

Chapter 3

Special Communications System

3-1. System Description

a. The SCS permits direct, automated, real-time communications in support of joint forces requiring rapid deployment or redeployment. SCS terminals send and receive record narrative messages over a 5 kHz, narrowband satellite channel.

b. The SCS operates in the UHF spectrum using the 225 to 400 MHz band. The Army, Navy, and Air Force operate SCS terminals. They consist of satellite communication terminals AN/GSC-40, AN/GSC-40A(V)1, AN/GSC-40A(V)2, and AN/MSC-64(V)2.

c. The SCS terminal, AN/MSC-64(V)2, is a highly mobile set installed in an S-280 type shelter. The rack-mounted combined ground command post terminal (CGCPT) AN/GSC-40(*) (V) (*) is configured to the needs of the fixed site at which it is installed.

3-2. Deployment

a. SCS terminals are deployed in Europe and Korea. All Army terminals function within a TACSAT network made up of force terminals (FTs) and command post (CP) equipment.

b. All SCS terminals deployed in a theater are operated as a network. The US Pacific Air Force has operational responsibility for all Air Force SCS terminals in the Korean theater. The US Army provides off-site maintenance support for US Air Force terminals in the Korean theater. Within joint commands, the US Army component commands are responsible for operation and maintenance of the SCS terminals assigned to their subordinate units.

c. SCS terminals deployed to Europe and Korea support Army, Navy, and Air Force real-time communication requirements for on-going special missions.

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3-3. Employment

a. The SCS terminal is a single-channel TACSAT set. Each SCS terminal uses an I/O device. The device has a keyboard and display for editing and composing narrative traffic. The keyboard and display equipment is the I/O unit MX-10159/G that functions as the sole subscriber data terminal equipment (DTE). The AN/MSC-64(V) and AN/GSC-40(V) are self-contained terminals.

(1) The AN/MSC-64(V)2 contains a complete communications system housed in an S-280 shelter, carried by a 2 1/2-ton truck, and powered by a trailer-mounted, 10-kilowatt generator. The AN/MSC-64(V)2 can also be powered by the vehicle engine with a 100 amp kit. The I/O unit organic to the terminal is the primary DTE and can be remoted up to 1,500 feet (455 meters). A low gain antenna is used during mobile operations. A high gain antenna is used during stationary operations.

(2) The AN/GSC-40, AN/GSC-40A(V)1, and AN/GSC-40(V)2 are rack mounted CGCPTS. These terminals are installed in CPS and configured according to the physical limits of the site.

b. A high degree of network flexibility is accomplished by using a TDMA control structure and a CGCPT. This technique allows communications to be executed on a time-shared basis between other terminals within the theater network. The terminal can operate in the random or time division multiplexing (TDM) modes. The random mode of operation allows the user to enter the TACSAT communications network on a random basis using an open selected channel.

3-4. Control and Management

a. The control and management procedures discussed here pertain to the communications between AN/GSC-40(V) and AN/MSC-64(V). The AN/GSC-40(V) performs the network control function (NCF) for a net of AN/MSC-64(V) FTs.

b. The NCF, normally located within a CP, performs the following subnet control actions:

- Transmits network timing synchronization message for initialization of a terminal entering the network and for retiming all receivers within the network.
- Transmits satellite operating mode for use by FTs.
- Transmits crypto-control data.

- Performs message preemption to allow transmission of a message with a higher precedence.
 - In stressed mode, identifies each frame, establishes priorities, and dynamically assigns use of next slot.
- c. The FTs perform the following control actions:
- Acknowledges/transmits messages.
 - Loads and monitors the synchronization code.
 - Selects transmit channel and time slot.
 - Monitors emergency action message alarm.
- d. The AN/MS-64(V) FT is transported by a 2 1/2-ton truck and trailer, and is crewed by three operators. Other technical data is listed below:
- Frequency range--225 to 400 MHz.
 - Power output-- 10 to 100 watts.
 - Operating mode--AFSAT.
 - Modulation type--Noncoherent frequency shift keying (FSK).
 - Data rate--75 bps.
 - Encryption device--TSEC/KN-2.
 - Spread spectrum technique--FH.

3-5. Antijamming and ECCM Techniques

a. The SCS uses FH emission techniques as an ECCM capability and terminal hardening against the effects of EMP. The CGCPT uses wideband operation of coded m-ary FSK, pseudorandomly generated, suppressed carrier RF burst that is frequency hopped. This type of RF emission provides excellent ECCM protection for discrete addressing, message privacy, and multiple addressing. For narrowband operation, noncoherent FSK is used.

b. Wideband operation is only used between the CGCPT and the National Command Authority AFSATCOM terminals. SCS, a UHF system, lacks any antijamming protection to the TACSAT terminal outside of the emission techniques listed previously. The short transmission times of burst communications present less attractive jamming targets than do longer

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continuous communications of regular nets. The only options available to TACSAT UHF terminals, in addition to short burst communications, are alternate frequency selection and mobility.