

REPORT ON
SELECT RADIO COMMUNICATION TOPICS
OF THE
CUERPO ESPECIAL DE SEGURIDAD (CES)
OF HONDURAS

FEBRUARY 2, 1973

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INTRODUCTION

At the request of the USAID Mission to Honduras, an in-country study was conducted for the purpose of reviewing certain aspects of radio communication development and technical support needs for the Cuerpo Especial de Seguridad (CES). This organization is an element of the Honduras military forces and is responsible for police-oriented duties within the entire republic.

The study was undertaken from January 22 through February 2, 1973 by Mr. Alfred W. Naurocki, Public Safety Telecommunications Advisor, USAID/Guatemala.

The scope of the study focused on three primary areas, as follows, which were of current significant interest to the USAID Mission and the Director of CES.

- I. An appropriate equipment recommendation to establish a new inter-island narcotics control radio communication network for the islands of Roatan, Utila, and Guanaja off the north coast area of Honduras. A similar specialized network is also to be considered for the city of San Pedro Sula, a major business and industrial area, and Tegucigalpa, the capital city of Honduras.

- II. To examine and recommend a suitable high-site location for the installation of an available automatic VHF-FM radio repeater

station and its tower which will permit extended vehicular communications for a highway patrol program.

III. To review the current effectiveness of radio maintenance practices by CBS radio technicians with recommended approaches for improvement of these vital services.

Each of the above topics is separately treated in the subsequent sections of this report. The need to improve the current capabilities for knowledgeable maintenance and support of past and contemplated radio equipment inputs is given special importance due to its close inter-relationship with the operation and long-term effectiveness of any communications network.

I. NARCOTICS CONTROL COMMUNICATION NETWORK

A. Operational Requirements

The principal network is to provide a means of communication among the islands of Roatan, Utila and Guanaja located about 65 KM off the north coast of Honduras. The island of Roatan is to be the focal point for this inter-island communications network. An island to mainland link is also required i.e. long-range communications from Roatan to Tegucigalpa.

A potential secondary requirement is to have the city of San Pedro Sula and Tegucigalpa also capable of having a means of communication with each other as well as Roatan Island on a long-range direct communications basis.

Within the jurisdiction of the islands of Roatan, Utila and Guanaja, local short range contacts are to be available using portable, hand-held radio units. These portable units are to be capable of communicating on a portable-to-portable basis or directly with their local control station on any island.

This same arrangement is to apply to San Pedro Sula and Tegucigalpa if deemed appropriate. All portable radios are to be mutually compatible for immediate operations regardless of the particular city or island at which they may be employed.

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B. Proposed System Description

The operational requirements for an inter-island communications network can be satisfied by use of VHF-FM high-band radio station installed in the major town on each island. Roatan would act as the focal point for information received from Utila and Guanaja. In addition to the VHF-FM base station at Roatan, a high-frequency single-sideband (HF-SSB) radio would also be installed there to provide long range communications with Tegucigalpa. This same HF-SSB radio would also be able to contact both San Pedro Sula and Tegucigalpa should like HF-SSB base stations be placed at these latter locations.

Compatible VHF-FM portable hand held radio units where employed will have contact with any VHF-FM radio base station in its immediate area.

In the case of the potential secondary requirement for like radio networks in the San Pedro Sula and Tegucigalpa metropolitan areas, it is considered that the effectiveness of the portable radios and base stations in the VHF-FM network be extended through use of two channel radios. Thus one channel can be utilized for operation via the CES automatic radio repeater station and the second channel can be used on an exclusive portable-to-portable or direct-base-to-portable arrangement.

C. Proposed Equipment

A listing of the recommended equipment and necessary materials proposed for satisfying the above needs is given in Attachment I. The listing groups the equipment according to its intended area of use as follows:

- a. Inter-island Communications (Roatan, Utila, Guanaja)
- b. VHF-FM and HF-SSB Equipment for Tegucigalpa and San Pedro Sula
- c. Optional VHF-FM Hand-held Portable Radios (All stations)

For the inter-island VHF-FM base station equipment, only single channel radios are proposed as they would be too distant to activate the CES repeater. All portable units are two channel types.

The frequencies proposed in the equipment listing offers compatibility with a limited number of CES radios. More effective coordination is thereby possible with CES forces when necessary. In the event special sensitive messages must be relayed over the network, simple voice codes known only to select radio users can be incorporated as part of the operational plan. These codes can be periodically changed as required. Completely new frequencies for the proposed equipment can be obtained with the authority of the Ministry of Telecommunications if absolutely required. How-

ever, a careful review should be undertaken as to the value of reducing the flexibility of this equipment by eliminating the frequent need to coordinate with other CES elements.

II. HIGH-SITE LOCATION FOR THE CES HIGHWAY PATROL RADIO REPEATER

A. General Considerations for Site-Selection

The purpose of this segment of the activity was to determine a suitable location for a VHF-FM automatic radio repeater station to be used for highway patrol purpose. This repeater was the second of two similar units procured for this class of service. The reasoning to employ VHF-FM repeater radios for highway patrol functions was based on an earlier study which also selected the first high-site called "Cerro de Hule", about 25 KM south of Tegucigalpa. (See reference No. 4)

Considerations attendant to use of the second repeater were the density of highway traffic along the longest routes that could be patrolled while maintaining radio contact with highway patrol headquarters. The town of San Pedro Sula was found to be a key area for traffic it being near the intersection of several major highways.

Opportune use was made of a nearby high-site called "Sierra de Omoa" upon which a microwave station was in operation. The site is at an altitude of 3231 feet located twenty kilometers directly

north of San Pedro Sula. Radio tests conducted from the site to a test vehicle traveling west over the highway from San Pedro Sula toward Guatemala confirmed good radio contact along most of the semi-mountainous terrain. The expected communications range is estimated to be at least 100 KM or better in all highway directions out of San Pedro Sula. The highway traffic control center is to be located in San Pedro Sula for controlling the radio-equipped patrol vehicles. Radio messages from San Pedro Sula to Tegucigalpa will continue to be transmitted via the HF-SSB link which is presently used to connect these two metropolitan centers. It is therefore recommended that "Sierra de Omoa be selected as the site for the second radio repeater installation.

B. Installation

In a like manner as done for the first radio repeater installation at Cerro de Mule, a private contract to install the other repeater at Omoa will have to be arranged by CES authorities. The CES technicians are not capable of this task. As a potential contractor, Mr. O. Danilo Funes, Chief radio technician for the Central American Air Navigation Corporation (COCESNA) should be considered for this new installation based on his experience on radio systems.

The high-site is serviced by electrical power lines. Permission

to use the site, including the existing microwave building and electrical power will have to be obtained through CES authorities. The proposed contractor said he would also assist in this regard. A 200 foot guyed tower was provided along with the repeater station. However only 60 feet of tower will be required to be erected at the high-site for the antenna due to the natural height advantage already available at this location. The remaining tower sections can be reserved for use where other VHF-FM stations may be planned.

A dirt access road to the Omoa site is in poor but passable condition. Nevertheless, it would be beneficial to have repairs made on this road by the Ministry of Public Works to facilitate transportation of equipment and materials as well as future maintenance trips.

The installation of the repeater and tower at the Omoa site when properly completed should provide the necessary radio coverage for an effective highway patrol system.

C. Recommendations

1. The Sierra de Omoa site should be selected for installation of the VHF-FM Radio Repeater to operate with highway patrol headquarters located in San Pedro Sula.

2. A private contractor should be employed to install the repeater station and tower for CES. Only 60 feet of tower is to be installed at the new location.

3. The contractor in conjunction with CES authorities should request use of the microwave building and electrical power at the Omoa site.

III. RADIO COMMUNICATIONS MAINTENANCE SUPPORT EFFECTIVENESS

A. General Situation

The Cuerpo Especial de Seguridad has acquired a significant amount of advanced types of radio communications equipment during the past seven years. In that period of time, a spacious radio maintenance shop and a simple, but functional communications control room have been established under USAID Public Safety guidance in the Casamata headquarters compound of CES.

Nevertheless there is ample evidence of an endemic deficiency in the capability of the CES organization to technically support its equipment maintenance needs. Operational effectiveness is likewise affected in properly controlling day-to-day criminal activities throughout the country. Several years earlier, the services of a full-time Public Safety Communications Advisor were available for the first time to assist CES for about two years. During this period, a series of communication sets were installed within Tegucigalpa and the country. Ground work was initiated at that time for the establishment of the radio maintenance shop and communications control room (See reference No. 1). Short term TDY assistance was also provided in later years to install further inputs of radio equipment for CES (See reference No. 2)

There was at the time minor attention focused on the development of an organizational self-sufficiency for the long-term upkeep

of this equipment due to the need for its prompt installation and its proper functioning while new. With the gradual aging of the units and attendant need for knowledgeable servicing, the lack of qualified technical expertise has become apparent. Many items of reasonably new radio equipment has been observed out-of-service and in storage ostensibly for lack of parts, but substantive conversations and spot checks disclosed in many cases, that the primary obstacle was improper diagnosis of equipment faults compounded by crude and often damaging service procedures.

These current findings of maintenance effectiveness corroborate those of earlier TDY communications observers who also have reported in-depth on this matter. (See reference No.'s 3 and 5). The recommendations presented in these earlier reports are still valid to date. Thus far, there has been no known effort to implement, in a firm manner, these earlier recommendations. In general, current observations substantiate the earlier recommendations which covered improved administration and organization of the maintenance section and associated records, development of spare parts control and procurement procedures, obtaining a more adequate budget for technical support and above all, the employment and training of better qualified technicians who can sustain all CES radio equipment in a functioning condition.

Future plans for new equipment such as that intended for a proposed narcotic control network can have a short-term benefit if maintenance responsibility is placed under the present CES technicians. The current individual assigned as the Chief of Radio Communications is in charge of the day-to-day communications control center operation as well as radio maintenance activities. Little inclination to assume full organizational responsibility and leadership in either the operations or technical side of the Dept. of Radio Communications has been positively demonstrated by him. The Commander of CES may be aware of and accept the limitations of his Chief of Communications at the present time.

It is considered that if improvements are to be achieved in the above areas, they can best be achieved through the continued attention of a full-time telecommunications advisor to develop a self-sufficient technical support capability for CES.

B. Recommendations

1. The USAID Public Safety Division, in conjunction with the Commander of CES, should jointly review the reasons for the lack of an appropriate radio communications maintenance program and plan a suitable course of action to remedy the situation. Several alternative approaches are offered as follows:

- (a) Re-define the officer-level job function of the Chief of Communications to allow his exclusive attention to his job as a radio technician rather than as a command-level officer. Military tasks such as participating in patrol operations, duty officer, etc. should be deleted from technician responsibilities. In this manner, the individual may eventually reach higher level technical skills by exclusive continued attention to radio repair tasks.
- (b) The establishment of a civilian-type position can be considered for the technical aspects of the work of the Dept. of Radio Communications. A Command officer-level individual can continue with the operational aspects including supervision of the CES Communications Central Center. The Chief technician would be under the jurisdiction of the commanding officer in charge of the overall Dept. of Communications.
- (c) The employment of another more qualified individual can be considered with sufficient administrative, organizational and technical capacity to replace the current Chief of Communications.

2. The assignment of a full-time Public Safety Communications Advisor for a minimum two-year period should be undertaken as soon as possible by the USAID/Honduras mission. External assistance of this type will be required if a satisfactory start is to be made in the development of a self-sufficient technical support capability for the present and future radio equipment of CES.

IV. DISCUSSIONS OF TOPICAL INTEREST WERE DISCUSSED WITH THE
FOLLOWING OFFICIALS:

Ambassador Hewson A. Ryan

Mr. Robert D. Davis

Deputy Chief of Mission

Mr. Edward Marasciulo

USAID Mission Director

Mr. José Cisneros

Acting Chief Public Safety
Advisor

Mr. Raymond Rifenburg

Assistant Program Officer

Col. Policarpo PAZ García

Commander, CES

Sub. Lt. Luis VALDEMAR Santos

Chief of Radio Communication CES

Mr. Raul Alejandro ESPINAL

DIN - Narcotics Section

Mr. O. Danilo FUNES

Chief Radio Technician -
COCESNA

V. REFERENCES

1. "End-of-Tour Telecommunications Technical Report for Honduras Civil Security Forces" August 30, 1968, by Arnold Elliot - USAID/Honduras Public Safety Telecommunications Advisor.
2. "Report of Installation of Radio Equipment Procured for the Cuerpo Especial de Seguridad of the Republic of Honduras" February 20, 1969 by Robert L. Yates, Public Safety Telecommunications Advisor.
3. "Honduras Telecommunications Review" April 1969 by Alfred Naurocki, Telecommunications Branch, Office of Public Safety, AID/W.
4. 2-Way memorandum of September 25, 1969 to Mr. Arthur Russell, Chief Public Safety Advisor USAID/Honduras from James L. McMahon Chief, Technical Services Division OPS/AID/W re:VHF-FM Radio Repeater Procurement.
5. "Special Report on the Honduras Cuerpo Especial de Seguridad Radio Maintenance Center", March 31, 1971 by Albert W. Carpenter, Technical Services Division, Office of Public Safety, AID/W.

ATTACHMENT I

Specifications for Recommended Equipment and Materials

FOR A

VHF-FM Radio Network (Narcotic Control)

A. Inter-island communications (Roatan, Utila, Guanaja)

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>ESTIMATED TOTAL COST</u>
1	3	<u>VHF-FM Radio Transceiver</u> , battery-operated 12VDC mobile dash-mount type for base station service; transistorized; less mobile antenna; transmitter power output 60 watts minimum; narrow-band modulation; single channel type; transmit/receive frequency: 154.570 MHz. \$1,000 ea.	\$ 3,000
2	1	<u>Lot VHF-FM Spare Parts Lot</u> including 100% transistors diodes, fuses, final ampl. tubes etc., not to exceed 10% of above item 1 cost.	300
3	1 ea.	<u>HF-SSB Mobile Radio for Base Station Service-100 Watt</u> PEP minimum output; USB/LSB selection; 2-12 MHz frequency range; minimum four channel, crystal controlled frequency selection; front panel speech clarifier control required; to be supplied complete with microphone and an antenna dipole kit tuned to the following frequencies: Channel one-3540.0 KH ₂ ; channel two-4048.0 KH ₂ ; channel three-5737.0 KH ₂ ; channel four-7405.0 KH ₂ Input Voltage: 12 Volts D.C. ea. \$1,600	1,600
4	1 lot	<u>HF-SSB Spare Parts Lot</u> including 100% transistors, diodes, fuses final ampl. tubes etc., not to exceed 10% of above item 3 cost.	160
5	2 ea.	<u>Masts, antenna support</u> 30 ft. height; telescoping tubular type; complete with base plate and guy wires. ea. \$80.00	160
6	2 ea.	<u>Antenna, VHF 3 db gain</u> , cardioid pattern; folded coaxial type for low angle radiation; D.C. ground lightning protection; type UHF female termination required; operating frequency 154.570 MHz supplied complete with mounting accessories (Motorola type 1010 B or equal). ea. \$90.00	180

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>ESTIMATED TOTAL COST</u>
7	1 ea.	<u>Antenna VHF</u> ; 3 db minimum gain; omni-directional pattern; coaxial gain type; light weight; D.C. ground lightning protection; type UHF female termination required; operating frequency 154.570, supplied completed with mounting accessories. ea. \$150	150
8	3 ea.	<u>Tower, antenna support</u> - galvanized, self-supporting type; 80 foot height; 30 lbs/sq. ft. wind loading; for concrete base mounting; complete with ground rod, clamp and wire for earth ground connection at base of tower. ea. \$600	\$ 1,800
9	1 roll	<u>Coaxial cable</u> , RG/8U type; 500 ft. roll	90
10	10 ea.	<u>Connectors</u> - Coaxial UHF type PL-259	10
11	4 ea.	<u>Battery</u> , rechargeable lead-acid type; 180 Ampere-Hour Capacity; Dry-charge, heavy duty type with electrolyte to be separately included. ea. \$60	240
12	3 ea.	<u>Battery charger</u> 12 VDC; 15 Ampere maximum output with charge ammeter. For Trickle Float charge service 115 VAC, 60 cycle input. ea. \$80	240
13	2 ea.	<u>Voltage step-down transformer</u> 200/240 VAC input; 115 VAC output 50/60 cycles; 400 VA; Acme Electric Corp. N.Y. Type T-10267. ea. \$35	70
Total estimated net cost			\$ 8,000
Surface transportation 10%			800
GSA Surcharge 8%			700
Total cost estimate			<u>\$ 9,500</u>

NOTE: 1. In the event an inter-island coastal patrol boat is later considered for use by CES, an additional VHF-FM radio of the type specified in item one is suitable for such marine mobile service at approximately the same cost. A special marine VHF-FM antenna would be required at an additional cost of about \$50.00

2. A.C. power sources on the islands of Utila and Guanaja are available for short periods of time only. Special arrangements for battery charging and/or use of a standby battery will have to be locally arranged by CES stations on these islands.

B. VHF-FM and HF-SSB Equipment for Tegucigalpa and San Pedro Sula

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>ESTIMATED TOTAL COST</u>
1	2 ea.	<u>VHF-FM radio base station</u> , 100 watts power output; narrow band modulation; local control desk-top model; input voltage: selectable 115 or 220 VAC 60 cycle; two channel type. Chan 1 transmit 154.570 receive 154.570 Chan 2 transmit 154.620 receive 154.010 ea. \$1,400	\$ 2,800
2	1 lot	<u>VHF-FM Spare Parts Lot</u> including 100% transistors, diodes, tubes, fuses etc., not to exceed 10% of above item 1 cost.	280
3	2 ea.	<u>HF-SSB Radio Base Station</u> , 100 watt PEP minimum output; USB/LSB selection; 2-12 MHz frequency range; minimum four channel, crystal-controlled frequency selection; front panel speech clarifier control required; to be supplied complete with microphone and an antenna dipole kit tuned to the following frequencies: Channel one-3540.0 KHz; Channel two-4048.0 KHz; Channel three-5737.0 KHz; Channel four-7405.0 KHz; Input voltage: Selectable 115 or 220 VAC 60 cycle. ea. \$1,600	\$ 3,200
4	1 lot	<u>HF-SSB Spare Parts Lot</u> including 100% transistors, diodes, tubes, fuses, etc., not to exceed 10% of above item 3 cost.	320
5	4 ea.	<u>Masts, antenna support</u> - 30 ft. height; telescoping tubular type; complete with base plate and guy wires. ea. \$80	320
6	2 ea.	<u>Antenna-VHF</u> 5 db gain minimum; omni-directional pattern; D.C. ground lightning protection; type UHF female termination required; operating frequency 154.570 MHz; supplied complete with mounting accessories. ea. \$250	500

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>ESTIMATED TOTAL COST</u>
7	2 ea.	Tower, antenna support - 100 ft. height; galvanized; guyed type; 30 lbs/sq. ft. wind loading; for concrete base mounting; complete with base plate, guy wire, hardware and ground rod. ea. \$700	\$ 1,400
8	1 roll	Coaxial cable, RG/8U type 500 ft. roll	90
9	10 ea.	Connectors coaxial type UHF PL-259 - ea. \$1.00	10
Total estimated net cost			\$ 7,920
Surface transportation			780
GSA Surcharge			700
			<hr/>
			\$ 9,400

C. Optional VHF-FM Hand-Held Portable Radio Equipment

1. Option A - VHF-FM hand-held portable transceiver OPS/FM-1 type; 1.5 watts power output; two channel capacity; standard flashlight battery (8-"D" cell) power source.

Estimated cost \$ 350 ea.

2. Option B - VHF-FM hand-held portable transceiver; Motorola or General Electric "Handie-Talkie" model; 3-5 watts power output; two channel capacity; special mercury cell or rechargeable nickel-cadmium battery power source.

Estimated cost \$ 800 ea.

3. Option C - VHF-FM Mobile/portable transceiver; Motorola or General Electric "Porta-mobile" model; 8-10 watts power output; two channel capacity; car battery (mobile) or nickel cadmium (portable) battery power source.

Estimated cost \$ 900

NOTES: 1. Detailed specifications and prices on each above portable radio item are available from the Technical Services Division, Office of Public Safety, AID/H.

2. Frequencies for two channel portable units are to be compatible with those currently given or as later modified for item 1 of parts A and B.

3. Recharging equipment or additional supply of special batteries will be required for options B and C.