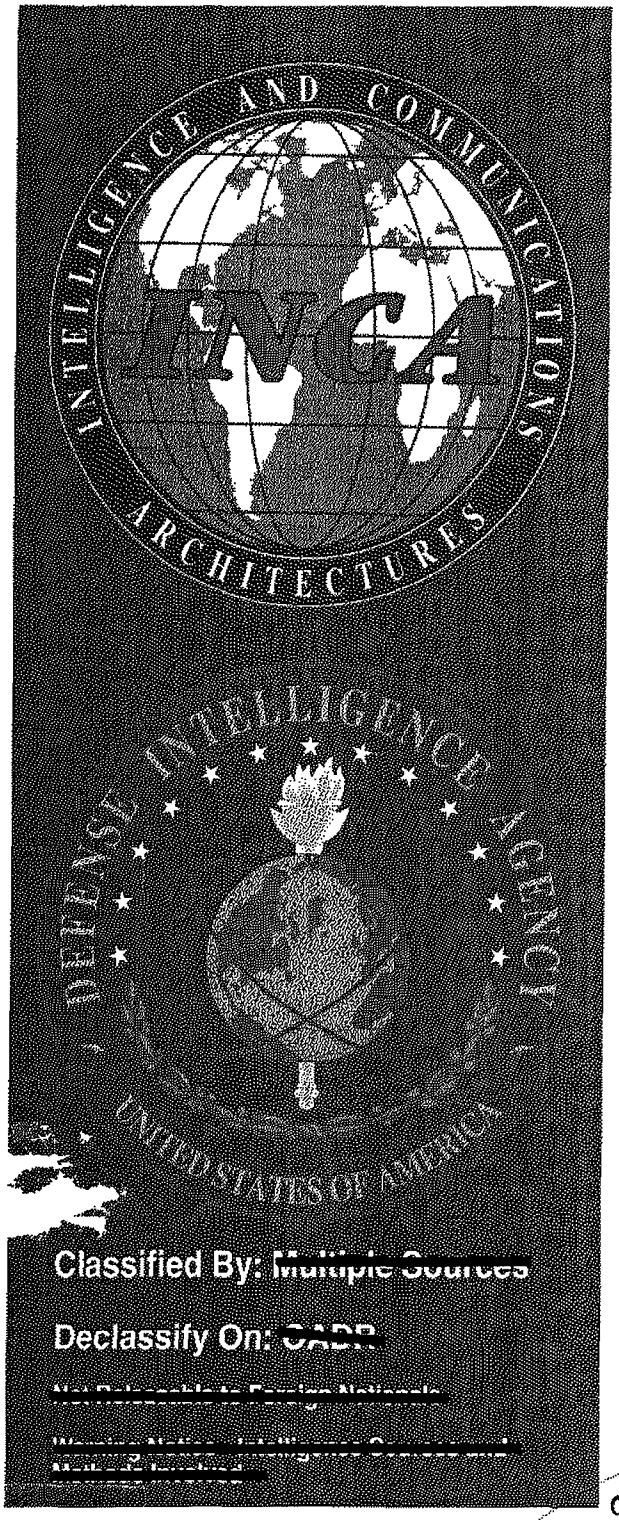
~~SECRET/NOFORN/WNINTEL~~



Classified By: ~~Multiple Sources~~

Declassify On: ~~OADR~~

~~Not Releasable to Foreign Nationals~~

~~Warning Notice: Intelligence Sources and Methods Involved~~

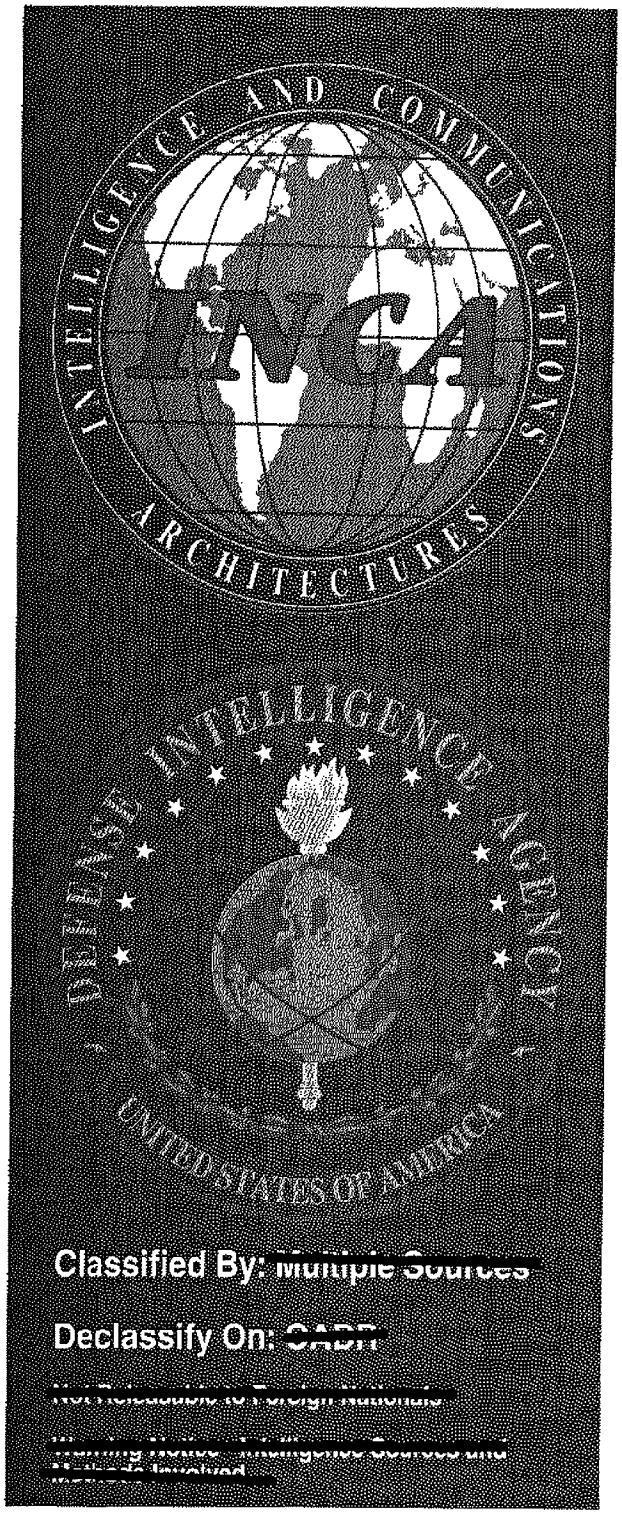
MASINT Handbook for the Warfighter (U)

Prepared by

The INCA Project Office

November 1994

~~SECRET/NOFORN/WNINTEL~~



Classified By: ~~Multiple Sources~~

Declassify On: ~~OADR~~

[redacted]

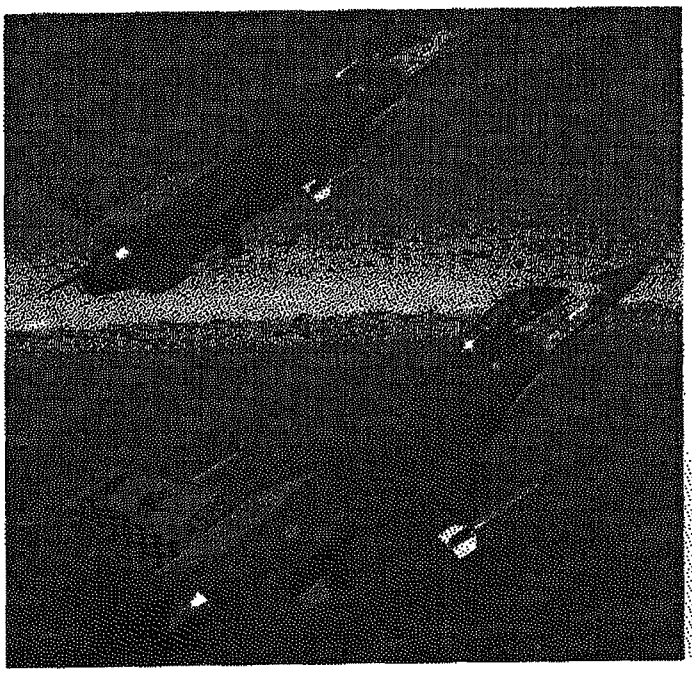
MASINT Handbook for the Warfighter (U)

Prepared by

The INCA Project Office

November 1994

X50612



This handbook was prepared by the INCA Project Office under the direction of (b)(3):10 USC 424 (b)(3):10 USC 424 Architectures, assisted by The Analytic Sciences Corporation.

TASC Staff

Authors.....

Editor.....

Illustrations/Designs.....

Production Support.....

(b)(6)

Photographs furnished by the Department of Defense, Joint Combat Camera Center, U.S. Navy, US Air Force, and U.S. Army.

Special thanks to the Central MASINT Office (b)(3):10 USC 424 and the DIA Publications Division.

DEFENSE INTELLIGENCE AGENCY

WASHINGTON, D.C. 20340-5100

U-81228/CMO-1 16 November 1994

TO: Distribution List

SUBJECT: Measurement and Signature Intelligence (MASINT) Handbook for the Warfighter

1. The *MASINT Handbook for the Warfighter* is designed to demystify the world of MASINT and provide focused information on how MASINT does and can support the warfighter now and in the future. The *Handbook* will be an effective companion document to the new *MASINT Users Guide, DIAM 58-8* now in production.

2. MASINT is not just scientific and technical intelligence. I perceive MASINT as "Intelligence for the Future Battlefield." MASINT is the absolutely essential threat, performance, signature, and profile information required to support force modernization and the effective employment of our increasing array of smart, brilliant, high-technology weapons. In the future, the gathering of this information will require strong intelligence and operational partnerships to include cooperative use and integration of collection resources.

3. The *MASINT Handbook for the Warfighter* was prepared jointly by INCA and members of my staff in the Central MASINT office. I and my staff request that you carefully peruse the Handbook for information of value to you and your mission. Please provide us candid, explicit feedback about what in the *Handbook* you like, dislike, or would like to know more about. Our prime objectives are improved communication with and support to the warfighter.

FOR THE DIRECTOR:

(b)(3):10 USC 424

1 Enclosure
MASINT Handbook for the Warfighter, November 1994

This Page Intentionally Left Blank

TABLE OF CONTENTS (U)

TABLE OF CONTENTS (U) (Continued)

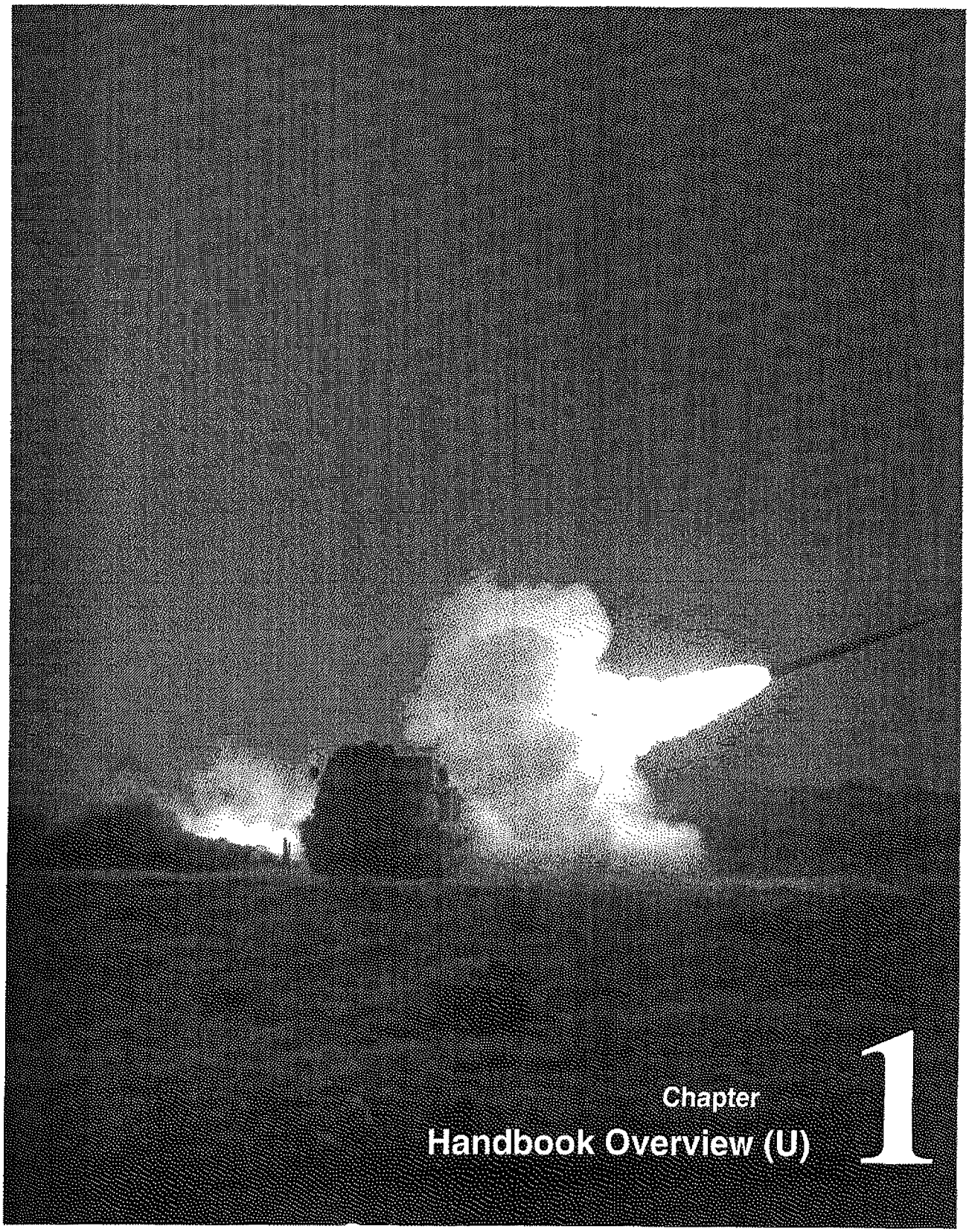
PREFACE

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) "We interrupt this broadcast to bring you an important announcement. At 2:00 a.m. eastern standard time, December 21, 1997, Libania launched an all-out air and ground attack against Kurzenstien. U.S. forces stationed in Kurzenstien are engaged. Updates will be provided as they become available. To repeat. . . ."

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) The MASINT Handbook for the Warfighter was prepared under the direction of the Intelligence and Communications Architectures (INCA) Project Office, Intelligence Program Support Group (IPSG), OASD (C^3I), in coordination with the Central MASINT Office. The principal mission of the INCA Project Office is the development of an overall Intelligence Architecture with planning and technical guidance for each theater of operation and command area of responsibility. This handbook was developed to educate and familiarize the warfighter with MASINT capabilities and provide technical planning information in support of the development of architectures and associated requirement statements.



Chapter 1

Handbook Overview (U)

CHAPTER 1

THE MASINT HANDBOOK FOR THE WARFIGHTER OVERVIEW

(U) PURPOSE

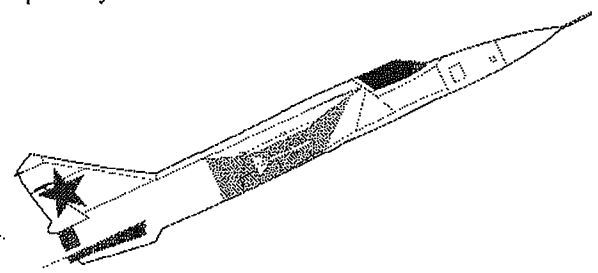
(U) The MASINT Handbook for the Warfighter (MHW) is designed to create a greater understanding by a military user of the relevant MASINT systems, capabilities, and infrastructure that support, or could support, military operations. Some MASINT capabilities have been utilized for years by the warfighter.

(b)(3):10 USC 424

MASINT satisfies time critical intelligence needs and has potential for satisfying more real-time/near real-time combat information needs for the warfighter; however, the full war-fighting potential of this diversified technical intelligence collection discipline has not been realized.

(U) Despite the lessons learned from DESERT SHIELD and DESERT STORM, a general lack of understanding and awareness of how existing (or future) MASINT capabilities could be applied in support of military operations prevails. There are numerous MASINT collection and exploitation systems, but few have been directly employed in the support of tactical operations. In some cases, Service or Unified Command MASINT capabilities have not been recognized as MASINT. These MASINT capabilities have evolved over time to support particular combat or operational information needs. Many of these sensors can provide intelligence information without interference with their primary missions.

(U) Theater and lower echelon command and staff elements may not be familiar with MASINT resources or with their utility to specific tactical problems. This document will provide a basic understanding of MASINT including applications of MASINT capabilities and technologies for possible solutions to a broad range of intelligence and combat information needs. It is also intended to assist in the development of MASINT statements of need for future required operational capability.



(U) This document is designed to increase operator's and planner's awareness of MASINT capabilities and their effectiveness in applying MASINT to military operations. It also provides information on how to research and request MASINT support.

(U) SCOPE

(U) The MHW serves as a tutorial for the non-technical military planner or collection manager. It is published at the lowest possible classification to permit distribution to the widest possible audience and to create an understanding and appreciation of MASINT capabilities that support the tactical commander's needs.

(U) Fundamental MASINT disciplines and techniques, trends, collection requirements and operations management, tasking, data processing, exploitation, dissemination, systems, technologies, and research and development are discussed. The Handbook explains

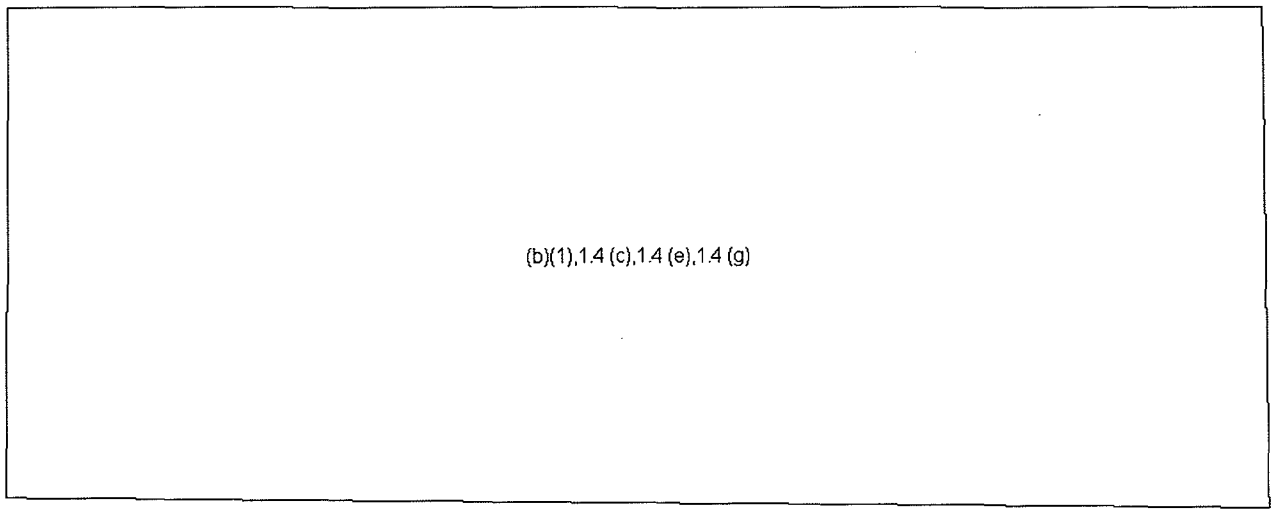


Figure 1-1. The MASINT Influence

MASINT capabilities and distinguishes between current and potential MASINT contributions to warfighting information needs.

(U) The Defense Intelligence Agency (DIA) Central MASINT Office (CMO) is the authoritative source for information on MASINT management, policies, and processes including existing and programmed MASINT assets, planned modifications or improvements, and Research, Development, Test and Evaluation (RDT&E) activities.

(U) READER'S GUIDE

(U) This book is a primer describing basic MASINT concepts, processes, and systems. While the focus is on current and near-term capabilities, programmed capabilities will also be identified.

(U) Chapter 2 presents an overview of the MASINT fundamentals by defining MASINT and introducing the MASINT disciplines, techniques, and terminology. Potential applications and functions are identified in the context of support to the warfighter.

(U) Chapter 3 identifies the principle structure of the MASINT system, its place in the Intelligence Community and Defense Department, and the associated collection, processing, exploitation, and dissemination management authorities and activities. An overview of the MASINT process to acquire support is discussed from collection requirement origination through dissemination of information to the originator.

(U) Chapter 4 describes the tactical, strategic, and technical MASINT relationships that support a military commander's information needs. The experience in DESERT STORM provided recognition of current and future MASINT contributions to the warfighter's arsenal of capabilities. There is also a realization that tactical MASINT sensors can provide valuable complimentary intelligence.

(U) Chapter 5 contains a description of MASINT systems and capabilities. These collection and processing systems are described to facilitate assessment of application to particular operational information needs. Each system is described in terms of collection platform, type of information collected, general applications, and timeliness of information. A MASINT Applications for Military Support table (Appendix A) is provided to assist in situation analysis and MASINT collection capability selection.

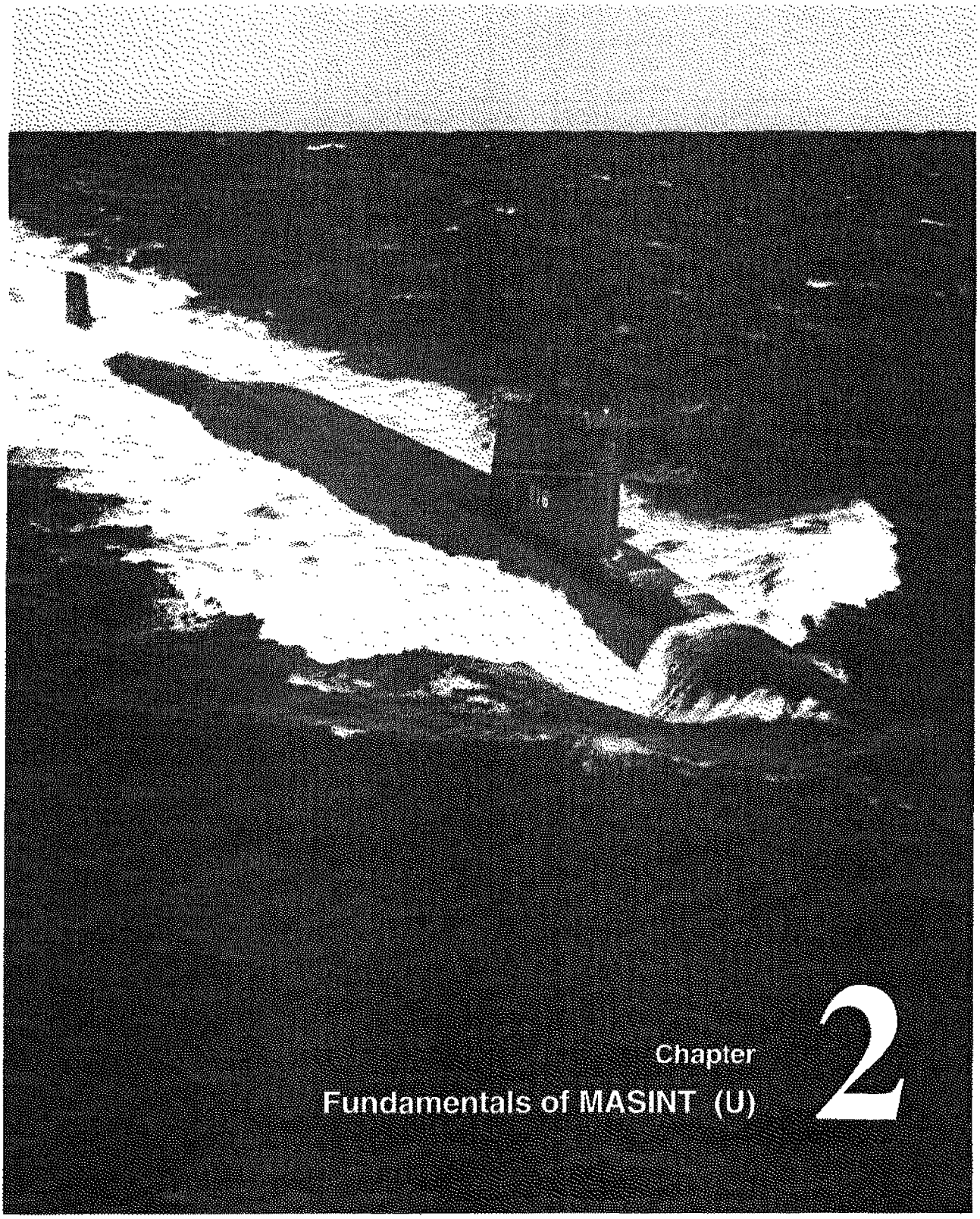
(U) Chapter 6 contains a description of key advanced technologies that may facilitate and enhance the applicability of MASINT to the warfighter needs. The

intent is to facilitate the submission of statements of need and requirements that support the implementation or acquisition of high payoff MASINT warfighting capabilities.

(U) Chapter 7 describes the unique contributions of MASINT information to the warfighter, the intelligence planner, and the decision maker to assist in their assessment of MASINT requirements in support of tactical missions.

(U) Chapter 8 contains the appendices of the handbook.

(U) The last two sections of the book is an annotated glossary of terms and acronyms ands a comprehensive index enabling the reader to locate topical information more easily.



Chapter 2

Fundamentals of MASINT (U)

CHAPTER 2

FUNDAMENTALS OF MASINT

(U) WHAT IS MASINT?

Definition

(b)(1),1.4 (c),1.4 (e),1.4 (g)

DCI Directive 2/11, December 1992

~~SECRET~~

(U) A MASINT sensor collects energy emitted by or reflected from an object or event of interest for the purpose of identification and characterization. Enemy weapon systems have physical characteristics and, more importantly, a characteristic performance when it is used. A weapon system in use constitutes a dynamic source or an event changing in time. Dynamic targets and events are primary candidates for MASINT exploitation. These dynamic sources produce energy emissions across the electromagnetic spectrum, carrying information about its characteristics and performance via waves or particles. This information is the signature collected by MASINT sensors which are optimized for specific target and event interactions with the physical environment.

(U) MASINT is like using sensory perceptions in addition to eyes and ears to provide valuable (in some cases unique) information about a target or event of interest. A helicopter flying nearby is heard by a human and is also detected by a MASINT sensor. The ear, similar in concept to a MASINT acoustic sensor, detects the sound waves generated by the helicopter. A human interprets the sound waves and identifies the distinctive rotor beating sound as associated with a

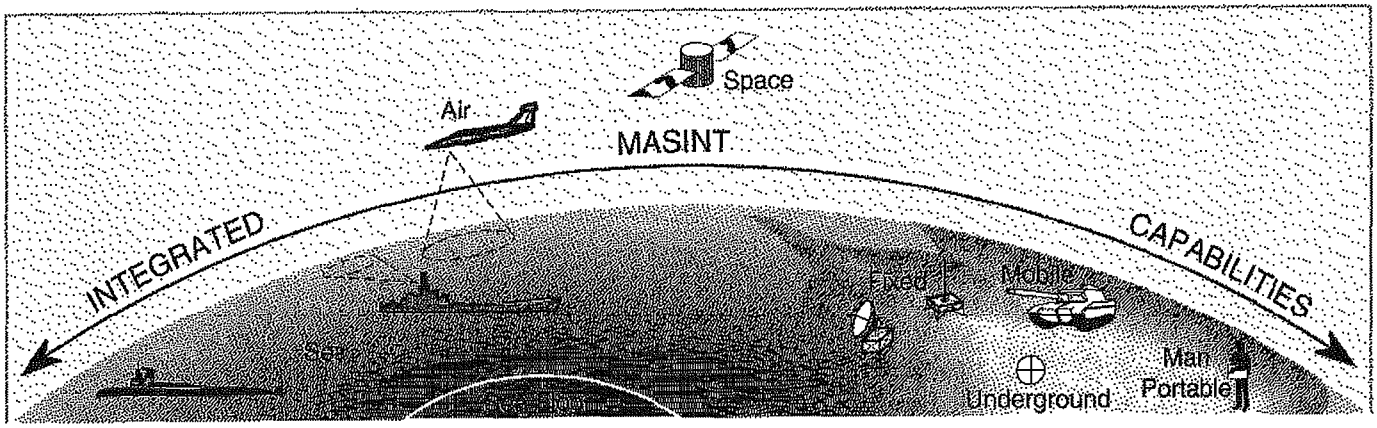


Figure 2-1. Integrated MASINT Capabilities

helicopter without having observed it. The MASINT collected sound waves are processed to not only identify the source as a helicopter, but to classify the specific type of helicopter based on comparison of the acoustic signature to a database.

(U) The human eye and a MASINT sensor can observe the light from a shooting star. The human eye detects and identifies this point source of light as a shooting star. MASINT infrared collection of the star light provides the same information, however processing and analysis can also provide the temperature of the shooting star and identification of its burning materials. As a warfighting application, missile launches appear to be shooting stars to MASINT sensors which can detect, identify, locate and track these point sources of energy in order to provide warning to specified users.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

Figure 2-2. Observation Through Multi-basing Collection Platforms

(U) Observation of the planet Saturn through a high power telescope reveals a definable shape, complete with rings, identifiable by the human eye (i.e., literal image). If not observed with a high power telescope, only a point source of light from the planet is visible to the human eye. MASINT analysis of this point source of light requires processing prior to interpretation. The light is broken into separate color components (wavelengths), similar to light passing through a prism, and into brightness or intensity profiles. Data exploitation is applied to determine what materials make up Saturn. In a similar way, the performance of a rocket motor is determined through the identification of the class and/or type of fuel materials used. The practical significance of knowing a missile's (or other weapon systems) performance is to determine how to intercept or counter the threat.

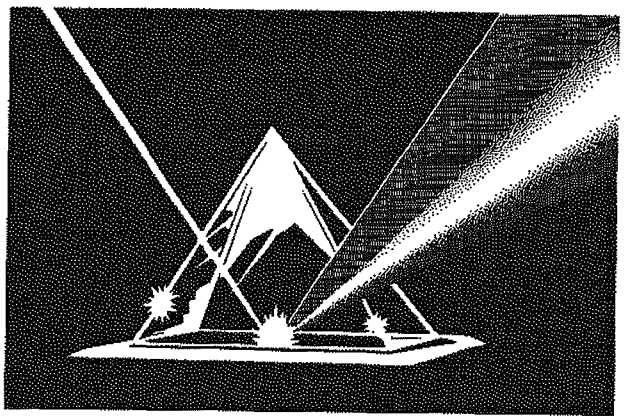


Figure 2-3. Prism Spreading a Light Source into its Spectral Component

(U) A final example of MASINT data is a radar return from a combat or air traffic control radar - reflection from an observed target. The radar operator visually detects the blip or reflection and determines the targets relative position and direction of flight on his display scope. If the radar is designed properly, MASINT analysis of this blip can be used to provide size, shape, and flight path of the observed target. A primary use of radar in the tactical role is for surveillance, detection, warning, and targeting based on target signature (e.g., radar cross section, jet engine modulation) recognition.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

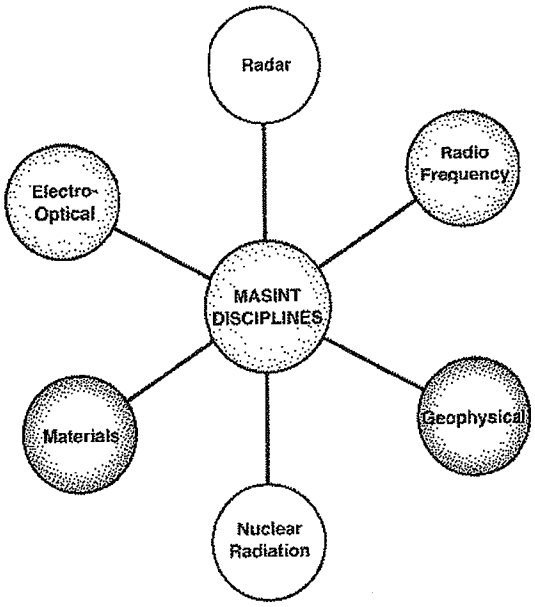
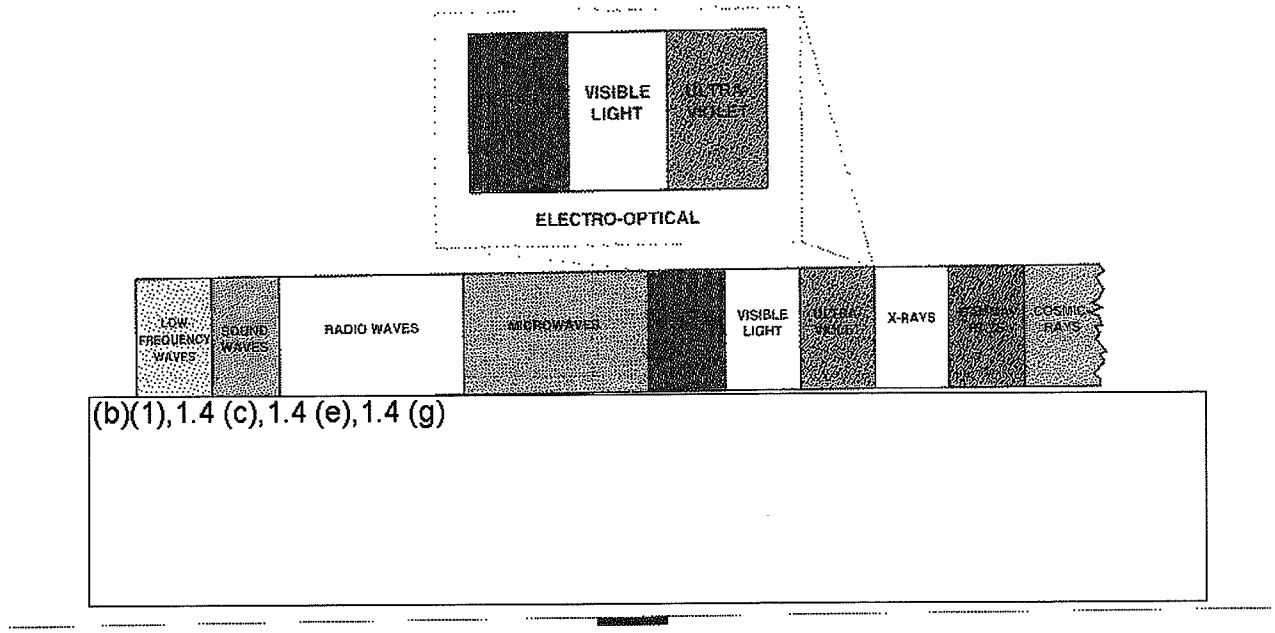


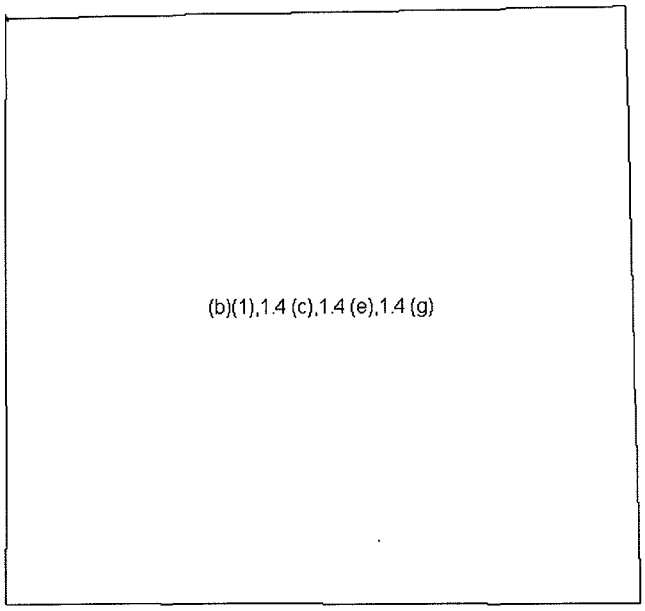
Figure 2-4. MASINT Discipline Taxonomy

(U) MASINT DISCIPLINES

(U) **MASINT is comprised of six primary disciplines: 1) Electro-Optical, 2) Radar, 3) Radio-frequency, 4) Geophysical, 5) Materials and 6) Nuclear Radiation.** Each discipline and its associated exploitation techniques will be described in relation to the type(s) of information provided and the current or potential support provided to a warfighter.

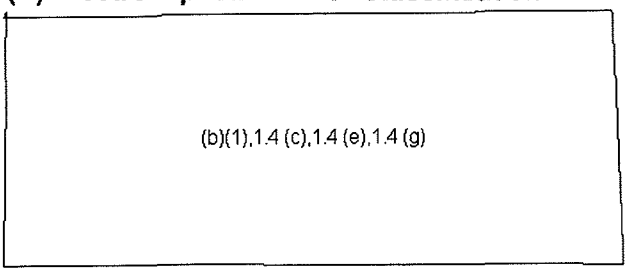


(U) Electro-Optical (EO)



(U) Another type of EO data is spectral data, previously described as data provided by a prism that separates light from the target into component colors. Spectra or spectral (sometimes referred to as spectro-radiometric) data is a higher resolution information source which permits the assessment of detailed target characteristics such as a chemical composition of the target to determine materials used in the weapon system.

(U) Electro-Optical Sensor Classification



Definition of MASINT Electro-Optical Intelligence

(U) Electro-Optical Intelligence is the collection, processing, exploitation, and analysis, of emitted or reflected energy across the optical portion (ultraviolet, visible, near infrared, and infrared) of the electromagnetic spectrum. MASINT EO may provide detailed information on the radiant intensities, dynamic motion, spectral and spatial characteristics, and the materials composition of targeted objectives. Electro-optical data collection provides broad applications to a variety of military, civil, economic, and environmental issues. Data may be collected by a variety of optically sensitive devices, such as radiometers, spectrometers, non-literal imaging systems, lasers, or laser radar (LADARS). The MASINT discipline does not include the collection, processing, and interpretation/analysis, of literal imagery products (IMINT), communications (COMINT), electronic (ELINT) or foreign instrumentation signals (FISINT) intelligence.

[Note: COMINT, ELINT, and FISINT are subdisciplines of SIGINT.]

(U) Infrared Intelligence (IRINT) is a subcategory of electro-optical that includes data collection across the infrared portion of the electromagnetic spectrum (short - long wave infrared).

(U) Optical Intelligence (OPTINT) is a subcategory of electro-optical that includes data collection across the ultraviolet, visible, and near-infrared portion of the electromagnetic spectrum.

(U) LASER Intelligence (LASINT) is the integration and specialized application of MASINT EO, materials, and other collections techniques to gather data on laser systems. The focus of the collection is on detection of a laser, laser threat warning, and/or precise measurement of the frequencies, power levels, wave propagation, determination of power source, and other technical and operating characteristics associated with laser systems - strategic and tactical weapons, rangefinders, and illuminators. (This definition should not be confused with the broader usage of the term LASINT which includes an overall knowledge about lasers and laser developments derived from multiple data or collection sources.)

MASINT Definitions 17 December 1990

PAGE 2-7 IS DENIED IN FULL

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) MASINT EO Information Products

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),(b)(3):10 USC 424,1.4 (c),1.4 (e),1.4 (g)

(U) Radar

(U) Definition of MASINT Radar Intelligence

(U) Radar Intelligence is the collection, processing, exploitation, and analysis of radar energy reflected from a target or objective. Instruments for active target illumination may include monostatic or bistatic, phased array, synthetic aperture radar (SAR), and over-the-horizon radar systems. RADINT collection provides information on radar cross sections, tracking, precise spatial measurements of components, motion and radar reflectance, and absorption characteristics for dynamic targets and objectives.

MASINT Definitions 17 December 1990

(U) MASINT collected by radar is the result of illuminating a target with a radar signal and collecting the radar energy reflected (actually reradiated) by the target. The target reflects radar energy in a unique radiation pattern or radar cross section (signature) that is a function of the shape and material properties of the target. Different types of objects produce different but definable patterns or signatures which can be measured to determine shape and size, and used to identify and classify targets of interest. Battlefield and space-track radars are representative military applications of the radar technique. In some cases, military radar systems such as the U.S. Space Command Spacetrack Network provide data on ballistic missiles and space launch vehicles to complement dedicated MASINT radar collection for intelligence exploitation.

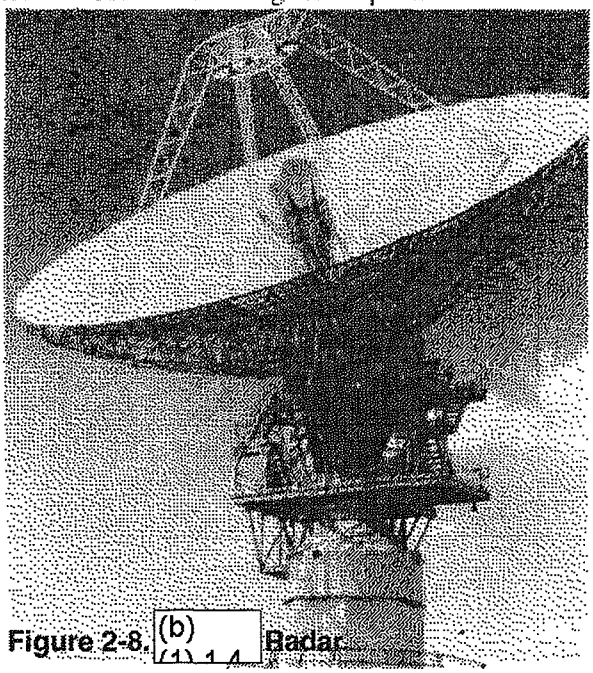
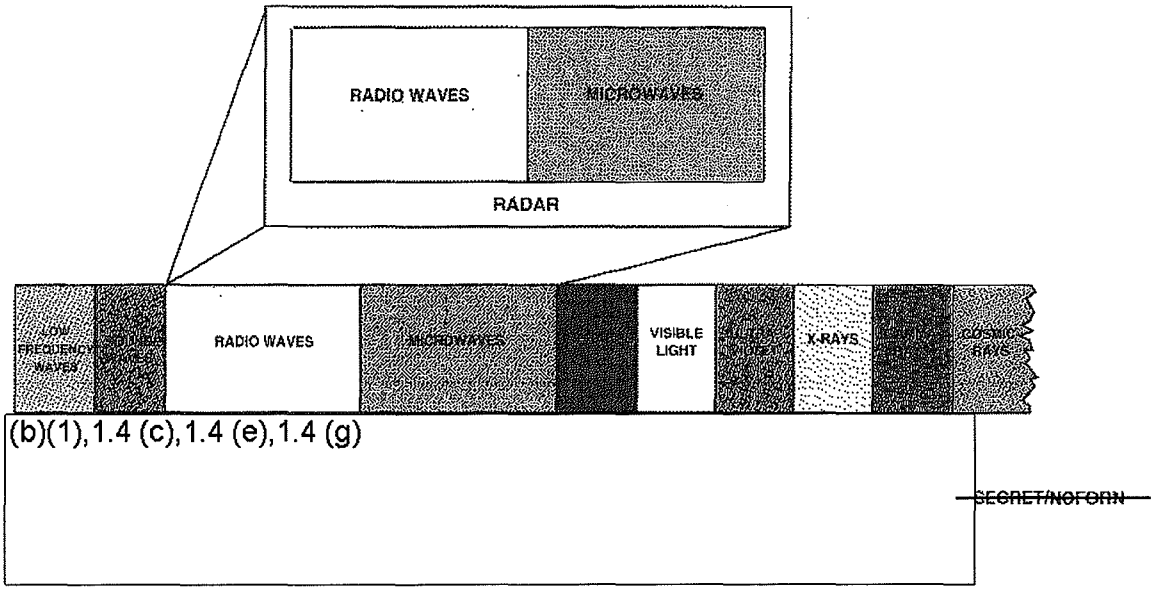


Figure 2-8. (b)(1),1.4 Radar



~~SECRET/NOFORN~~

(U) Radar Sensor Classification

(U) Radar systems can be classified in multiple ways - by the radio-frequency used (HF, UHF, VHF, C, X, S-bands, etc.), by a collection geometry (monostatic, bistatic, over-the-horizon, line-of-sight), by an antenna type (dish, phased array, synthetic aperture) and by the data collected (metric, signature). Radars typically provide three dimensional target location, cross-section or signature measurements, and motion of dynamic targets.

(U) Radar systems are primarily active monostatic systems (collocated transmitter and receiver) that are mechanically or electrically steerable to provide line-of-sight coverage from horizon to horizon.

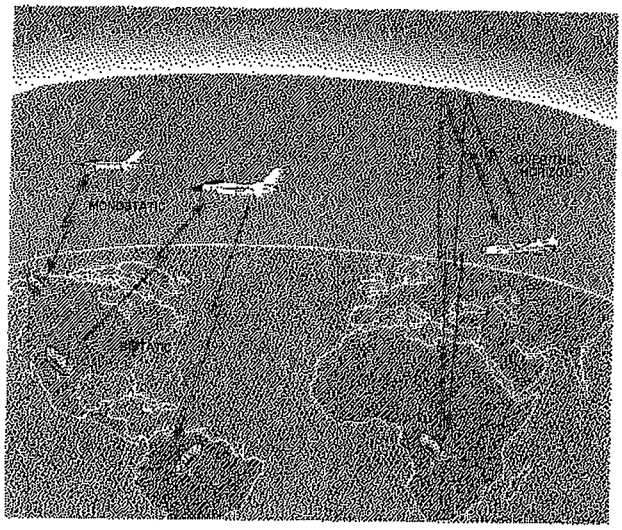


Figure 2-10. Radar Collection Techniques

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) The type of antenna used by a radar varies with mission and application. Phased array antennas with electrically steered beams are used to detect and track hundreds of targets at a time. Mechanically steered dish radars are used to detect and track only a few targets at a time. The size and mobility of the collection platform is also a primary consideration for battlefield type radar systems. Airborne systems such as JOINT STARS and AWACS are state-of-the art tactical applications of radar to support the warfighter's needs.

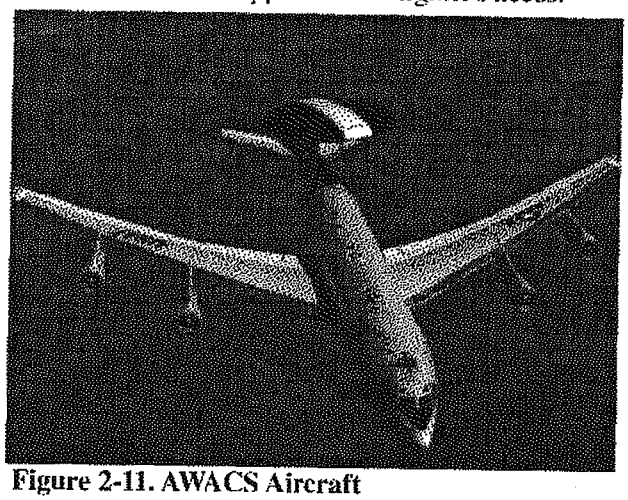


Figure 2-11. AWACS Aircraft

(U) Synthetic aperture radar (SAR) creates a larger apparent antenna than is actually used by consistently adding together (coherently integrating) the radar returns as the host platform moves along a track with respect to the target. The length of the ground track during the integration is the length of the synthetic aperture, and the more returns added together, the better the resolution. A SAR system provides high resolution, day/night collection capability which is

exploitable by advanced MASINT processing methods for change detection, terrain mapping, underwater obstacle detection, dynamic imaging of moving targets, and radar cross-section signature measurements.

(U) MASINT Radar Information Products

(U) **The primary radar contributions are surveillance, detection, tracking, identification, and size and shape characterization of moving targets.** Target position (range, azimuth and elevation,) as a function of time, provides accurate target trajectory (flight path) prediction and reconstruction inputs that are critical to combat operations. Tactical warning and target intercept of a hostile aircraft in the theater of operations is routinely accomplished by radar technique applications using a network of ground and airborne sensors. Signature data, the radar cross-section or jet engine modulation profiles developed from technical collection and threat assessments, aids in the identification and classification of hostile targets. From tracking data; speed, direction, and location are derived to help direct aircraft or point ground based weapons at the target. Similarly, missiles, ships, vehicles, artillery shells, spacecraft, and other targets are illuminated for both tactical operations and threat assessments. The body of knowledge represented by the technical and tactical collection supports force/strategy planning and decision making as well as the weapon system acquisition process.

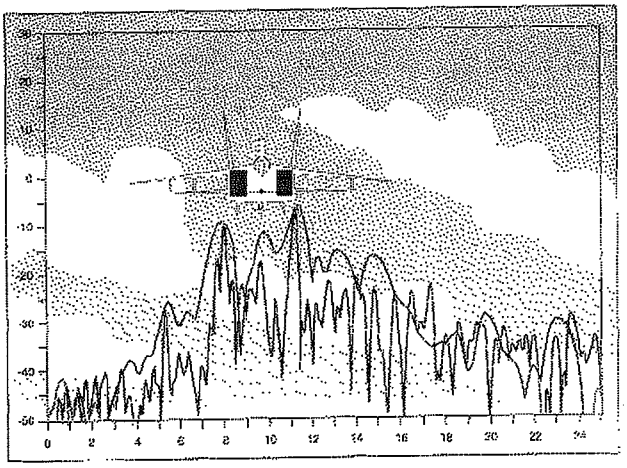


Figure 2-12. Radar Signature of Aircraft

(U) For example, from reflected radar target returns, an experienced radar analyst can reconstruct the size, shape, and location of the observed target, including length, diameter, direction and speed. This information is critical in the determination of target performance assessments for missiles. Currently, Intelligence Community radars like COBRA DANE and COBRA SHOE, U.S. Space Command early warning and space track radars such as the FPS 17/79, and other Service/organization collectors such as the Army Kwajalein radars, provide the bulk of radar information for intelligence exploitation on missiles and space objects. There are tactical radar systems such as the Navy's AEGIS radar that are capable of providing intelligence data. The proliferation of delivery systems for weapons of mass destruction necessitates the exploitation of all potential collectors to provide sufficient data to characterize the threat to combat operations.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

variety of MASINT problems. The nature of the problem, availability of assets, and the collection geometry will affect how well bistatic systems perform. In general, bistatic radar systems can perform many of the MASINT functions: detection, location, and identification of targets. (b)(1),1.4 (c),1.4 (e),1.4 (g) tracking data on aircraft and missile launches, and therefore, provide a tipoff to other sensors or defenses. Because of the separate location of the receiver and the transmitter, a bistatic system has some immunity to jamming countermeasures and the ability to operate under conditions that would negate monostatic sensors. Particularly, (b)(1),1.4 (c),1.4 (e),1.4 (g) rapid information on tracking of targets; however, non-real-time analysis may be needed for identification, classification, and characterization of the target.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (b),1.4 (e),1.4 (g)

(b)(3):10 USC 424

(U) Radio-Frequency (RF) MASINT

(U) Definition of Radio-Frequency (RF) MASINT

(U) Radio-Frequency/Electro-Magnetic Pulse Intelligence (RF/EMP) is the collection, processing, and exploitation of radio-frequency electromagnetic pulse emissions associated with nuclear testing or other high energy events for purposes of determining power levels, operating characteristics and signatures of advanced technology weapons, power, or propulsion systems. MASINT applications specifically exclude the collection of COMINT and ELINT intelligence which are functions encompassed under SIGINT.

(U) Unintentional Radiation Intelligence (RINT) is the integration and specialized application of multiple MASINT collection, processing, and exploitation subdisciplines and techniques against unintentional radiation sources that are incidental to the design propagation and operating characteristics of military and civil propulsion units, power sources, weapons systems, electronic systems, machinery, equipment, or instruments. These techniques may be valuable in detecting, tracking, and monitoring a variety of activities of interest.

MASINT Definitions 17 December 1990

~~(S)~~ A rapid change in a material or medium, resulting in an explosive force, produces radio-frequency emissions. (b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

characterize, and target threats. A primary objective of RF MASINT collection has been to diagnose the technical parameters of a target device for purposes of determining its power levels, operating characteristics, and signatures.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

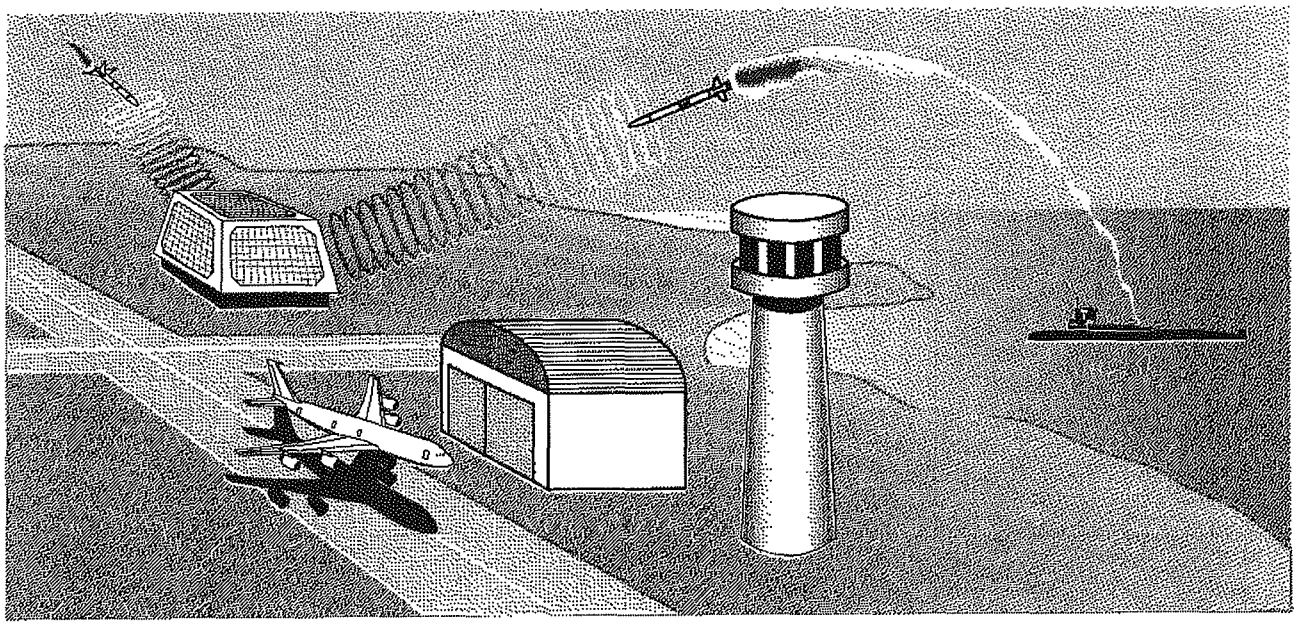


Figure 2-13. High-power Microwave Weapons System

(b)(1),1.4 (c),1.4 (e),1.4 (g)

est include ships, submarines, aircraft, land vehicles, and mobile/fixed installations; for example, signals emanating from helicopters may have unique modulations because of rotor blade interference. (b)(1),1.4 (b)(1),1.4 (c),1.4 (e),1.4 (g) (b)(1),1.4 (c),1.4 (e),1.4 (g) Another example of RINT is the unique resonant audio modulations overlaid on communication signals that are characteristic of the platform's internal structure. Electrical power equipment also produces unique signal modulations that can be identified by RINT collection.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Radio-Frequency MASINT Sensor Classification

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) MASINT Radio-Frequency Information Products

(b)(1),1.4 (c),1.4 (e),1.4 (g)

surprise, to produce effective countermeasures, and to warn the warfighter, will be required.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(3):10 USC 424

(U) Geophysical MASINT

Definition of Geophysical MASINT

(U) Acoustic Intelligence is the collection, processing, and exploitation of emitted or reflected sounds, pressure waves, or vibrations, in the atmosphere (ACOUSTINT), in water (ACINT), or in the earth's surface, (SEISMIC). Acoustic and seismic sensors may be valuable in measuring aircraft and ship performance characteristics, detecting weapons testing and large military movements, and gathering data on natural and environmental issues. MASINT applications specifically exclude communications intelligence.

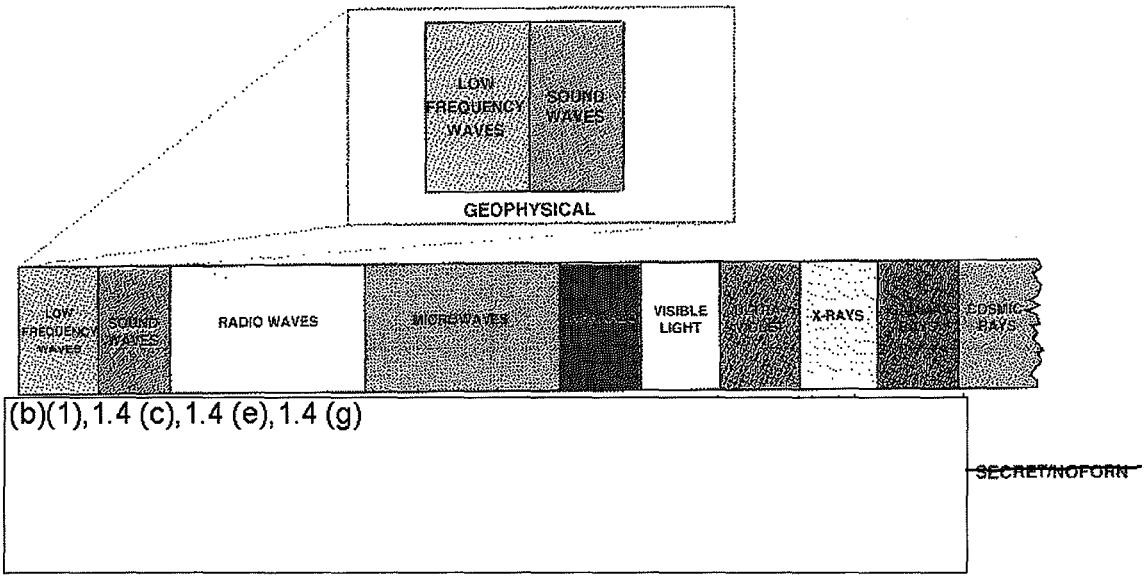
MASINT Definitions 17 December 1990

~~(S)~~ Geophysical MASINT is the collection, processing, and exploitation of earth-atmospheric transmitted events including emitted or reflected sounds, pressure waves, vibrations, magnetism, or ionospheric disturbances in the Earth's atmosphere, water, surface, or sub-surface; for example, an underground nuclear test will result in both seismic and acoustical emanations that can be detected by MASINT sensors.

(U) Geophysical Sensor Classification

(U) The primary means of classification of geophysical MASINT is by the medium through which the signal is transmitted, and by the type of geophysical process exploited. ACOUSTINT, the collection of sound waves, is divided into three categories: 1)underwater acoustics - unintentional or intentional sound from submarines, ships, underwater weapons, and hydro-acoustic systems; 2) atmospheric acoustics - sounds produced by artillery ground ranging and aircraft or helicopter operation and overflight; and 3) seismic (underground acoustics) - subsurface vibrations resulting from weapons, vehicular movements, detonations and testing--particularly nuclear weapons--or earthquakes.

(b)(1),1.4 (c),1.4 (e),1.4 (g)



mic/hydroacoustic monitoring of subsurface nuclear testing.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) MASINT Geophysical Information Products

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(3):10 USC 424

(U) Materials MASINT

(U) Definition of Materials MASINT

(U) Materials Intelligence is the physical collection, processing, and exploitation analysis of atmospheric trace elements; gaseous, liquid, or solid particulates; effluents or debris. Materials intelligence has specific applications to nuclear, chemical, biological warfare, military and civil production, economic and environmental problems. Data may be acquired by a variety of airborne, shipborne, or ground-based collectors and sampling stations.

MASINT Definitions 17 December 1990

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Materials Collection Classification

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) MASINT Material Information Products

(U) From any given sample, various information can be derived based on the sample and the analytic/forensic techniques used; for example, the type of material can be determined and characterized by its specific chemical or physical properties and the capability or vulnerability of the material can be determined. The vulnerability of a material in a weapon system can indicate an exploitable weakness or defect. Characteristics of the sample also allow weapon system designers to compensate for or redesign to maintain technological advantage over the adversary's weapon system.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

- Determine composition of cloud obscurants and smoke or chaff.
- Determine materials effectiveness against U.S. weapons guidance and reconnaissance sensors.

(U) Nuclear Radiation

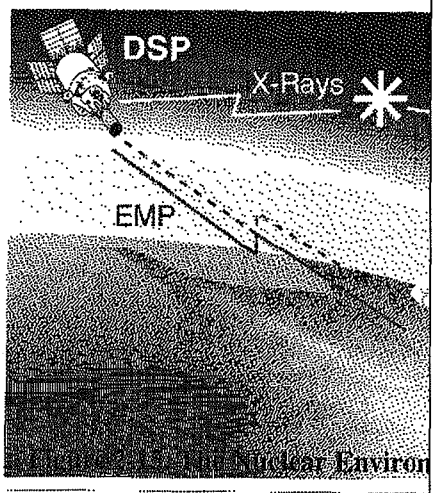
(b)(3):10 USC 424

(U) Definition of Nuclear Radiation

(U) Nuclear Intelligence is information derived from the nuclear radiation and physical phenomena associated with nuclear weapons, processes, materials, devices, or facilities. Nuclear monitoring includes nuclear radiation detection, identification, and characterization of sources and events. Data exploitation results in nuclear signature of weapons or materials.

MASINT Definitions 17 December 1990

(b)(1),1.4 (c),1.4 (e),1.4 (g)



(b)(1),1.4 (c),1.4 (e),1.4 (g)

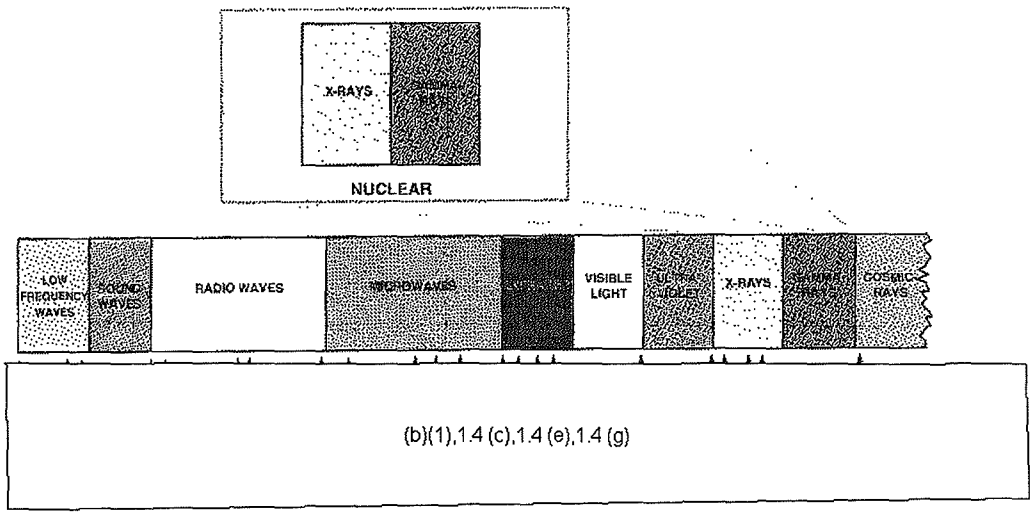
(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Nuclear Radiation Sensor Classification

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) MASINT Nuclear Information Products

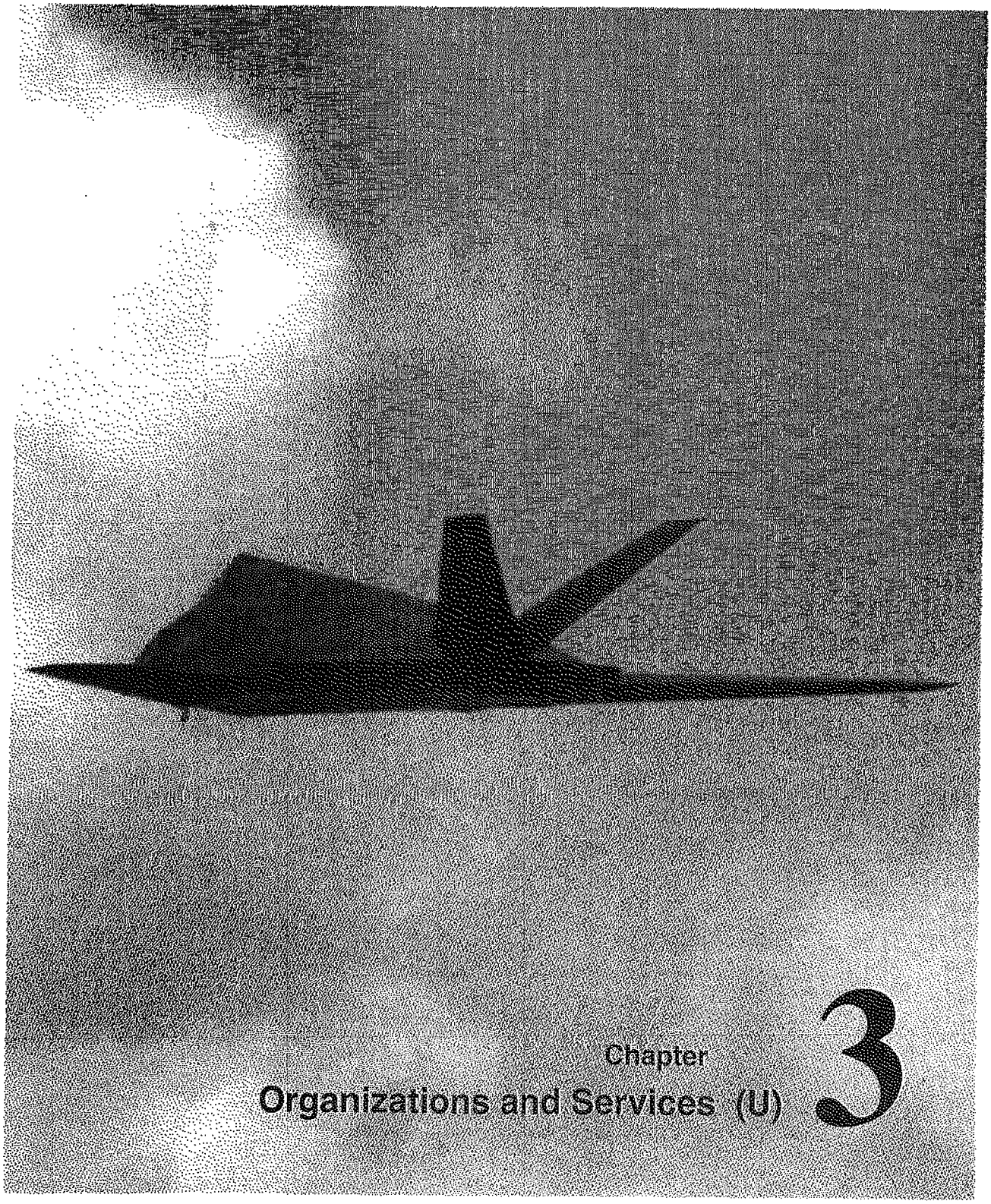
(b)(1),1.4 (c),1.4 (e),1.4 (g)



(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

This Page Intentionally Left Blank



Chapter 3

Organizations and Services (U)

CHAPTER 3

MASINT ORGANIZATIONS AND SERVICES

(U) MASINT STRUCTURE

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(3):10 USC 424

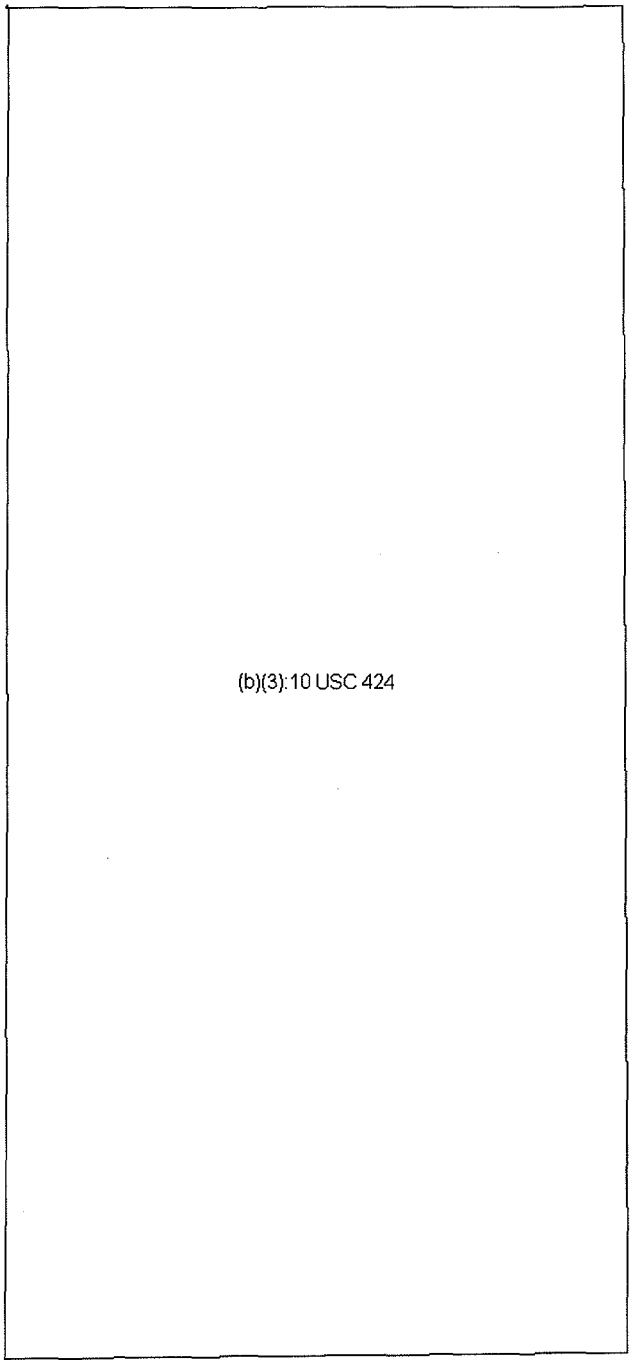
(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

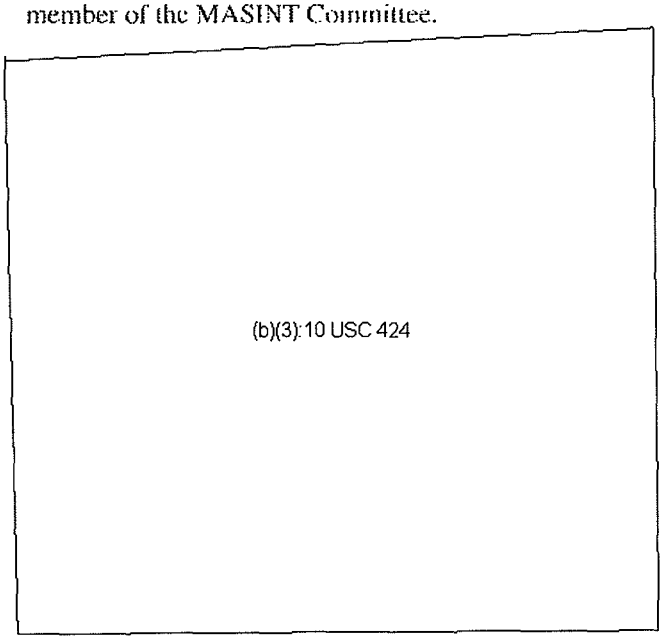
(b)(3): 10 USC 424



(U) MASINT COMMUNITY PARTICIPANTS

(U) Assistant Secretary of Defense/C^3I

(U) The Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) provides oversight of MASINT affairs of the Department of Defense. The OASD/C^3I provides broad guidance for DoD MASINT activities and performs resource management responsibilities for MASINT collection, processing, exploitation, dissemination, and research and development to support the operational commands and defense policymakers. OASD/C^3I is an associate member of the MASINT Committee.



(U) Defense Intelligence Agency (DIA)

(b)(1), 1.4 (c), 1.4 (e), 1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Central Intelligence Agency

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Ballistic Missile Defense Organization

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Department of Energy

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) U.S. Air Force

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) State Department

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) National Security Agency

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) U.S. Army

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) U.S. Navy

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) U.S. Marine Corps

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Defense Special Missile and Astronautics Center

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Unified Commands

(b)(1),1.4 (c),1.4 (e),1.4 (g)

primarily a user of MASINT information to support their airlift, aerial refueling, and sealift missions.

(U) MASINT SERVICES

(U) The Requirements Process

(U) MASINT encompasses the full ranges of collection requirements and operations management; data processing, analysis, and exploitation; and reporting and product dissemination activities. The variety of techniques has resulted in a distributed network of MASINT capabilities with tailored reporting and dissemination to interested users.

(U) The MASINT collection requirements management system provides the warfighter a full range of standing, change, time-sensitive, amplification, and ad hoc requirement formats to express his information needs with their associated timeliness for his mission. Collection managers from a deployed area through the theater and command collection management process can develop dynamic collection plans. MASINT con-

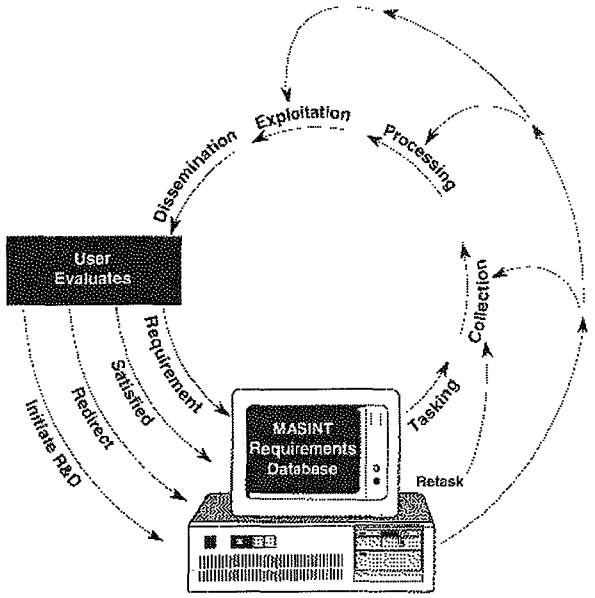


Figure 3-5. MASINT Requirements Process

(U) Requirement Submission Definitions

Standing Requirement (MASINT-SN): A MASINT requirement demanding continuing, long-term, collection actions. The MASINT-SN is subject to a mandatory review and revalidation by the originator at a minimum of every 3 years; otherwise, requirements will be automatically inactivated. The originator may simply affirm that the requirement is valid as written or propose specific changes (see MASINT-CH below) to update the requirement. The MASINT-SN revalidation process requires the same approvals and MASINT requirements subcommittee (MRSC) review as the original validation process. If requirements are kept current, the review/revalidation process can be considerably shortened. The CMO will provide periodic messages identifying requirements subject to review within the following 180 days. Standing requirements may become subject to review at any time if their continued validity or currency of collection objectives are challenged.

(U) Change Requirement (MASINT-CH): A complete or partial change to a MASINT standing requirement. The MASINT-CH is a mechanism to facilitate permanently updating or modifying portions of a MASINT-SN without resubmitting the entire requirement. The MASINT-CH is applicable to standing requirements only. It may be used to propose additions to, modifications to, or deletions from portions of a MASINT-SN. Approval/validation of the MASINT-CH remains subject to MRSC review.

(U) Time-Sensitive Requirement (MASINT-TR): A MASINT requirement requiring the initiation of collection actions immediately to within 72 hours of receipt. The MASINT-TR must be rejustified/revalidated at 7-day intervals to continue collection. The MASINT-TR may be a totally unique requirement or the amplification of an existing MASINT standing requirement (MASINT-SN).

(U) Amplification (MASINT-AM): A MASINT requirement (other than the MASINT-TR above) requiring a temporary or short-duration amplification or modification to an existing MASINT standing requirement. The MASINT-AM may be used to request initiation of collection actions from 72 hours to 6 weeks after receipt. (Reminder: a time-sensitive requirement may be extended up to 10 weeks on request of the consumer. Further extensions at 10-week intervals must be rejustified on the basis of requirement non-satisfaction and/or continuing activity of interest. Concurrent with the second 10-week extension, a permanent change to the MASINT-SN must be submitted unless the consumer can provide strong rationale to justify continuation of the MASINT-AM).

(U) Ad Hoc Requirement (MASINT-AH): A totally new, short-duration, MASINT requirement for which there is not an existing MASINT standing requirement. The MASINT-AH may request initiation of collection actions from 72 hours to 6 weeks after receipt. Like the MASINT-AM, after the initial 6-week collection period, the MASINT-AH may be extended up to 10 weeks on request of the consumer; further extensions at 10-week intervals must be rejustified on the basis of requirement non-satisfaction and/or continuing activities. Concurrent with the second 10-week extension, a MASINT-SN must be submitted unless the consumer can provide strong justification for continuation of collection on an ad hoc basis.

National and Defense Measurements and Signature Intelligence Requirements Structure, Procedures, and Format, CMO-1 Message 8 June 1993

tributions by organic, theater, and national assets can provide information on the enemy target, such as warning, location, heading, type, and number.

Type	Action Agent	MASINT Requirement Types
Standing	MRSC/CMO-1	Continuing long-term collection need. Revalidation required minimally every 3 years
Change	MRSC/CMO-1	Complete or partial modification of a standing requirement
Time Sensitive	CMO-3	Collection initiation required within 7 hours. Extendable
Amplification	CMO-3	Temporary modification or emphasis of a standing requirement. Extendable
AdHoc	CMO-3	New short duration requirement for collection evaluation from 72 hours to 6 weeks. Extendable

Figure 3-6. Requirements Types

MASINT requirements are handled in two primary categories: time critical (i.e., time-sensitive, ad hoc, amplifications) and routine (i.e., standing, change). For time-critical requirements, the originator processes his requirement through his organization validation process with submission to Central MASINT Operations Center for tasking. An originator submits routine requirements through his organizational validation process to DIA/CMO-1 for national validation and tasking. A detailed description and guide to MASINT requirements submission can be found in the MASINT User's Guide (new DIAM 58-5 to be completed in FY 95).

(U) Collection

(U) The warfighter's requirements are primarily for current information; however, long-term information needs are captured in standing requirements submitted by general military intelligence or scientific and technical intelligence production agencies, but directly related to a warfighter's planning, preparation, and execution of his operational mission.

~~(S)~~ Many collection sensors organic to the Services and U.S. Commands use MASINT disciplines and techniques and have a long history of performing tactical missions. (b)(1),1.4 (c),1.4 (e),1.4 (g) (b)(1),1.4 (c),1.4 (e),1.4 (g) The MASINT process does not degrade these traditional uses, but extends "information" on a non-interference basis to other users that have a similar need. The MASINT Requirements System provides the mechanisms for users to request information from all sensors that use MASINT techniques.

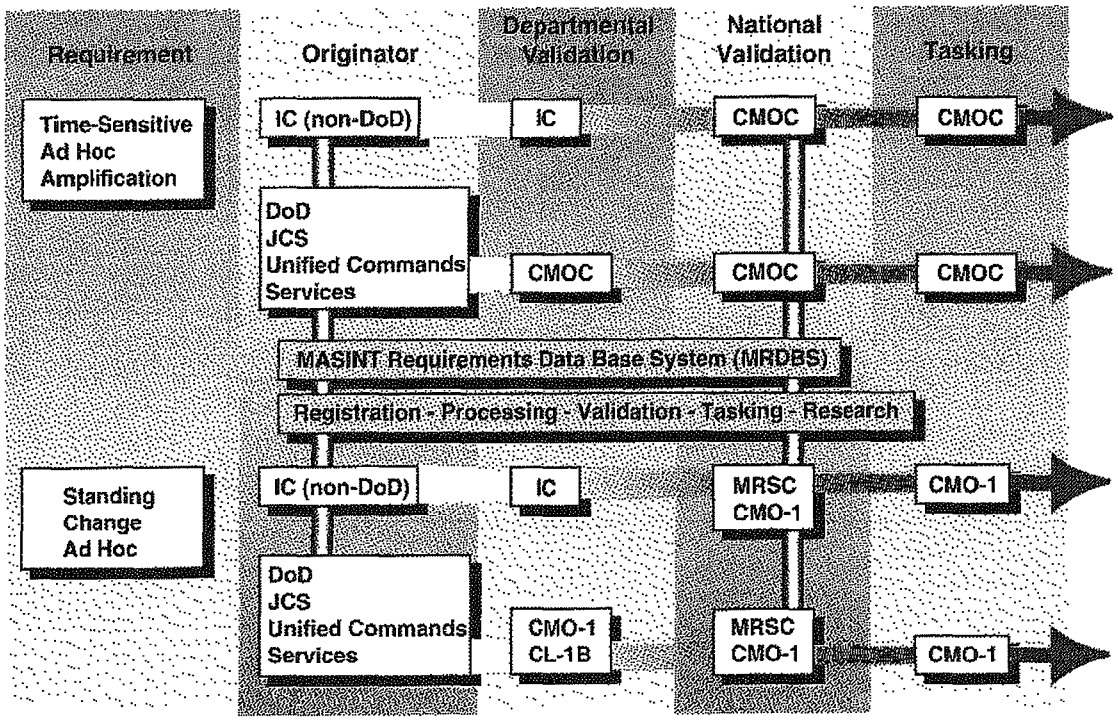


Figure 3-7. Requirements Submission Procedures

(S/NF) The coordination of dedicated and non-dedicated MASINT collection capabilities is the responsibility of the CMO, in particular CMO-1, CMOC (CMO-3), DIA/CL-1B (for DoD and Unified Command Submissions) and the MASINT Requirements Subcommittee. Their responsibilities include receiving, reviewing, validating, and prioritizing user requirements and tasking them to the National, JCS, Service or Unified Command entity with operational

(b)(1),1.4 (c),1.4 (e),1.4 (g)

Processing/Exploitation/Fusion

(U) MASINT tends to be a processing intensive collection discipline. It requires the translation of observables into recognizable target features (e.g. location, type of target). The evolution of computer, communications, data fusion, and display processing technologies makes near-real-time MASINT support to a warfighter feasible. The collection requirements management process will be in place to support a robust, effective application of MASINT to the warfighting functions of the present and future. MASINT collection, processing, exploitation, reporting, and dissemination infrastructure will also evolve to ride along on the information highway being developed for the warfighters.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

identification of nominality) to a quick-look screening of the raw data for feedback in near-realtime for operational reporting, for limited identification new or unusual activities and for sensor maintenance.

(U) Dissemination

~~(S)~~ Reporting by MASINT sensors has evolved based on Service, Unified Command, and organization operational directives for command and control, and for intelligence collection management; in addition, aggressive users working with the collection operations community and specific user groups have created tailored infrastructures to ensure the receipt of their information. MASINT reporting must be incorporated into the existing infrastructure and accommodate a diversity of data sources, applications, and user interests. (b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) U.S. Space Command could be a model for Joint Intelligence Centers or Fusion Centers for tactical exploitation of MASINT combat information (i.e., raw, unevaluated MASINT data) or MASINT contribution to tactical intelligence products. The Service S&T Centers still provide a critical role in the overall processing, analysis, and exploitation of MASINT data. They develop the initial processing techniques or algorithms, validate their performance and accuracy, create signature profiles, and facilitate translation into reliable field sensors which the warfighters can use organically to satisfy their information needs.

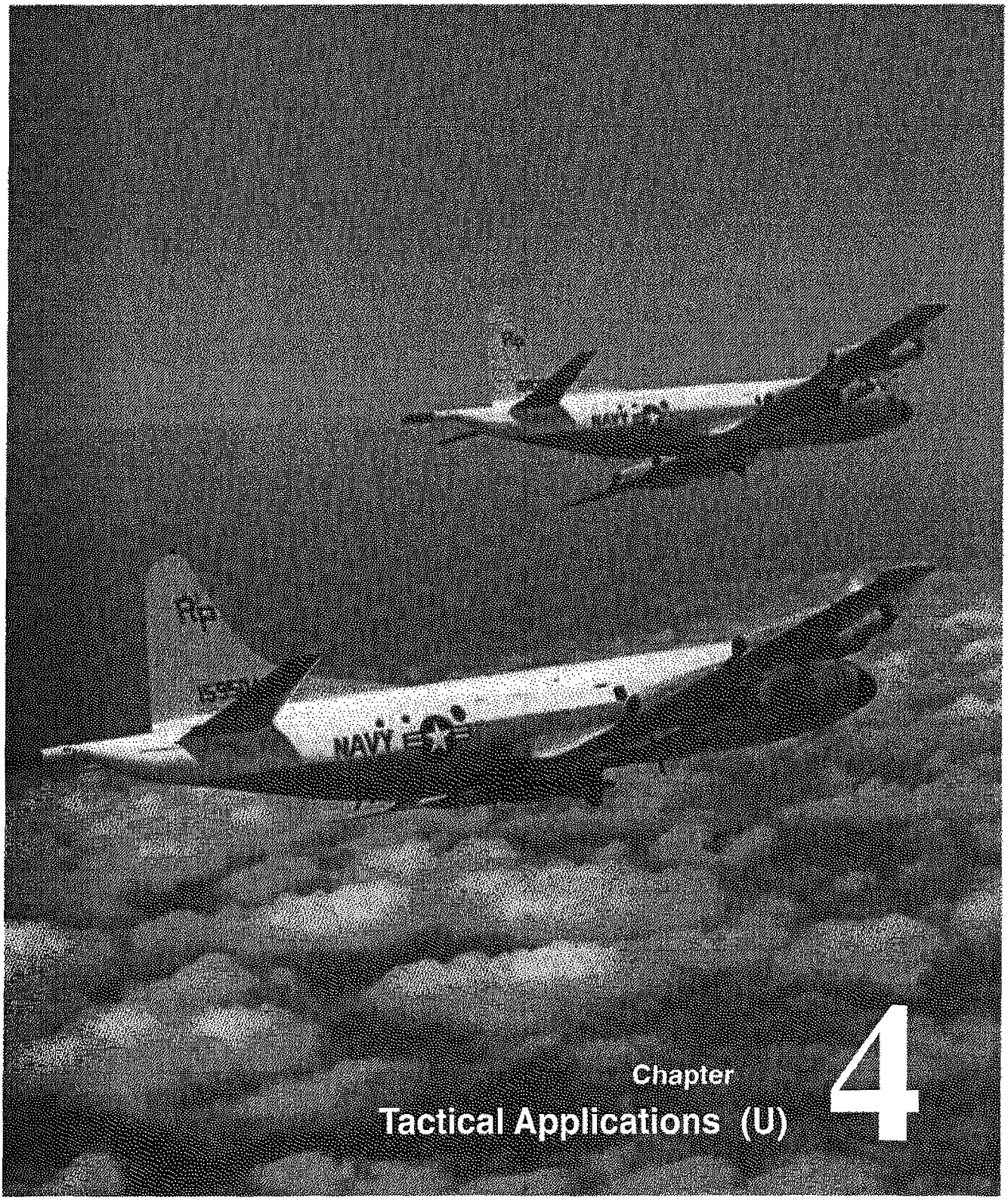
(U) Collection ground sites play varying roles in MASINT data processing. The range is from a full-up or preliminary data processing capability (i.e., provides data for TACREP reporting or in standard engineering terms ready for data exploitation/analysis and

(U) Product dissemination by the primary MASINT processors support a variety of users based on specific agreements. To the extent possible, processed MASINT data is standardized for further data analysis processing, correlation, and fusion. These users have been primarily technical data analysts or all-source system analysts who develop performance or threat assessments for a weapon system. Their products are typically handbooks, studies, reports, and briefings which the warfighter uses in mission planning. Electronic media products are becoming more available; in particular, products such as models and signature data used by the weapons acquisition community to develop new systems or countermeasures are available in computer compatible formats. Likewise, the warfighter can be integrated into product distribution based on his specific needs.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) The connectivity of collection, processing, and exploitation through communication must be developed to disseminate MASINT products to meet the warfighter's timelines. MASINT collection management is being improved through enhanced electronic connectivity to support timely submission of information needs. Currently electronic messages, E-Mail, telephone, and fax make it possible to submit time-sensitive, ad hoc, and amplification requirements to meet time critical conditions. Submission of standing requirements and changes by electronic message, E-Mail, and hardcopy by courier are timely enough in most circumstances. A CMO local area network with a MASINT requirements processing capability is being implemented in 1994 and 1995. By 1996, connectivity through the Department of Defense Intelligence Information System (DODIIS) wide-area network is planned. Users, collectors, processors, and exploiters will, as the DODIIS wide area network with multi-level security progresses, have the capability to enhance their connectivity, to reduce the timelines for products, and to increase dissemination of MASINT data.

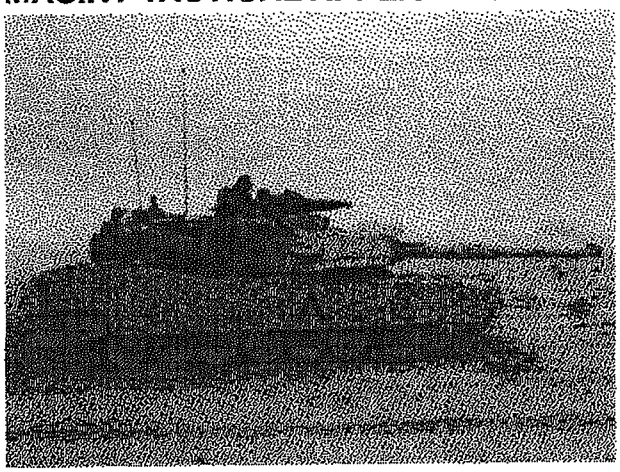
This Page Intentionally Left Blank



Chapter 4
Tactical Applications (U)

CHAPTER 4

MASINT TACTICAL APPLICATIONS



(U) Warfighter Information

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

A commander can enhance his offensive and defensive options with MASINT, because it is nearly impossible to employ countermeasures to deny all MASINT collections against threat targets. MASINT's technical collection capabilities are used in a strategic sense to develop target signatures or profiles to detect threats. In the tactical environment, these target signatures are used for mission planning; precision guided missile target recognition; hostile target detection, warning, and interception (e.g., theater missile defense); and battle damage assessment.

(U) Obtaining timely, accurate information about the enemy and preventing him from gaining an advantage on the friendly forces is the essence of military intelligence. As defined in JCS Pub-1 there are several types of intelligence or information that exist, each with its own characteristics. MASINT, like the other intelligence disciplines, contributes to combat information, tactical intelligence, and strategic intelligence.

(U) Definitions of Combat Information, Tactical Intelligence, and Strategic Intelligence

(U) Combat Information: Unevaluated data, gathered by or provided directly to the tactical commander which, because of its highly perishable nature or the criticality of the situation, cannot be processed into tactical intelligence in time to satisfy the user's tactical intelligence requirements.

(U) Tactical Intelligence: Intelligence required for the planning and conduct of tactical operations. Tactical and strategic intelligence differ primarily in level of application, but may also vary in terms of scope and detail.

(U) Strategic Intelligence: Intelligence required for the formation of policy and military plans at national and international levels. Strategic and tactical intelligence differ primarily in level of application, but may also vary in terms of scope and detail.

JCS Pub-1

(U) In reality, these definitions are arbitrary distinctions for information continuum. A warfighter under fire or preparing for a mission does not distinguish between a tactical or strategic attack. To him, the time and related distance to a target or threat establishes an immediate versus a longer term intelligence need. MASINT supports the entire continuum of information needs. MASINT information, technique development, and target signatures are derived across the information spectrum in response to user stated needs.

(U) Because of the changing nature of conflict and advanced technology data handling capabilities, the distinction between strategic and tactical intelligence has blurred. **MASINT contributions to threat assessments, orders of battle, IPB, and targeting materials are likely to be both strategic and tactical intelligence missions on today's complex battlefield.** The primary difference may be only the timeliness factor--the update of tactical MASINT information from continuous tracking to several times a day, compared to update of strategic MASINT information only a few times a day or weekly; for example, target signature changes or denial and deception are capable of negating the advantage of smart weapons if not identified in time for reprogramming. In this scenario, near-real-time MASINT target signature collection and dissemination can be critical.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) MASINT APPLICATIONS TO MILITARY PROBLEMS

(U) Tactical Applications

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g) The future for MASINT support to the warfighter is ever expanding as the complexity of weapon systems increase and technology provides the capability to deny traditional intelligence capabilities.

(U) Land Warfare

(b)(3):10 USC 424

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Intelligence Preparation of the Battlefield

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(3):10 USC-424

(U) Currently the only capability to address IPB requirements for terrain features/conditions, obstacle detection, or vegetative stress indications through MASINT multispectral techniques is Landsat; however, enhanced spectral data processing and analysis capabilities and applications should be understood, developed, and implemented based on the tactical operators needs.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

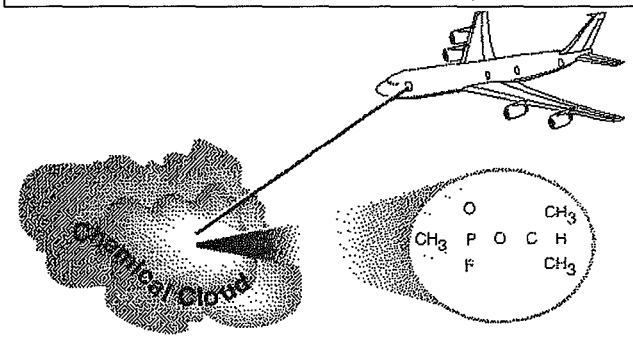


Fig 4-3. Chemical Monitoring Using a Laser

(U) Chemical/Biological Warfare

(b)(3):10 USC 424

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(3):10 USC 424

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(3):10 USC 424

(U) Battle Damage Assessment (BDA)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Air Warfare

(b)(3):10 USC 424

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Non-Cooperative Target Recognition (NCTR)

(U) Representative NCTR Requirement (Specified by Unified Command)

- Positive identification of target

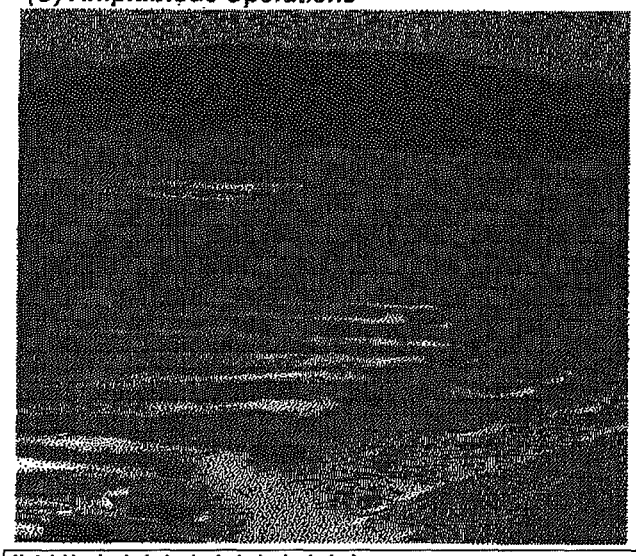
DoD OPMASINT Requirements Survey

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Naval Warfare

(b)(3):10 USC 424

(U) Amphibious Operations



(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Beyond-the-Horizon Surveillance

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Unconventional Warfare

(U) Representative Unconventional Warfare Requirements (Specified by Unified Commands)

- Detect enemy activity and movements

DoD OPMASINT Requirements Survey

(U) Unconventional Warfare is identified as Low Intensity Conflict (LIC) and Special Operations. Low Intensity conflicts are often localized, generally in the Third World, but contain regional and global security implications. Special Operations are conducted by specially trained, equipped, and organized forces against strategic or tactical targets in pursuit of

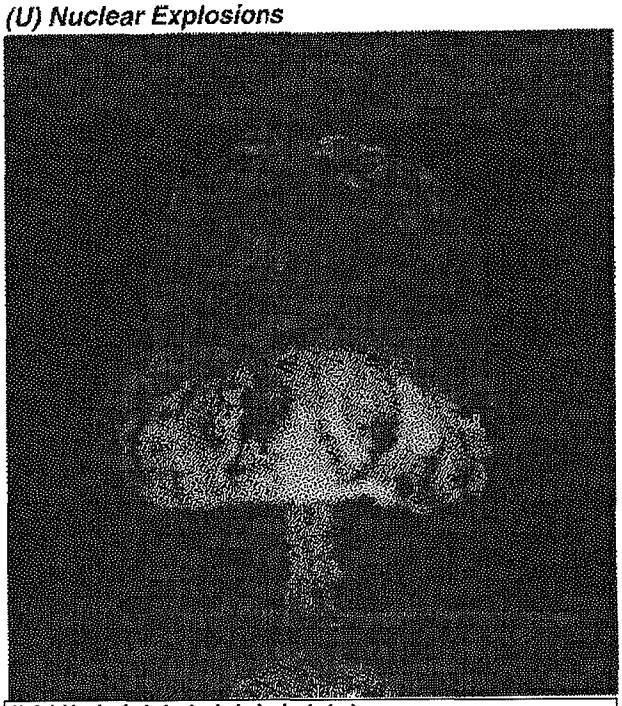
PAGES 4-11 AND 4-12 ARE DENIED IN FULL

national military, political, economic, or psychological objectives.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Nuclear Explosions



(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Strategic Applications

(U) Tactical Warning/Attack Assessment

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Target identification, classification, and characterization are significantly improved when sensors detecting different phenomena collect data on the same target; an example is an IR sensor detecting thermal emissions and an optical sensor collecting data that provides the composition of materials. Such combinations produce significantly more reliable target characterization; additionally, scenario generation typically requires data fusion from several sensors since a single sensor can not provide all the data required.

(U) Target Signature Profiles/Templates

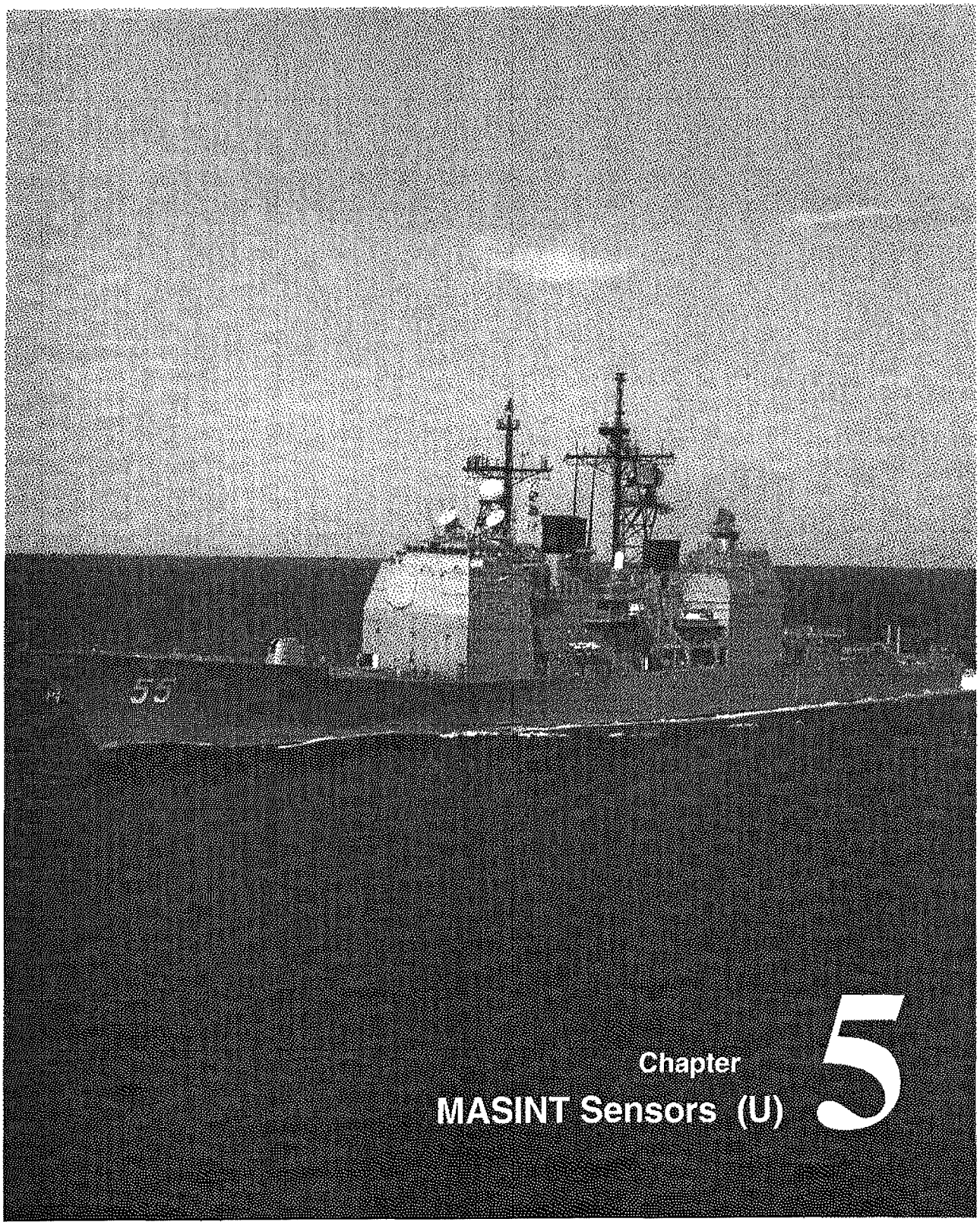
(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Tactical Sensor Support

(U) Tactical sensor development is driven by both the target signature parameters and needs specified by the military operator. As data collected against threat weapons systems is exploited and critical analysis performed, the criteria for design of tactical collection systems in support of specific military missions is ascertained. The support of the military operator in the field to identify current and future needs is the linchpin to future tactical sensor development.

(U) **Whether support to the warfighter is provided by national systems via tactical information networks or by theater systems operated by the warfighter, MASINT has contributions to be made.** The timeliness requirements for both information needs are nearly the same. Technology is shrinking the globe, turning previous strategic MASINT applications into tactical necessities to meet the warfighter's needs.

This Page Intentionally Left Blank



Chapter 5
MASINT Sensors (U)

CHAPTER 5

MASINT SENSORS

(U) INTRODUCTION

(U) This chapter provides a brief summary of the major MASINT collection systems. A listing of key MASINT applications for military operators is provided for familiarization. Chapter 3 of this handbook provided a guide to request infrared, radar, or other MASINT sensors to address military operational support needs. This chapter assists in understanding which MASINT capability is applicable to support a particular need.

(U) MASINT SYSTEMS

(U) COBRA BALL (RC-135S)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

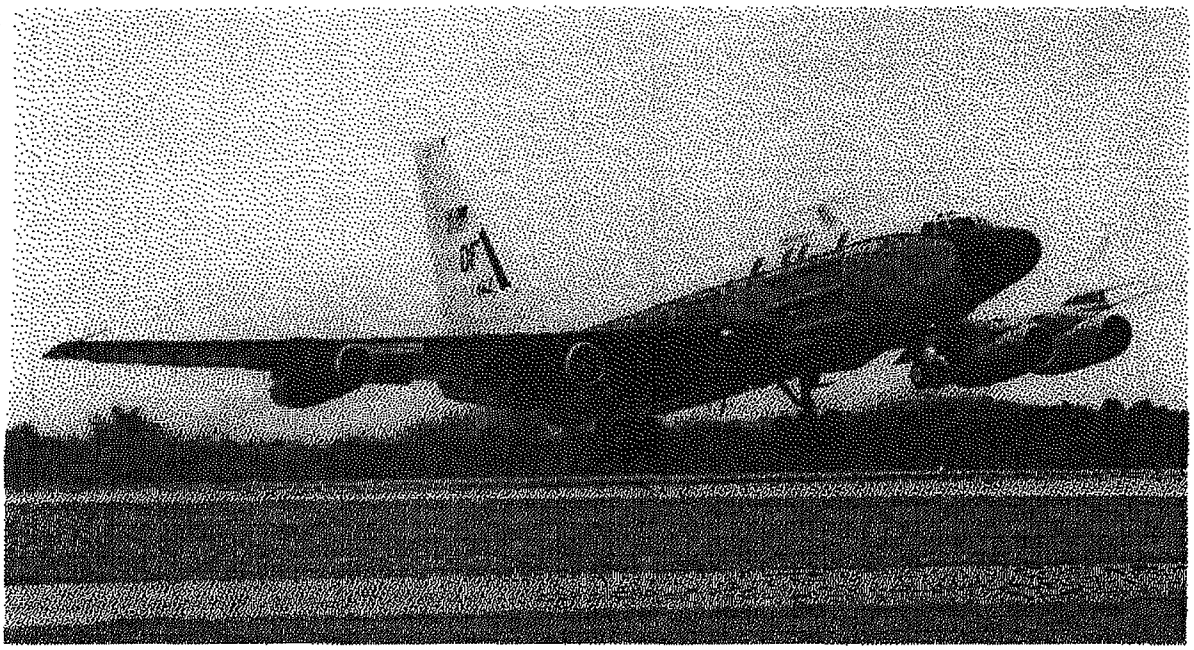


Figure 5-2. COBRA BALL Aircraft

Figure 5-3. COBRA BALL Real TIme Optical System Sensor

(U) Defense Support Program (DSP)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

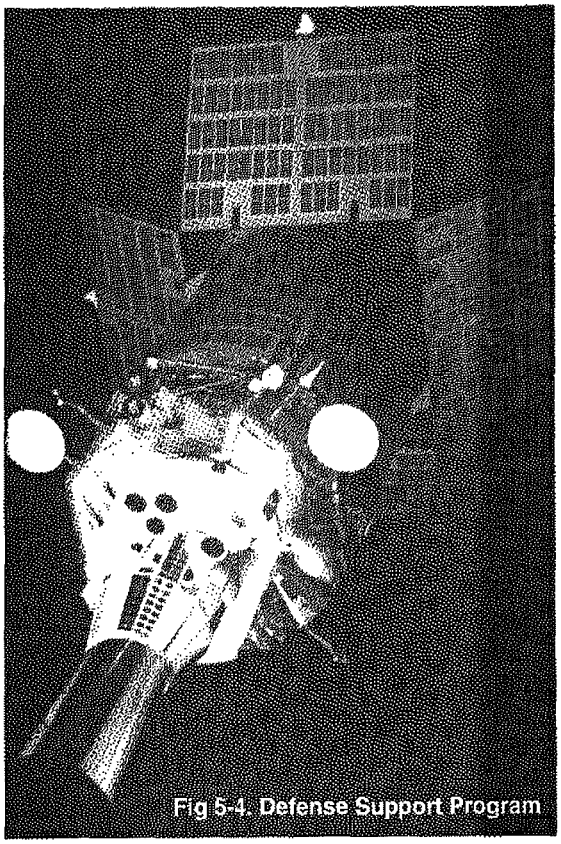


Fig 5-4. Defense Support Program

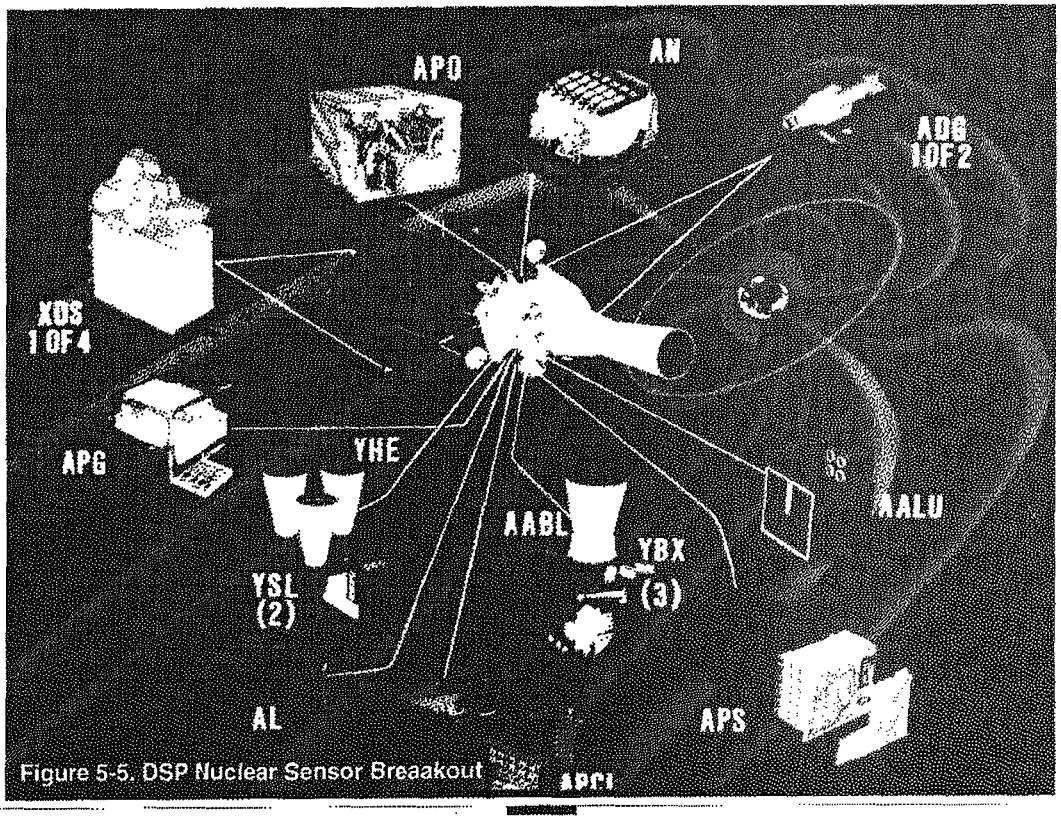


Figure 5-5. DSP Nuclear Sensor Breaakout

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) The primary mission of the TECRAS class of MASINT sensors is to collect target signatures to support development and targeting of "smart" weapons. Collection capabilities consist mostly of man portable sensors that provide thermal signatures of combat vehicles, aircraft, and equipment; spectral signatures of tactical aircraft; IR signatures of ground combat vehicles and aircraft; and materials signatures of CW effluents at production and storage sites. The sensors are operated by USA INSCOM personnel with data processing and exploitation accomplished predominately by Army NGIC.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) United States Atomic Energy Detection System (US AEDS)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Hydroacoustic

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Seismic

(U) The seismic system is used for teleseismic detection and analysis of foreign nuclear detonations. Ten seismic field arrays strategically located worldwide continually collect data and transmit it to AFTAC for analysis. Specific tasking of this system is for the detection of foreign nuclear detonations. Also underway is research and training into regional detection and analysis of seismic activity focusing on the ability to detect local activities such as vehicular movements. This capability is limited to within several hundred meters of the actual instruments because of natural attenuation of seismic waves and the tuning of the instruments.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Satellites

(U) Nuclear Detonation (NUDET) Detection System

(U) The satellite portion of the USAEDS network comprises sensors onboard the DSP satellites and the GPS/NDS satellites to provide coverage for surface, atmospheric, and space nuclear detonations. These assets or their variants will largely satisfy the proliferation mission for atmospheric explosions in the foreseeable future. DSP and GPS/NDS provide complementary coverage from the surface to the upper atmosphere. Beyond this range only DSP's unique instruments can provide detection of deep-space events. The GPS/NDS system consists of 21 operational satellites with 3 operational spares; at least 4 operational satellites will be above the horizon from any point on earth at all times for continuous worldwide coverage.

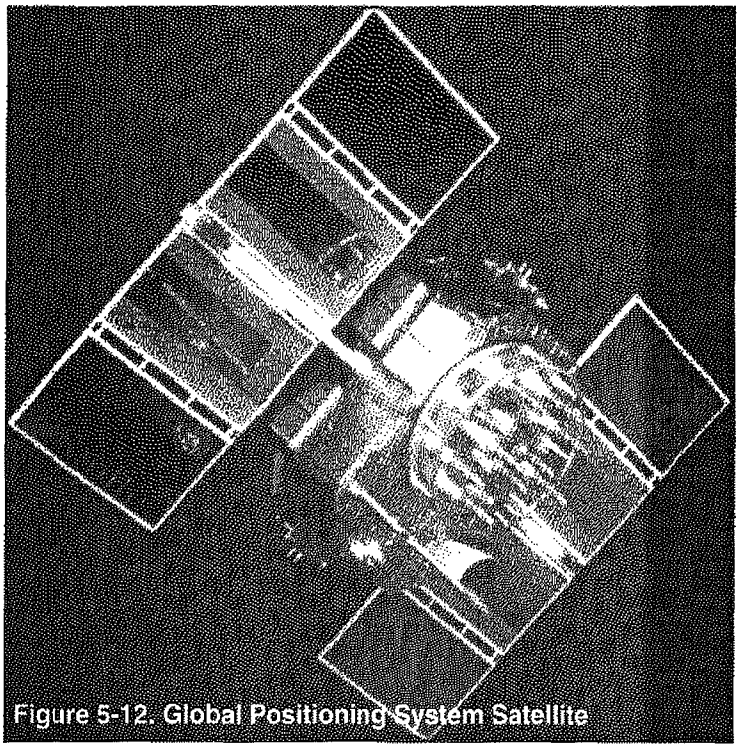


Figure 5-12. Global Positioning System Satellite

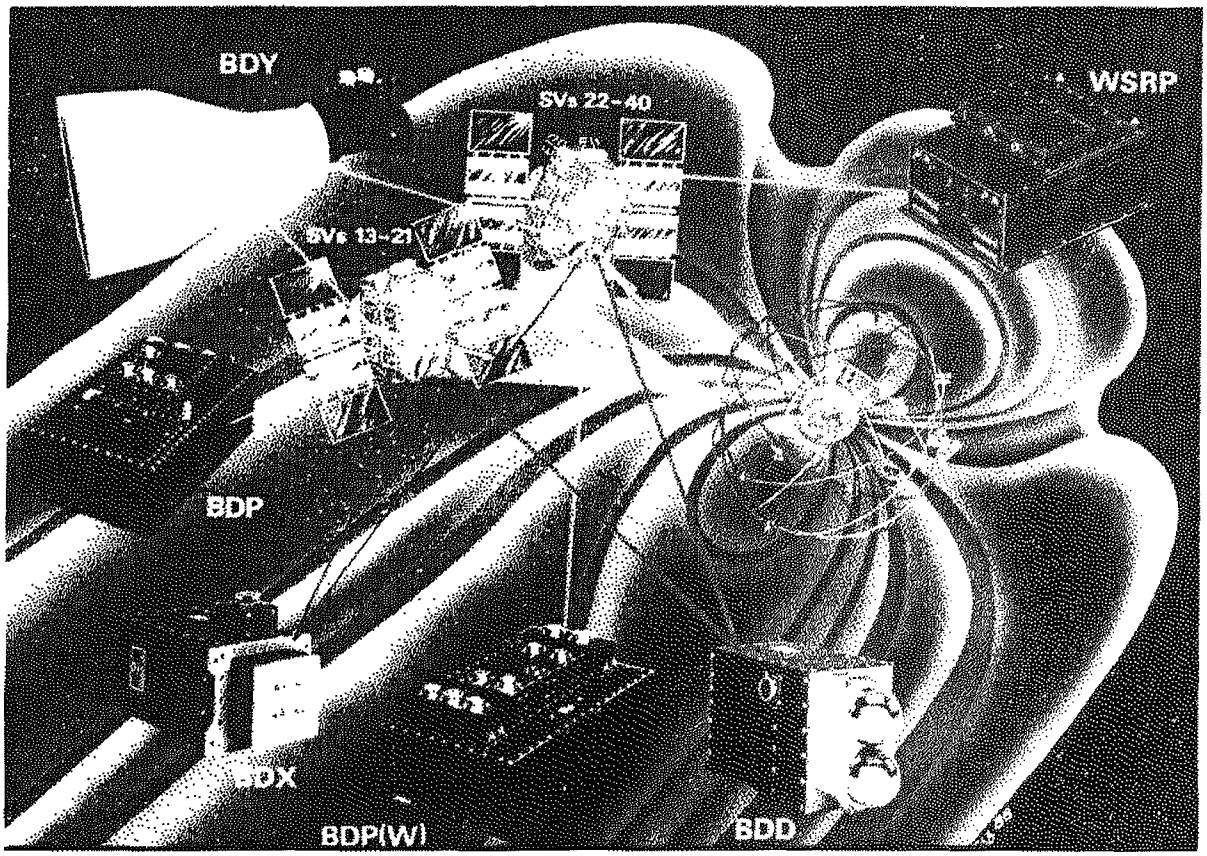


Figure 5-13. GPS NDS Sensor Breakout

(U) Air Samplers

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Ground Filter Unit (GFU)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

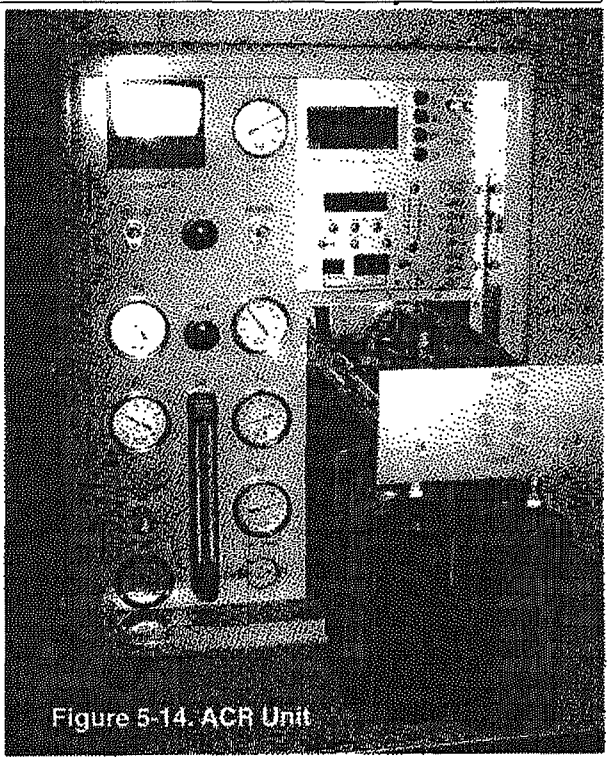


Figure 5-14. ACR Unit

(U) Automatic Cryogenic Rectifier (ACR)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) WC-135 Air Sampler

(b)(1),1.4 (c),1.4 (e),1.4 (g)

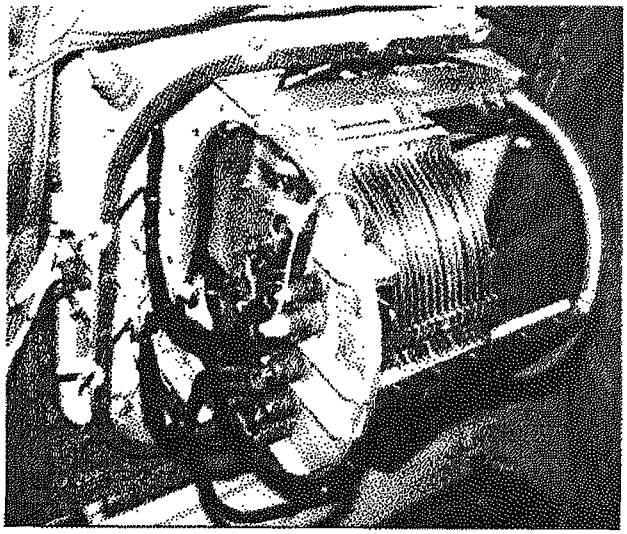


Figure 5-16. WC-135 Airborne Sampler

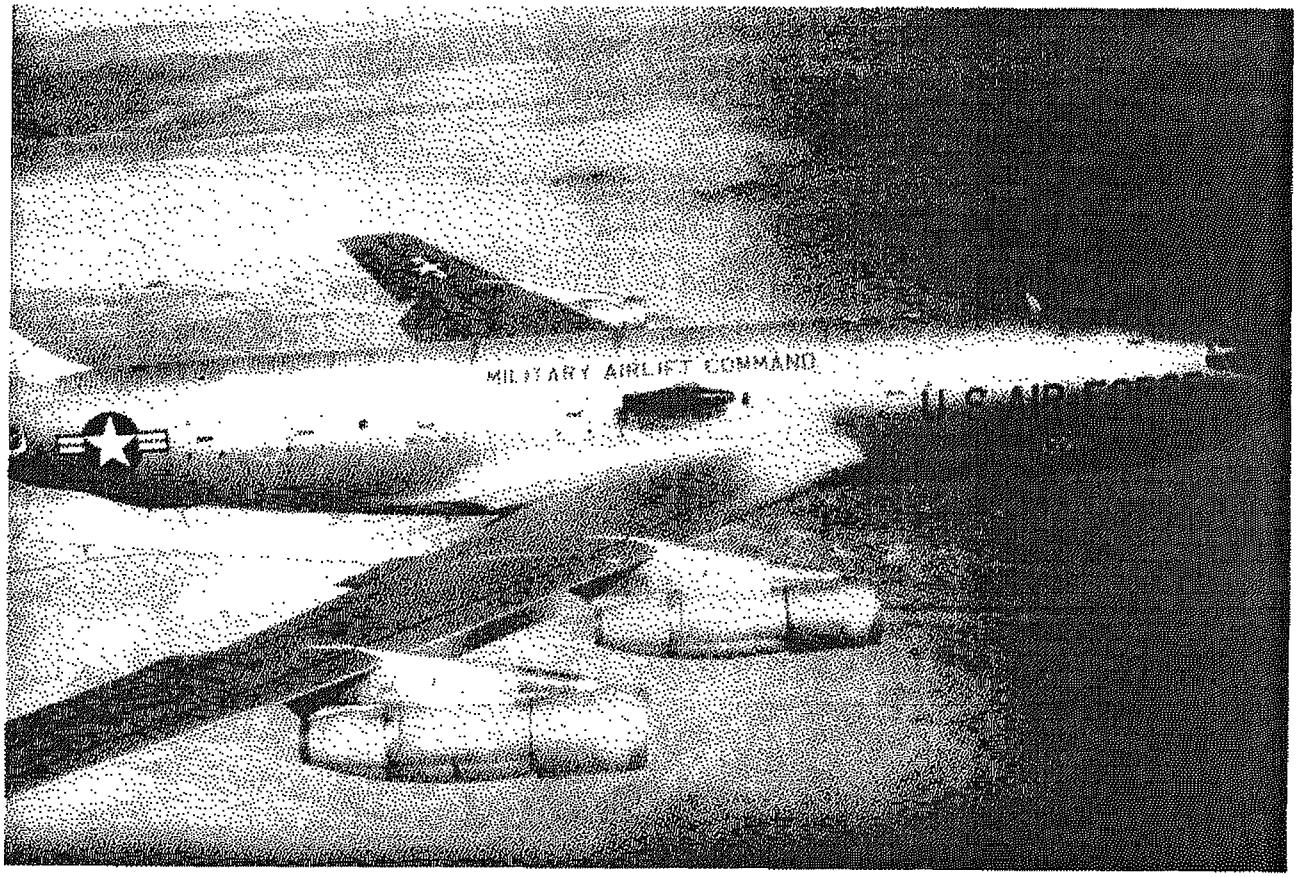


Figure 5-17. WC-135 Aircraft with Air Sampler Pod

ALCOR/Haystack

(b)(1),1.4 (c),1.4 (e),1.4 (g)

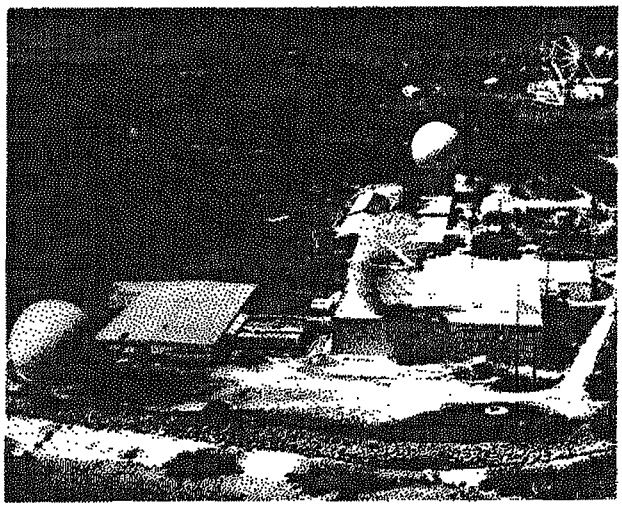


Figure 5-18. ALCOR at Kwajelien

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

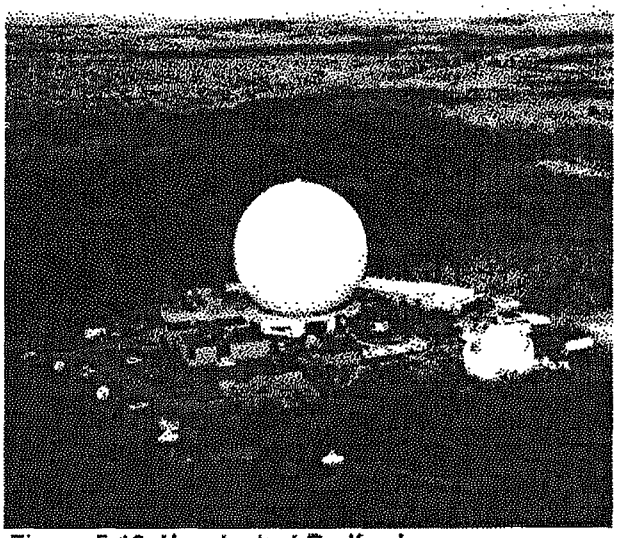


Figure 5-19. Haystack at Bedford

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Airborne Synthetic Aperture Radar System (ASARS)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

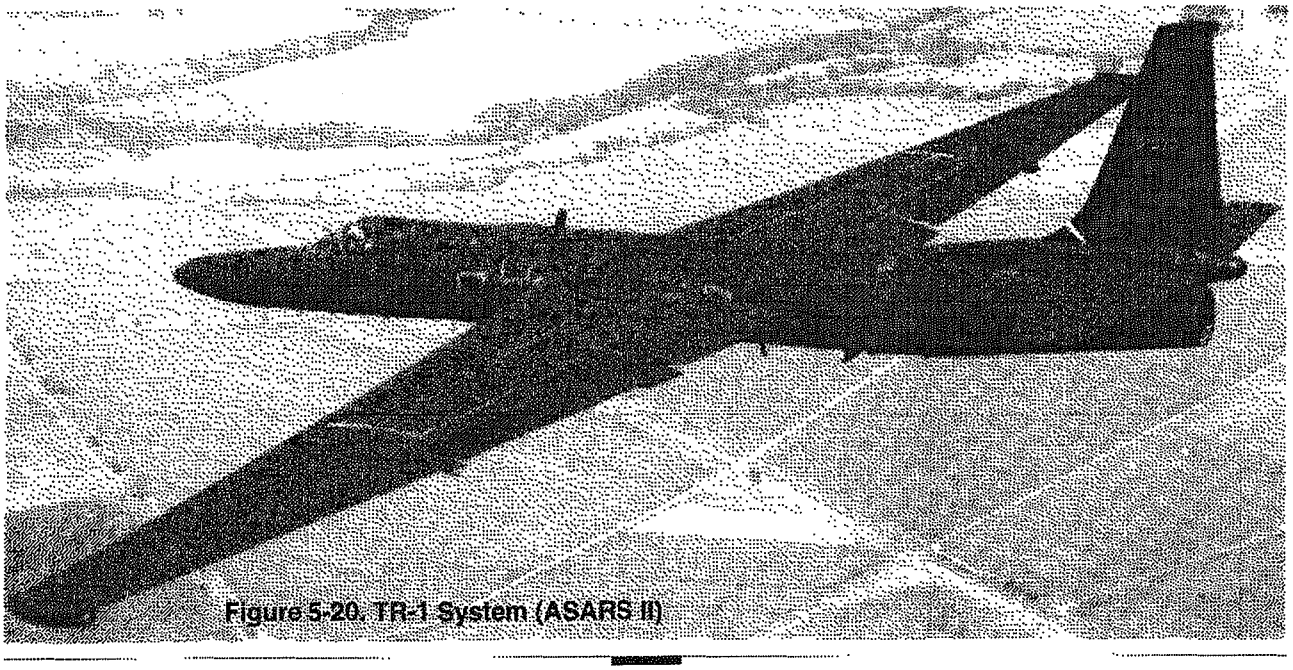


Figure 5-20. TR-1 System (ASARS II)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) COBRA DANE

(b)(1),1.4 (c),1.4 (e),1.4 (g)

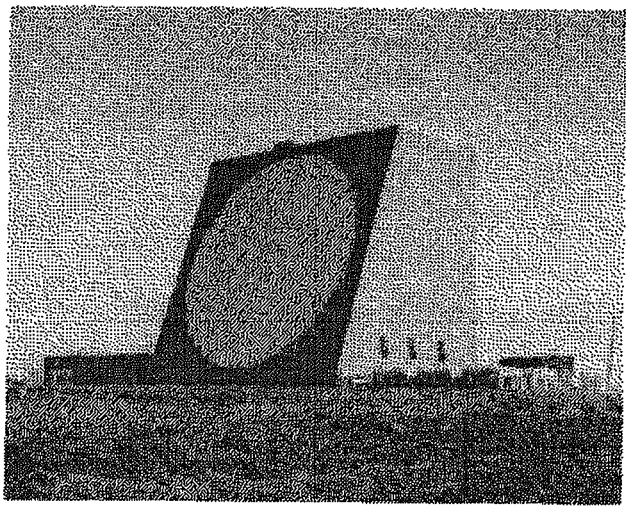


Figure 5-21. COBRA DANE (AN/FPS-108) Radar

(U) COBRA JUDY

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) COBRA SHOE

(b)(1),1.4 (c),1.4 (e),1.4 (g)

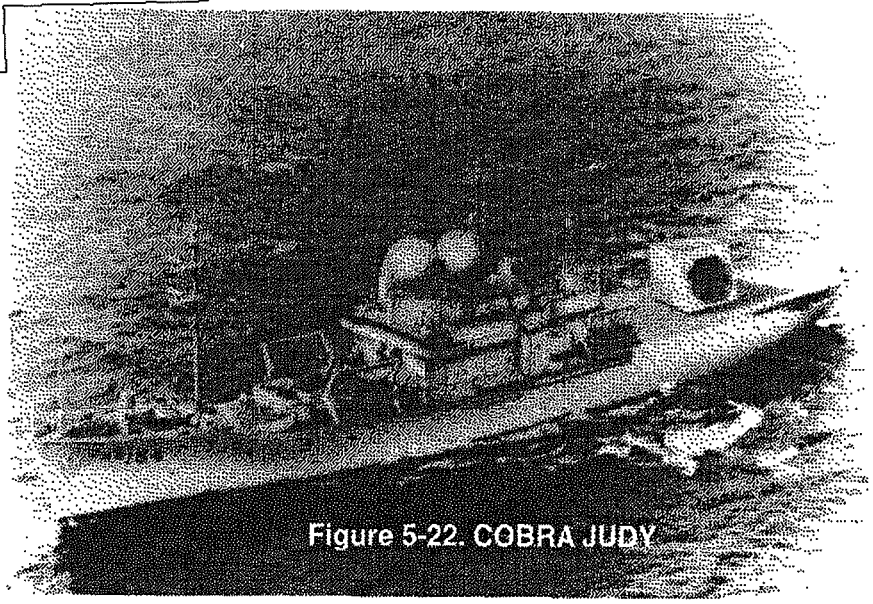


Figure 5-22. COBRA JUDY

(U) JSTARS

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

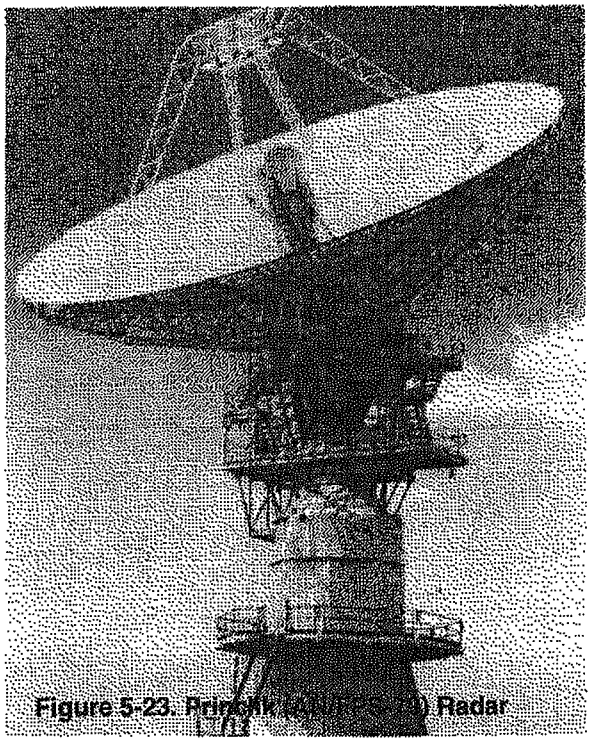
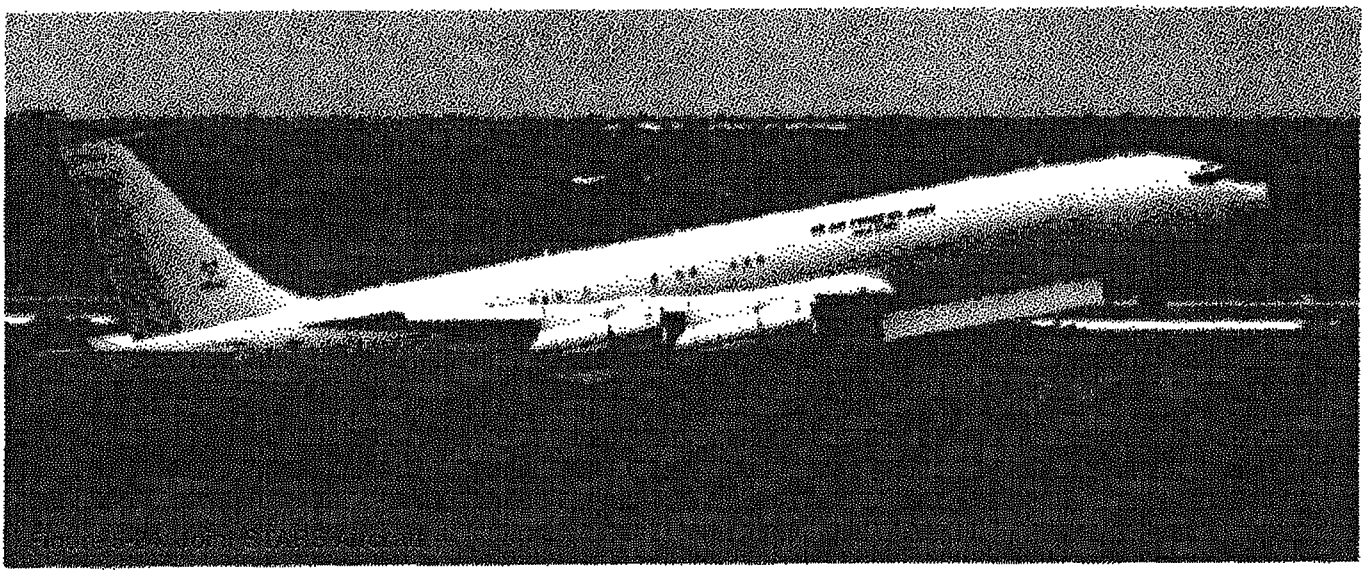
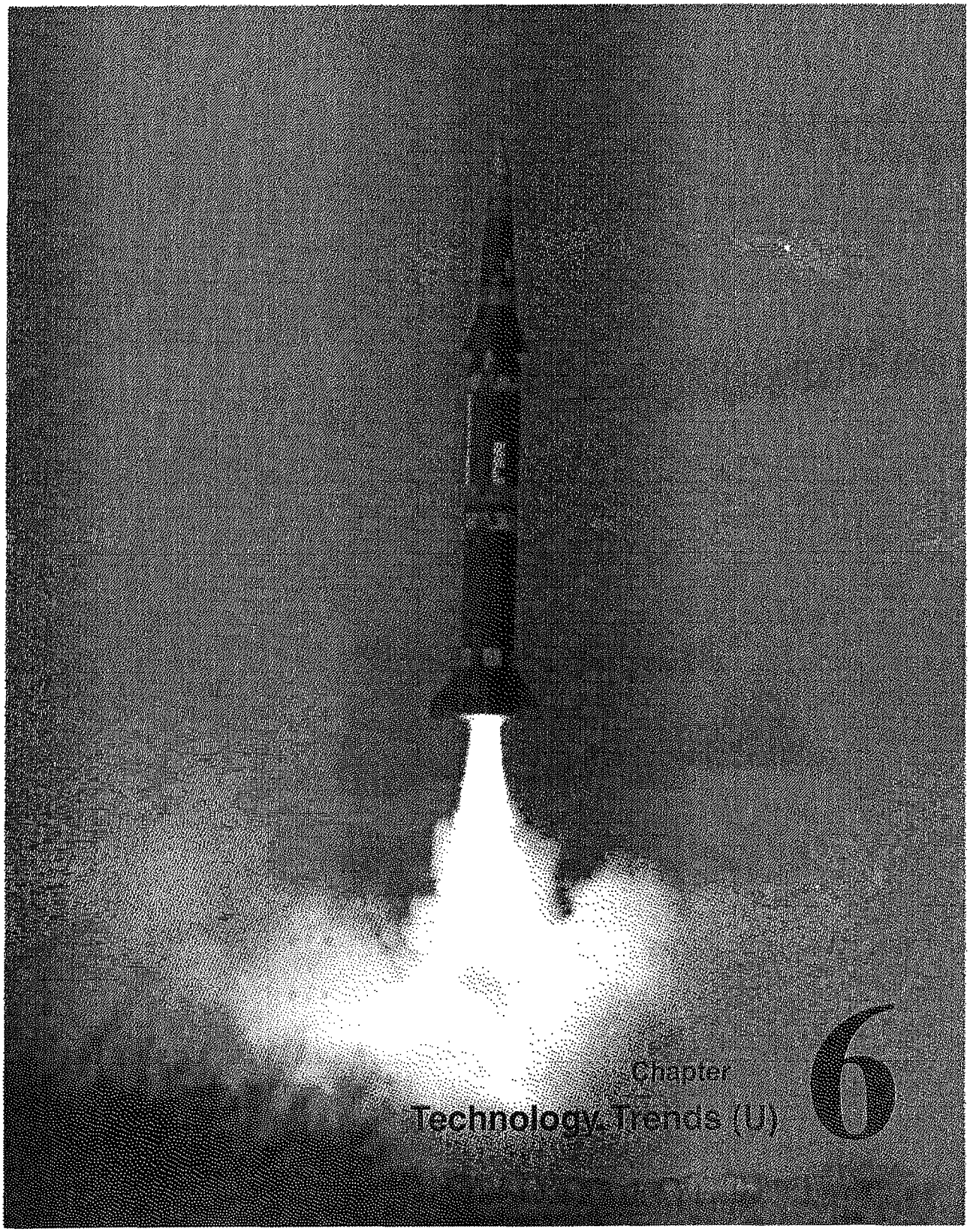


Figure 5-23. Princlik (U//FOUO) Radar

(U) Princlik Radar

(b)(1),1.4 (c),1.4 (e),1.4 (g)





Chapter 6

Technology Trends (U)

CHAPTER 6

TECHNOLOGY TRENDS

(U) MASINT AND THE FUTURE

(U) The thrust for the development of new MASINT technologies is accelerated support to military operators. Technologies applicable to MASINT collection, processing, near-real-time fused data exploitation, and dissemination are considered. The goal is to provide new or improved, user-friendly, actionable intelligence information in near-realtime.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Technology trends and their impact on MASINT operational intelligence are discussed in the context of representative land, air, naval, and unconventional warfare missions.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) LAND WARFARE

(U) Transporter/Erector Launchers

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Theater Ballistic Missile Defense

(b)(1),1.4 (c),1.4 (e),1.4 (g)

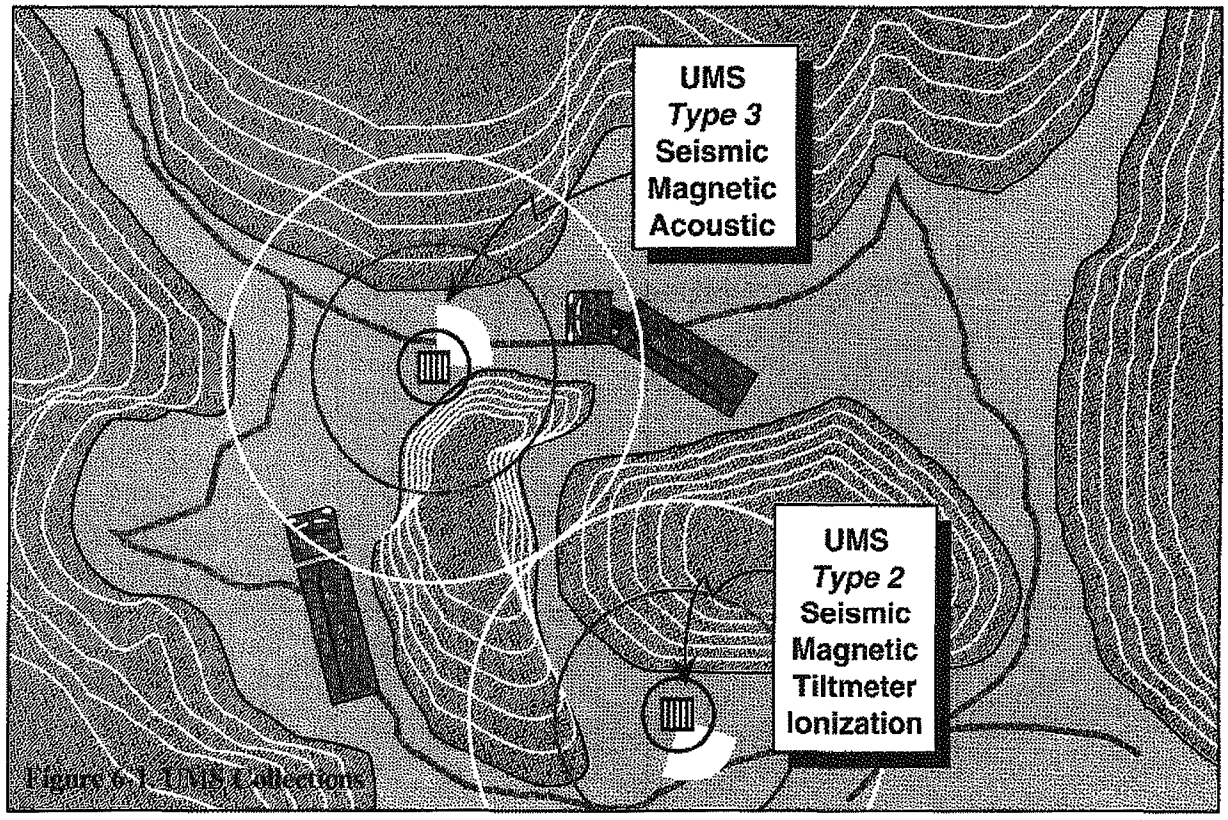


Figure 6-1 UMS Collections

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Chemical/Biological Warfare

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Battle Damage Assessment (BDA)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Underground Targets

(b)(1),1.4 (c),1.4 (e),1.4 (g)

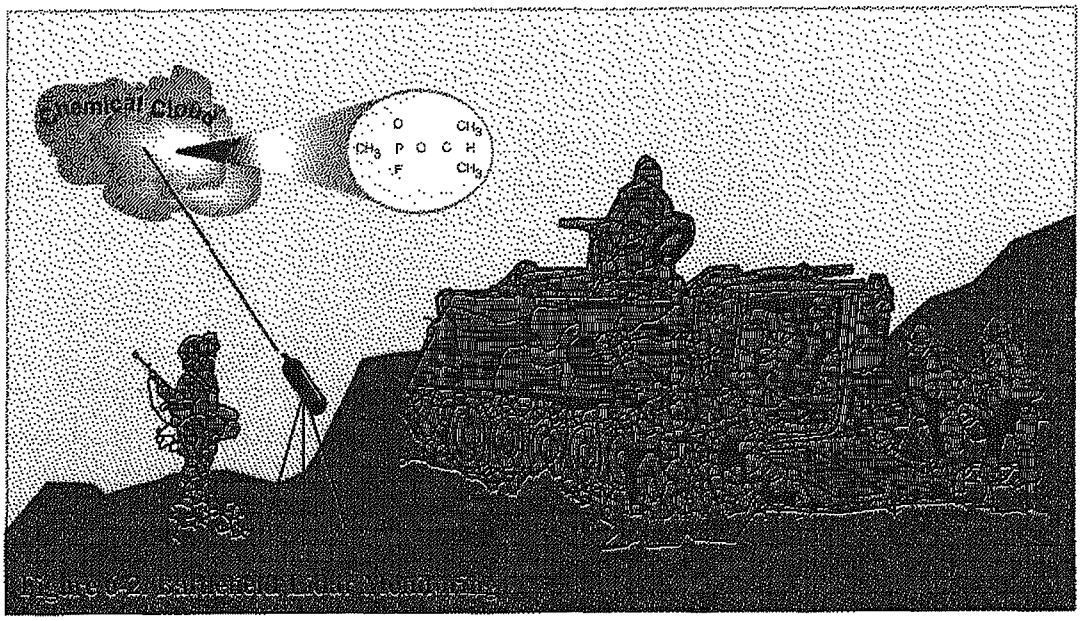


Figure 6-2. Satellite Laser Ground Strike

(U) Intelligence Preparation of the Battlefield (IPB)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Directed Energy Weapons

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) AIR DEFENSE

(U) Aircraft Movements

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) NAVAL WARFARE

(U) Beyond-the-horizon (BTH) Surveillance

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Amphibious Operations

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) UNCONVENTIONAL WARFARE

(U) Low Intensity Conflict Activity Indications

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) INFRASTRUCTURE

(U) Processing/Exploitation/Analysis

(b)(1),1.4 (c),1.4 (e),1.4 (g)

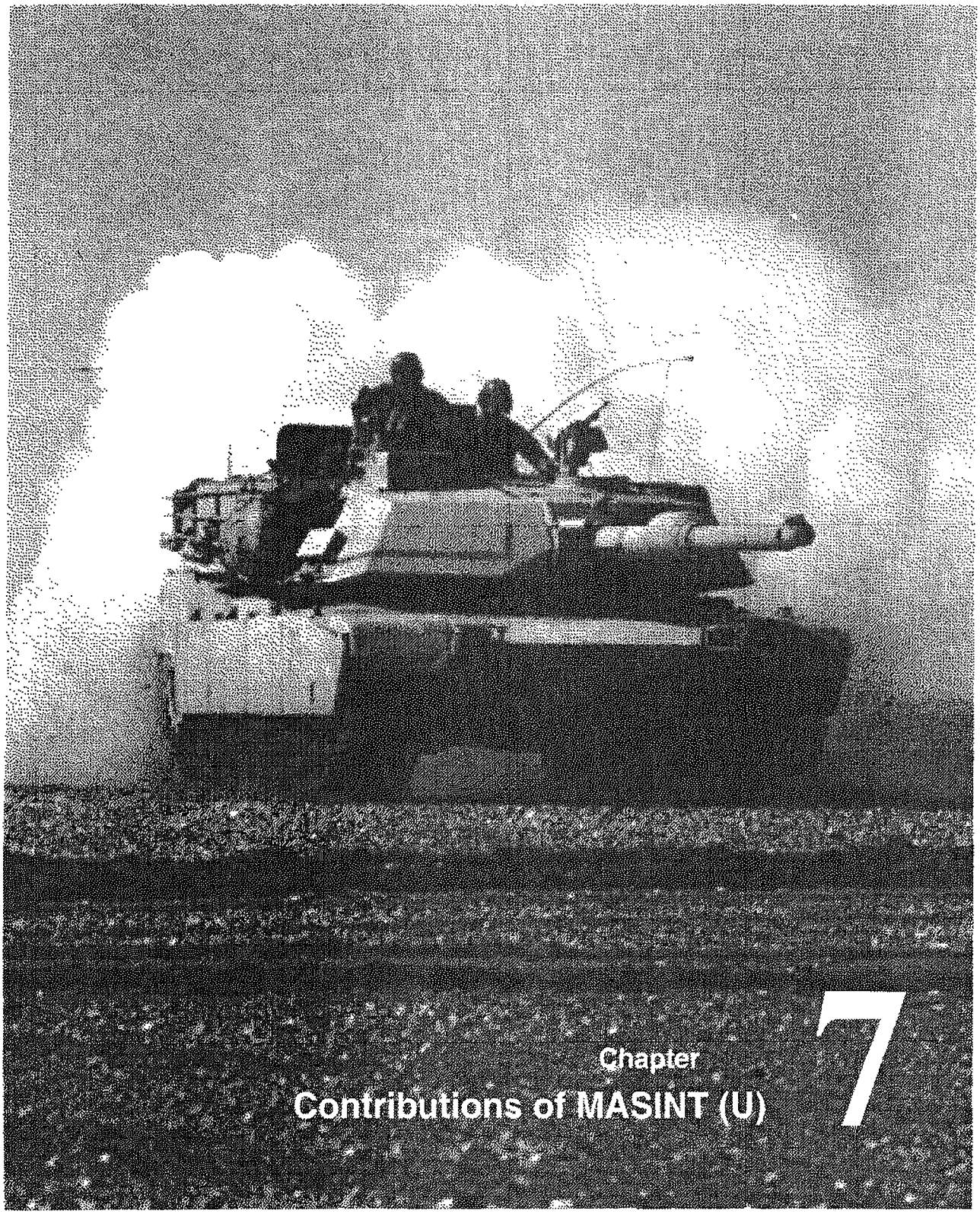
(U) Simulation and Modeling

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Communications

(b)(1),1.4 (c),1.4 (e),1.4 (g)



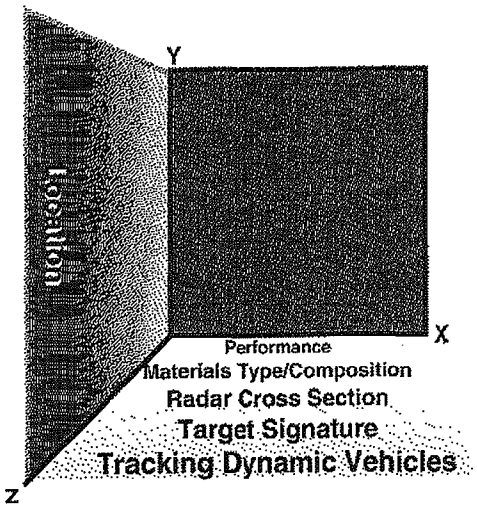
Chapter 7

Contributions of MASINT (U)

PAGE 7-3 IS DENIED IN FULL

CHAPTER 7

CONTRIBUTIONS OF MASINT



(U) THE THIRD DIMENSION

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

This Page Intentionally Left Blank

Chapter 8
Appendices (U)

APPENDIX A (U)

(U) MASINT APPLICATIONS FOR MILITARY SUPPORT

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

APPENDIX B (U)

MASINT SUPPORT DIRECTORY

(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

MASINT Committee Staff and Members

(b)(3):10 USC 424

(b)(3):10 USC 424

Chairman, Subcommittees and Working Groups

(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

Spectroradiometric Working Group (SPRAWG)
Chairperson TBD

Geophysical Working Group
Chairperson TBD

(b)(3):10 USC 424

Nonproliferation Working Group
Chairperson TBD

MASINT Collection Managers

(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424

ABBREVIATIONS

COMM - Commercial (unsecure) Telephone
DISTS - Defense Intelligence Secure Telephone System (gray phone)
DSN - Defense Suitland Network (formerly AUTOVON)
FAX - Facsimile
STU III - Secure Telephone Unit III

APPENDIX C (U)

(U) MASINT: A BRIEF HISTORY

(U) The term MASINT was coined in the mid 1970s. Previously, all radar intelligence data was referred to as RADINT (radar intelligence) and data collected by COBRA BALL was called OPTINT (optical intelligence). DIA placed these data types and others under an umbrella called MASINT to facilitate collection and programmatic management for these one or two of a kind sensor systems which responded to unique requirements that were not part of the other traditional collection disciplines. There was also NUCINT (nuclear intelligence), ACOUSTINT (acoustic intelligence) and IRINT (infrared intelligence).

(U) Prior to the formalization of the MASINT Committee, each Service and the CIA had their own MASINT- related efforts including development of collection systems. DIA formed a MASINT Division to provide centralized guidance for DoD MASINT collection requirements and systems, and to coordinate with other Intelligence Community organizations. The Director of Central Intelligence (DCI) formed a MASINT Subcommittee under the SIGINT Committee in 1983 as an initial step toward recognition as a national collection discipline. In 1986, the DCI created the MASINT Committee and tasked it to provide policy and guidance for development of MASINT collection capabilities and to validate collection requirements. The most recent reorganization of the Intelligence Community in 1992 resulted in the formation of the Central MASINT Office (CMO) under DIA. The CMO, a joint Department of Defense and Intelligence Community organization, has oversight of all MASINT activities including administrative support for the MASINT Committee.

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(b)(1),1.4 (c),1.4 (e),1.4 (g)

(U) Radar, infrared, acoustic, seismic, nuclear radiation detection, and materials sampling are the core MASINT collection techniques which have a long history of use whether recognized as MASINT or not.

This Page Intentionally Left Blank

GLOSSARY OF TERMS AND ACRONYMS

A

ABM: Anti-Ballistic Missile

ACINT: Acoustic Intelligence (Emitted or reflected sounds, pressure waves, or vibrations in water or fluids)

Acoustic: Information source for MASINT achieved by exploiting sound (Passive or active collection of acoustic radiation in atmospheric, land, or ocean environments)

ACOUSTINT: Acoustic Intelligence (Emitted or reflected sounds, pressure waves or vibrations in air)

ACR: Automatic Cryogenic Rectifier

Active EO: The use of a laser to illuminate a target to provide ranging, tracking, and signature information

AEDS: Atomic Energy Detection System

AEGIS: Naval radar with capability to provide MASINT data on theater ballistic missiles within their range and field of view

(b)(1),1.4 (c),1.4 (e),1.4 (g)

AH: Ad Hoc Requirement

ALCOR: U.S. Army radar located on Kwajalein (Provides radar imaging of low to medium altitude satellites)

AM: Amplification Requirement

AOA: Amphibious Objective Area

ASAR: Airborne Synthetic Aperture Radar (b)(1),1. bility with potential to provide MASINT phase history data)

ASAT: Antisatellite

ATGM: Antitank Guided Missile

ASW: Anti-submarine Warfare

AWACS: Airborne Warning and Control System (Tactical radar with potential MASINT capability)

Azimuth: Horizontal direction on the earth surface (Key element for target location description relative to a collection sensor)

B

BDA: Battle Damage Assessment (High priority military mission to determine status of a previous target)

Bistatic: System in which the receiver is some distance from the transmitter, with separate antennas for each (For example, a bistatic radar)

BMD: Ballistic Missile Defense

BMDO: Ballistic Missile Defense Organization

BMEWS: Ballistic Missile Early Warning System

Broadband Radiometric Signature: Primarily associated with the infrared intensity versus time profile of a target and used for target template generation for object identification

BTH: Beyond the Horizon

BW: Biological Weapons

C

C^3I: Command, Control, Communications and Intelligence

C^4I: Command, Control, Communication, and Computers and Intelligence

CBJB: Congressional Budget Justification Book

CBW: Chemical and Biological Warfare

CENTCOM: U.S. Central Command

CH: Change Requirement

CINC: Commander-in-Chief

CMT: Critical Mobile Target

CMO: Central MASINT Office

CMOC: Central MASINT Operations Center

CMTCO: Central MASINT Technology Coordination Office

COBRA BALL: RC-135S airborne collector of infrared target signatures of missile reentries and experimental testbed for TBM collection demonstrations

COBRA DANE: Large phased array radar located on Shemya Island, AK for collection on Russian ICBM and space launches

COBRA EYE: Airborne only wave infrared collector (RC-135X) providing target signatures for BMDO

COBRA JUDY: Seabased S and X-land radar collectors, operated by BMDO

COBRA SHOE: Ground-based HF over-the-horizon radar, providing range, range rate, and relative azimuth on target at Russian test ranges and in Iraqi

COMINT: Communications Intelligence

CPB: Charged Particle Beam

CREEK CHART: Ground-based S-and phased array which monitors Russian airborne, missile and space activity in the Barents Sea

CW: Chemical Weapons

D

DCCC: Defense Collection Coordination Center

DCI: Director of Central Intelligence

DCID: Director of Central Intelligence Directive

DEFSMAC: Defense Special Missile and Astronautics Center

(b)(3):10 USC 424

DEW: Directed Energy Weapon

DIA: Defense Intelligence Agency

DODIIS: Department of Defense Intelligence Information System

DSP: Defense Support Program

E

Electromagnetic Spectrum: The total range of wave lengths or frequencies of electromagnetic radiation extending from the longest radio waves to the shortest cosmic rays

Electro-Optical: Passive electro-optical, or optical collection in ultraviolet, visible, or infrared (short-mid-, and long-wave) portions of the electromagnetic spectrum

Electro-Optical Intelligence: A primary MASINT discipline that provides radiant intensities, dynamic motion, spectral/spatial characteristics and materials composition of targets of interest

Elevation: Vertical distance to a target (or point) from sea level or some other reference point

ELINT: Electronic Intelligence

EMP: Electromagnetic Pulse

EO: Electro-Optical

F

FISINT: Foreign Instrumentation Signal Intelligence

FLIR: Forward Looking Infrared

FPS-17/79: Ground based radar in Turkey providing spacetrack and also has the capability to monitor some Middle East military activity (e.g., Iraqi)

FSU: Former Soviet Union

Fusion Center: Location where multi-discipline information sources are correlated to provide a combined display or representation of a situation

G

Gamma-rays: High energy radiation produced in a nuclear explosion

Geophysical: MASINT discipline category that includes acoustic, seismic, hydroacoustic, magnetic, and ionospheric disturbances in the earth's atmosphere, water, surface, or subsurface

GPS: Global Positioning Satellite

H

Haystack: Long-range imaging radar at MTT/LL for collection on geosynchronous satellite systems

HF: High Frequency

HPM: High Power Microwave

HYDICE: Hyperspectral optical system in development by the Navy to support spectroradiometric experiments and utility analysis

Hydroacoustic: Sound, pressure waves, or vibrations transmitted or reflected in the water

I

ICBM: Intercontinental Ballistic Missile

IMINT: Imagery Intelligence

Intelligence and Communications Architectures (INCA) Project Office

IR (Infrared): A primary radiation source exploited by MASINT for target signatures, measurements, and tracking

INR: Bureau of Intelligence and Research (State Department)

INSCOM: U.S. Army Intelligence and Security Command

IPB: Intelligence Preparation of the Battlefield

IPSG: Intelligence Program Support Group

IRINT: Infrared Intelligence

J

JCS: Joint Chiefs of Staff

JEM: Jet Engine Modulation

JIC: Joint Intelligence Center

JSTARS: Joint Surveillance and Target Radar System

JTIDS: Joint Tactical Information Distribution System

JWICS: Joint Worldwide Intelligence Communications System

K

KEW: Kinetic Energy Weapon

L

LADAR: Laser radar. Laser detection and ranging

Landsat: Spacebased multi-spectral collection sensor

Laser: Active or passive collection by a light infrared detection and ranging system (LIDAR) or laser detection and ranging system (LADAR) (Includes use of active lasers in combination with passive EO collection devices; e.g., spectrometers, to stimulate/excite targets or air parcels and thus enhance the potential of passive EO sensors)

LASINT: Laser Intelligence

LIC: Low Intensity Conflict

LIDAR: Light detection and ranging

Line-of-Sight: The straight unobstructed path or line between two points, as between a sensor location and a target

LWIR: Long-Wave Infrared

M

MASINT: Measurement and Signature Intelligence

MASINT Committee: Measurement and Signature Intelligence Committee responsible for national MASINT management and policy

MASINT Disciplines: Consists of electro-optical, radar, radio frequency, geophysical, materials sampling, and nuclear radiation techniques and capabilities

Materials: The physical collection of gases, effluents, and liquids particulates, to determine target attributes or processes

Materials, Effluent, and Debris Sampling: The active or passive collection of gases, airborne solid or liquid particulate, liquids, or biological, chemical, mineral, soil, or vegetative samples

Measurement: The gathering of precise technical data such as radar cross section, radiant intensity or temperature to identify military operations, assess weapon system performance, or to understand other naturally occurring events

MHW: MASINT Handbook for the Warfighter

MIRV: Multiple Independently-Targetable Reentry Vehicle

MODS: Multiple Optical Data System

Monostatic: Conventional radar where transmitter and receiver are at the same location and share the same antenna

MRDBS: MASINT Requirements Database System

MRSC: MASINT Requirements Subcommittee

MTI: Moving Target Indicator

Multi-band: Refer to a collection device with several to10s of bands of operation

Multi-spectral: Primarily used to refer to imaging system with a few bands of operation (e.g., Landsat)

N

NAIC: National Air Intelligence Center

NBC: Nuclear, Biological, Chemical

NCTR: Non-Cooperative Target Recognition

NDS: NUDET Detection System

NETCAP: National Exploitation of Tactical Capabilities

Neutrons: A particle of radiation associated with nuclear materials and their detection

NFIP: National Foreign Intelligence Program

NGIC: National Ground Intelligence Center

NPB: Neutral Particle Beam Weapon

NRL: Naval Research Laboratory

NRT: Near-Realtime

NUCINT: Nuclear Intelligence

Nuclear Radiation: A major MASINT discipline/technique for characterizing nuclear testing and material production

Nuclear Radiation Detection: Passive or active detection, collection, and measurement of gamma, neutron, x-ray, or other radiation from nuclear sources

NUDET: Nuclear Detonation

O

OASD: Office of the Assistant Secretary of Defense

ONI: Office of Naval Intelligence

OPINT: Optical Intelligence

Optical: The use of visible or near visible light (UV or far IR) to provide MASINT targets signatures

OTH: Over the Horizon

Other Geophysical: Use of magnetic and gravimetric collection techniques

P

PHD: Phase History Data

Polarization: The orientation of electromagnetic waves that are transmitted or received (e.g., horizontal, vertical)

R

R&D: Research and Development

Radar: Active or passive collection by line-of-sight, bi-static, or over-the-horizon radar systems

Radar Cross Section: The reflected target signature of an object of interest

Radiation Detection: The collection of x-ray, gamma-rays, neutrons etc., to characterize nuclear testing and material production/transportation

RADINT: Radar Intelligence

Radio Frequency: A major MASINT technique exploiting electro-magnetic pulse (EMP), other wide-band RF emanations, and unintentional radiation sources

Radio-Frequency/Electro-Magnetic Pulse Intelligence: Passive collection of high-intensity radio-frequency or electro-magnetic pulse data from weapon sources

Radiometry: The detection and measurement of radiant electromagnetic energy

Range: The distance from a sensor to a target of interest

RDT&E: Research, Development, Test, and Evaluation

RF/EMP: Radio Frequency/Electro-magnetic Pulse Intelligence

RF MASINT: Radio Frequency MASINT

RINT: Unintentional Radiation Intelligence

RMS: Requirements Management System

ROW: Rest of the World

RTOS: Real Time Optics System

S

S&T: Scientific and Technical

SAM: Surface-to-air Missile

SAR: Synthetic Apeture Radar

Seismic: Passive collection and measurement of seismic waves

SIGINT: Signals Intelligence

Signature: The product of multiple measurements collected over time and under varying circumstances. (Persistent, characteristics which are consistently replicated over multiple observations of similar targets)

SLOW WALKER: Program which detects high performance aircraft by DSP

SLOW JOGGER: Program which detects high performance aircraft by DSP-A

SMO: Support to Military Operations

SN: Standing Requirement

SNM: Special Nuclear Materials

SOCOM: Special Operations Command

Sonar: A sensor that uses underwater ground to detect and locate objects in the sea (Sound navigation and ranging)

SOSUS: Sound Surveillance System

Spectral Data: The wavelength at related information from a MASINT collection sensor

Spectroradiometric: Passive EO collection and application of MASINT techniques to derive data from multi/hyper/ultra-spectral and radiometric collection systems

SRBM: Short Range Ballistic Missile

SAR (Synthetic Aperture Radar): PHD (phase History Data): Active collection and exploitation of phase and amplitude histories from coherent synthetic aperture radar systems, (may also include the use of traditional and developmental radar exploitation techniques with data derived from SAR imaging systems)

T

TACREP: Tactical Report (Man machine readable format used to report perishable information of tactical significance for the immediate attention of a tactical user)

Tactical Warning: Warning after initiation of a hostile or threatening act based on an evaluation of information from all available sources

Target Trajectory: The path of the object or target of interest

TBM: Theater Ballistic Missile

TECRAS: Technical Reconnaissance and Surveillance

TEL: Transporter-Erector-Launcher

Temporal History: Time history of a MASINT data product

TENCAP: Tactical Exploitation of National Capabilities

TIARA: Tactical Intelligence and Related Activities

TIBS: Tactical Information Broadcast Service

TR: Time Sensitive Requirement

Tracking: Following the movement of an object over its course of flight by plotting its bearing and distance at frequent intervals

U

UAV: Unmanned airborne vehicle.

UMS: Unattended MASINT Sensor

Unintentional Radiation: Passive collection of unintentional radio-frequency/other radiation sources emanating from targets of interest

USAEDS: United States Atomic Energy Detection System

UV: Ultra-violet

UWB: Ultra Wideband

V

Visible: Refers to the wavelengths of light observable by the human eye

W

Wavelength: Refers to operating range of an optical system

X

X-ray: Nuclear particle of interest for characterizing nuclear explosions and materials production

This Page Intentionally Left Blank

INDEX

A

B

C

D

E

F

G

H

S

T

U

V

W

X

Y

Z

This Page Intentionally Left Blank

DISTRIBUTION LIST

Cust. No.	Customer Short Title	No. of Copies
A001	OSD AND DEPSECDEF	1
A002	JS/CHAIRMAN	1
A010	AFS COLLEGE LIB	2
A015	ARPA	2
A020	3480TSS/DOULSA	2
A024	DEF NUCLEAR AGCY	2
A045	DISA	20
A056	DSI	1
A085	NAT DEF UNIV	3
A102	OUSDP	2
A104	PDUSDP (S & R)	1
A106	NCCSS	1
A116	DASD CI & SCM CI	1
A117	OASD/PA & E	1
A119	DEF/SMAC	3
A120	OASD (SO/LIC)	1
A121	JOINT SPECTRUM CENTER	1
A122	OSD/DASD/SO	2
A123	OSD/DASD/LIC	1
A124	OSD/OUSDP/NA	1
A125	OSD/USDA	1
A128	BMDO	20
A130	JTSG	1
A152	OUSD(A)/OD PI-SP	1
A153	OSD/USDA/C3I	20
A155	USDRE DUSD (S & TNF)	1
A156	USDRE DUSD (TWP)	1
A200	DMA HQ	2
A219	DMA COMBAT SPT CTR	2
A246	JS/J-3 (JOD)	2
A248	JS/J-33 STOD	1
A251	JS/J-3 (NMCS OPS)	1
A253	JS/J-3 (STRAT OPS)	1
A300	CLIC	1
A304	JS/SECRETARY	1
A305	JSOC	2
A306	SFOD-D	2
A308	JS/DIR JT STAFF	1
A309	NAVAL SPECIAL WARFARE DEV GRU	1
A310	JS/J-3 SPECOPSDIV	1
A311	DET 2 SOCOS/IN	1
A315	JS/J-8	1
A325	JS/J-3	1
A332	JS/J-3 (SPACE OPERATIONS)	2
A335	JCS/J-4	1
A339	JS/J-5 (NUC/CHEM)	1
A340	JS/J-5 MIL SEC	1
A341	JS/J-5 M/UN NEG	1
A342	JS/J-5 (WHEM)	1
A343	JS/J-7 (CWPD)	2
A345	J2	15
A348	JS/J-33 STOD	1
A352	DESA	1
A363	USNMR SHAPE	1
A625	DET 4 USAFTAWC/CCA	1
A701	JS/CHRM STAFF GP	1
A703	JS/J-3/JRC	1
A706	USEUCOM SOUTHERN REGION JOIC	1
A720	JS/J-5 DDS & P	1
A721	JS/J-5 IN	1
A724	DUSDP	1
A747	SAF/DSPO/TECHNICAL LIBRARY	2
A748	DASD(ISA)PANAL	1
A820	JEWC/SA	4
A821	JEWC/OPE	1
A822	JEWC/DVP	1
B001	DIA/DR	1
B002	DIA/DD	1

(b)(3):10 USC 424

Cust. No.	Customer Short Title	No. of Copies
(b)(3):10 USC 424		
B836	DIR/IATF WEST	1
B837	CDR JTF-6	1
B838	NORAD/J2D/US ONLY DIA LIAISON	2
B839	EL PASO INTEL CTR DIA REP	1
B840	DIA REP NSA	2
B854	USDAO CANBERRA	1
B862	USDAO OTTAWA	1
C001	UNDER SECRETARY OF THE ARMY	1
C003	DUSA (OPERATIONS)	1
C013	OASA (RES DEV & ACQUISITION)	1
C015	CHIEF OF STAFF USA	2
C020	HQDA DCS-OPERATIONS & PLANS	2
C022	HQDA DCSOPS-PLANS&ASSESSMENTS	1
C025	HQ DOCS DMC (RAND)	1
C026	NATIONAL GUARD BUREAU	1
C040	ARMY LIBRARY (PENTAGON)	1
C041	HQDA/ODISC4	1
C045	USA INSCOM (INTEL OPNS CENTER)	10
C047	USA INSCOM (MASINT)	10
C048	USA MED RES INST CHEMICAL DEF	1
C101	SECRETARY OF THE ARMY	1
C241	748TH MI BN	1
C309	500TH MIL INTEL BDE	4
C310	501ST MI BDE - KOREA	4
C311	DET 16, 500 MI BDE	2
C314	513TH MIL INTEL BDE	2
C325	470TH MI GROUP	1
C395	USA INSCOM (SYTEMS ANAL ACTY)	1
C397	650TH MILITARY INTEL GROUP	1
C410	MI BN (CI) TECH	1
C426	5TH SIGNAL COMMAND	1
C459	USA COMMAND&GENERAL STAFF COL	4
C461	USA INFANTRY CENTER	1
C465	US MILITARY ACADEMY-WEST POINT	1
C470	USA WAR COLLEGE	5
C471	OPNS GROUP USA WAR COLLEGE	1
C500	USA TRAINING & DOCTRINE CMD	5
C510	USA AVN RSCH&ANAL OFFICE	1
C512	USA MATERIAL COMMAND (HQS)	2
C513	USA ARMAMENT RES DEV&ENGR CTR	1
C515	CHEM-FIO DEF CMD DEV & ENG CTR	2
C516	USA RESEARCH INSTITUTE	1
C517	STRICOM	1
C518	USA SPACE PROGRAM OFFICE	4
C523	USA RESEARCH LAB (ADELPHI)	1
C525	USA CENTER FOR SIGNALS WARFARE	2
C535	USA AVIATION SYSTEMS COMMAND	1
C539	USA TRADOC ANALYSIS CMD-WSMR	2
C540	USA STRATEGIC DEFENSE COMMAND	4
C545	USA ARMAMENT MUN(TIONS&CML CMD	1
C547	USA NUCLEAR & CHEMICAL AGENCY	1
C550	COMMUNICATIONS ELECTRONICS CMD	1
C553	USA INFORMATION SYSTEM CMD	1
C565	USA COMBAT AVIATION TNG BDE	1
C567	USA AIR DEF CENTER & FT BLISS	1
C568	USA AIR DEF SCHOOL LIBRARY	2
C569	USA BELVOIR RES DIV & ENGR CTR	2
C570	USA TOPOGRAPHIC ENGR CTR (TEC)	1
C610	USA MISSILE INTEL COMMAND	2
C617	USA CONCEPT ANALYSIS AGENCY	1
C620	USA ITAC SPECIAL RESEARCH DET	1
C623	USA FOREIGN INTELL ACTIVITY	1
C632	USA CHEMICAL CENTER	1
C635	USA AIR DEF CENTER & SCHOOL	1
C646	USA COMBINED ARMS COMBAT CTR	2
C649	USA SIGNAL CENTER & FT GORDON	5
C683	USA INTEL CENTER & SCHOOL	10
C749	HQDA DAMI FRGN INTEL MGT	2
C750	HQDA DAMI MGT SUPPORT OFFICE	1
C752	HQDA DAMI MOD SUPPORT DIV	1
C753	MI BN (CI) (SPT), 902D MI GP	1
C753	MI BN (CI) (SPT), 902D MI GP	3
C755	902D MI, INTEL GROUP	1
C756	MIL INTEL BN (SECURITY)902D MI	1
C757	DET S, FOREIGN INTEL ACTY	1
C758	USA MI BN (LOW INTENSITY)	1
C759	USA INSCOM (HUMINT)	1
C766	HQDA DAMI INTEL DIV	3
C768	ITAC LIBRARY	1
C769	USFK/EUSA LIAISON OFFICER	1
D002	OP-81(DNM)/CNA	1
D003	OP-N-87 DCNO SUBWAR	1
D006	NAVY INTL PROGRAMS OFFICE	1
D022	OP-94/SPACE C&C	1
D067	NISRORU 1972	1
D079	OP-81/PRO RES APPR	1
D150	CMC (INTE)	1
D184	NAVSTKWARCEN	1
D202	NAVWARCOL/LIB	2
D204	NAVWARCOL/INTEL	2
D205	NRL/LIBRARY 5227	1
D220	ONR	1
D246	NAVSWC	2
D248	NAVSEASYSCOM	1
D249	NAVPGSCOL	1
D256	NAVSURFWARCENPHD	1
D258	NSWCCD	1
D261	NUSC NEWPORT	1
D263	NCCOSC	2
D280	OP-098D/DIR RDT & E	1
D320	NSGA EDZELL	1
D361	FLEMINEWARTRACEN	1
D368	FLETRACEN NORVA	1
D369	RIPO 18/SWEYMOUTH	1
D376	RIPO 6/DALLAS	1
D405	RIPO 14/ATLANTA	1
D406	RIPO 17/WHIDBEY	1
D414	ONI 1905	1
D415	ONI 2020	2
D416	NISCPROD 0591	2
D458	ONI 0909	1
D460	NTIC 0406	1
D462	NR NAVMARINTCEN 0872	1
D465	USNA ANNA	2
D475	NAVY WARFARE ASSESSMENT CENTER	1
D487	JHU/APL	1
D496	DIR SSPO	1
D498	RIPO 12/COLUMBUS	1
D505	COMNAVSECGRU	1
D539	FIRSTEURLNT 1081	1
D599	NAVTECHTRACEN	1
D600	SWOSCOL NEWPORT	1
D602	NETPMSA CODE 317 IS	1
D605	COMSPAWARSYSCOM	3
D606	MAWTS ONE	1
D641	EWTGU NORFOLK	1
D642	EWTGU CHARLESTON	1
D644	NSGA NAPLES	1
D645	NSGD SDIEGO	1
D646	NSGD YOKOSUKA	1
D647	NSGA PEARL HARBOR	1
D660	NMITC	3
D700	CG USMC INTELLIGENCE CENTER	5
D701	MCAGCC TEECG	1
D708	CG 2ND MEB	1
D709	CG 3RD MEB	1
D711	CG MCCDC	1
D748	MARINE RESERVE FORCE	1
D750	MARCORSYSCOM	1
D799	CENPROGFAC (SPAWR)	1
D902	NAVMIC DET NP	2
D910	OP 923/SPEC PROJ	1
D930	TNW PROGRAM	1
D947	ONI 332	20
D955	NIAC	2
D960	LANTFAST	1
D971	DNI/OP-092	1
D983	NSGA FT MEADE	1
D991	FITCPAC	5
E001	HQ USAF/INEE	1
E003	HQ USAF/INXX	15
E017	HQ USAF/INEE (RAND-C)	1
E018	HQ USAF/INEE (RAND-W)	1
E023	497 IG/INO	4
E025	HQ USAF/INXY)	20
E040	497 IG/IND	2
E046	497IG/INH	1
E049	OL LA DET 4 67IG/DOS	1
E054	497 IG/INAG	1
E077	OL FH 67IG	1
E078	DET 4 67IG	1
E079	OL HO DET 4 67IG	1
E080	DET 2 696 IG	1
E100	480IG/PSD	5
E107	SAF/IA	2
E111	SAF/SS	10
E115	HQ AFRES/IN	1
E120	26 IG/DOHX	1
E236	SAF/AQPF	1
E237	SAF/AQLZ	1
E250	OAS/XRA	1
E262	SAF/IAYW	1
E263	SAF/IAS	1
E280	AFTAC/IN	15
E281	AFOTEC/INS	1
E298	HQ USAF/XOOOOB-CDB	1
E302	HQ USAF/XOOOC	1
E303	497 IG/INOA	1
E305	497 IG/INAS	1
E307	497 IG/INAF	1
E310	HQ USAF/XOXX	2
E401	HQ AFMC/IN	2
E404	AEDC/IN	1
E408	PHILLIPS LAB/IND	2
E409	HSC/IN	1
E410	AFDTC/IN	1
E411	ASC/NAIC/TAIA	1
E413	ELEC SYS DIV/IND	2
E416	HQ AFMC/INJ(G)	2
E427	ROME LAB/IRRP	2
E429	SMC/INS	2
E436	AFIWC/MSO	1
E438	17 TRSS/DOULSI	2
E440	AFFTC/IN	1
E449	366TH OSS	1
E450	CADRE/IN	1
E451	AIR UNIV LIBRARY	5
E465	USAF ACADEMY	2
E500	17RSS/DOUL	2
E505	3423 TCHTS/TTI	2
E550	20IS/CCOA	2
E565	488IS/DOE	1

Cust. No.	Customer Short Title	No. of Copies
E700	HQ AFISA/INSD	2
E706	HQ AIA/DOXS	5
E707	HQ AIA/DOS	2
E725	HQ AFIA/FI	1
E756	HQ AETC/XOXI	2
E800	58 SOW/IN	1
F005	USTRANSCOM/TCJ2-JS	1
F015	USAF AIR MOBILITY WARFARE CNTR	1
F018	621 AMOG/IN	1
F019	22 AF/IN	1
F020	62 OSS/DOI	1
F022	89 OSS/IN	1
F035	164 TAG (ANG)/DOI	1
F039	172 MAG/DOI	1
F042	627 ALSS/IN	1
F045	624 ALSG/IN	1
F046	608ALG/IN	1
F052	443 OSS/IN	1
F711	19 AREFW/DOXI	1
F712	22 OSS/IN	1
F713	101 AREFW/DOXI	1
F714	126 AREFW/DOXI	1
F715	128 AREFG/DOXI	1
F716	134 AREFG/DOXI	1
F717	141 AREFW/DOXI	1
F718	151 AREFG/DOXI	1
F719	157 AREFG/DOXI	1
F720	121 OSS/IN	1
F721	161 AREFW/DOXI	1
F723	108OSS/IN (150ARS)	1
F724	171ARW/DOI	1
F726	43 OSS/DOI	1
F730	434 AREFW/DOI	1
F731	452 AMW/DOI	1
F732	940 AREFG/DOI	1
F736	512 OSS/IN	1
G005	HQ USSPACECOM/J2FOP LIBRARY	3
G006	HQ AFSPACECOM/INXU	1
G009	USASA/MOSC-OP-INT	1
G010	SPACE WARFARE CENTER/IN	2
G014	14TH AIR FORCE/IN	1
G015	OL A HQ AFSPACECOM/SCZO	2
G016	3 SPSS/IN	1
G017	17 SPSS/IN	1
G025	73 OSS/IN	1
G027	DET 3 4 SPSS/IN	1
G169	2 SWS/IN	2
G170	5 SWS/IN	2
G171	6 SWS/IN	1
G172	7 SWS/IN	1
G173	12 SWS/IN	1
G250	NORAD/USSPACECOM CIC OL O	1
G506	COMNAVSPACECOM	5
G510	NAVSURVSUPPCEN	1
G553	NAVSPASUR	1
H005	USCINCEUR	10
H007	CR JOIC	1
H010	SOCEUR	1
H025	HQ USEUCOM(ECMD)	1
H097	HQ 3AF/IN	2
H116	17 AF/DOI	1
H300	ODCS IN (USAREUR)	5
H301	7TH ARMY TNG CMD	1
H305	COMTECH DET E	1
H313	ODCSI(USAREUR)CI	1
H315	CDR 21ST TAACOM	1
H320	66TH MI BDE	1
H322	ODCSINT USAREUR CMD	2
H500	CINCUSNAVEUR	2
H509	FAIRECONRON TWO	1
H510	MSRF(ASWOC)ROTA	2
H511	COMSIXTHFLT	2
H513	COMSERVFORSIXTHFLT	1
H521	MSRF(ASWOC) SIGONELLA	1
H524	HQ V CORPS	5
H526	HQ 3RD INF DIV	1
H527	HQ 1ST ARMORED DIV	1
H701	FOSIF ROTA	1
H705	16AF/IN	1
I005	USCINCCENT	10
I015	USNAVCENTREAR	1
I040	SOCCENT	10
I506	CJTFME/CMEF	2
J004	NAVY RES 0209	1
J005	CINCJSACOM	10
J007	COMUSFORAZ	1
J009	COMSOCLANT	2
J012	DIRJIATF EAST	1
J033	COMUNDERSEASURVLANT	1
J043	VFC 12	1
J200	NAVSURFLANT SSAAC	1
J400	2D SRI GROUP	2
J430	NAVSUBSCOL	1
J500	CINCLANTFLT	5
J501	USCOMSOLANT	1
J502	COMSECONDFLT	1
J503	NR COMSTRIKEFLTANT	1
J505	COMNAVAIRLANT	2
J507	COMINEWARCOM	1
J515	AIC	4
J516	COMSURFWARDEVGRU	1
J517	COMNAVSURFLANT	1
J520	LFTCLANT	1
J521	CSTG DET NORFOLK	1
J523	FLETRAULANTDETCHAR	1
J532	COMSUBLANT	1
J573	FMFEUR DESIGNATE	2
J575	COMMARFORLANT	2
J576	COMPHIBGRU 2	1
J580	TWO SIX MEU	1
J582	II MEF	1
J583	COMTRALANT	1
J592	CCWGRULANT	1
J593	COMOPTEVFOR	1
J603	COMFLETHAGRU GTMO	1
J614	2D MARINES	1
J618	SIXTH MAR	1
J620	EIGHTH MAR	1
J654	TACTRAGRULANT	1
J660	COMCARGRU TWO	1
J818	CG SECOND MARDIV	1
J842	COMCARGRU FOUR	1
J843	COMCARGRU SIX	1
J844	COMCARGRU EIGHT	1
J945	COMFAIRKEFLAVIK	1
J951	COMSTRIKEFITWPNSCOL	1
J953	FASCTRAGRULANT	1
J955	SWATSLANT	1
J993	SECONDMAW	1
J999	CJTF160	1
K005	USCINCPAC	10
K006	COMSOCPAC	1
K007	COMUSJAPAN	4
K008	JOINT INTER-AGCY TF WEST	1
K010	USFK/EUSA	1
K011	CIOC USELE USFK-J2	4
K012	USFK (BJ-PL-S-CI)	2
K013	SOC-K	2
K020	611 AIF/CC//	1
K021	3OSS/DOI	1
K022	354OSS/OSN	1
K023	COMUSNAVAK	2
K101	HQ PACAF/IN	5
K115	605TH AIF	2
K201	613AIF/CC//	2
K300	JICPAC/SSL	5
K302	CDRUSARPAC	10
K303	1STBN 1SFGA	1
K304	45TH SPT GP	1
K305	25TH INF DIV	2
K306	4TH SOSC	1
K307	1ST FIIU	1
K309	3D FSSG	1
K320	USARJAPAN	2
K344	6TH INF DIV (L)	1
K367	NAVPHIBSCH CORO	1
K401	3D SRI GROUP	1
K408	COMLATWINGPAC	1
K500	CINCPACFLT	5
K510	COMNAVFORJAPAN	1
K514	COMTHIRDFLT	1
K515	COMSEVENTHFLT	1
K516	CG I MEF	5
K525	COMNAVAIRPAC	1
K601	FIRSTMAW	1
K603	THIRDMAW	1
K605	COMMARFORPAC	2
K607	13TH MEU	1
K608	11TH MEU	1
K610	FIRSTMARDIV	1
K612	THIRDMARDIV	1
K613	FIRSTMAR	1
K614	FOURTHMAR	1
K615	THIRDMAR (REIN)	1
K616	TWELFTHMAR	1
K617	FIFTHMAR	1
K618	SEVENTHMAR	1
K631	31ST MEU	1
K632	CG III MEF	1
K633	15TH MEU	1
K645	JDET	1
K650	COMNAVSURFPAC	1
K655	COMPHIBGRU 1	1
K659	COMNAVFORKOREA	1
K660	COMTRAPAC	1
K668	COMSUBPAC	1
K736	FAIRECONRON 1	1
K737	FAIRECONRON FIVE	1
K752	FAIRECONRON 3	1
K801	COMNAVSURFGRUMDPAC	1
K802	COMCRUDESGRU ONE	1
K803	COMCRUDESGRU THREE	1
K804	COMCRUDESGRU FIVE	1
K840	COMCARGRU 1	1
K841	COMCARGRU THREE	1
K842	COMCARGRU 5/CSF7FL	1
K843	COMCARGRU 7	1
K898	COMPHIBRON 3	1
K899	COMPHIBRON 5	1
L005	USSTRATCOM J271	5
L007	USSTRATCOM/J2(AMA)	2
L021	USSTRATCOM/J21	2
L041	USSTRATCOM J2233	2
L042	USSTRATCOM/J221	1
L044	USSTRATCOM/J26	1
L045	USSTRATCOM/J534	1
L046	USSTRATCOM J25/PDT	1
L049	USSTRATCOM J2234	1
L050	USSTRATCOM/J2221	1
L051	USSTRATCOM/J2243	1
L058	USSTRATCOM/J2432	1
L059	USSTRATCOM/J241	1
L060	USSTRATCOM/J23	1
L108	9 RTS/INOE	1
L125	55 SRW/INV	1
L126	USSTRATCOM/J5	1
L153	82 RS/IN	1
L166	USSTRACTOM J3621	1
L201	USSTRATCOM/J213	1
M004	USSOUTHCOM J3 DD-I	5
M005	USCINCSO	10
M006	SOCSOUTH	6
M100	24TH AIS/OI	1
M303	JTF-B	1
N005	USCINCSOC	4
N010	HQ AFSOC	10
N011	USAF SPEC OPS SCH	1
N015	COMNAVSPECWARCOM	1
N019	NAVSPECWARCEN	1
N020	USASFC	2
N021	USAJFKSWC	2
N025	CDR USASOC(A)AOIN-IOT	2
N026	112TH SIGBN SO (A)	1
N105	1ST SFGA	1
N110	5TH SFG(A)	1
N115	3RD SFG(A)	1
N120	7TH SFG(A)	1
N125	10TH SFG(A)	1
N160	19TH SFG (A)	1
N165	20TH SFG (ABN)	1
N300	COMNAVSPECWARGRU 2	1
N310	SEAL TEAM TWO	1
N315	SEAL TEAM FOUR	1

Cust. No.	Customer Short Title	No. of Copies
N320	SEAL TEAM EIGHT	1
N400	COMNAVSPECWARGRU 1	1
N410	SEAL TEAM ONE	1
N415	SEAL TEAM THREE	1
N420	SEAL TEAM FIVE	1
N515	919 SPEC OPS GP/IN	1
P001	NPIC/GPB	1
P002	NPIC/IB	1
P005	DOE/DASI	5
P050	CIA/OIR/CLB	1
P051	CIA/CRES/IRC/SRB	20
P054	DDS&T/FBIS/VED	1
P055	CIA/OIR/IMD/ISB	1
P056	CIA/CCIS/ICS	5
P075	FBI	1
P079	STATE INR/PMA	2
P085	STATE	2
P090	NSA/E3234/HARD CY COLLECTIONS	30
P100	NAT SEC COUNCIL	2
P109	PFIAB	2
P111	WHITE HOUSE SIT RM	1
P125	DEPT OF TREASURY	1
P127	US SECRET SERVICE	1
P702	CIA/NIO/GPF	2
P714	COMMUNITY MANAGEMENT STAFF	2
P716	NAT INTEL COUNCIL	2
Q008	ONI 3311	2
Q043	AFMIC	2
Q420	NAIC/DXLA	2
Q422	NAIC/SC ST IISP	1
Q590	NGIC-IANGIC-MLA-LS1	2
Q591	NGIC-IANGIC-ICB	2
Q592	NGIC-MLB LIB SERVICES 2	2
Q593	IANGIC-IF	2
Q594	NGIC ACQUISITION STRATEGY DIV	2
Q595	NGIC-RSE	2
Q596	NGIC-BATTLEFIELD RECON DIV	1
Q597	IANGIC-RCH	1
Q598	IANGIC-RMS	1
Q599	IANGIC-RCC	1
Q600	NGIC MIL APPLICATIONS	1
Q601	NGIC-IANGIC-RBE	1
Q602	IANGIC-RMT	1
Q603	IANGIC-RAC	1
Q604	IANGIC-RFA	1
Q605	NGIC COLLECTION RQMTS DIVISION	1
Q619	MSIC REDSTONE	5
R010	OMB	1
R082	EL PASO INTEL CTR	1
R084	MARITIME INTELLIGENCE CENTER	2
R145	ACDA	4
R200	USCG OIN	1
R205	USCG ICC	1
S001	LANL	5
S003	SANDIA NAT LABS	5
S013	LLL	5

Total Customers: 770 **Total Hardcopy: 2162**

~~Not Releasable to Foreign Nationals~~

~~Warning Notice - Intelligence Sources and Methods Involved~~