Chapter I

EQUIPMENT AND OPERATIONS

1. Background

Air, land, and sea forces all require effective communications for command and control. Single-channel (SC) very high frequency (VHF) frequency modulation (FM) combat net radio systems provide the primary means of communication for command and control of a wide variety of combat forces.

Section A. SINCGARS Radios

2. Capabilities

Modern generations of combat net radio (CNR) systems are more capable and reliable than previous generations. The SINCGARS is the largest family of radios in this latest generation of combat radios. SINCGARS incorporates many features found on similar compatible radios. SINCGARS features include—

a. Frequency hopping (FH) modes.

b. Integrated communications security (ICOM).

c. Voice and data capability.

d. Built-in test (BIT).

e. Modular design.

f. Ground and airborne versions.

3. Common Characteristics

The services tailor their particular radio designs to satisfy service-unique requirements. These radios require the following common characteristics to ensure interoperability in multiple nets:

a. FH data waveform.

b. 30.000 to 87.975 megahertz (MHz) operating band.

c. SC FM operation: 30.000 to 87.975 MHz with 25 kilohertz (kHz) channel spacing (2320 channels).

d. SC FM frequency offsets (+/-5, +/-10 kHz).

e. Compatibility with encrypted ultra high frequency (UHF) communications system (VINSON)-based (e.g., KY-57/KY-58) communications security (COMSEC) for security of voice and data in FH and SC communication modes.

f. Use of a nonhopping, SC cue frequency for alerting a net control station (NCS) in an FH net.

g. Late net entry capabilities.

h. Electronic remote fill (ERF) capabilities:

(1) Cold start net opening (ERF of FH data over a single manual selected for net opening).

(2) FH update (ERF to update FH data during net operations).

(3) Transmission security key (TSK) for establishing an FH pattern for radios.

(4) Synchronize (sync) time.

(5) 3-digit net identification.

4. Service SINCGARS Radio Variants

All military services combat, combat support, and combat service support units

employ SINCGARS and SINCGARS FH compatible radios. There are airborne, manpack, and vehicular SINCGARS radios. Unless otherwise noted, reference to the SINCGARS radio in this document includes all SINCGARS compatible radio systems. Table I-1 lists each service's SINCGARS-compatible radios.

a. Army. The Army SINCGARS operates in the 30.000 to 87.975 MHz frequency range. Early ground versions of SINCGARS consist of a receiver-transmitter (RT-1439) supported by external COMSEC equipment assembled with other common modules into manpack and vehicular configurations. These radios are known as *non-integrated COMSEC (non-ICOM)* since they require the TSEC/KY-57 security equipment for cipher text (CT) operation. Newer production ground SINCGARS receiver-transmitters (RT-1523 series) are known as *integrated COMSEC (ICOM).* They have an internal module that performs the cipher functions; thus, they do not need the external KY-57 equipment. However on the other hand, the Army airborne SINCGARS radio (AN/ARC-201/A) requires use of the TSEC/KY-58 security equipment for CT operation. All three versions of the airborne radio handle voice; only the data bus version (RT-1478) handles data through use of a data rate adapter (DRA). Both ICOM and non-ICOM versions of the radio are operationally compatible in FH and CT operations. (See Appendix B for further details on differences between non-ICOM and ICOM radios.)

b. Air Force. The Air Force Airborne SINCGARS compatible radio (AN/ARC-222) operates SC FM and FH in the 30.000 to 87.975 MHz range and SC amplitude modulation (AM) in the 108.000 to 151.975 MHz frequency range (108.000 to 115.975 receive only). It interfaces with the KY-58 to achieve a COMSEC capability. The airborne radio interfaces with the AN/PSC-2-digital communications terminal

PROCURRING SERVICE	RADIO NOMENCLATURE	USING SERVICE			
		ARMY	USAF	NAVY	USMC
Airborne					
Army	AN/ARC-201A(V)	Yes		Yes#	
Navy/USMC	AN/ARC-210(V)	Yes	Yes	Yes	Yes
USAF	AN/ARC-222		Yes		
Manpack					
Army/USMC	AN/PRC-119/A	Yes	Yes	Yes	Yes
Vehicular					
Army/USMC	AN/VRC-87/A*	Yes			
	AN/VRC-87/C	Yes			
	AN/VRC-88/A	Yes			Yes
	AN/VRC-88/C	Yes			
	AN/VRC-89/A	Yes	Yes	Yes	Yes
	AN/VRC-90/A	Yes	Yes	Yes**	Yes
	AN/VRC-91/A	Yes	Yes		Yes
	AN/VRC-92/A	Yes		Yes	Yes

# Denotes ARQ-53 only.
* "/A" denotes an integrated COMSEC (ICOM) radio in addition to non-integrated COMSEC (non-ICOM) versions.
** Denotes shipboard installation.

Table I-1. Service SINCGARS Radio Configurations

(DCT-2) and the improved data modem (IDM) to pass data. Air Force ground units, primarily tactical air control parties (TACPs) and combat control teams (CCTs), employ the Army SINCGARS AN/VRC-89A/90A/91A (RT-1523 (ICOM) radio). The modular control equipment (MCE) facilities located at the control reporting centers (CRCs), control reporting element (CRE), and forward air control party (FACP) utilize the RT-1439 (non-ICOM) radios and interface with external COMSEC devices (KY-58).

c. Navy

(1) For shipboard applications, Navy units use the AN/VRC-90A nominally identified as an AN/ARQ-53 that replaces the AN/VRC-46. The AN/VRC-90A updates amphibious readiness groups (ARGs)/battle groups with SINCGARS electronic protection (EP) capability. The greatest number of radios exists on amphibious ships, with the largest population on command and flag-configured ships.

(2) As a related portion of the shipboard program, the Navy will field the AN/ARQ-53, based on the RT-1476/ARC-201(V), to provide a 2-channel airborne relay for over the horizon (OTH) communications.

(3) For airborne applications, Navy units use the AN/ARC-210 radio. The AN/ARC-210 operates in the 30.000 to 399.975 MHz frequency range and implements the SINCGARS and Have Quick EP modes.

d. Marine Corps. Marine Corps ground units use the same vehicular and manpack SINCGARS radios as the Army. Marine aviation units use the AN/ARC-210(V) radio.

5. Modes of Operation

SINCGARS radios offer a range of operating modes to commanders. These modes include SC plain text (PT), SC CT, FH PT, and FH CT.

a. Considerations. When establishing CNR nets, commanders must consider the mission, availability, and capabilities of CNR communications equipment, electronic attack (EA) capabilities of adversary forces, and United States (US) national security policy. SC PT operations provide ease of operation while providing little or no security or protection. FH CT operations provide message traffic security and EA (jamming and direction finding [DF]) resistant transmissions. FH CT communication protects both the message and the sender.

b. SC Mode. SINCGARS radios can store SC frequencies and offsets. SC frequencies and offsets (+/- 5 kHz or +/- 10 kHz [+/-] 5 or 10 kHz) are entered manually through the radio's front panel keypad. When operating in the FH mode, two of the SC presets are reserved for the manual and cue channels. See Appendix C for a sample communications-electronic operating instructions (CEOI)/signal operating instructions (SOI) print-out depicting manual and cue channels information. SINCGARS is voice interoperable with all SC radios operating in the SINCGARS frequency range and channel spacing.

c. FH Mode. SINCGARS radios can store FH data for unique FH nets. SINCGARS radios require four data elements to communicate in the FH mode. The FH data elements are hopsets/lockouts, net identifiers (IDs), net sync date/time, and TSK. Once FH data is loaded, the user need only move the FH channel switch to move from one FH net to another. In addition, users in nets sharing common hopsets, TSK, and sync time can also move from net to net by entering the appropriate net ID. FH data elements are discussed—

(1) Hopsets/Lockouts. The hopset is the set of frequencies (2320 frequencies minus protected frequencies) on which an FH net hops. Hopsets are electronically loaded and stored in the radio. SINCGARS radios have the capability of storing an unique

hopset in each preset FH channel. Lockouts provide frequency exclusions in conjunction with a hopset.

(2) Net IDs. The net ID is a 3-digit number from 000 to 999 that distinguishes one FH net from another when all other FH data elements are the same. Unique net IDs may be stored in each FH preset channel. Net IDs, embedded in the hopset data, are loaded electronically with a fill device or by ERF and maybe changed using the keypad on the front panel of the SINCGARS receiver-transmitter (except on ARC-210 radios). Newer models of SINCGARS allow the changing of all 3 digits while earlier models only permit changing the last 2 digits.

(3) Sync Time. Sync time is required for synchronization of the frequency hops. Sync time consists of the last 2 digits of the Julian date (SINCGARS Julian date) plus a 6-digit time (hours: minutes: seconds). Each station in the FH radio net must be within (+/- 4 seconds) of the net sync time to communicate.

(4) TSK. The TSK is a generated variable that controls the pseudo-random FH pattern. A TSK must be loaded into the SINCGARS radio prior to opening an FH net. TSKs are electronically loaded into the radio with a fill device and, after net opening, TSK may be transferred by ERF.

d. Frequency Hopping-Master (FH-M) Mode. Only one radio in each FH radio net will use this mode. The FH-M radio maintains the radio net's sync time and transmits the ERF. Normally the designated NCS or alternate NCS will operate in the FH-M mode.

e. CT Communications. CT operations require a traffic encryption key (TEK). A key encryption key (KEK) is required for over-the-air rekey (OTAR). TEK and KEK are electronically loaded and stored in the radio or external security equipment.

(1) The TEK is used in CT operation and encrypts/decrypts operational voice and digital data transmissions.

(2) The KEK encrypts/decrypts TEKs and is used for OTAR of TEKs.

f. PT Operation. SINCGARS radios are also capable of PT operation (either SC or FH). When operating with radios that do not have a CT capability and/or are operating in PT, an army ground SINCGARS radio in the CT mode can monitor PT communications. A beep tone informs the SINCGARS operator that the incoming message is in PT rather than CT.

g. Voice or Data. SINCGARS radios operate in voice or data rates (bits per second) of 600, 1200, 2400, 4800, 16,000, AD1 (analog data). The AN/ARC-222 operates with voice-frequency shift keying (FSK) analog data rate of up to 1200 bits per second (bps) and at a digital data rate of 16 kilobits per second (kbps) and tactical fire direction system (TACFIRE).

Section B. SINCGARS Radio Operations

6. FH NET Operations

The joint task force (JTF) Command, Control, Communications, and Computer Systems Directorate of a joint staff (J-6) has overall responsibility for ensuring interoperability of CNR nets. All services currently have, and are continuing to deploy, SINCGARS and/or SINCGARS-compatible FH combat net radios. Forces assigned to JTFs will follow their respective service's detailed radio operator procedures within the general guidance provided in the following paragraphs.

7. Loadset Distribution (FH and COMSEC Data)

a. An army ground SINCGARS radio loadset consists of FH and COMSEC data. Designated operators may transfer FH and COMSEC data physically from device to device, transmit the data electronically, or use a combination of physical and electronic means. The lowest operational echelon

normally distributes and stores loadsets consistent with the availability of fill devices, security arrangements, and operational needs.

b. The controlling authority (CONAUTH) and JTF J-6 provide COMSEC and FH data to users. However, the CONAUTH provides only that amount necessary to satisfy operational requirements consistent with distribution capabilities. The storage of reserve loadsets at selected echelons facilitates rapid distribution, reduces risk, and minimizes the impact of loss of a storage device in the forward area.

8. Net Opening

NCS can open FH nets using either *hot* or *cold* start net opening procedures. The preferred method is *hot* start net opening. Before opening a net, the NCS must receive FH data and COMSEC.

a. Hot Start Net Opening. Each member in the net loads all FH and COMSEC data into the radio or associated KY-59/58, including sync time, and enters the net.

b. Cold Start Net Opening. Each net member loads either a cold start TSK (non-ICOM only) or their operational TSK (non-ICOM and ICOM) and the operational TEK into their radio prior to net opening. Net stations receive their ERF from their NCS on the manual channel in the FH CT modes, store it in the appropriate channel, switch over to that channel, and enter the net. NCS operators load all FH and COMSEC data, except sync time, into the radio prior to cold start net opening.

9. FH Sync Time Management

a. SINCGARS radio operators normally open and maintain their nets on ZULU time. Use of ZULU time ensures ease of FH net opening, late net entry, and commanders' ability to enter and monitor all their FH nets. NCSs manage time for their nets. To prevent FH radio nets from drifting off precise ZULU time (+/- 4 seconds), the NCS updates sync time daily to ensure cross-net communications capabilities. Each time the NCS radio transmits (in FH master mode), all radios on the net that receive the transmission are incrementally resynchronized to NCS sync time.

b. A net member can obtain precise ZULU time from any one of three methods. The model/version of SINCGARS and the available time sources (e.g., precision lightweight global positioning system (GPS) receiver (PLGR) or automated net control device [ANCD]) determine the method for loading time. Methods are—

(1) ERF (net opening and update).

(2) Electronic fill from:

(a) ANCD (RT-1523A and B versions).

(b) GPS receivers, such as the AN/PSN-11, PLGR (RT-1523A, and RT-1523B versions).

(3) Manually, through the SINCGARS radio front panel keypad.

10. Late Net Entry

A radio loaded with all FH and COMSEC data that drifts off sync time may be desynchronized by one of four methods:

a. Automatically Load GPS ZULU Time. RT-1523/A and/B ground, ARC-210, and ARC-222 radios can receive time electronically from a GPS receiver.

b. Manually Load GPS ZULU Time. Only attempt manual if GPS time is available. Operators may enter sync time through the front panel keypad.

c. Passive Late Net Entry. The SINCGARS radio has a built-in capability to resynchronize itself when out of synchronization by more than (+/-4 seconds) but less than (+/- 60 seconds). When the operator enables this mode, the radio is

brought into the net without further action by the operator.

d. Cue and ERF Late Net Entry. If a SINCGARS station must enter an FH CT net and has the correct TSK and TEK, the station may contact the net by changing to the cue frequency, pressing push-to-talk (PTT), and waiting for the NCS to respond. This action by the operator causes the message cue indicator to appear in the display of the NCS radio. Normally only selected NCSs, their alternate NCSs, or other designated stations will load, monitor, and respond on the cue frequency. Radios responding to cue calls should move frequently and/or remote to reduce the risk of detection by enemy direction-finding systems and subsequent targeting and attack.

11. FH Mixed Net Operation

Operate SINCGARS radios in the SC mode only when absolutely necessary. When operating with SC radios, a SINCGARS mixed-mode retransmission site/station can provide communications between a SC station/net and an FH net without requiring all stations to operate in the vulnerable SC mode. To reduce the risk of being targeted by enemy direction findings equipment, locate mixed-mode retransmission sites away from any friendly position.

Section C. Support Equipment

12. Army Equipment

a. Army Key Management System (AKMS). AKMS integrates all functions of crypto management and engineering, SOI, EP, cryptographic key generation and distribution, key accounting, and key audit trail record keeping into a total system designated the Automated COMSEC Management and Engineering System (ACMES). ACMES is a 2-phase program.

(1) ACMES (Phase I) focuses primarily on requirements for CNR frequency management, common fill device (CFD), and electronic SOI. ACMES provides users with an enhanced SOI, FH data, and COMSEC key generation capability. The ANCD provides the capability to electronically store and rapidly distribute SOI and key material. In addition, the ANCD provides radio operators the capability to load all FH and COMSEC data plus sync time into the SINCGARS radio in one simple procedure (Figure I-1). Phase I consists of two functional elements:

(a) ACMES Workstation. The workstation generates SOI and FH data and integrates COMSEC cryptographic keys. The workstation consists of the AN/GYK-33A, lightweight computer unit (LCU), a rugged desktop computer (486 processor), and the AN/CSZ-9, random data generator (RDG). The LCU, in conjunction with the RDG, generates SOI and FH data (TSK, net IDs, and hopset). The ACMES workstation replaces the AN/GYK-33 basic generation unit (BGU). Workstations with RDGs are organic to corps, divisions, and separate brigades. Workstations without RDGs are organic to subordinate brigades and separate battalions.

(b) ANCD, System Designation AN/CYZ-10. The ANCD is an electronic data storage and CFD procured by the National Security Agency (NSA) and configured by the Army with unique application revised battlefield electronics communications system (RBECS) CEOI, data transfer device (DTD) software (RDS), and keypad. The ANCD, in conjunction with the ICOM SINCGARS, performs the full range of combat net radio cryptonet support functions to include COMSEC key generation, transfer, and storage. In addition, the ANCD serves as an electronic SOI and replaces the need for most paper SOI products. The ANCD replaces the KYK-13, KYX-15, MX-18290, and MX-10579 in support of SINCGARS.

(2) ACMES (Phase II) is a follow-on system with enhanced and expanded capabilities (Figure I-2). Phase II consists of three functional elements:

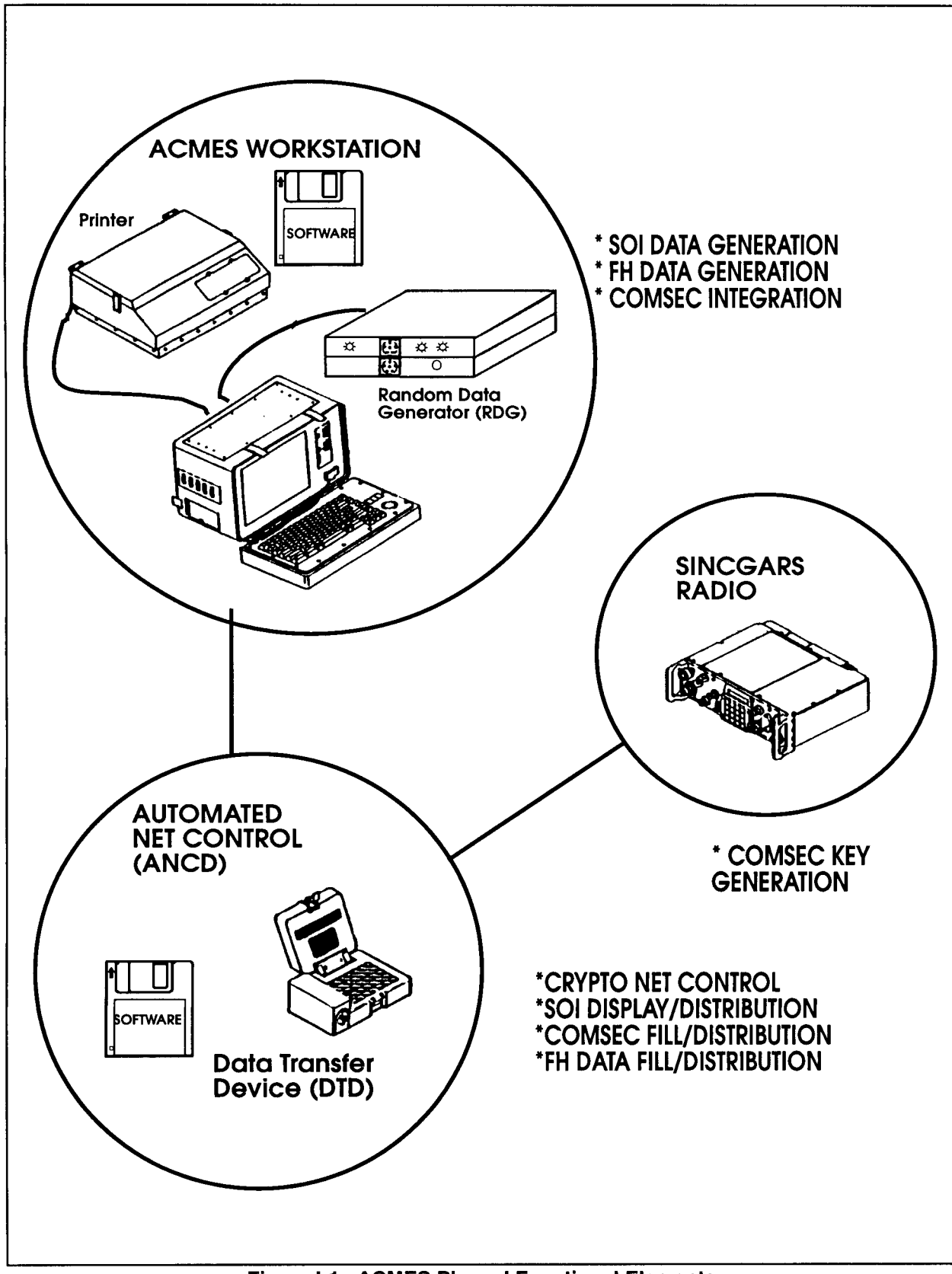

Figure I-1. ACMES Phase-I Functional Elements

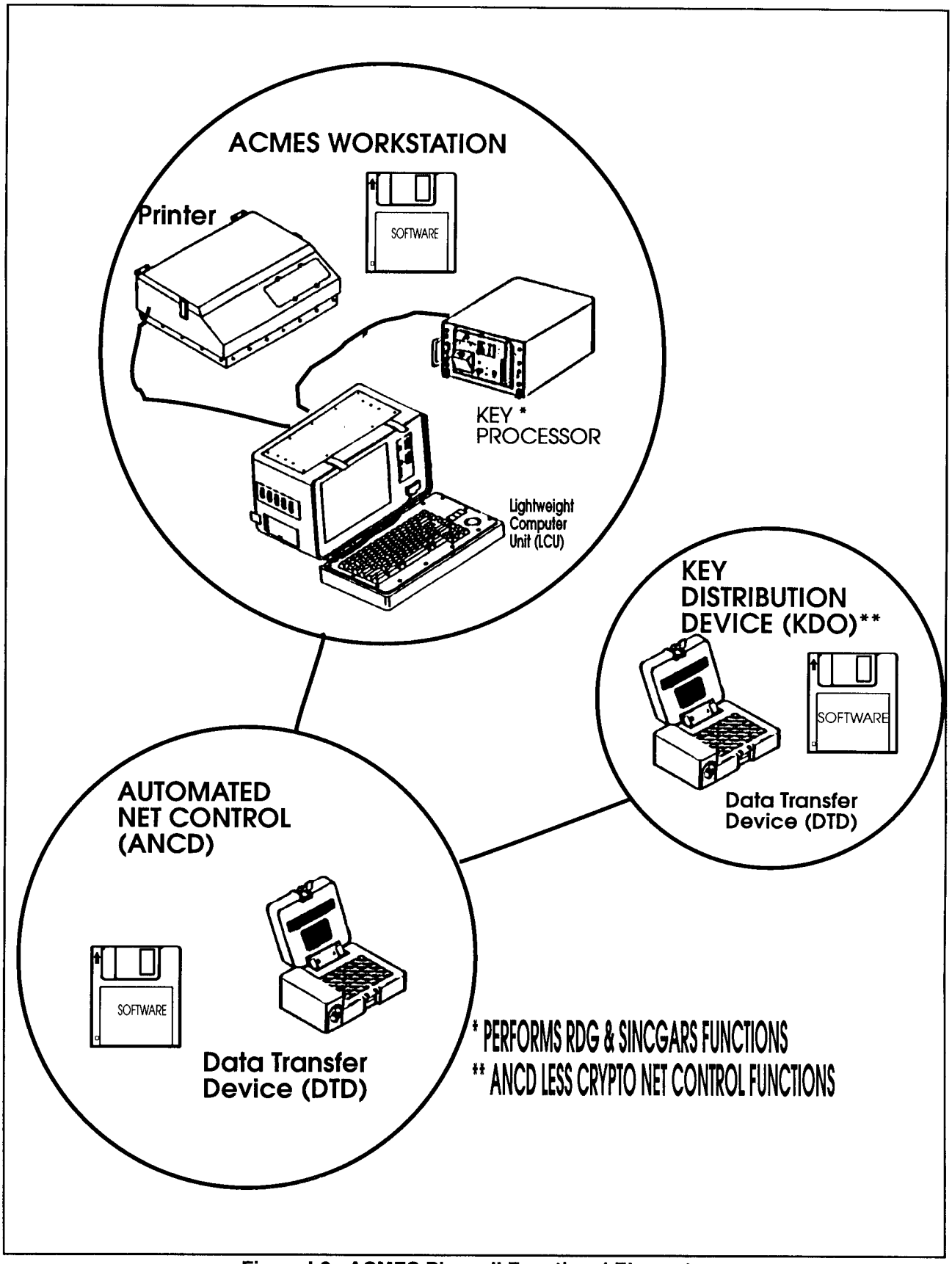

Figure I-2. ACMES Phase-II Functional Elements

(a) ACMES Workstation. The Phase-II workstation provides commanders with a fully automated capability to plan, control, and generate FH data and COMSEC keys and manage complex cryptonets. The Phase-II ACMES workstation provides cryptonet managers with the means to distribute cryptographic keys, SOI, and FH data; audit trail databases, design crypto nets; accomplish net configuration; accommodate key supersession; and manage all operational keys and SOI. This workstation is fully interoperable with all electronic key management system (EKMS) elements. A key processing equipment (KPE) will replace the RDG for FH data generation and SINCGARS and ANCD for COMSEC cryptographic key generation.

(b) ANCD. The Phase-II ANCD is a software-improved version of the Phase I.

(c) Key Distribution Device (KDD). The KDD ANCD is a limited keypad version of the DTD. Its application software can perform the tasks performed by an ANCD without NCS functions.

b. ACMES provides commanders the necessary tools to work with the widely proliferating COMSEC systems associated with the mobile subscriber equipment (MSE), echelon above corps communications (EAC comms), Joint Tactical Information Distribution System (JTIDS), Enhanced Position Location Reporting System (EPLRS), SINCGARS and other keying methods (electronic key generation, OTAR transfer, and electronic bulk encryption and transfer) being fielded by the Army.

13. Air Force Equipment

a. Air Force Key Data Management System (AFKDMS) (Figure I-3). To meet its special needs, the Air Force is developing AFKDMS. AFKDMS is composed of two subsystems: Key Distribution Management System (KDMS) personal computer (PC) subsystem and the key data system (KDS) DTD subsystem. The KDMS software is designed to manage and, to a limited extent, generate fill variables for the Air Force SINCGARS radio assets (AN/ARC-222, Army ICOM (RT-1523) and non-ICOM (RT-1429) radios). It runs on a Microsoft-disk Operating System (MS-DOS) International Business Machines (IBM)-PC compatible 80286, 80386, or 80486 computer with 640 kilobits (kb) random access memory (RAM) and 4 megabyte (MB) of extended memory. The KDMS can run from as little as 512 kb of free conventional RAM if required. To ensure interoperability with the other services in the SINCGARS mode, it incorporates the revised SINCGARS ICOM/ non-ICOM support software (RSINISS) and other selected modules from RBECS. It is menu-driven and contains on-line context-sensitive help. The AFKDMS—

(1) Imports Army or multiservice net information from RBECS 3.5 inch diskettes provided by the joint force commander (JFC) J-6 or Army Corp units. The KDMS extracts net information by reading data elements from the RBECS files and reformats the data for use in the AFKDMS system.

(2) Provides information to establish Air Force close air support (CAS), combat search and rescue (CSAR), etc., operational nets. The AFKDMS allows the net planner to enter SC frequencies and to manage FH data for FH nets. When a baseline ground force CEOI/SOI is available, the Air Force net planner can develop Air Force unique nets for unilateral Air Force operations, including training if required. The planners can develop TSK variables if the PC has 1 MB of additional RAM and a RDG.

(3) Provides information to construct mission sets. The AFKDMS provides capability to build mission sets consisting of 20 FH nets, 20 cue frequencies, and 20 SC frequencies to provide for the primary mission and multiple contingency missions.

(4) Loads the Fill Device. The KDMS loads the DTD fill device (KDS subsystem) with multiple-load sets for the

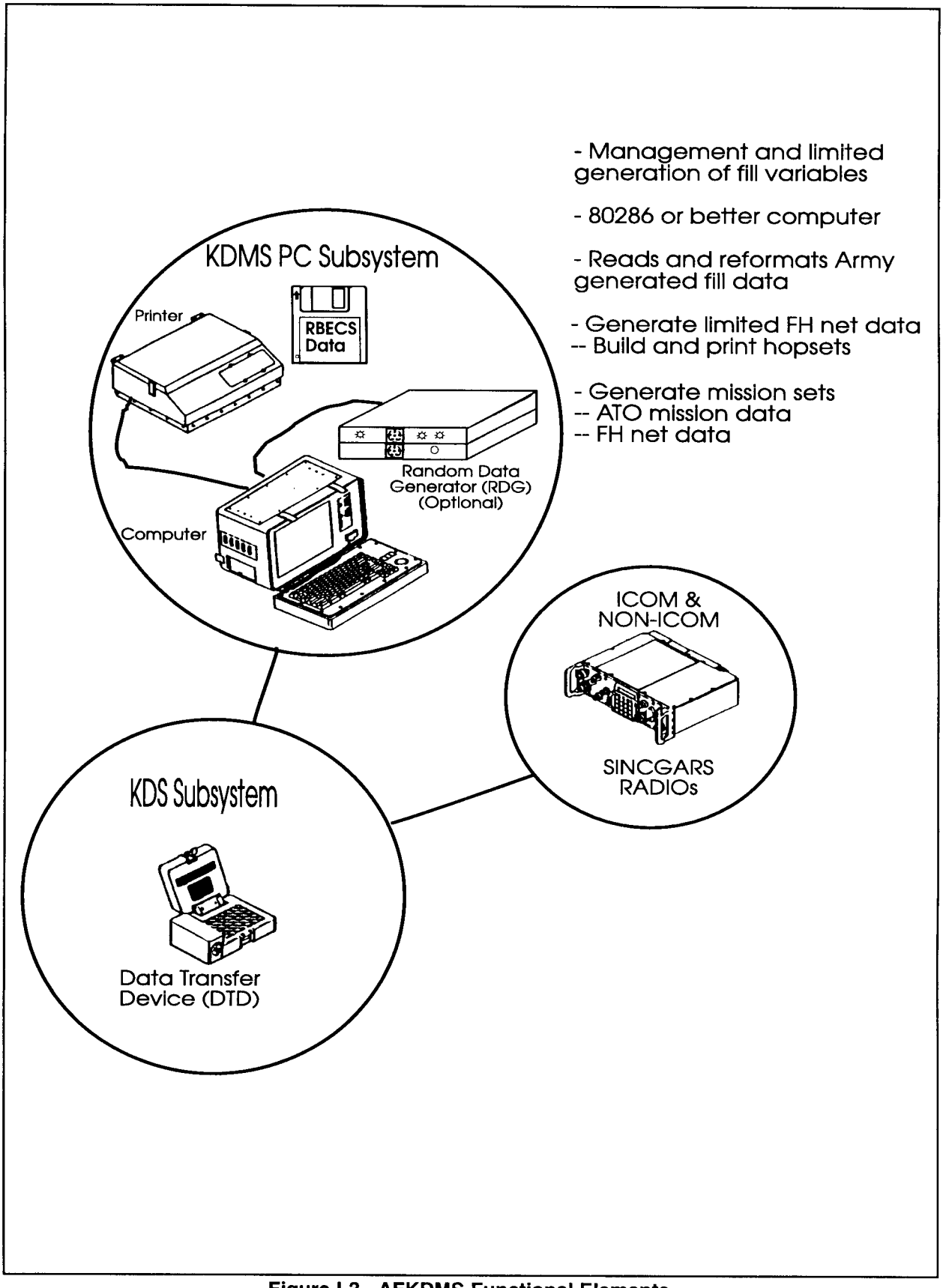

Figure I-3. AFKDMS Functional Elements

assigned aircraft and ground radio assets. The transfer of data from the PC is accomplished using Electronic DS-101 Emulation Software (EDES) and the DS-101 protocol. The KDS operator uses the KDS fill device (AN/CYZ-10) to fill designated radios using the DS-102 and modified CSESD-11 protocols.

b. Air Force Electronic Key Management System (AFEKMS) (Figure I-4). AFEKMS is a fast, flexible, and secure method of generating, managing, distributing, and auditing cryptologic materials using electronic communications and peculiar subsystem auxiliary devices. It is the San Antonio Air Logistic Center (SA-ALC) implementation of the NSA-developed EKMS. The DTD subsystem is expandable and can be used to support various Air Force communications via unique user application software (UAS) implementations. It provides cryptographic material on a wholesale level and supports TSK and COMSEC key requirements for a host of communication systems including SINCGARS. AFEKMS components include—

(1) KPE. The KPE generates, encrypts, and decrypts keys as required to support the COMSEC distribution system in accordance with (IAW) SA-ALC policy and procedures. The encrypted keys are passed to the local management device (LMD) for further transfer to the DTD.

(2) LMD. The LMD is a high-end PC (i486) installed at base-level COMSEC account facilities. It is provided by the SA-ALC specifically for wholesale cryptographic material management support. The LMD interfaces with the KPE for the generation of keys.

(3) DTD. The DTD (AN/CYZ-10) is a generic key management and distribution device incorporating NSA electronic-fill data format standards and interface protocols. It is backward compatible with fielded cryptographic devices; it contains a 2-line character display and functional keyboard; and the software-configurable menus are user friendly.

(4) Electronic key distribution device (EKDD). The EKDD is a UAS DTD that services several Air Force communications systems. The Air Force ground and airborne SINCGARS radios require extensive EP fill parameters including TSKs; therefore, they require unique UAS. Currently, this application requires a separate DTD software modification, hence, a unique nomenclature KDs.

14. Navy Equipment

a. There are four major components to RBECS for the Navy in joint operations. They are the unclassified RBECS software package (including the application utility package software), computer, RDG, and DTD. Only the software, computer, and RDG are necessary to design, generate, and produce joint CEOI (JCEOI)/CEOI material (Figure I-5).

(1) The RBECS software can run on any MS-DOS based computer system with the following characteristics: MS-DOS operating system 3.30 or higher, PC/AT 386 or higher, 4 MB RAM (minimum available for program execution), 10 MB hard disk storage.

(2) The RDG is necessary to generate the JCEOI/CEOI and SINCGARS transmission security (TRANSEC) variables. The RDG consists of three components: the AN/CSZ-9 (a non-deterministic generator), the battery power pack, and its connecting cable system. The power pack requires five BA-30/"D" cell batteries for operation. The computer must have at least one serial communications port (RS232/SERIAL) available for the RDG and DTD.

(3) The DTD is a storage device which is loaded by the PC with all JCEOI/CEOI data, SINCGARS electronic counter-

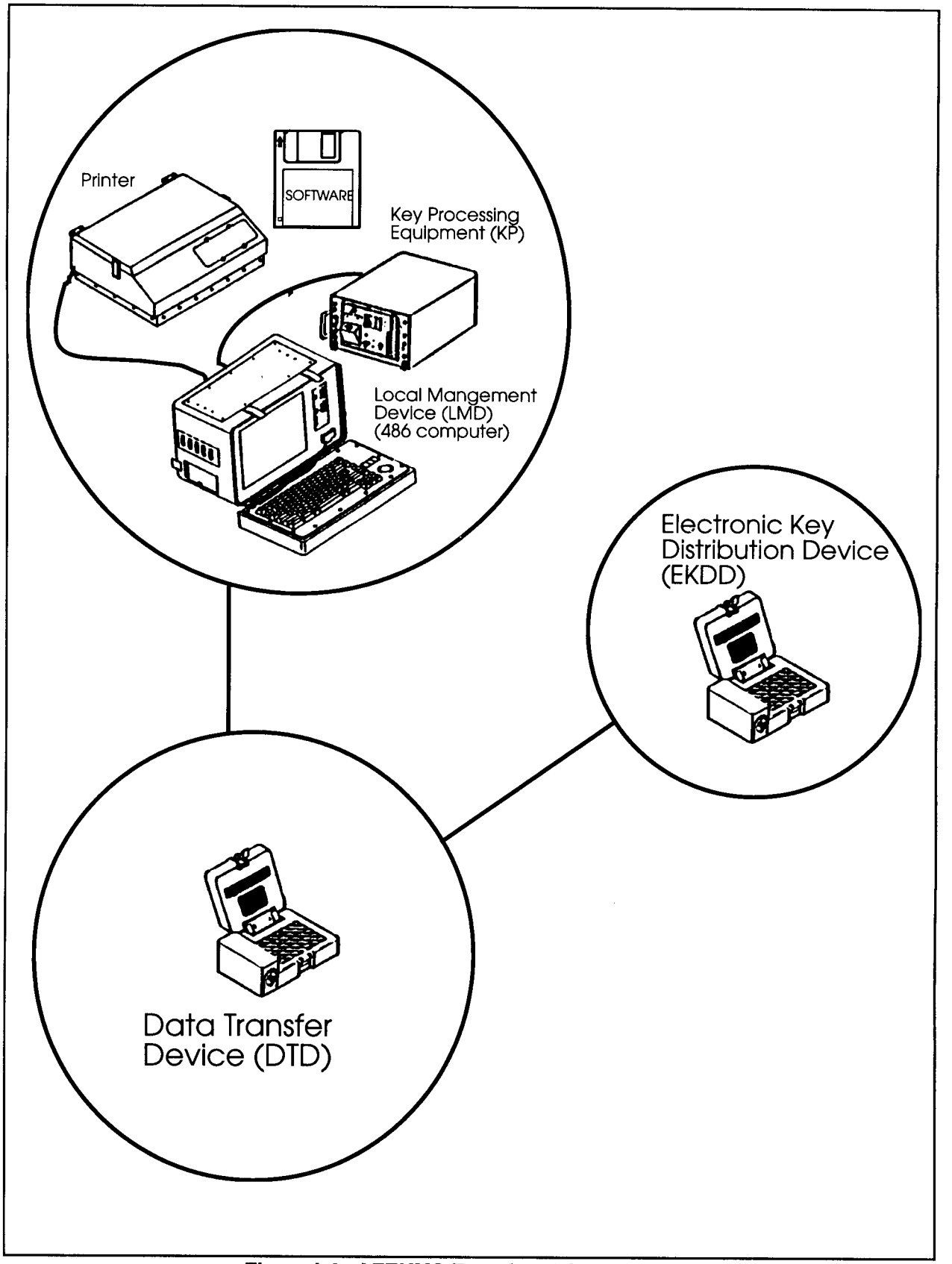

Figure I-4. AFEKMS Functional Components

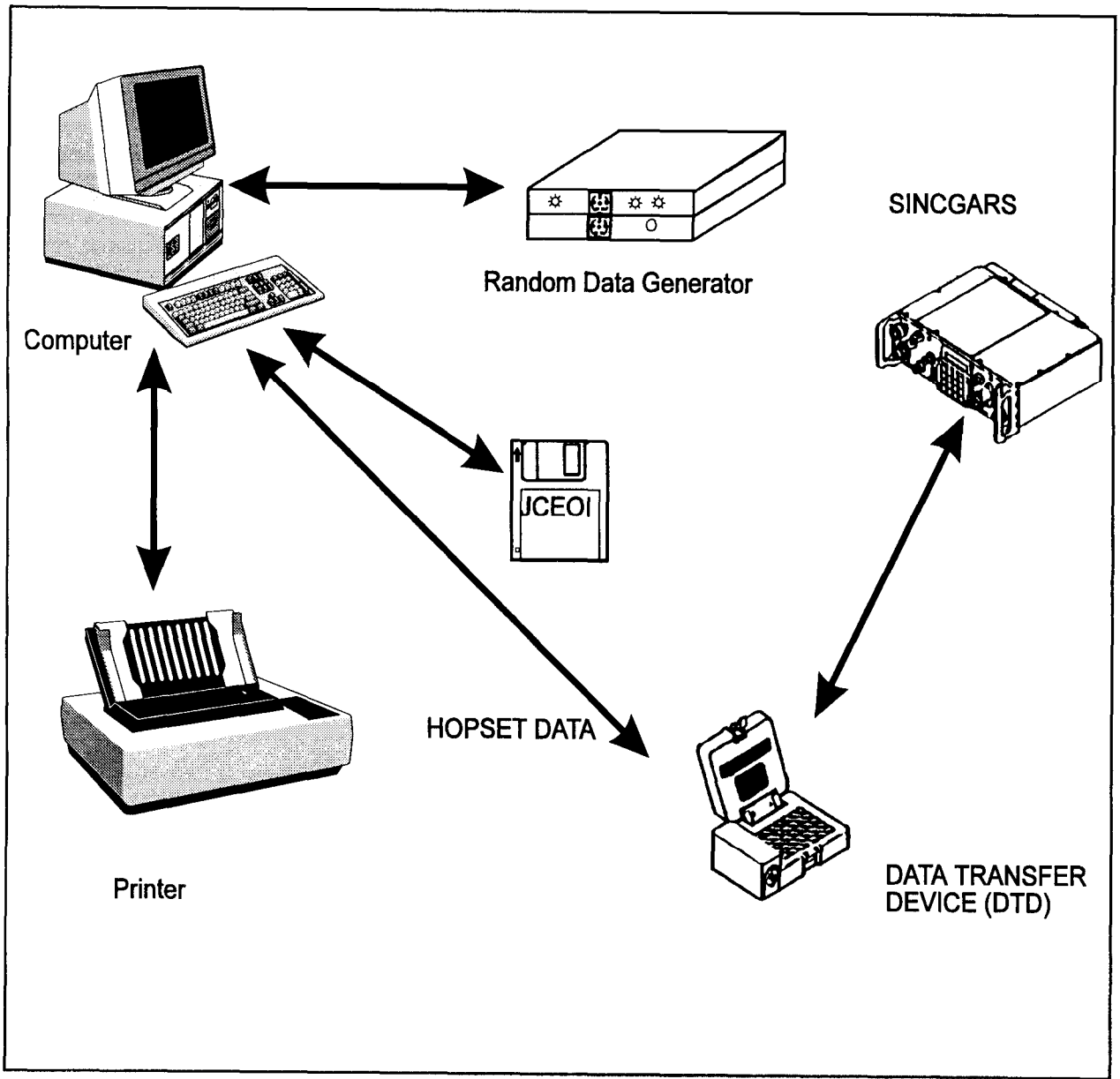

Figure I-5. Basic RBECS System

countermeasures (ECCM) data (hopsets, lockouts, etc.), and TRANSEC keys. The ANCD/DTD is also loaded with COMSEC keys (TEKs and KEKs) when used in conjunction with a SINCGARS radio RT-1523, RT-1523A, or KY-57/58 equipment. The ANCD/DTD is intended to replace the KYX-15/KYX-15A and KYX-13 devices. An ANCD/DTD can transfer data from one ANCD/DTD to another, as well as send selective data over the air via VHF-FM broadcast using SINCGARS.

b. For the ARC-210, the Navy uses the ARC-210 Fill Program (AFP) running on an MS-DOS PC or Tactical Air Mission Planning System (TAMPS) to generate an ARC-210 loadset file. The AFP user can manually enter Have Quick, single-channel, and aircraft selection data. The AFP user can also import SINCGARS loadset files from the RBECS system. The ARC-210 loadset file is loaded into an (AN-CYZ-10) DTD running consolidated single-channel radio ECCM package (CSEP) application software. The

DTD running CSEP can then load ARC-210 radio(s) using the DS-101 interface.

c. The Navy Key Management System (NKMS) provides an automated key management system for the distribution and management of encrypted key within and between the commanders in chief (CINCs)/ services IAW EKMS. NKMS is being implemented in two phases.

(1) Phase I distributed LMD installed with Automated Navy COMSEC Reporting System (ANCRS)/COMSEC Automated Reporting System (CARS) software, secure telephone unit III (STU-III) telephones, and AN/CYZ-10 to all account holders. As a part of Phase I, the software at Director Communication Security Material System (DCMS) and COMSEC material issuing office (CMIO) has also been updated.

(2) The EKMS Phase II distributes the key processor (KP), X.400 communications software, and bar code readers and updates the LMDs. Local COMSEC management software (LCMS) that allows the LMD to communicate with the KP replaces ANCRS/CARS software. Figure I-6 illustrates the major functional components of NKMS.

15. Marine Corps Equipment

a. The RBECS FH module and SOI (less call signs) module are applications software within a higher level systems planning engineering and evaluation device (SPEED) system. A third module, frequency assignment, completes the total functionality of SPEED. This module accesses multiple databases to achieve frequency deconfliction and minimize cosite interference. SPEED resides on the Fleet Marine Force end user computing equipment (FMF EUCE), AN/ UYK-83/85, and lightweight computer units at the Marine expeditionary force (MEF) and major subordinate command (MSC) levels. The Marine Corps uses the AN/CYZ-10 DTD for both COMSEC and TSK fills at all levels. SPEED produces the following two SINCGARS-related products:

(1) Classified, paper printout containing unit identification, frequencies, and call signs.

(2) FH parameters for down loading via the DOS *"shell"* into a DTD.

b. In the future, the Navy Key Distribution System (NKDS) will provide the call sign variable as well as TSK and COMSEC keys to support the SINCGARS program for the Marine Corps. The NKDS LMD loads COMSEC and TSK into the SPEED (AN/UYK-85, lightweight computer unit). NSA provides both keys, but the COMSEC custodian controls them.

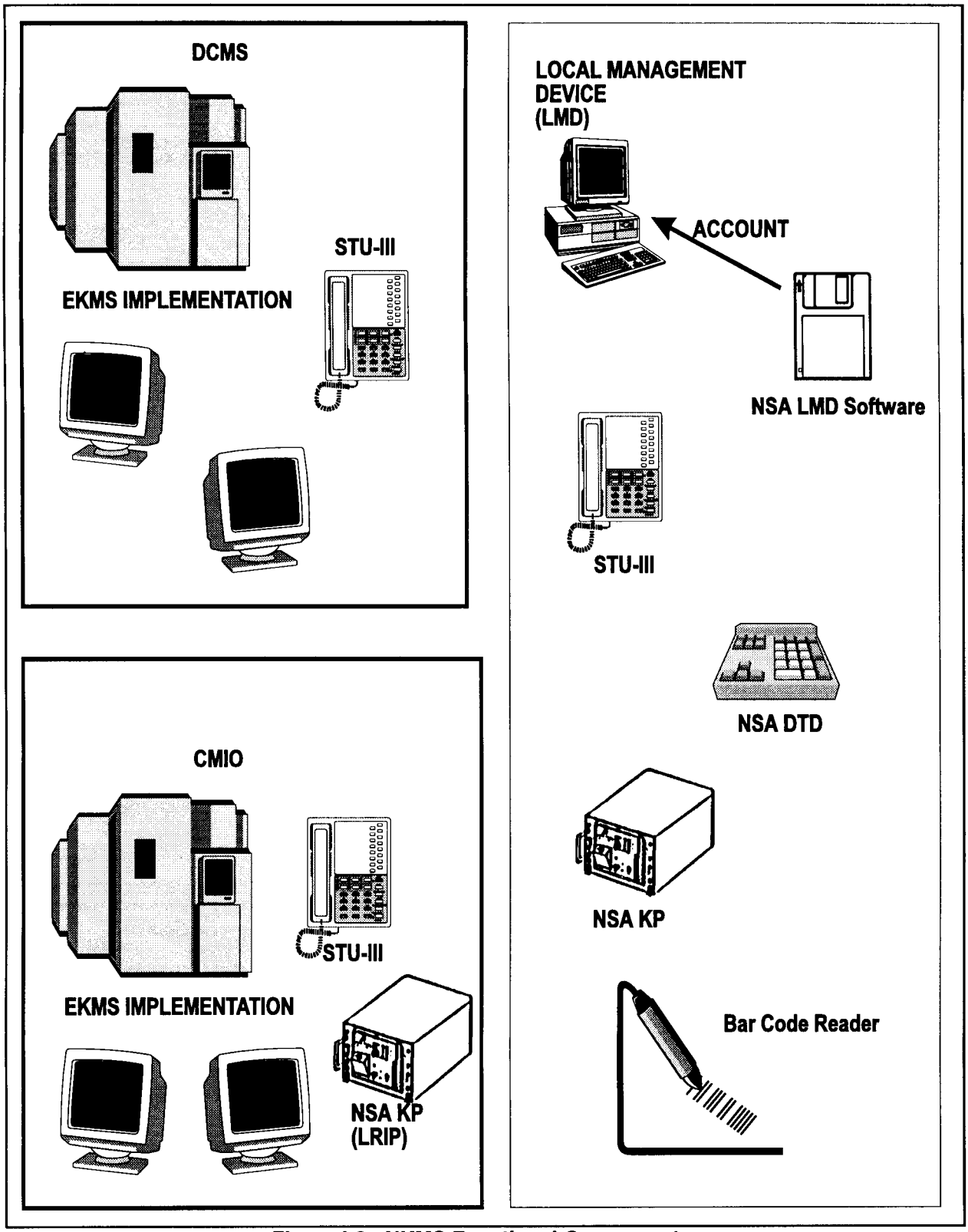

Figure I-6. NKMS Functional Components