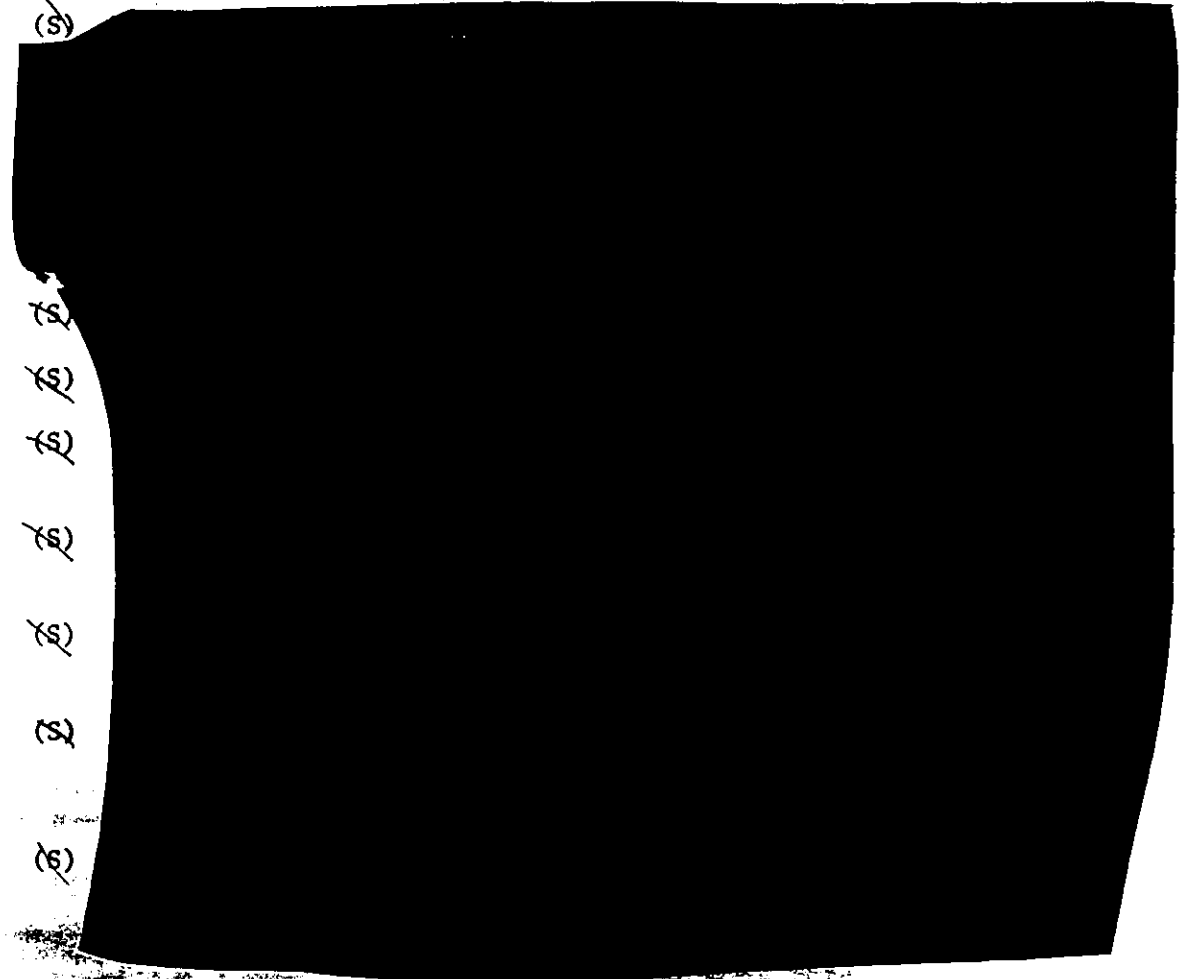
3.0 POST-ATTACK SITUATION ANALYSIS (U)

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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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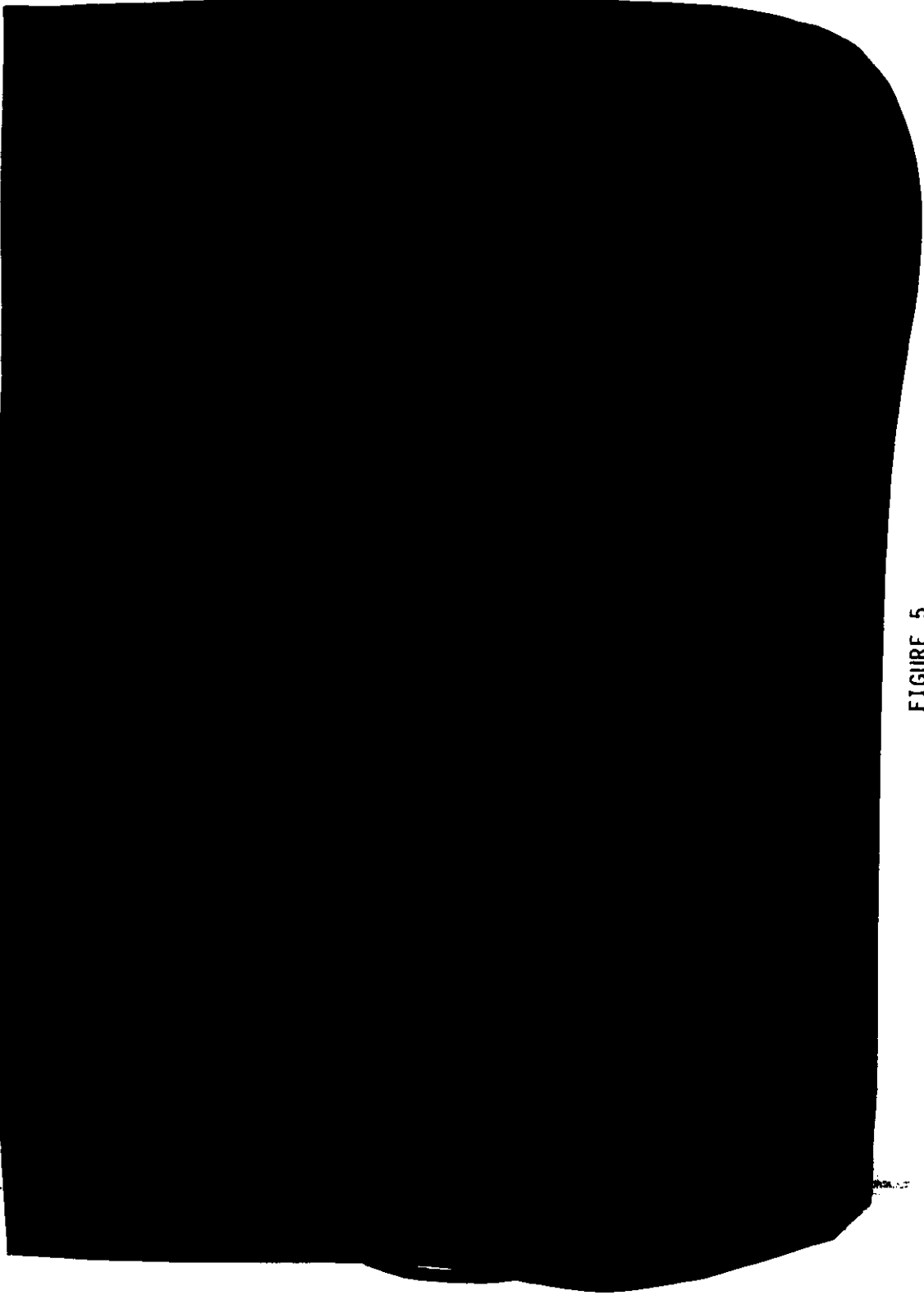
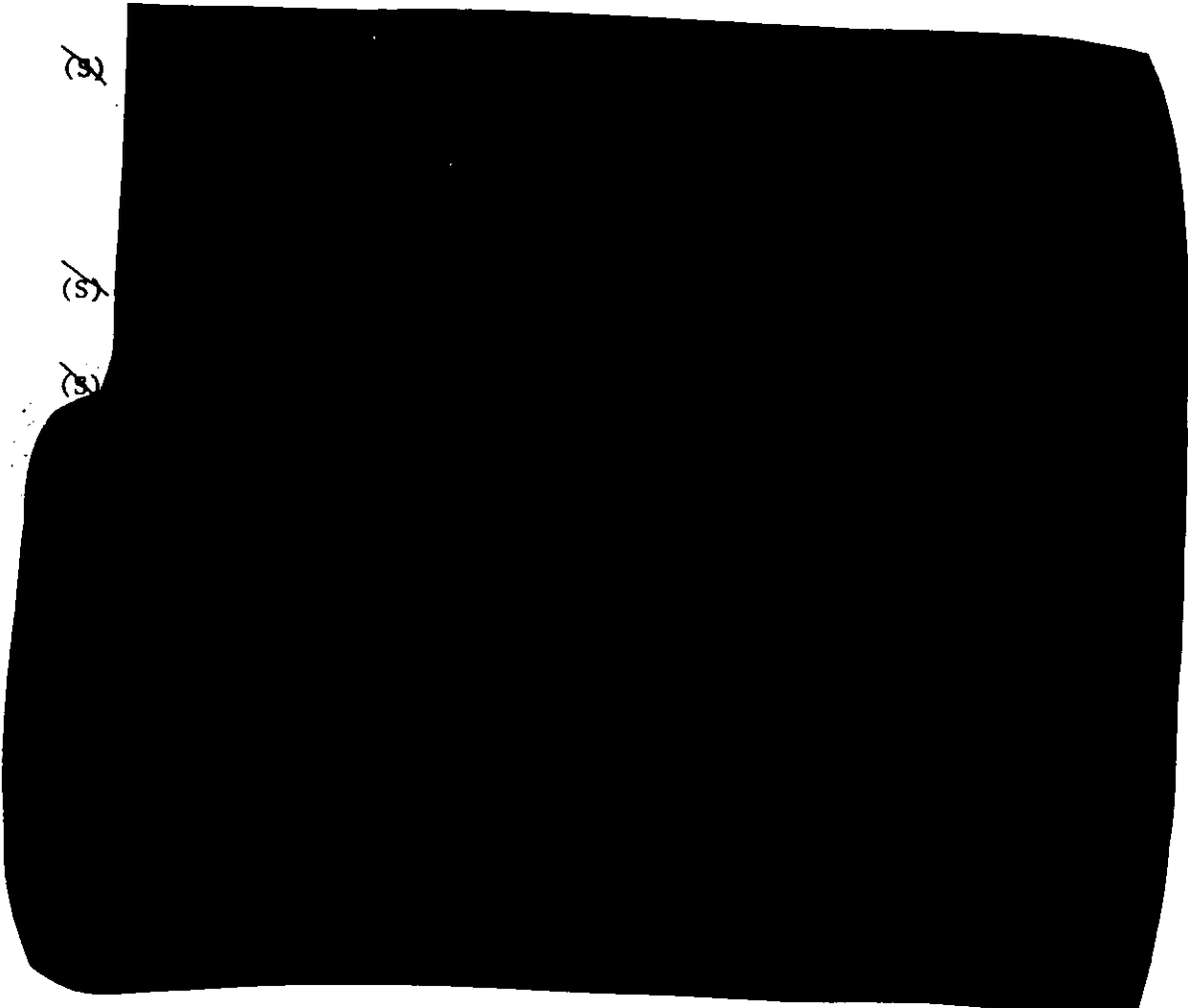


FIGURE 5

(U) TRANSITION TO POST-ATTACK

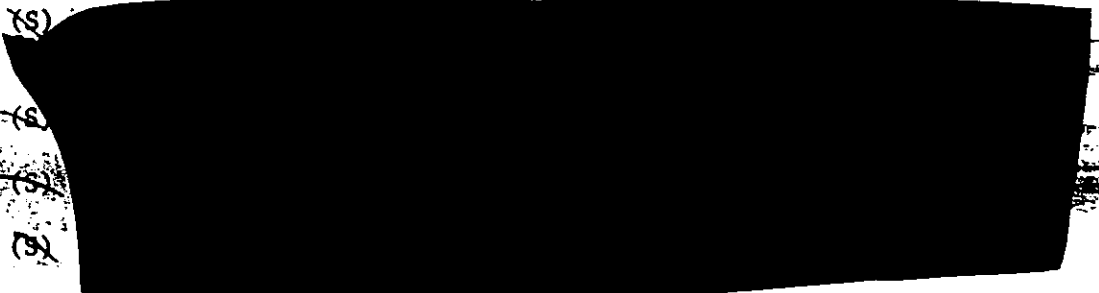
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3.2 Post-Attack Situation (U)

(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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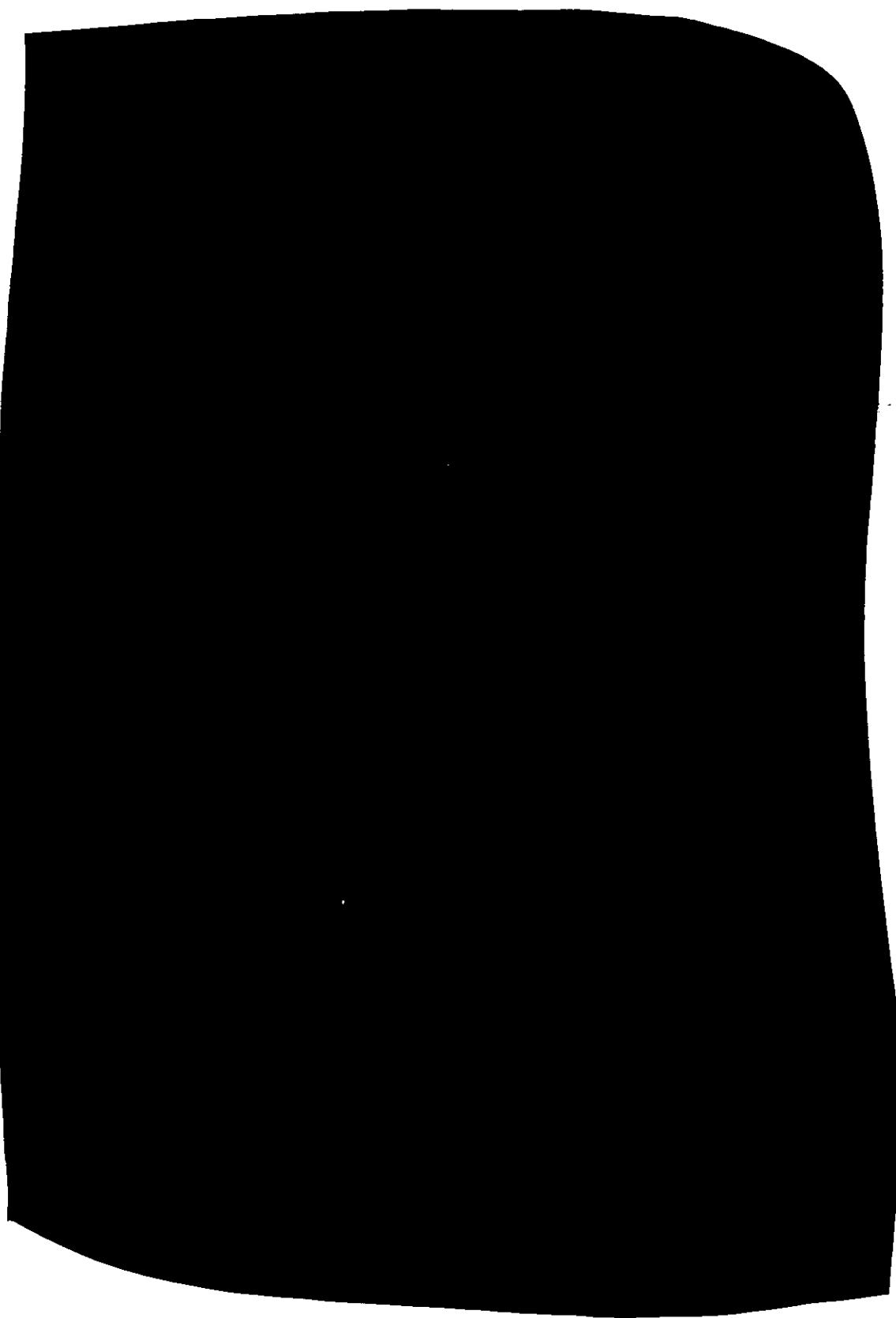


FIGURE 6

(U) PEACETIME MEECN.

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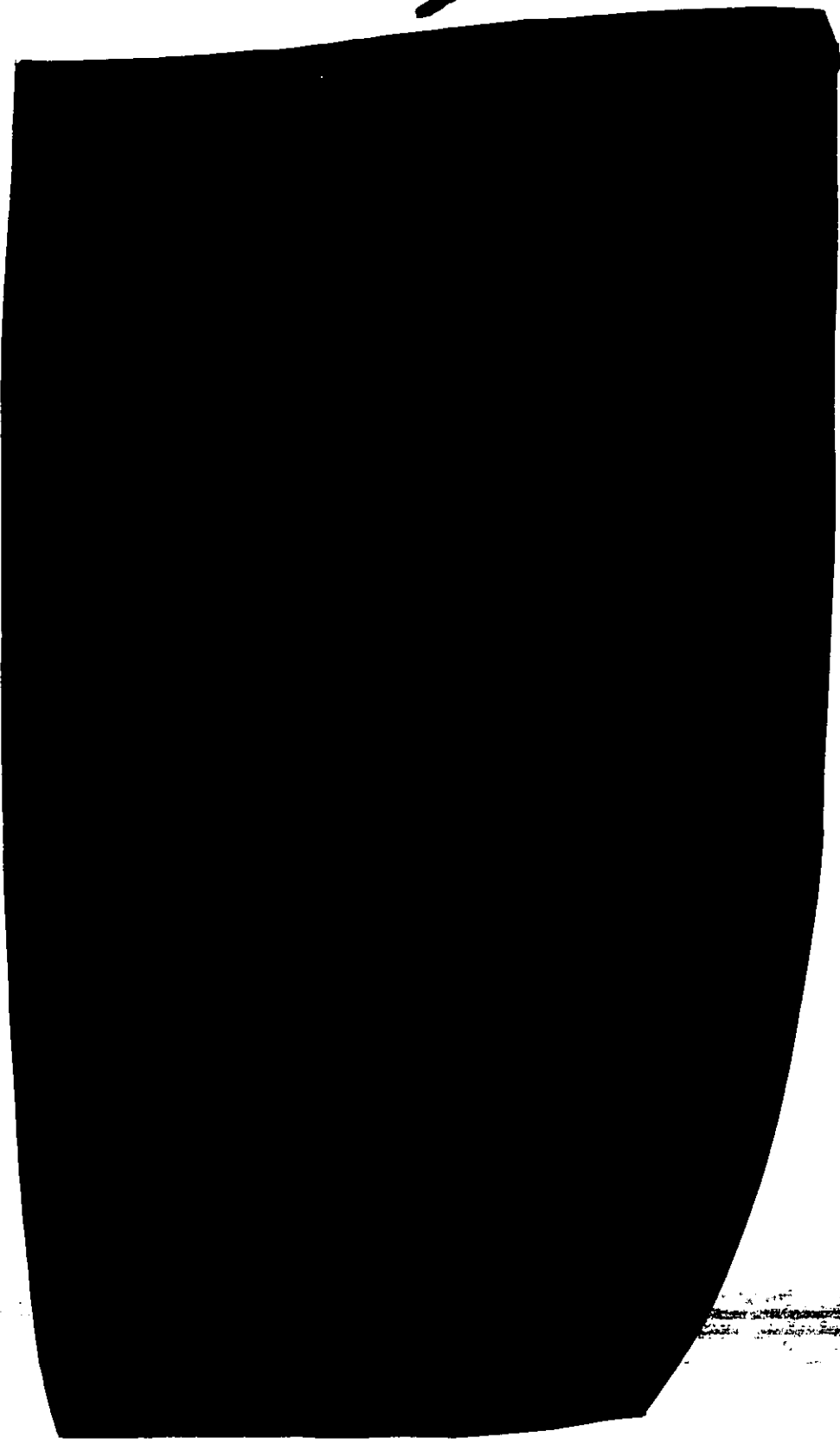


FIGURE 7

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

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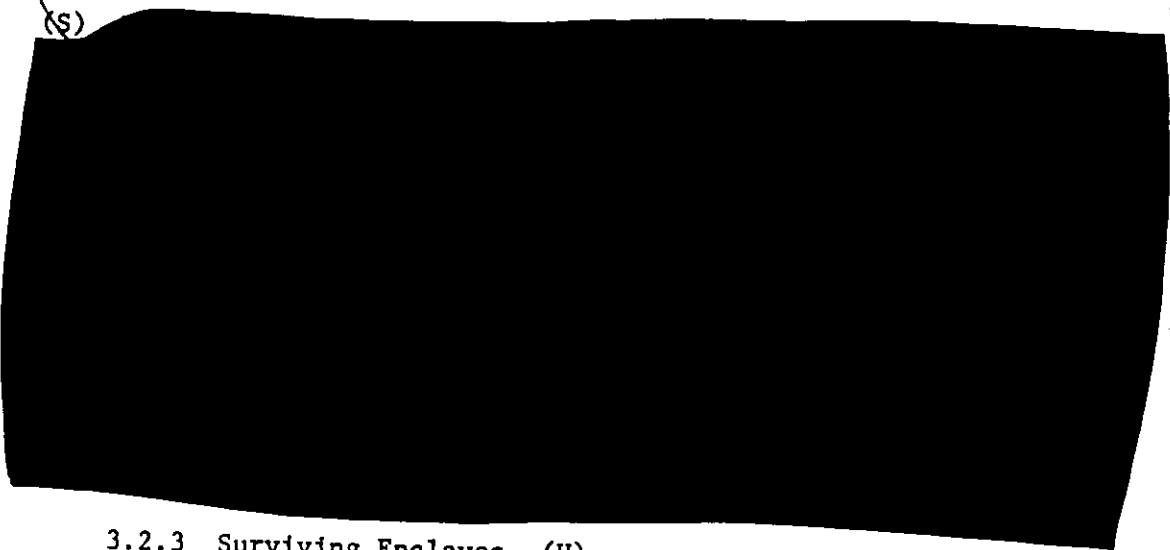


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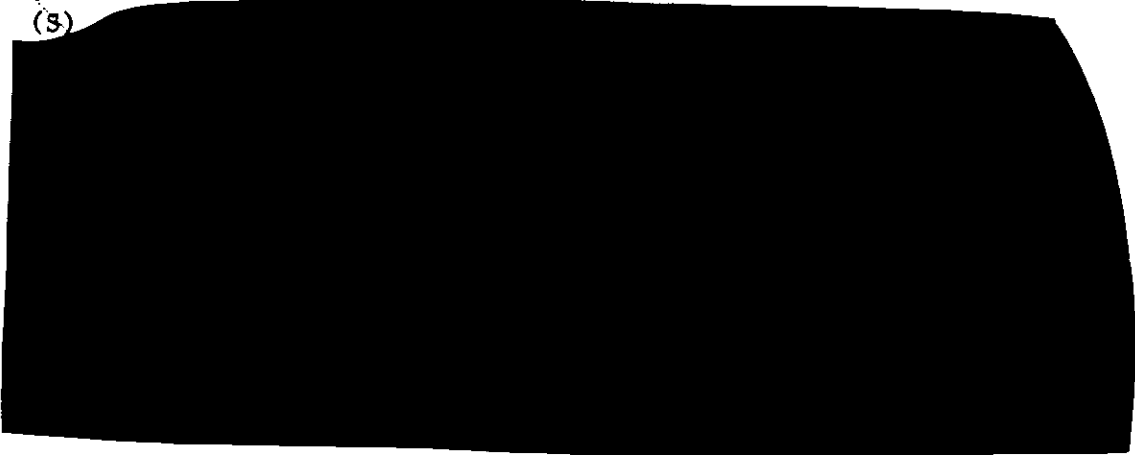
3.2.2 Surviving Communications Assets (U)

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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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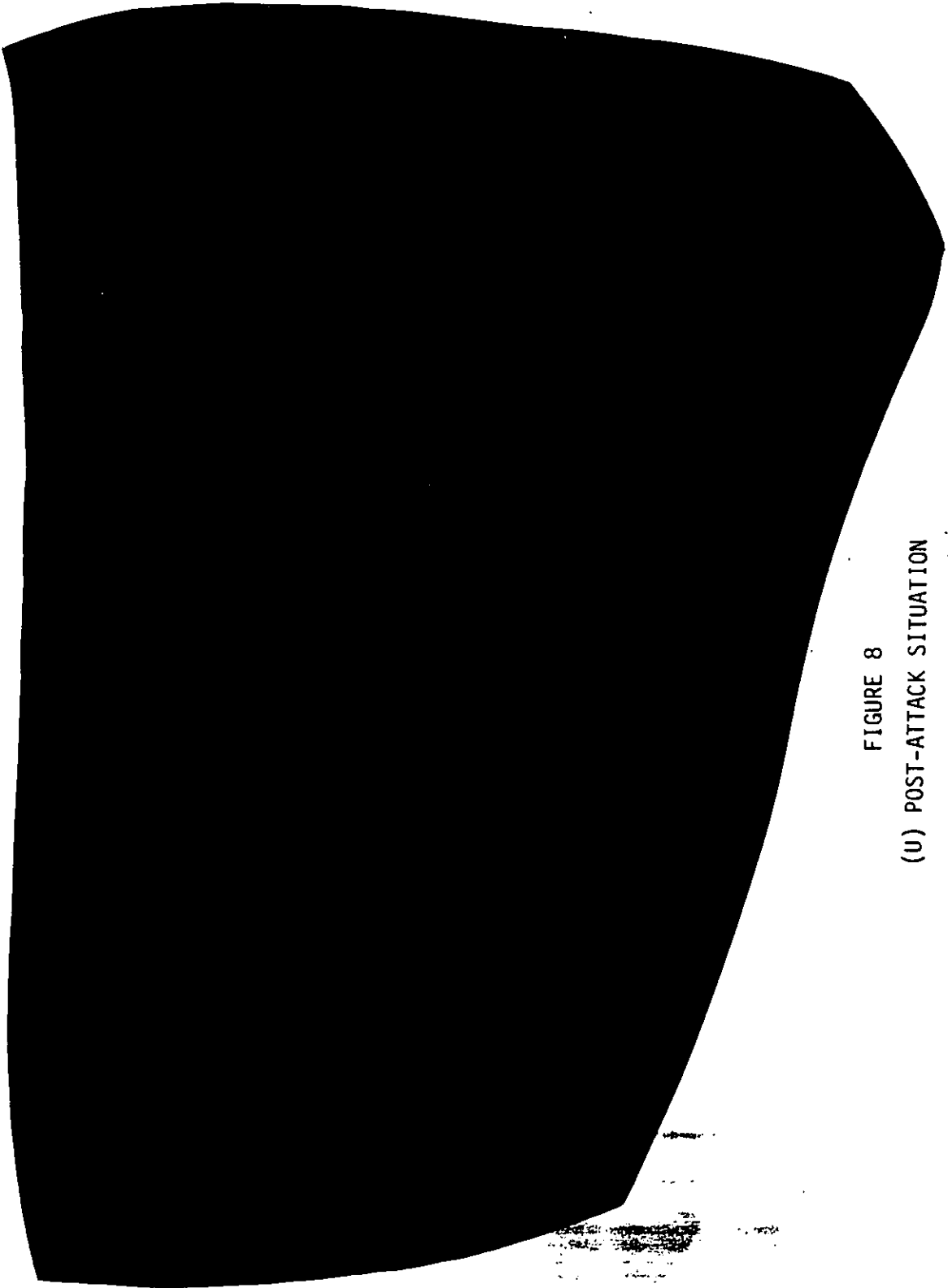
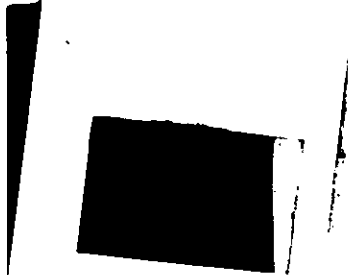


FIGURE 8  
(U) POST-ATTACK SITUATION

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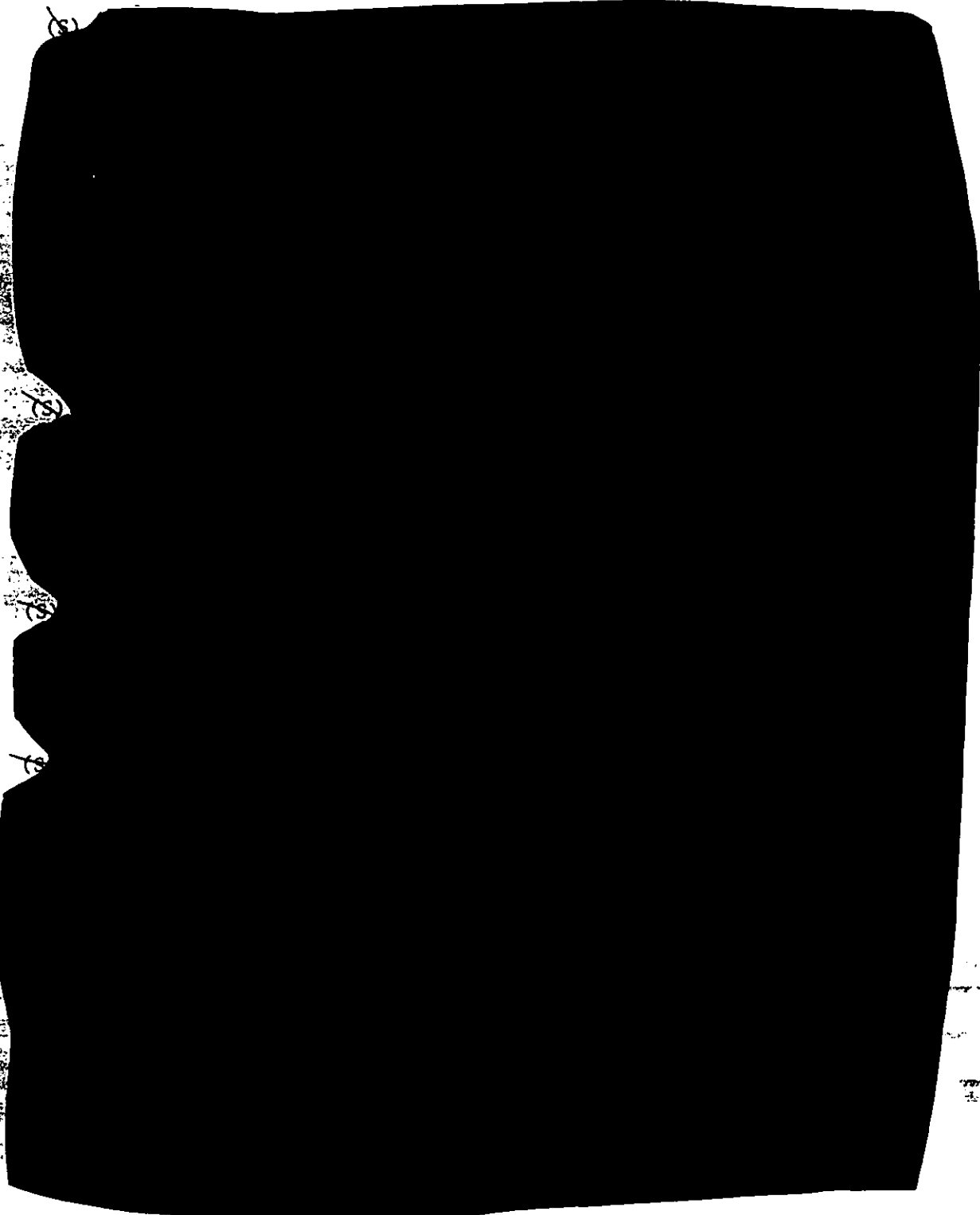


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3.3 Strategic Node Connectivity (U)



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FIGURE 9  
(U) STRATEGIC NODE CONNECTIVITY REQUIREMENT

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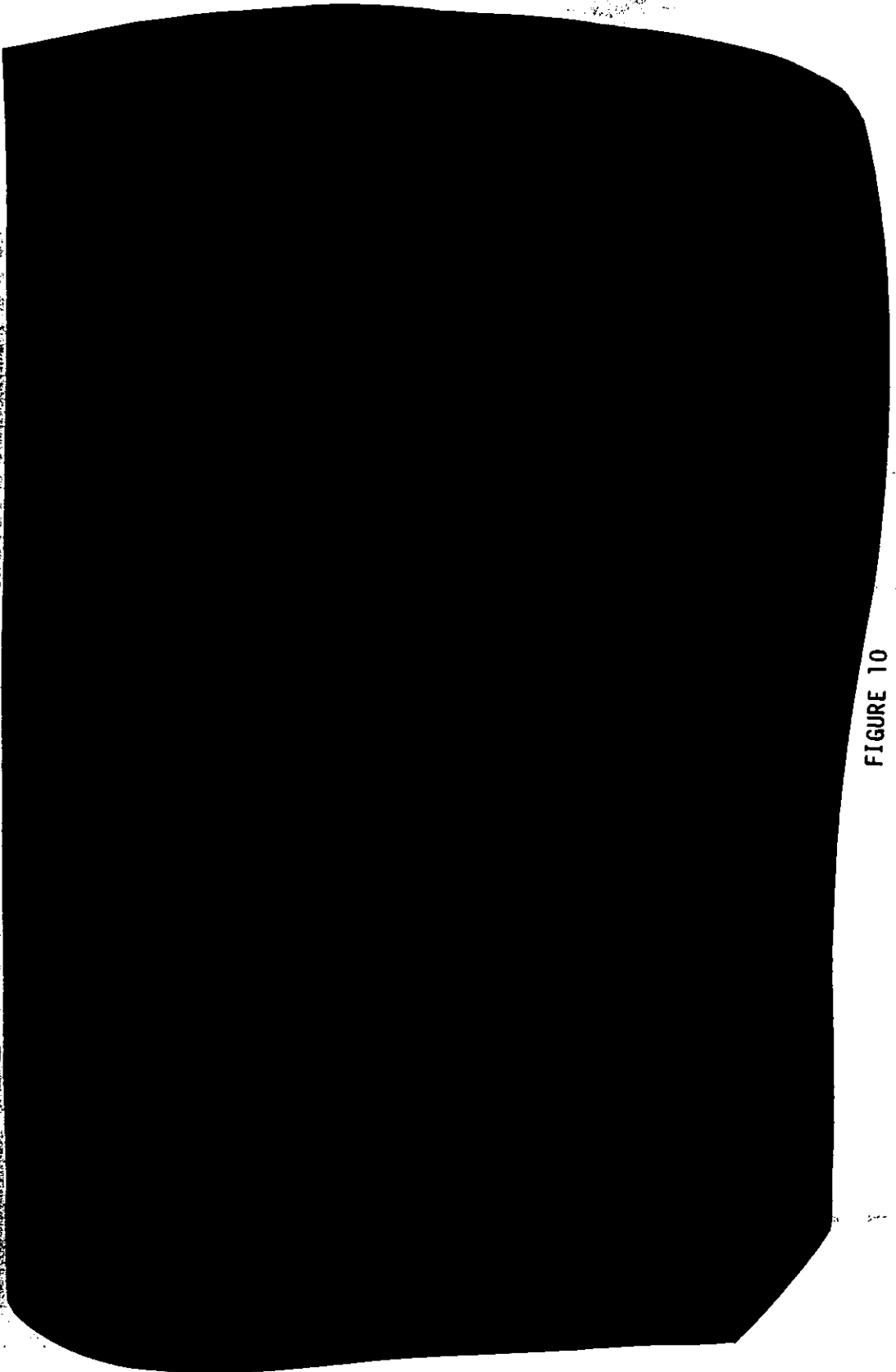


FIGURE 10

(U) POTENTIAL STRATEGIC HF NETWORK

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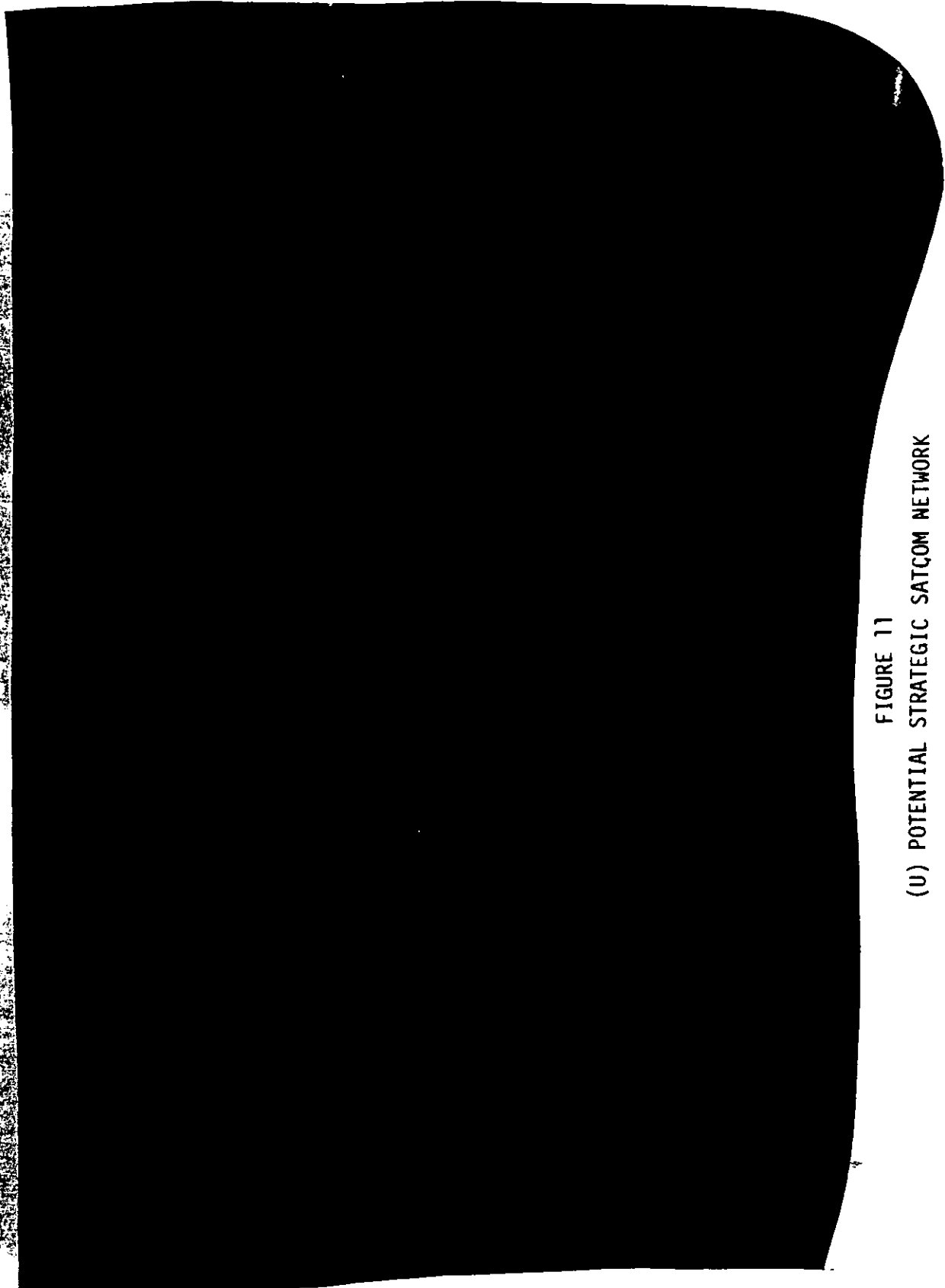
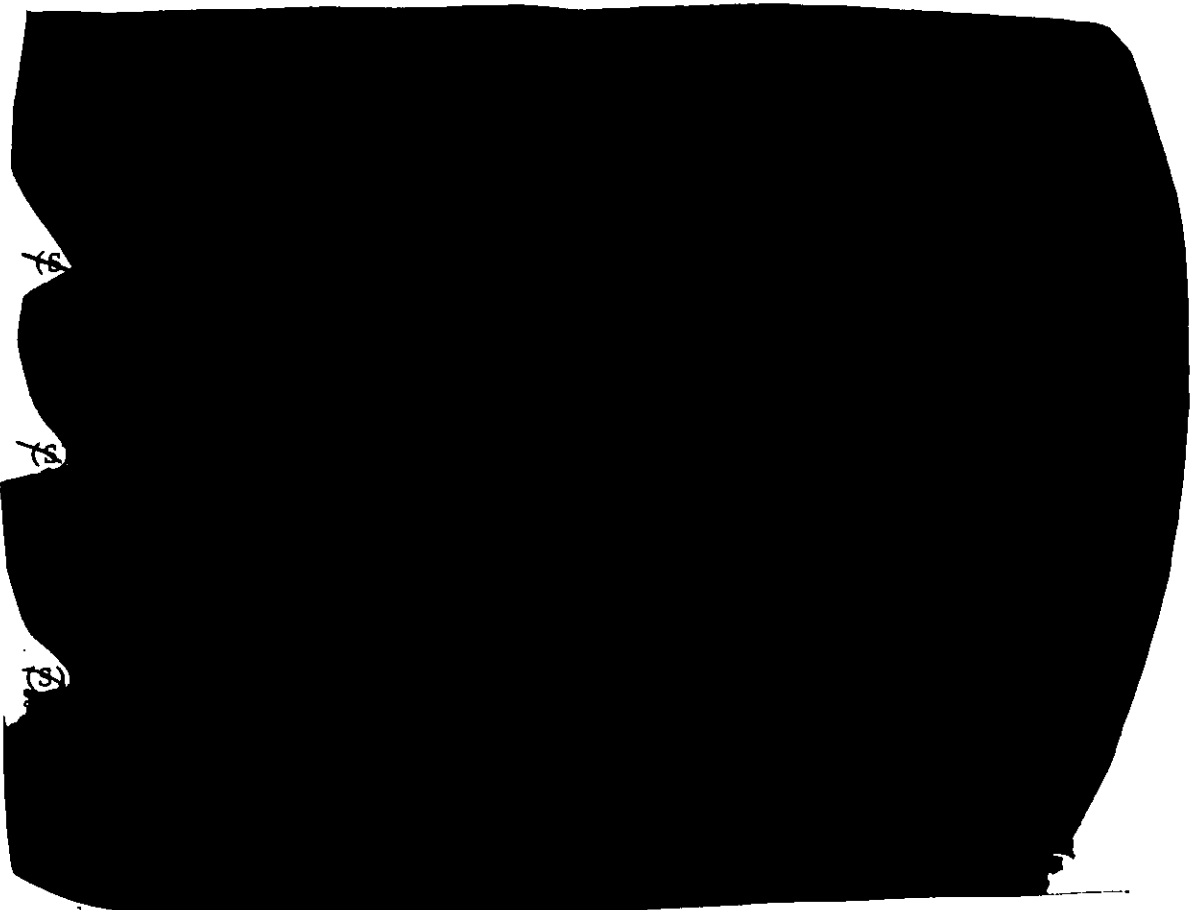


FIGURE 11  
(U) POTENTIAL STRATEGIC SATCOM NETWORK

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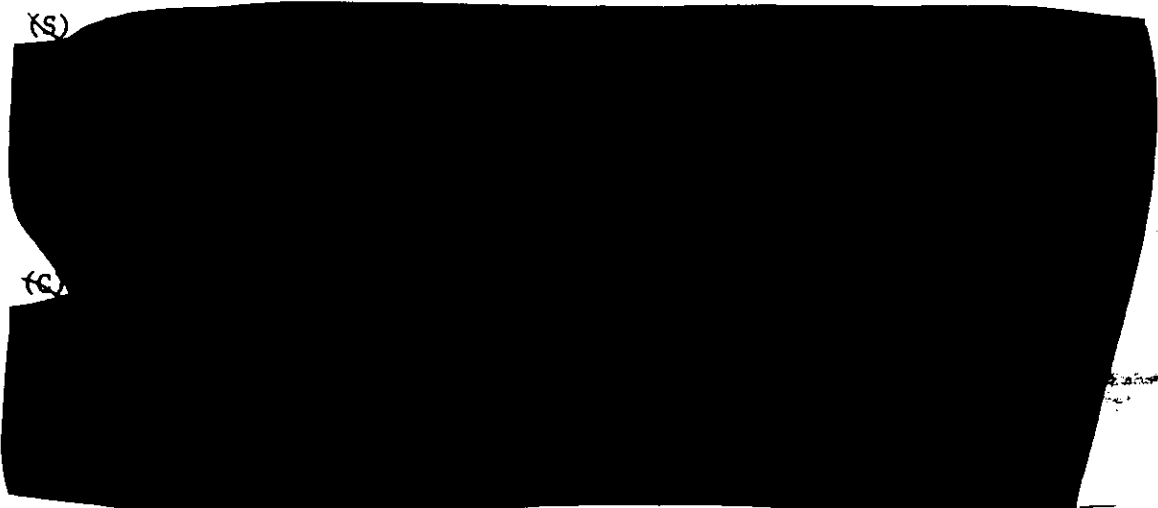
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(U) Annexes A and B present the detailed HF and SATCOM analyses.

3.4 Enclave Connectivity (U)



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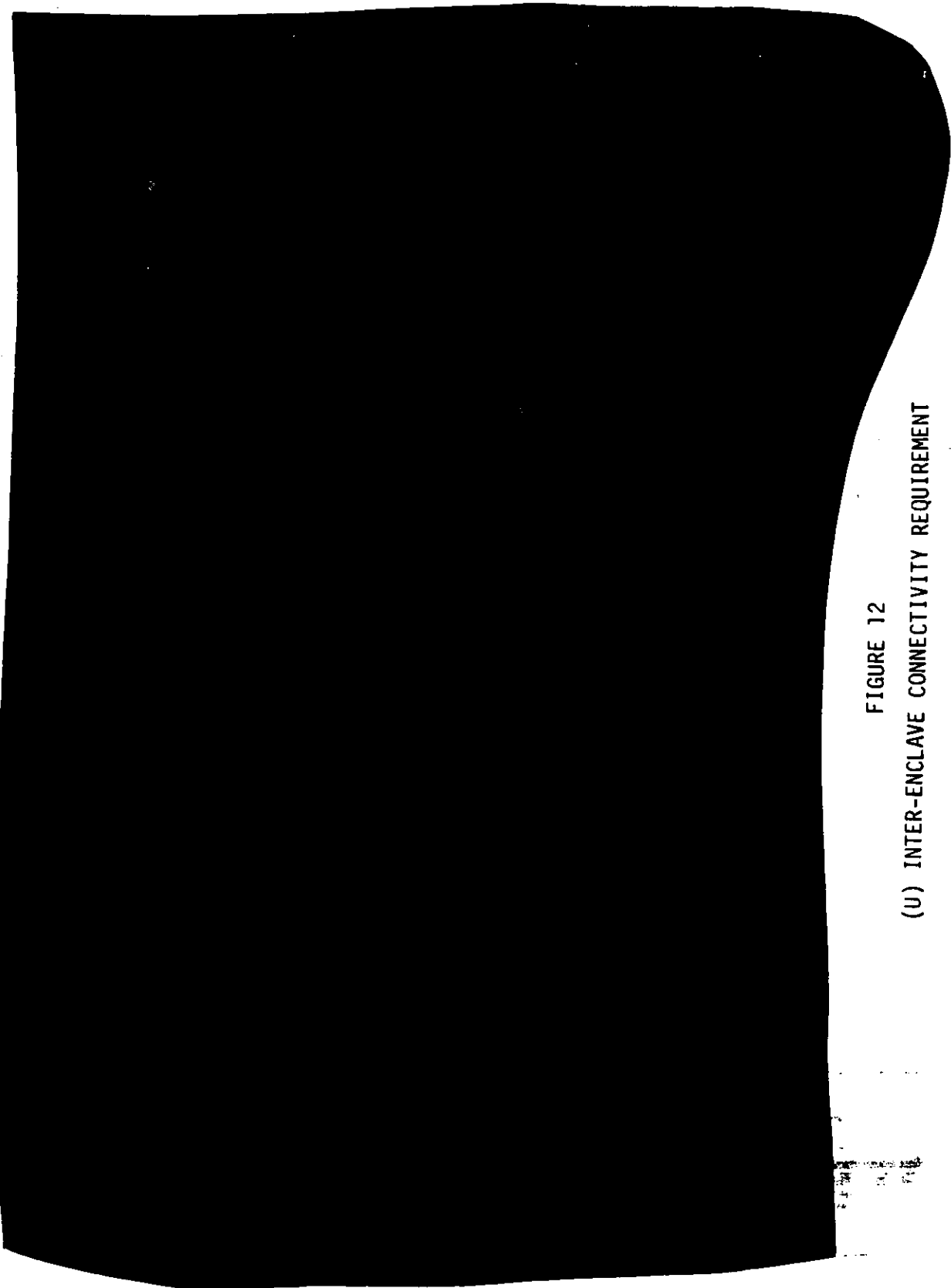
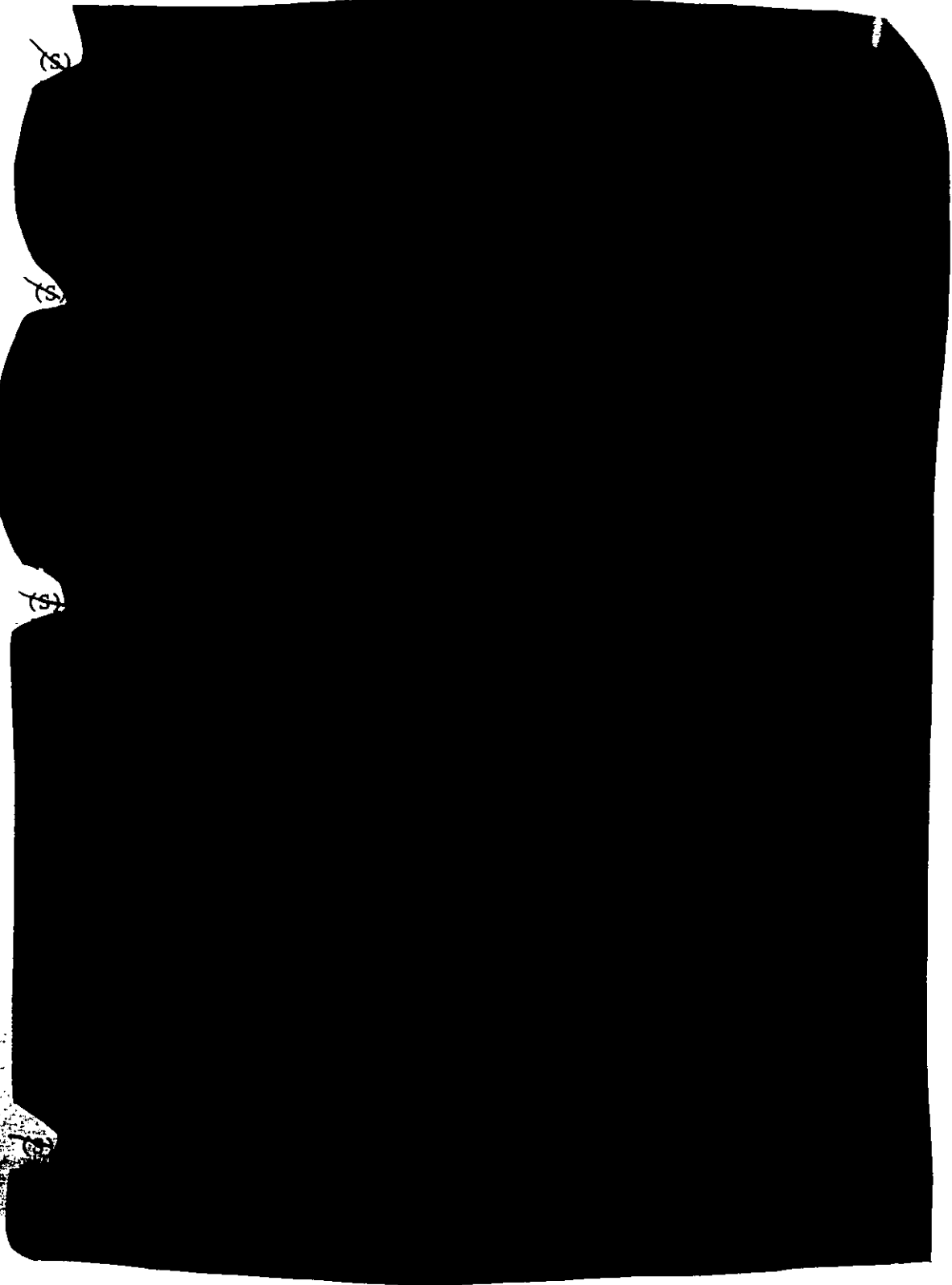


FIGURE 12  
(U) INTER-ENCLAVE CONNECTIVITY REQUIREMENT

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3.5 Principal Findings and Conclusions (U)

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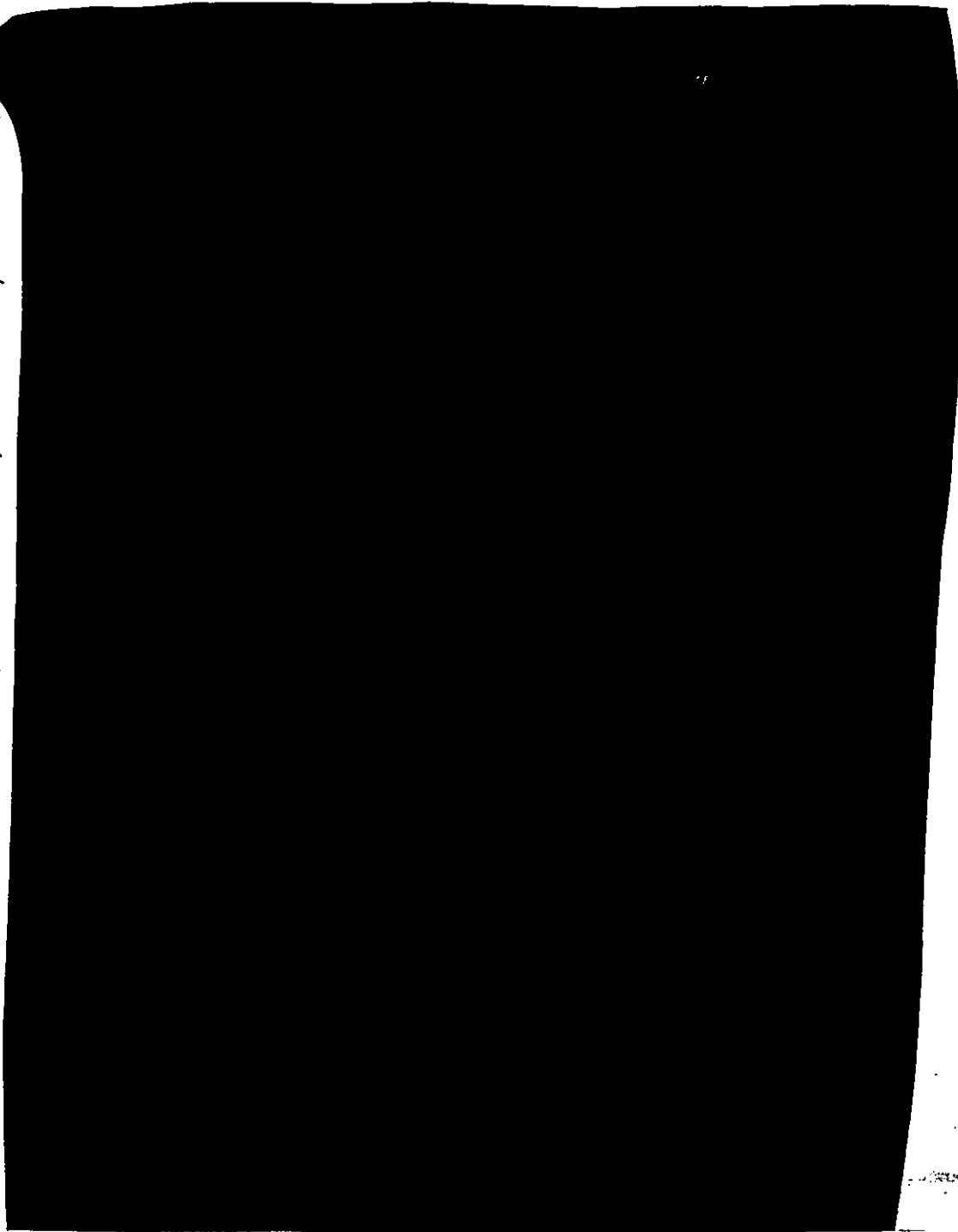
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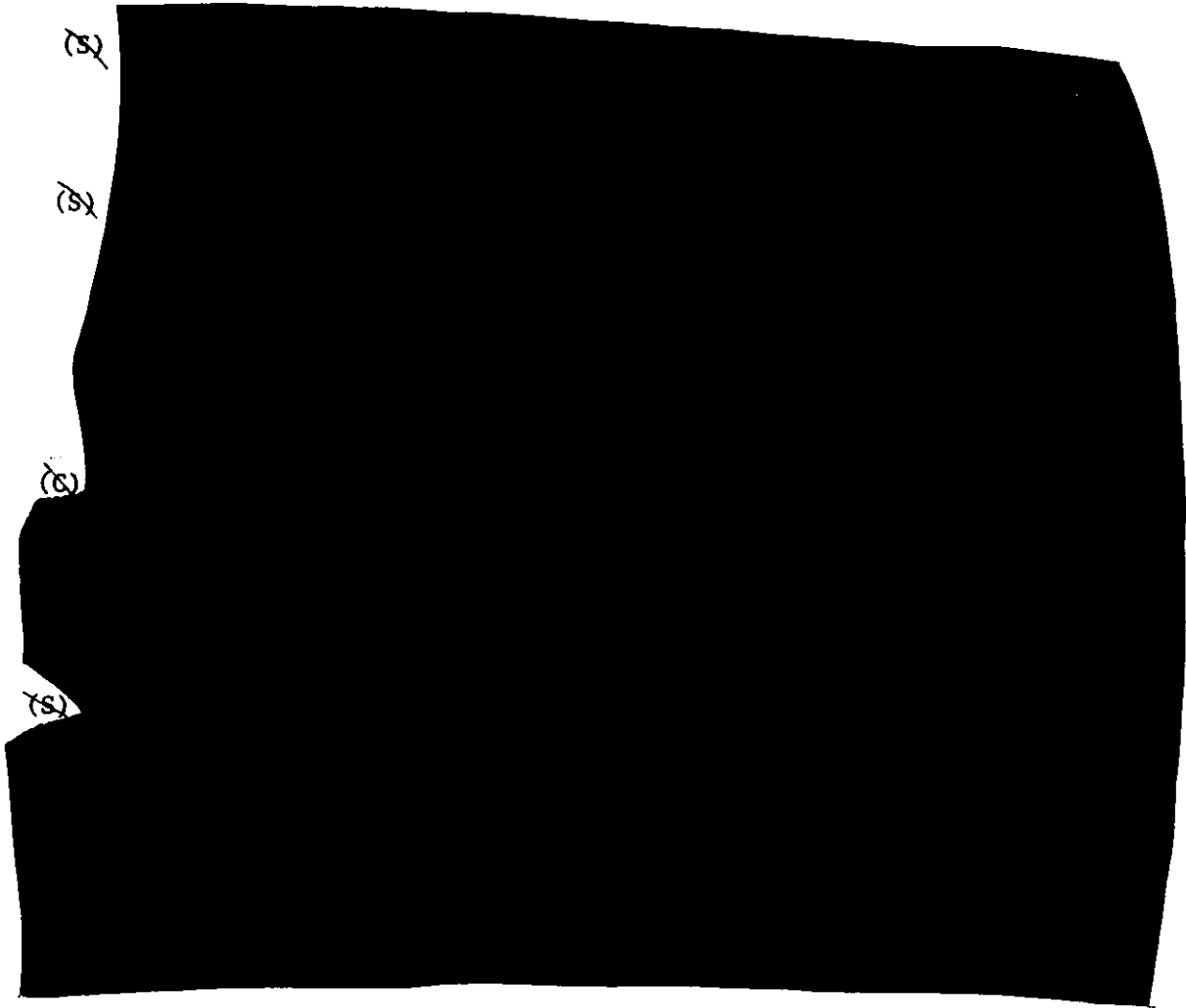
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\* (U) NOTE: The terms used in the capability matrix are defined as follows:

- (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.

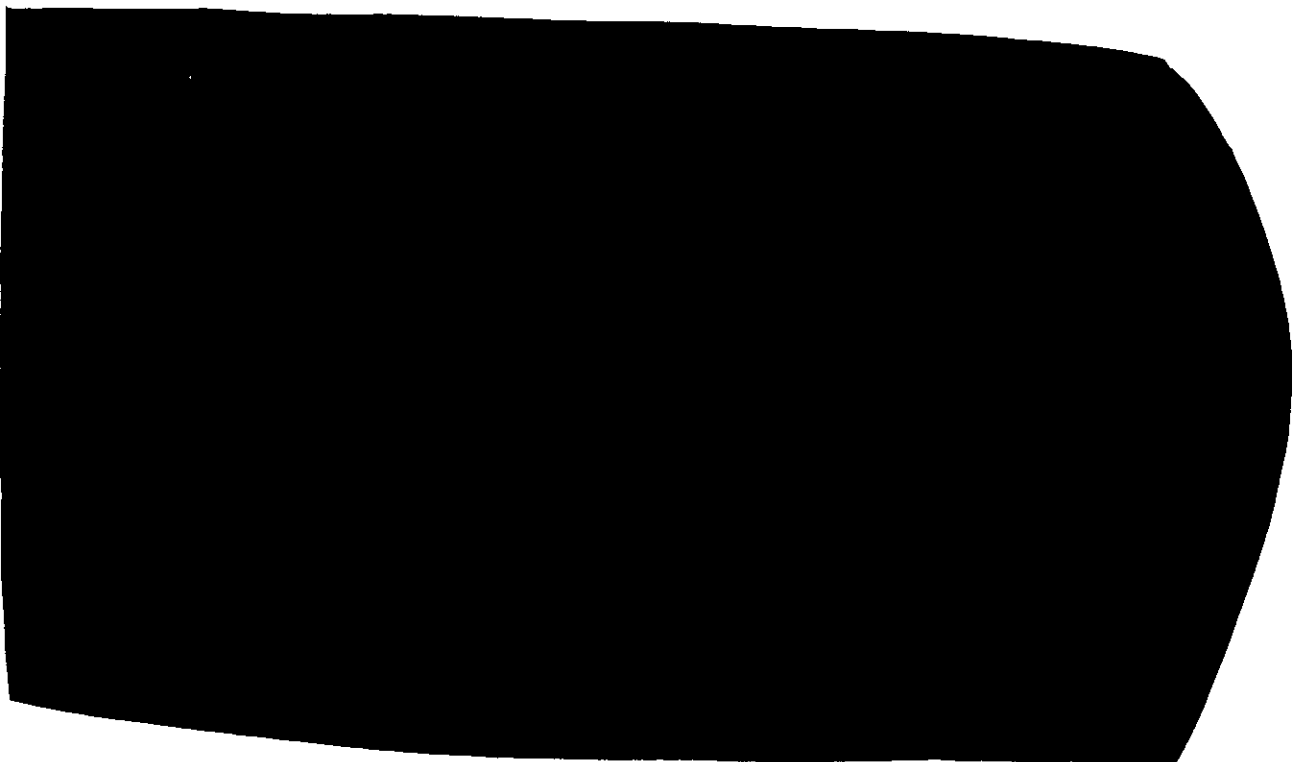


FIGURE 13

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

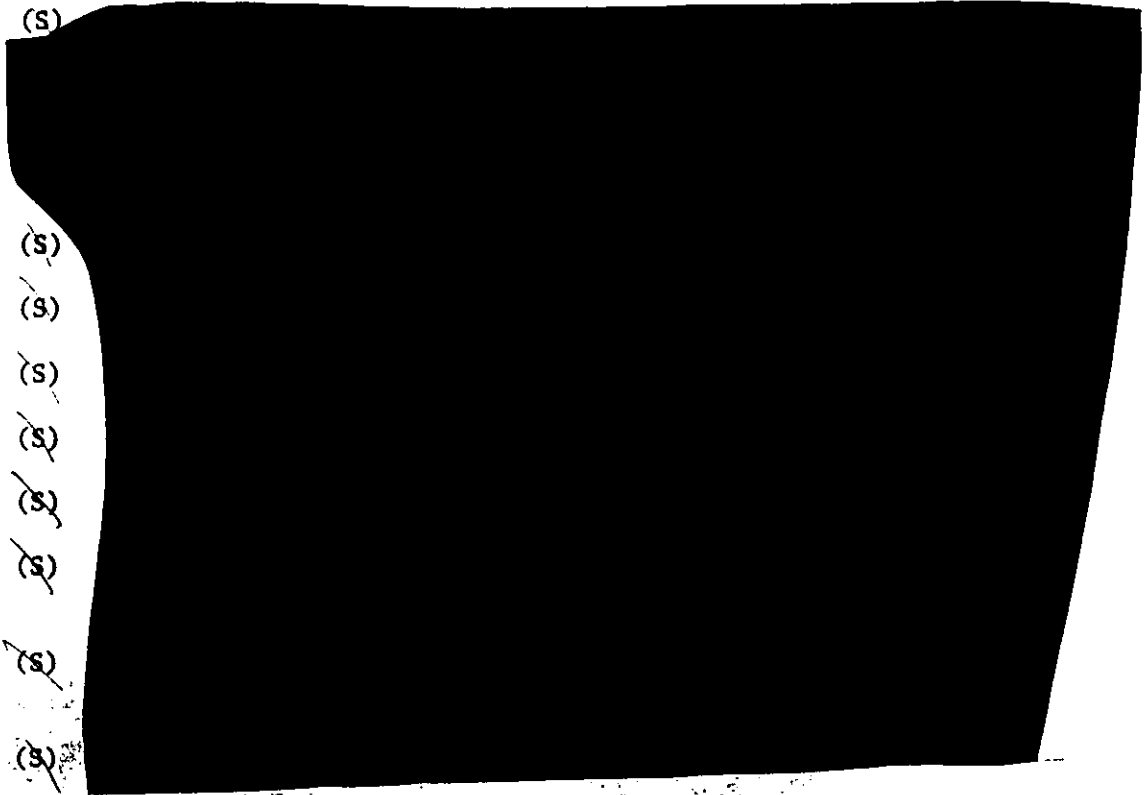
4.0 PROPOSED SOLUTIONS (U)

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4.1 Communications Shortfalls (U)

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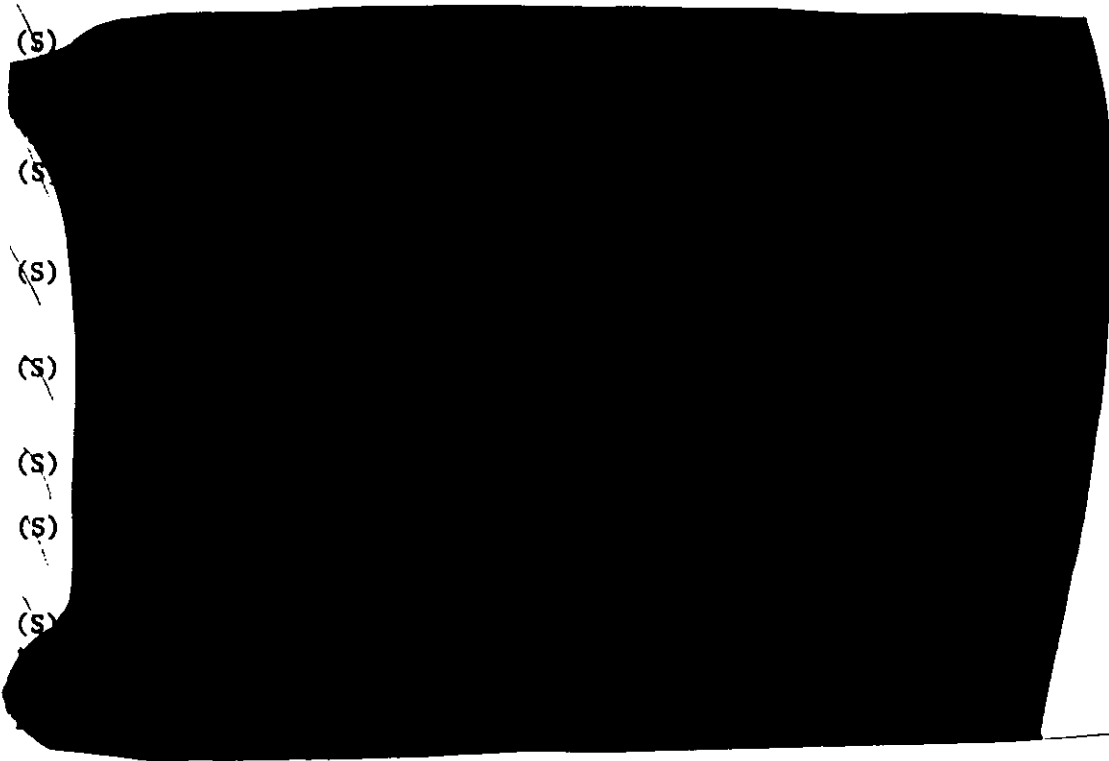
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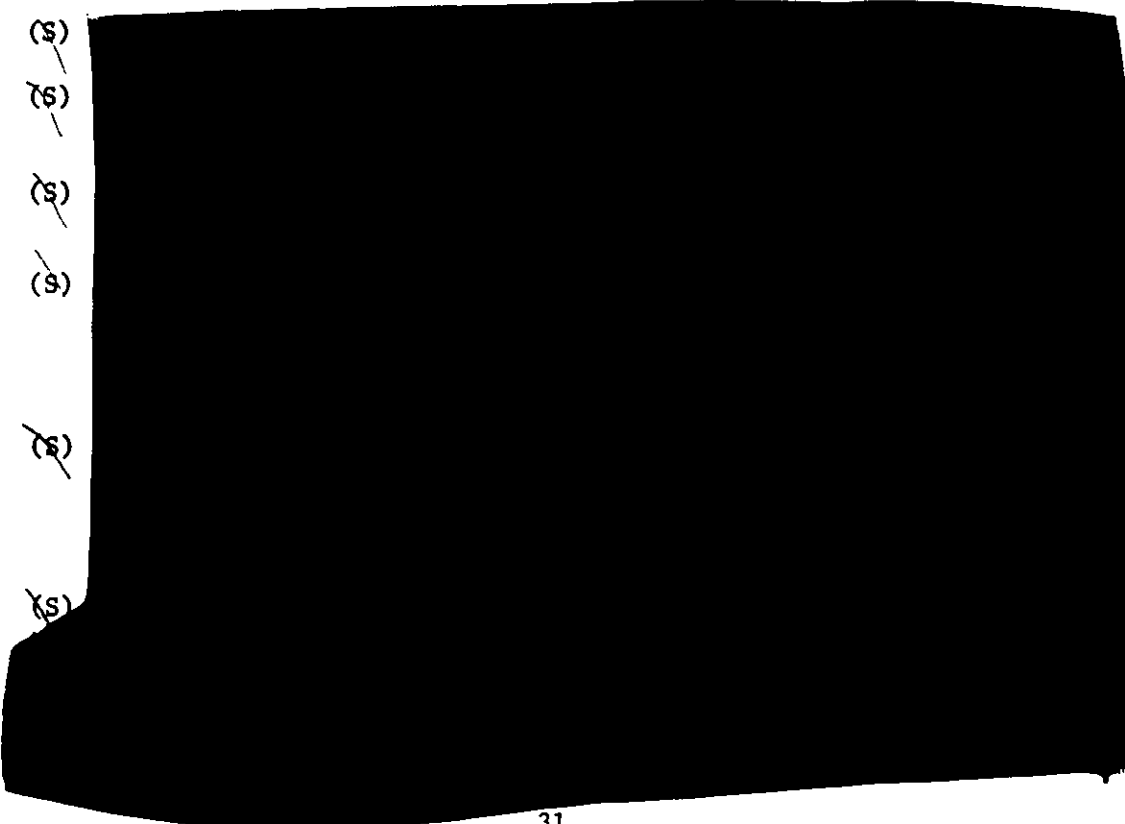
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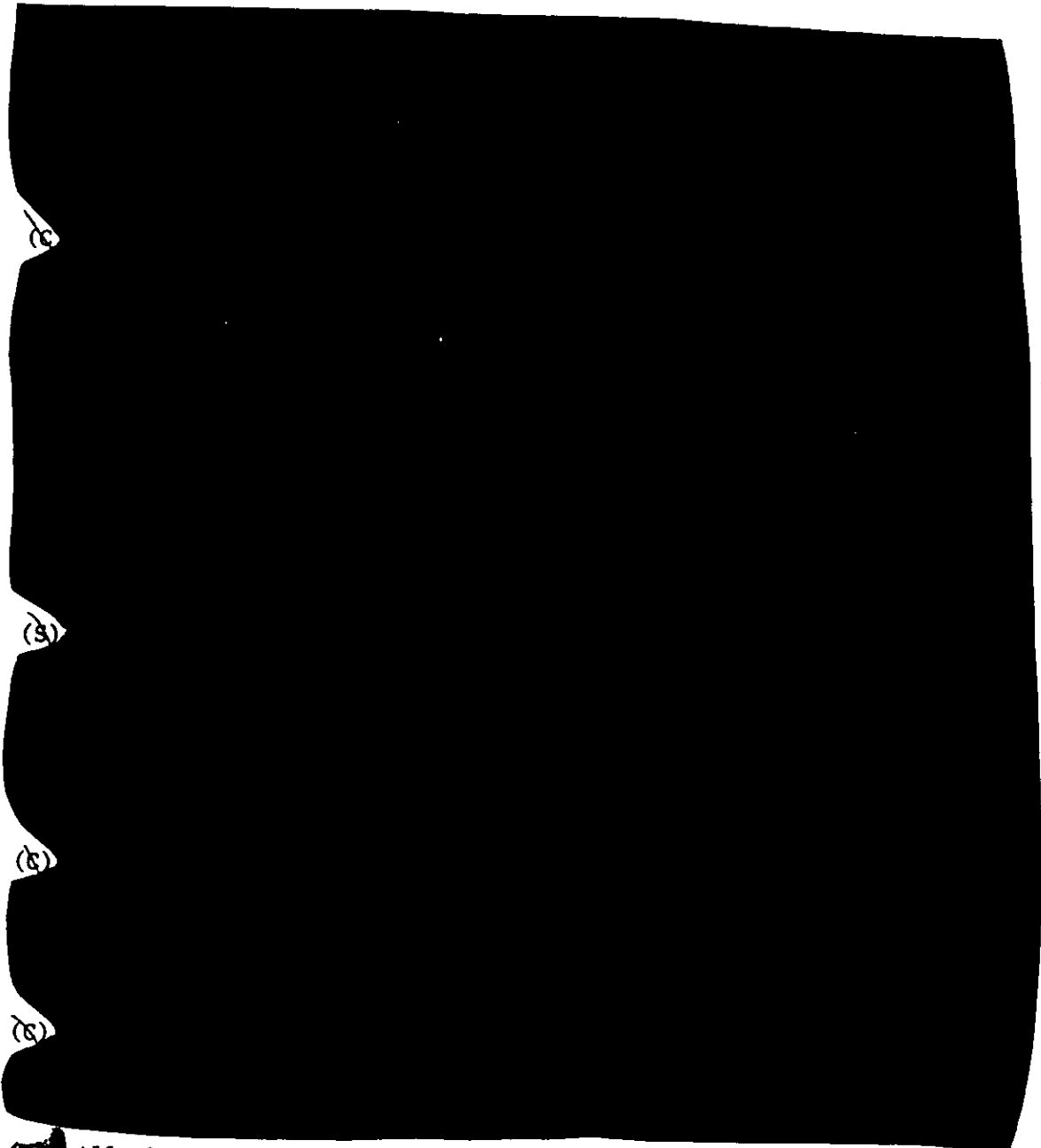
4.2 Solution Description (U)

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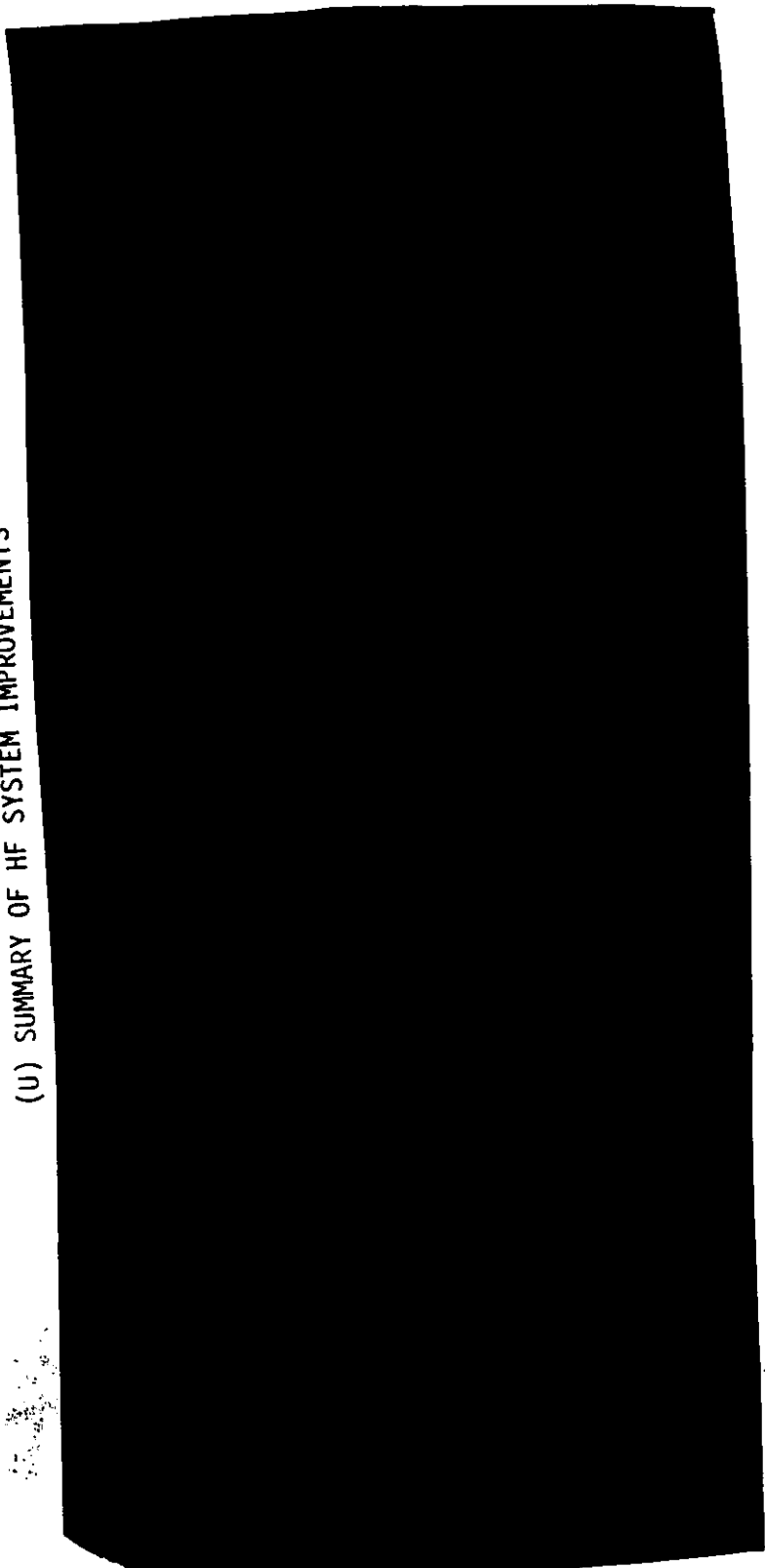


(U) All three approaches require detailed evaluation and cost analyses. Detailed discussions of the three approaches and alternatives applicable to each are contained in Annex A, to be published separately. The final solution may be a combination or hybrid of all of the above in a configuration which 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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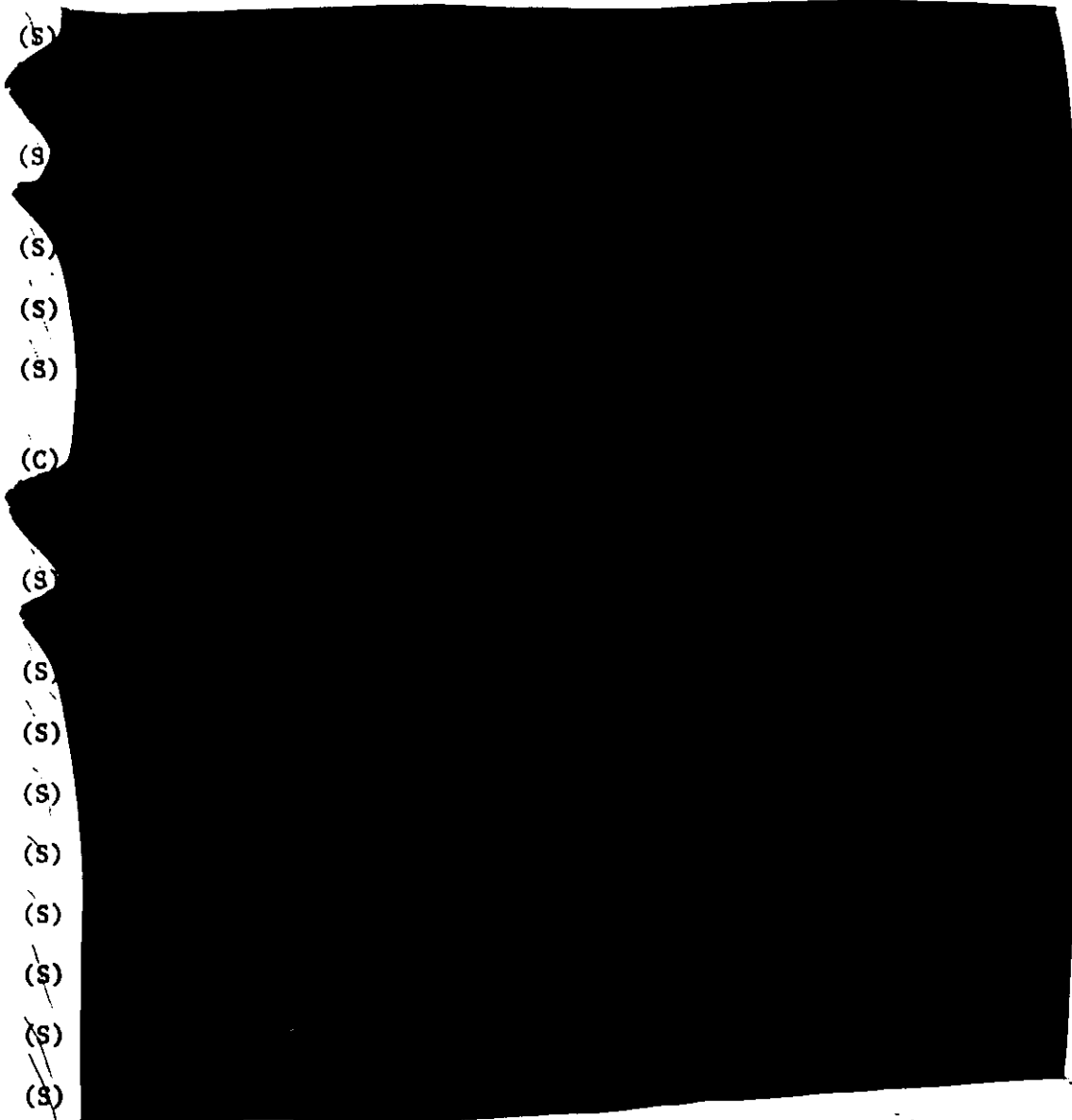
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~~SECRET~~ detailed presentation of the SATCOM alternatives that led to the solutions proposed above is contained in Annex B.

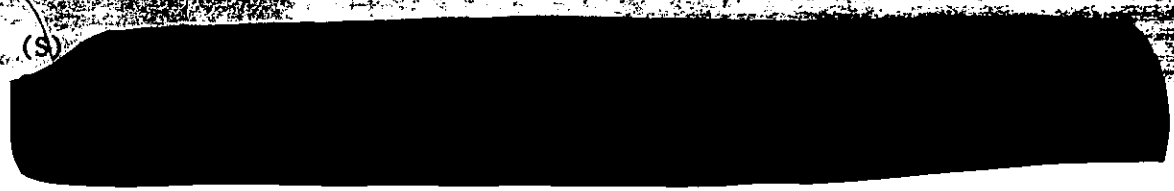
4.2.3 Plans and Procedures (U)

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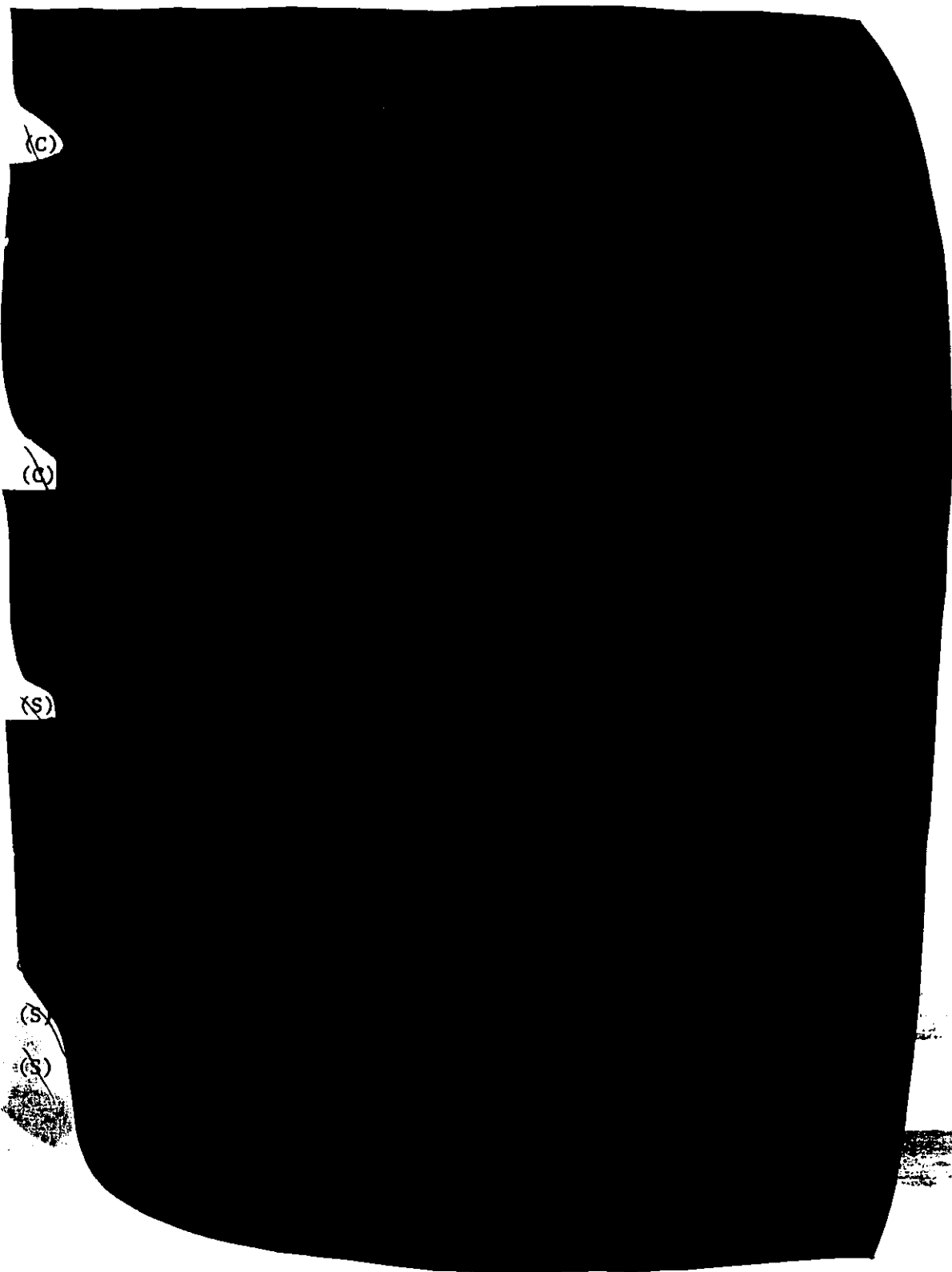


4.2.4 Common-Carrier Restoration (U)

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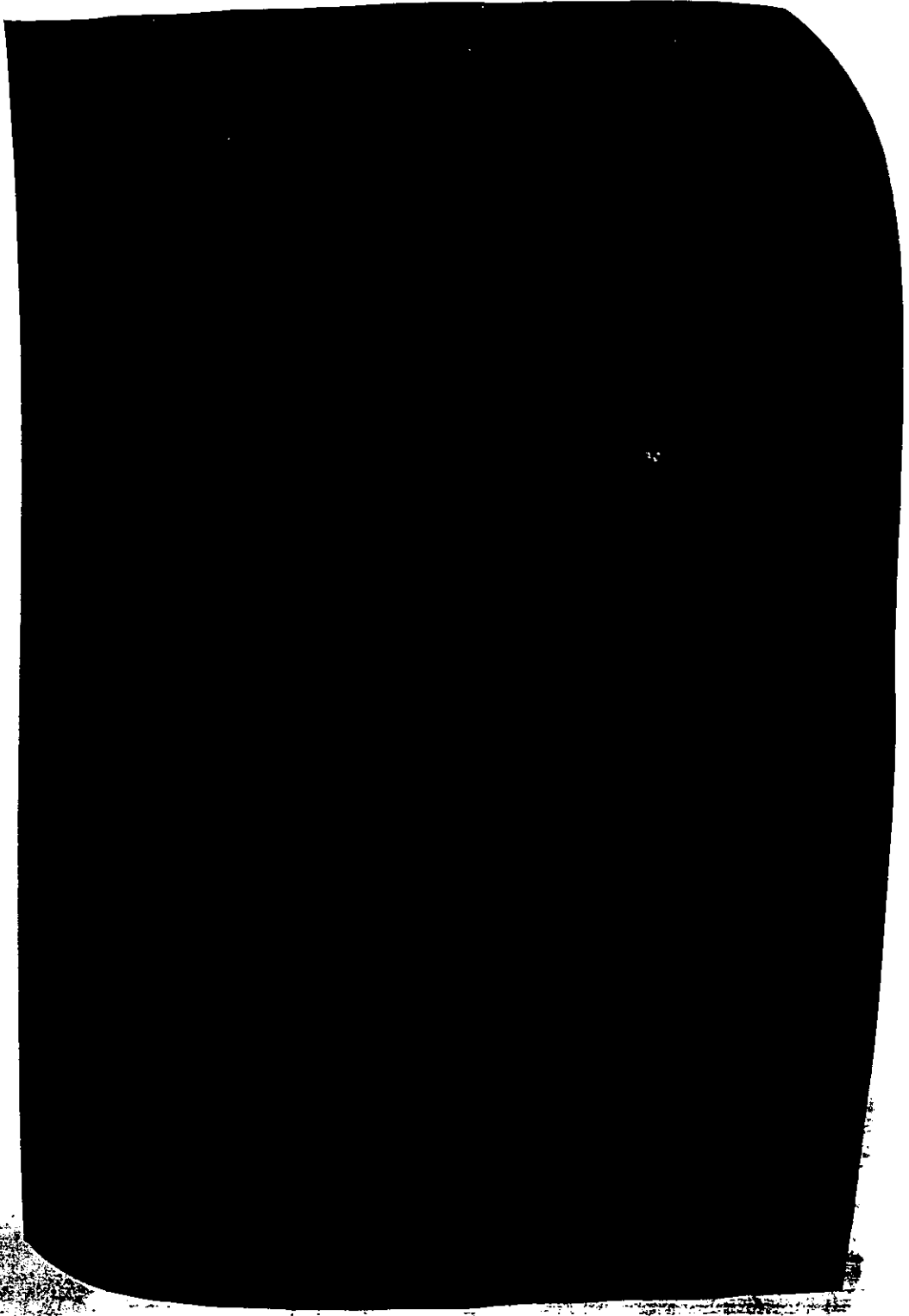
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4.3 Transition Plan (U)

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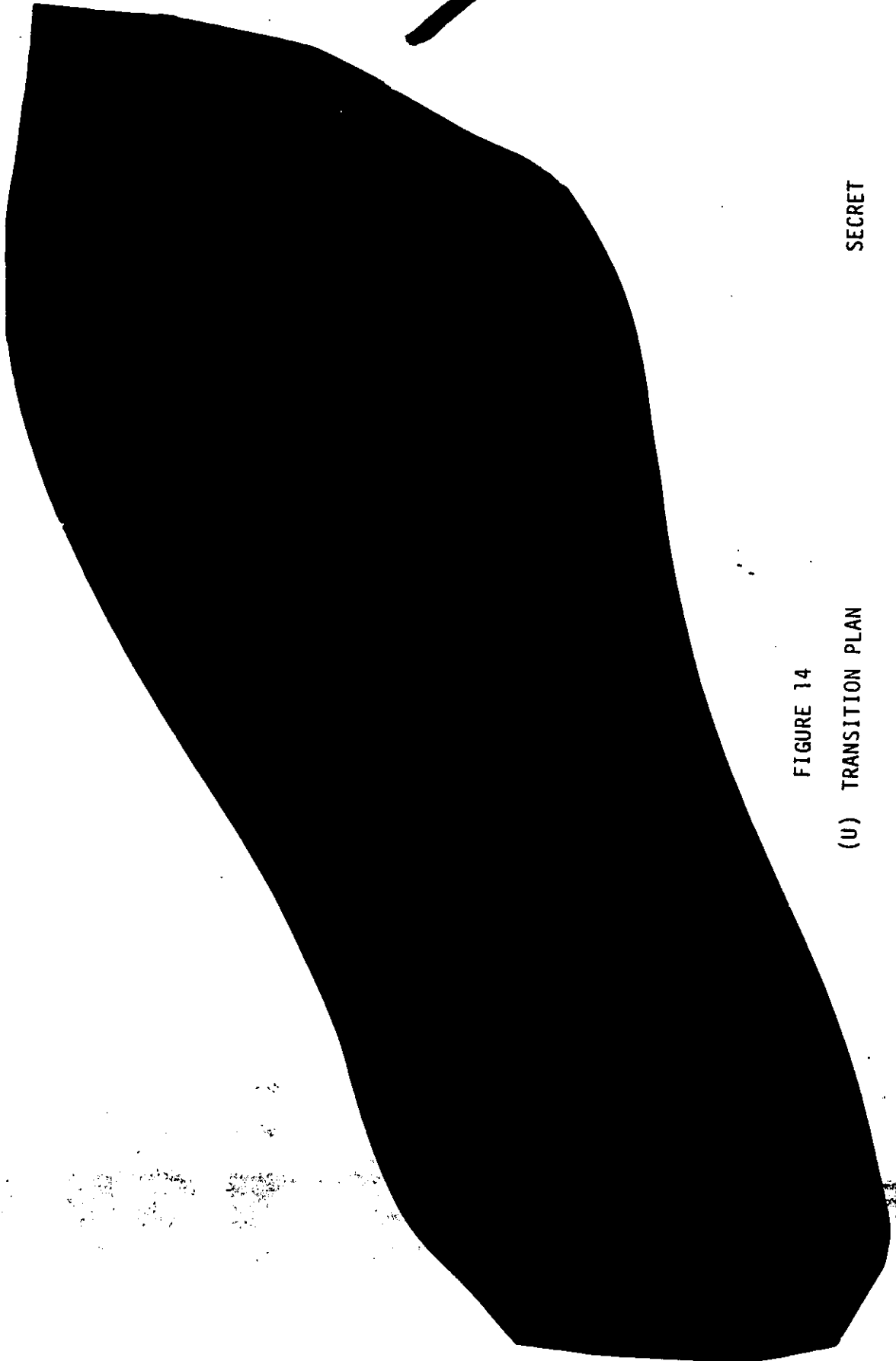
4.4 Near-Term (Pre-1985) Improvements (U)

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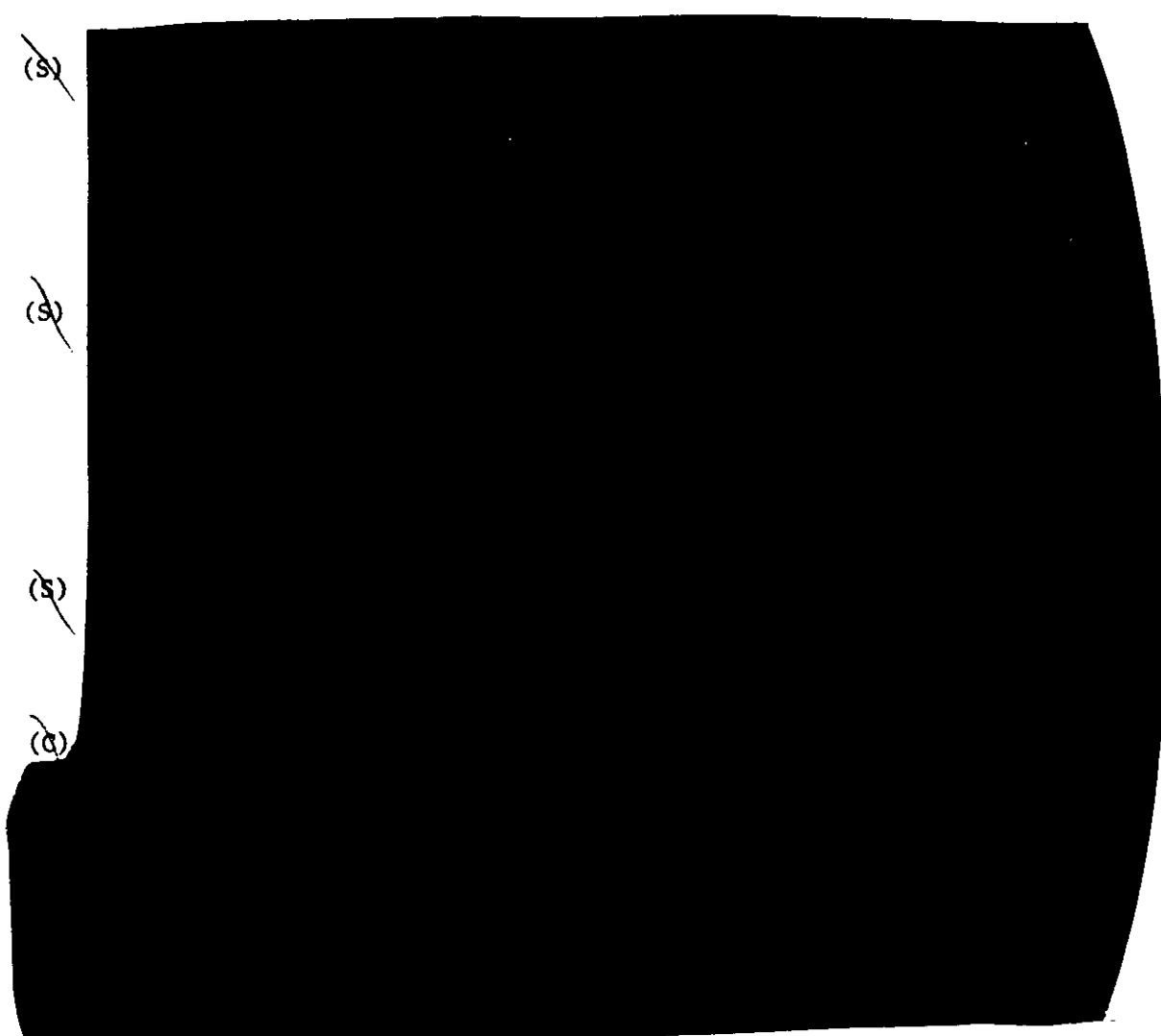


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FIGURE 14

(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

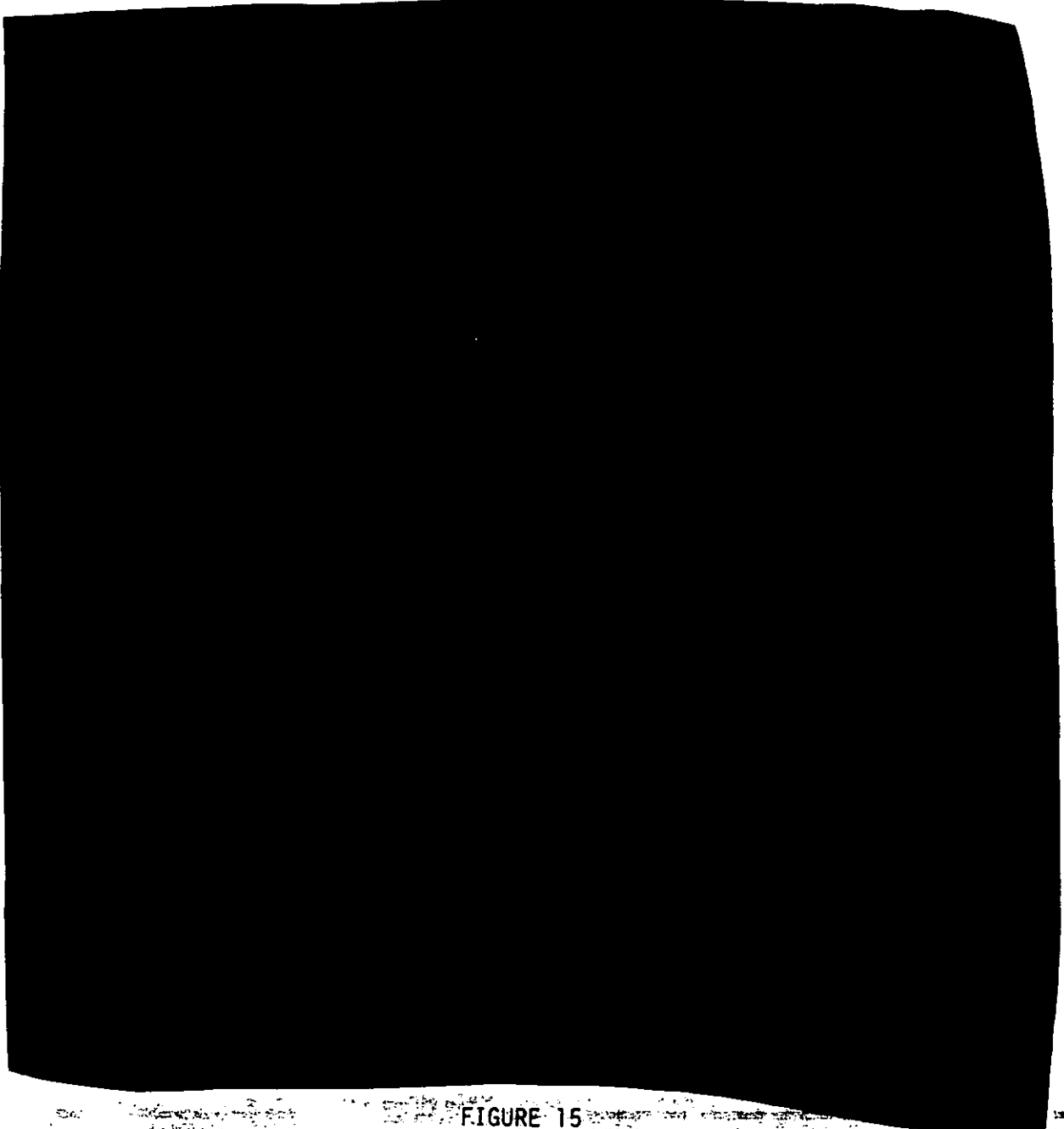


FIGURE 15

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

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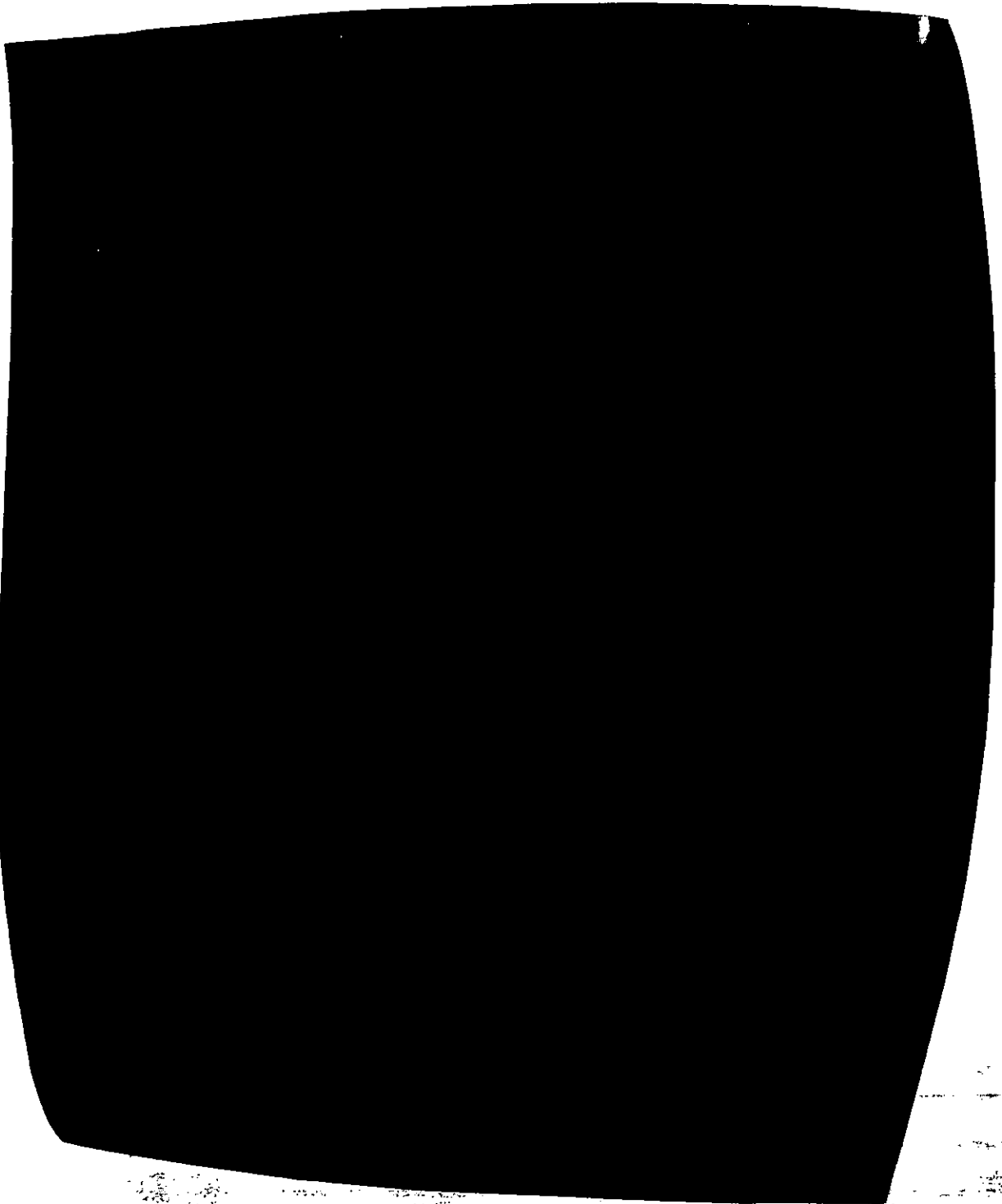
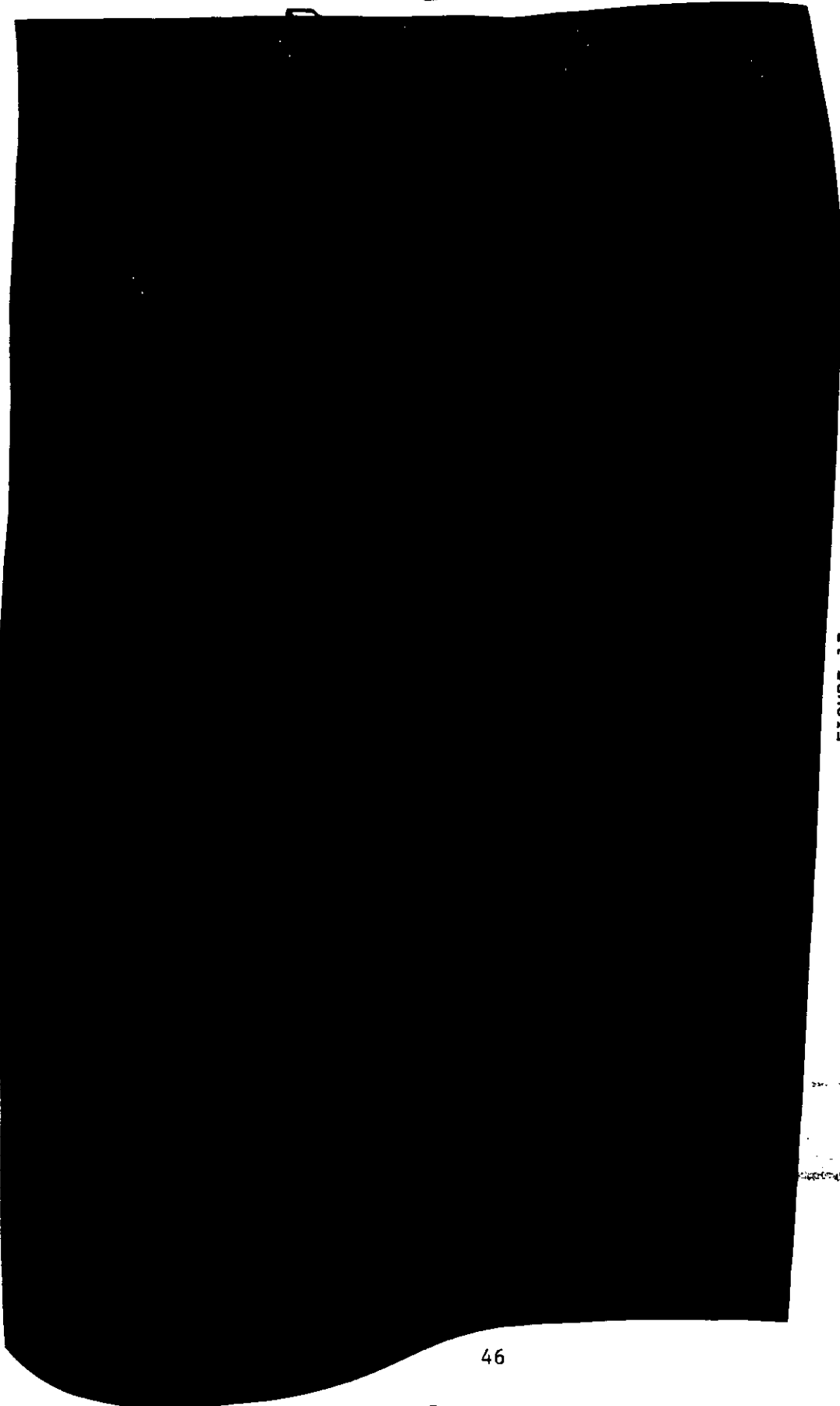


FIGURE 16

(U) GROUNDWAVE NETWORK

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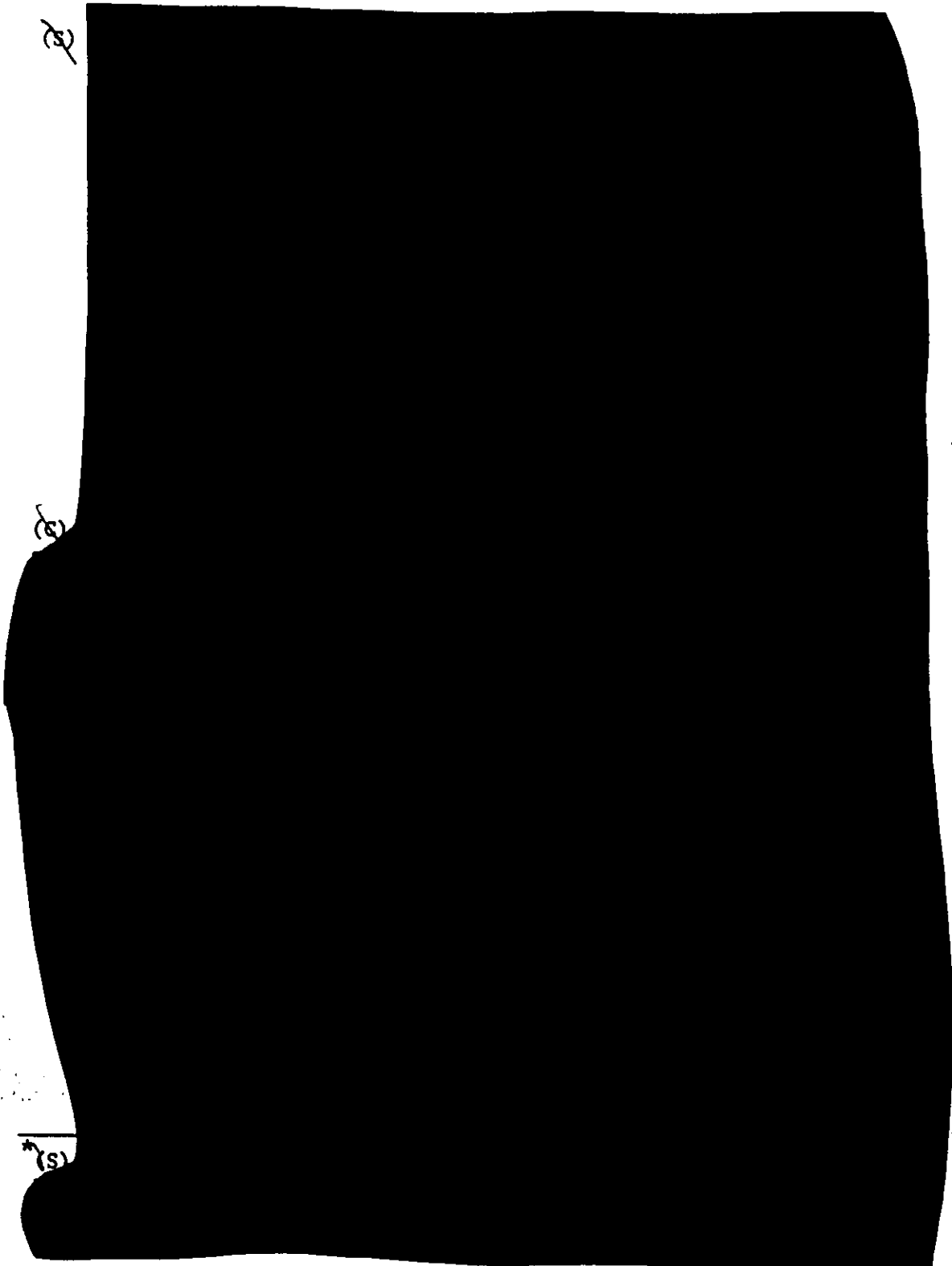
FIGURE 17

(U) EXAMPLE FORCE MANAGEMENT CONFIGURATION

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

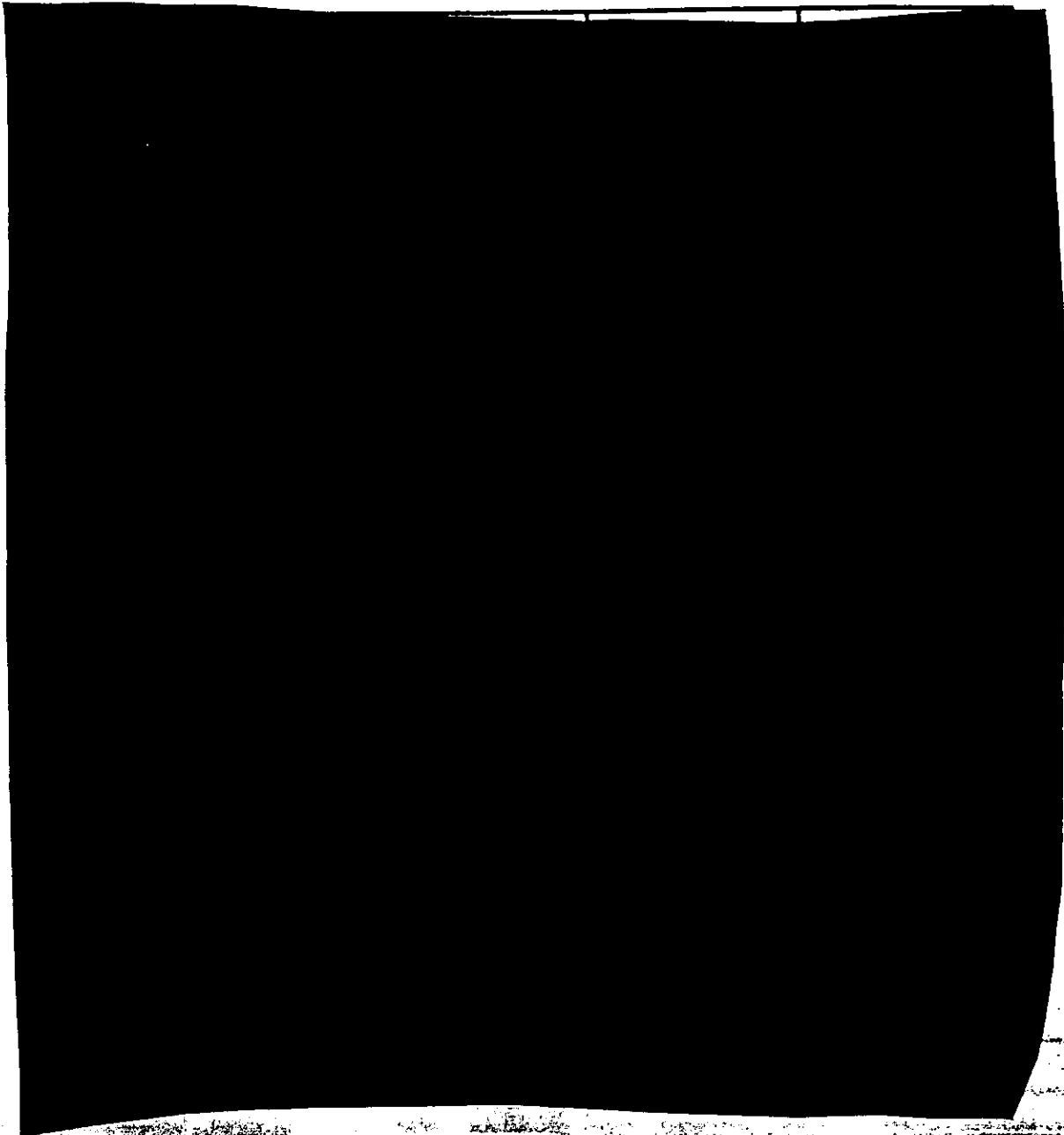



FIGURE 18

(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)

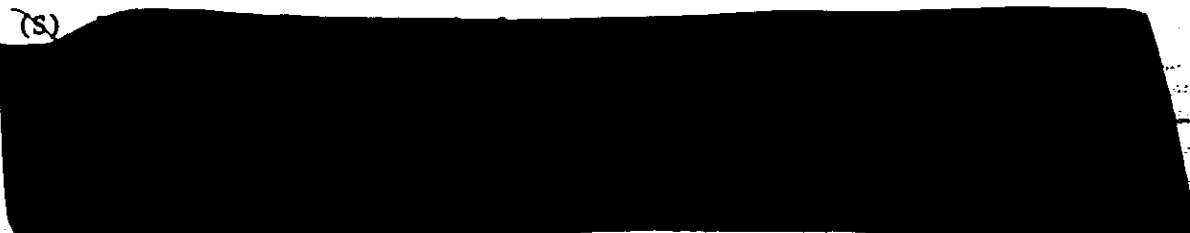
Recommendation 1, SATCOM Interoperability (U)

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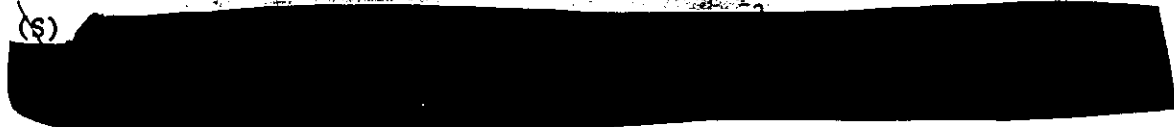
Recommendation 2, SATCOM Terminals (U)

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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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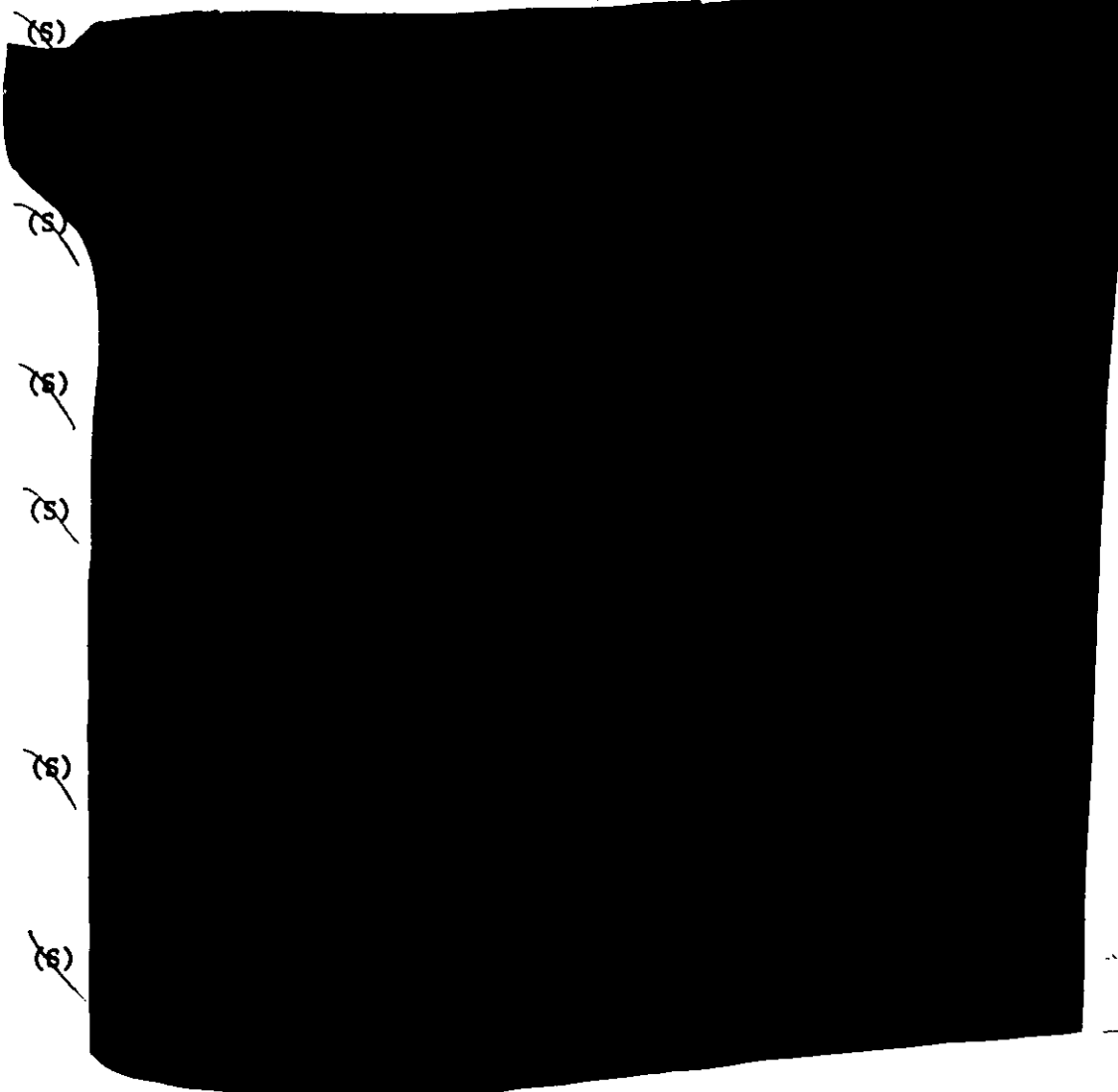
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5.5 Schedule of Recommended Actions (U)

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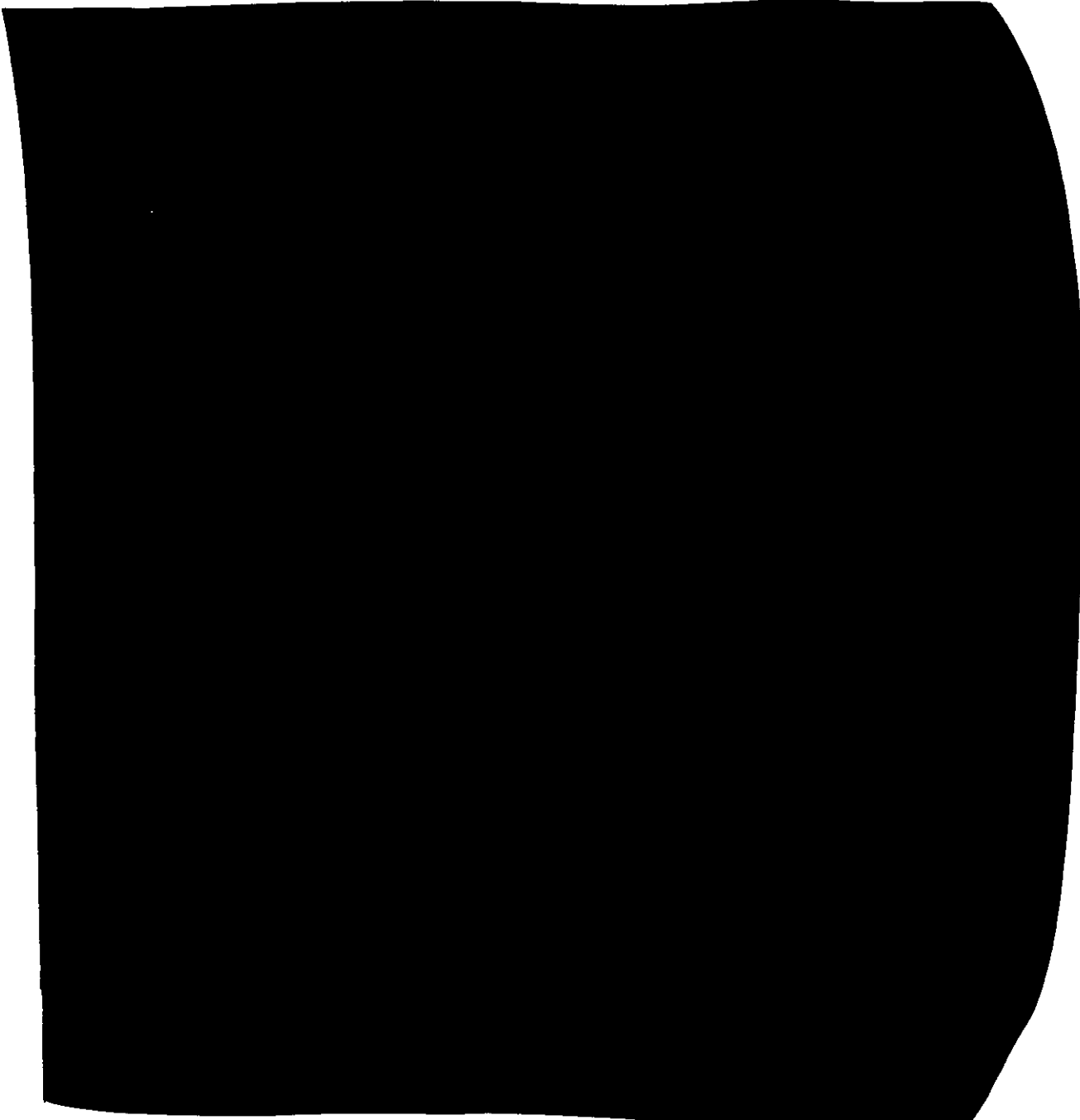
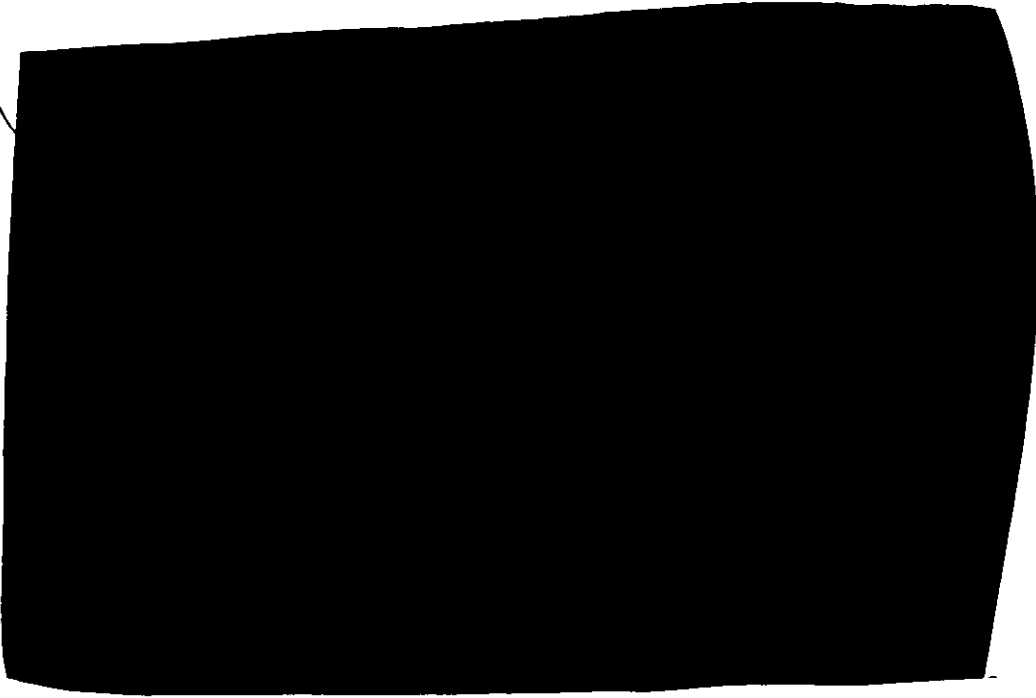


FIGURE 19

(U) SCHEDULE OF RECOMMENDED ACTIONS

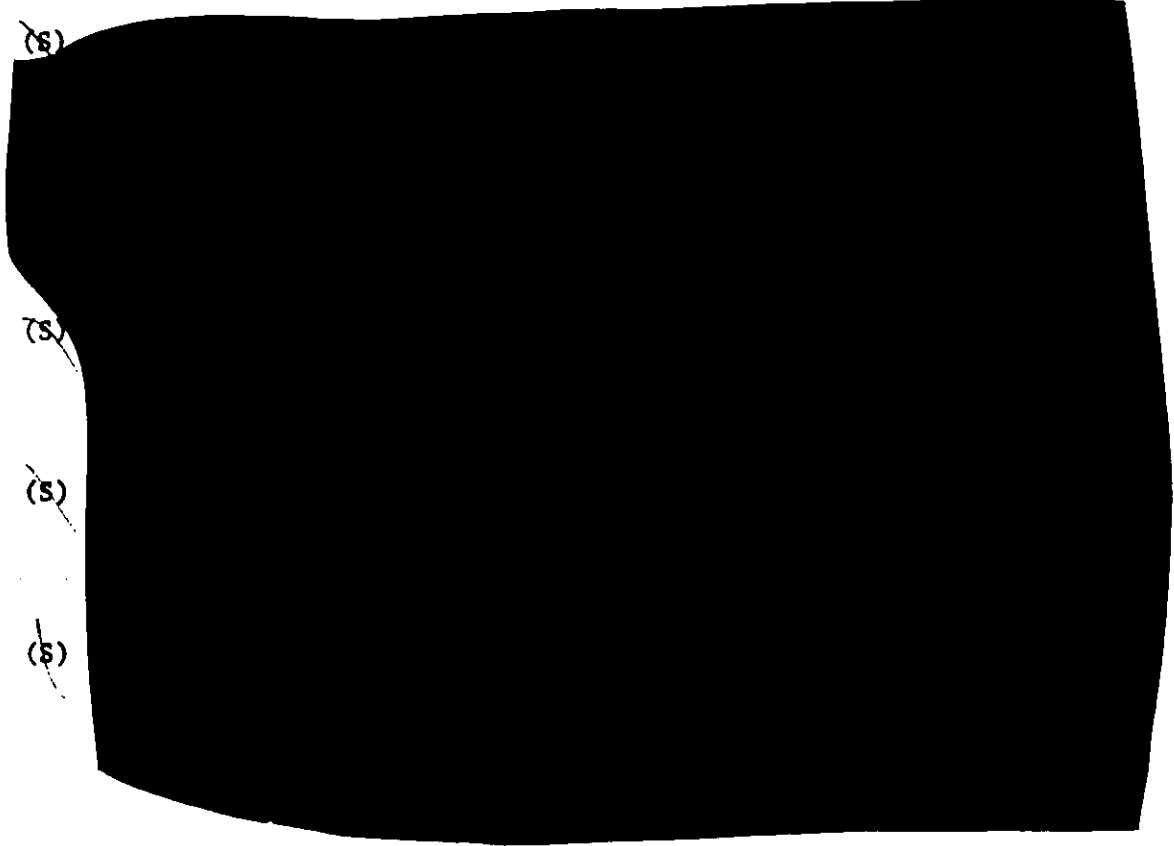
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5.6 FY 80 Resource Requirements (U)

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(U) ...Contingent upon ASD (C<sup>3</sup>I) 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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