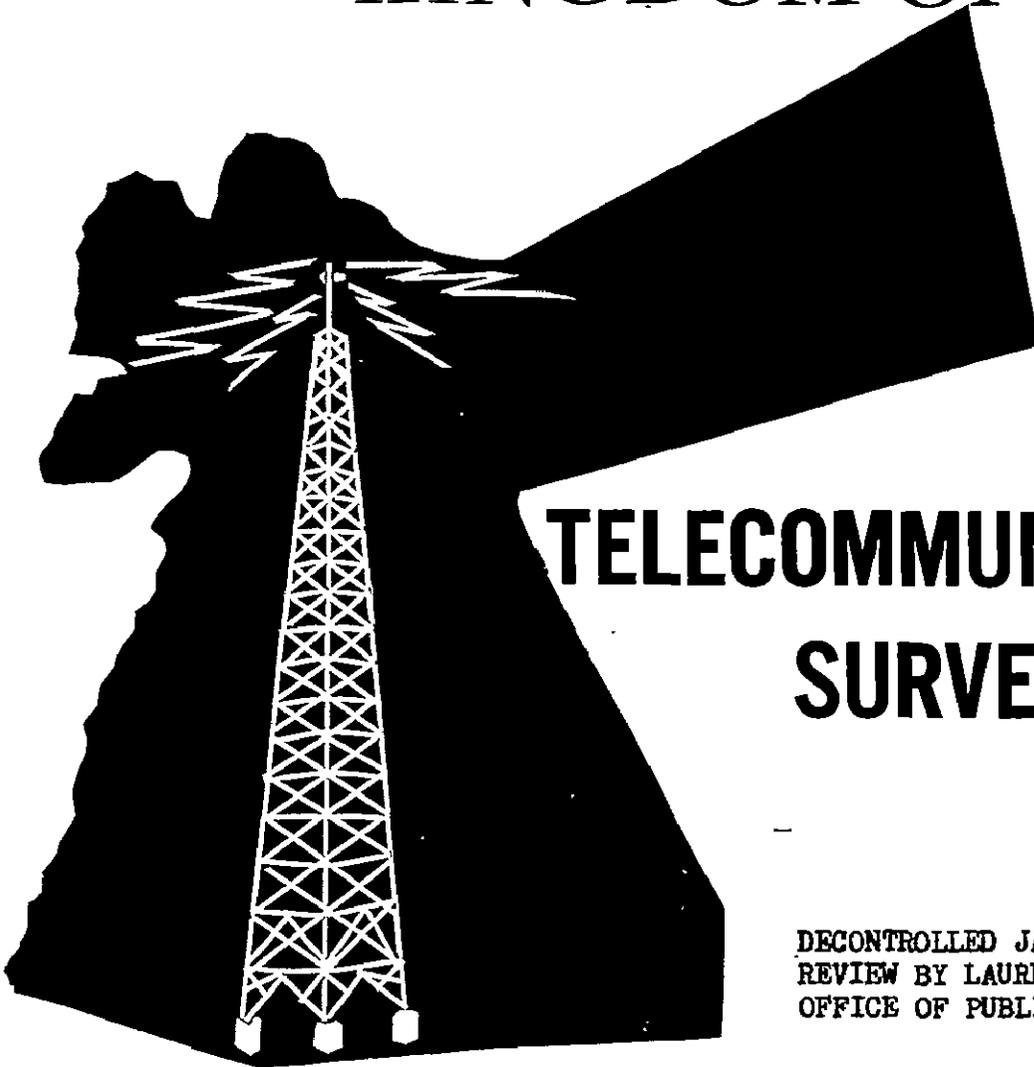


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HASHEMITE KINGDOM OF JORDAN



POLICE TELECOMMUNICATIONS SURVEY REPORT

DECONTROLLED JANUARY 24, 1975 AFTER
REVIEW BY LAUREN J. GOIN, DIRECTOR,
OFFICE OF PUBLIC SAFETY, AID/W

AGENCY FOR INTERNATIONAL DEVELOPMENT
OFFICE OF PUBLIC SAFETY

NOVEMBER 1964

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POLICE TELECOMMUNICATIONS - SURVEY REPORT

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AGENCY FOR INTERNATIONAL DEVELOPMENT

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INTRODUCTION

A "Survey of the Civil Police Forces of the Hashemite Kingdom of Jordan" by the Office of Public Safety, dated August, 1963 recommended that a telecommunications specialist from the Office of Public Safety make a study of communications problems. In response to a USAID/J request, the recommended study was conducted from October 15 to November 15, 1964. The study, the results of which are provided in this report, covered:

1. The various types of communications networks in operation or needed by the Public Security Forces, and an evaluation of their present capabilities.
2. The identification of major problem areas, and recommended solutions.
3. The prediction of future commodity and logistic support and training requirements to be used as a basis for Joint Kingdom of Jordan and USAID/J planning.

Meetings were held with Major General Hikmat Muhyar, Director of Public Security, and with his assistant, Brigadier General Kazim Abu Ghazaleh. Daily meetings were held with Lt. Fu'ad Hamokah, Chief of Communications, and with his staff members. Several field trips were made with Lt. Hamokah to inspect equipment installations and to observe operations in distant parts of the Kingdom and to study topographical conditions related to radio transmission paths.

In addition, meetings were held with Government Post Office (GPO) communications representatives Mr. Saleh Atiyat, Chief Engineer and Mr. Tagi el Farouki, Technical Director. Colonel Hyndman and Major Kast of the U.S. Army (military Atache) were conducted regarding military planning. Interviews were held with Mr. Emil Quebeisi, Manager of the Civil Airport and with Capt. Ali Murayan, Chief Signal Officer of the Royal Air Force.

The Chief of the Public Safety Division, Jordan and the AID/W representative held a lengthy discussion with Lt. Colonel Badri Khair, Director of Civil Defense, concerning civil defense planning and coordination and including communications requirements.

GLOSSARY

ALPHABETICAL DESIGNATIONS

USAID/J	-	United States Agency for International Development, Jordan
OPS	-	Office of Public Safety, AID/Washington
GOJ	-	Government of Jordan
GPO	-	Government (General) Post Office, Jordan
CD	-	Civil Defense

TECHNICAL TERMS

Carrier, Telephone - A method used to superimpose one or more channels over and above the single circuit available through standard telephone pairs.

Channel - A means of one-way transmission. Multi-channel equipment provides several channels for transmission over one means of conveyance, such as the telephone carrier equipment.

Circuit - A means of two-way communication between two points, comprising both send and receive channels.

Crystal - A crystal is a frequency determining device used in radio equipment to provide a stable source of control of the operating frequency (or channel).

Frequency Modulation (FM) - The form of modulation in which the instantaneous frequency of a carrier wave is deviated with modulation, rather than the amplitude or power of the carrier

High Frequency (HF) - Frequencies from 3 to 30 megacycles. Used for long distance point-to-point communications.

Patch - Electrically connecting two or more circuits together.

Simplex - That type of operation which permits the transmission of signals in either direction alternately. In the context of this report, wherein simplex is to be used by the Highway Patrol - the method permits vehicle to vehicle as well as base station to vehicle communications.

Single Sideband Transmission (SSB) - That method of communication in which the frequencies produced by the process of amplitude modulation on one side of the carrier are transmitted and those on the other side are suppressed. The carrier frequency may be either transmitted or suppressed, but is usually suppressed. Equipment is usually used for voice transmission, but may be used for telegraph or teleprinter operation.

Very High Frequency (VHF) - Frequencies from 30-300 megacycles used for line-of-sight communications. Normally employed by police forces for city-wide radio patrol operations and for highway patrol communications.

GENERAL INFORMATION

The Hashemite Kingdom of Jordan has an area of 37,000 square miles, the eastern portion of which is mostly desert area. The western portion of Jordan is divided into two distinct areas by the Jordan River Valley and the Dead Sea. The western area, bordered by Israel, is called the West Bank area and the portion east of the river is called the East Bank. The river valley area reaches a depth of more than 1300 feet below sea level, while the central portion of Jordan is a high plateau area reaching an elevation of more than five thousand feet. Jordan is bounded on the North by Syria, on the NorthEast by Iraq, and on the East and SouthEast by Saudi Arabia.

Amman the Capital is a city of 250,000 inhabitants with another 50,000 residing in the metropolitan area. Other large cities, located mostly in the West Bank area, include Jerusalem (115,000 people), Nablus (180,000 people) and Hebron (125,000 people). Total population of Jordan is approximately 1,800,000.

The Police organization consists of nearly 6,000 men and the communications staff of approximately 185 men.

Aquaba, a small city, is the only seaport and is located at the extreme South-Eastern tip of Jordan. An excellent highway connects the port with the Capital, Amman. Large stretches of this highway are devoid of human habitation. An abandoned historical city, Petra, located near this highway has become a favorite tourist spot and vehicle traffic is rapidly increasing over this, the only major artery in southern Jordan.

A single track railroad connects Amman with a phosphate mining area a short distance south of Ma'an, the only sizeable city in the southern portion of Jordan. Limited local air service is available from Amman to Aquaba and to Jerusalem.

The Government Post Office has limited open-wire telephone circuits to all of the major cities, however service is often poor causing considerable delay in getting calls through.

SUMMARY

The Public Security Forces (civil police) operate and maintain their own communications system independently with the exception of a few leased telephone circuits. Police requirements include long distance point-to-point networks, city police radio patrol operation, highway radio patrol operation and intra-service communication.

The communications survey disclosed the fact that all police communications requirements were not being met as efficiently as they should be, although the communications personnel should be commended for doing as well as they were doing with the equipment provided them. The presence of some new single-sideband equipment and some relatively new VHF equipment indicated that budgetary support to the police was not completely lacking although perhaps limited. Incompatibility of different types of equipment and improper selection to meet specific communications requirements pointed up the need for technical assistance. Repeated discussions with technical personnel evidenced a high degree of receptiveness to constructive guidance.

To effect a more efficient operation and to meet communications requirements not being adequately fulfilled at this time, the following recommendations are offered:

1. Initiate a highway radio patrol system by providing base and mobile radio equipment for the most strategic cities and highway segments. To be augmented by additional units during subsequent fiscal periods.
2. To improve operational methods in handling public complaints and emergency calls by the city police radio patrols through technical guidance.
3. Provide city of Amman police with modern, higher-powered, transistorized mobile radio equipment; provide remote controlled base station and install at a more effective transmitting location. Transfer present equipment to a smaller city with flat terrain.
4. Provide services of a telecommunications advisor to assist in training, logistics supervision, future planning and day-to-day guidance.

OBSERVATIONS AND CONCLUSIONS

The Jordanian Police communications system reflects considerable effort on the part of officials concerned to provide essential communications in support of their overall police mission. However, the present system has limited capabilities and the communications organization leaves much to be desired. An insufficient number of technically qualified technical personnel has contributed to the general unreliability of the police communications system and has resulted in the purchase of new equipment which has not been compatible with existing facilities.

Plans to replace obsolete equipment on a time-phased sequence, to provide new facilities suitable to the police requirements, or to expand small systems with additional units have not been initiated. The ability of telegraph operators to handle message traffic expeditiously and the skill of the technicians in the repair of defective equipment using the limited number of test instruments available to them is attributed to their aptitude and ingenuity.

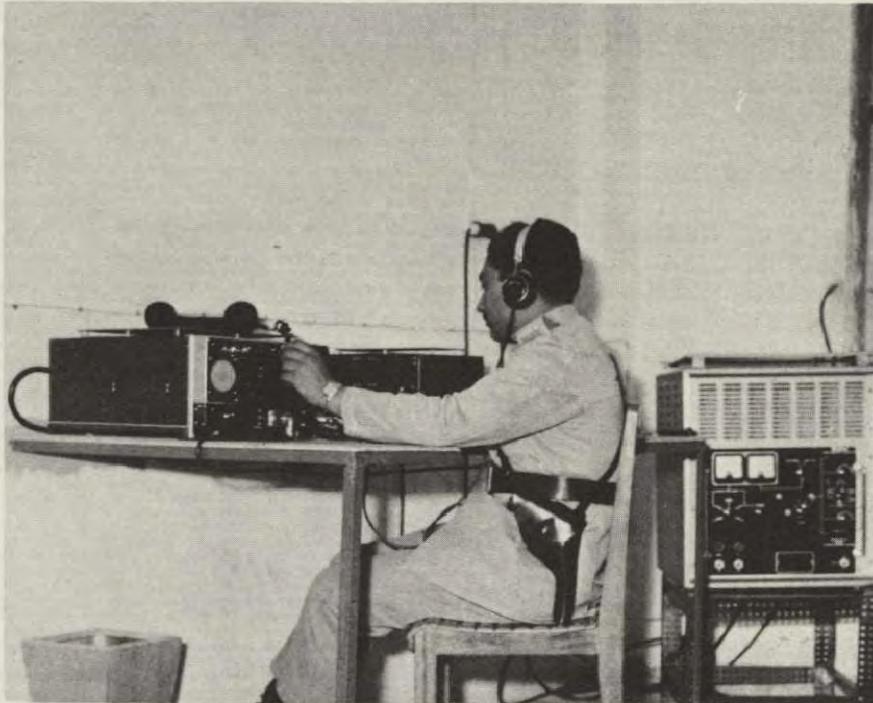
A. POLICE RADIO TELEGRAPH NETWORK

The Police point-to-point radio telegraph network handles all administrative and operational message traffic between the Directorate in Amman and the several Districts, and between Districts and their sub-network Posts (Fig. 1). The network is divided into three sections according to geographical locations. All Districts and Posts west of the Jordan River Valley and the Dead Sea area comprise the "West Bank" section (Fig. 2), all District and Post stations to the east of the River boundary comprise the "East Bank" section (Fig. 3). The Desert Forces section lies generally to the east of the East Bank section and includes all desert areas from the northern borders of Jordan to the southern border, and along the entire eastern frontier. (Fig. 4)

1. PRIMARY NETWORK

It was noted that the recently installed SSB equipment of English manufacture being used for the district networks was unable to handle radio traffic as well as had the antiquated HF-AM equipment it replaced. After checking operation at several locations it was evident that the frequencies for which crystals had been obtained were not selected according to sound engineering practice. After monitoring several other frequencies assigned to the police for both night-time and daytime use, a new table of frequencies which would meet distance/propagation requirements was formulated and submitted to the Director of Communications. With the procurement of new crystals it is expected that the existing SSB equipment will fulfill present traffic requirements. (Appendix 2-Table of recommended frequencies)

Although this equipment is presently operating in the radio telegraph mode it can be utilized for radio telephone use as well and has been provided with the necessary terminating equipment to connect it into the local telephone switchboard (police) at each location. Directorate to District and inter-District radio telephone capability is thereby possible in the event of toll telephone outage or line loading.



RADIO TELEGRAPH/TELEPHONE (SSB) INSTALLATION
AT WEST BANK CONTROL POSITION

It is expected that traffic will increase each year, particularly with the West Bank stations (adjacent to Israel) and that a more rapid means of written message exchange will be required. When this need develops, perhaps in two or three years, tone keyer and converter equipment could be added to the SSB stations to enable them to serve teleprinter equipment at Amman, Jerusalem, Hebron and Nablus. This would then provide a radio teleprinter network independent of the GPO wire circuits at no more cost than the purchase of "carrier" equipment by the Police for utilization over GPO leased circuits.

2. SECONDARY NETWORK

The secondary portions of the radiotelegraph system extends between each of the Districts and their respective Posts. Equipment consists of Type 19, Mark III

(Canadian R. C. A.) World War II vintage, most of it procured as surplus. The 19s are battery powered and present a problem of constant need for recharging batteries as their power drain is excessive. Although radio frequency power output is limited to about ten watts for telegraph, and half of that for telephone operation, the equipment appears to handle traffic requirements adequately as the distances to be covered are small. All Posts and Districts are provided with extra 19s to be substituted for those in operation in event of breakdown. Enough spare 19s are on hand to maintain the secondary networks for another two or three years. A/C mains power is not available at some of the Posts, particularly at the Desert Posts. Eventual replacement of the type 19s equipment with transistorized units with higher output and less battery power drain will be necessary.

3. DESERT FORCES NETWORK

The Desert District Headquarters and its radio telegraph net control station is located in Amman. A single sideband transceiver of the same make as that used by the Police Security Forces for primary network service is in operation for handling traffic with the three Desert Sub-District stations. The Sub-Districts and the Posts use the type 19 equipment described earlier. Many of the outlying Desert Posts have no power source available other than "Lister" gasoline engine-DC generator units for recharging the batteries used with the 19 type sets. The Lister units have seen many years of daily use, however a large supply of all needed replacement parts, such as pistons, crankshafts, and other major parts required for overhaul are in stock. The units can be continued in operation for a few additional years.

B. CITY OF AMMAN, RADIO PATROL

Police radio patrol operation for the City of Amman leaves much to be desired. The radio base station, located at the Headquarters of the Security Police detailed to the Amman District, has an output power of 50 watts FM on a frequency of 87.3 Mcs. Although located on a hilltop, there are several higher hills interlaced with deep valleys which contribute to poor radio coverage of the city as a whole. Six patrol cruisers are equipped with 10 watt output FM transmitters transmitting on 72.6 Mcs. Only four of these cruisers are in service during one operating shift, the other two are held as standby. The radio equipment is not connected with the regular car battery and generator, but instead is supplied through external, heavy duty batteries which are replaced every eight hours.

Radio Patrol cars do not cruise or patrol during their tour of duty, but are assigned to a random location for several hours at a time with the engine off. Complaints are usually handled from one of the eighteen sub-posts scattered throughout the city rather than being given to a radio equipped car. As a consequence, only eight or nine complaints are handled per day by the four cruisers. Furthermore, it is impossible to use the regular car battery as a power source and to maintain a charged battery without running the automobile engine.

One of the contributing factors to the requirement for "spotting" cruisers is special locations throughout the city is the erratic radio coverage now obtainable. A better base transmitter-antenna site is available on a much higher hilltop. A 100 watt



DESERT DISTRICT NET CONTROL STATION AT AMMAN

base station located there, controlled remotely from the City Headquarters by leased telephone line would provide much improved coverage of the valley areas. The method of patrol operation should be drastically changed. More complaints should be dispatched to the patrol cruisers and the number of sub posts reduced. The cruisers should be supplied with "alternator" type of low speed cut-in battery charging equipment and the auxiliary batteries discarded.

Coincident with improvement of both the radio coverage of the city and with the methods of patrol operation, and with the recommended reduction of the number of sub posts now handling complaints directly, a much greater volume of radio traffic should develop. Consideration should be given to the procurement of four additional cruisers, equipped with low-drain, transistorized radio equipment and alternators, compatible with the presently operating equipment.

Equipment at the left in the picture at the top of the following page, a Telefunken transceiver of 15 watts output and three years of age, is not in operation. Four Telefunken mobile units rated at five watts output, and four motorcycle transceivers rated at one and one-half watts, to be operated in conjunction with the base station are also not in use. Coverage of the city had been extremely poor, and, coupled with the claimed impossibility of obtaining spare parts, the equipment has been shelved. Arrangements for a factory representative to renew the equipment have been made, by the Police.

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CITY OF AMMAN, RADIO PATROL DISPATCHING CENTER

This equipment, after renewal, should be transferred to a smaller city having relatively flat terrain wherein it could perform more satisfactorily the communications function for which it was designed. The mobile equipment uses transistorized power supplies with low drain characteristics and should present no particular battery charging problem assuming normal patrol procedures are effected. (Refer to Fig. 6, Map of City of Amman)

C. HIGHWAY PATROL (PROPOSED)

There are extremely long stretches of highway, particularly between Amman and Ma'an and Aquaba, with very few villages, service stations, public telephones and other similar traveler facilities. Vehicle breakdown, accidents and other emergencies requiring police assistance cannot be serviced for many hours because of the lack of communications and the absence of a regular police highway patrol. There is a real need for the establishment of such a patrol equipped with two-way radio and with base radio stations located at strategic spots.

With limited budget funds, creation of a highway patrol could be phased over a three year procurement-installation period. The first year should provide Amman, Irbed, Jerusalem, Ma'an and Aquaba with base stations as the areas adjacent to these

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cities are considered areas of greatest traffic flow and therefore the greatest need. A minimum of four or five, preferably more, radio-equipped vehicles should also be provided and assigned to highway patrol duty. Cities of lesser strategic importance should be phased in during the second and third years, and an additional number of vehicles provided.

D. INTELLIGENCE SERVICE

Until recent months, the Intelligence Service has been a part of the general police organization, using all the available communications facilities of the parent organization. The Intelligence Service now wishes to establish an entirely new communications system, disassociated from the regular police. The Intelligence Service could use existing police telegraph facilities and still maintain the security they desire by encoding their message traffic accordingly. Commodity support for the proposed Intelligence Service communications system can not be justified as it represents needless duplication of personnel and equipment.

E. DIRECTORATE OFFICIALS MOBILE TELEPHONE

A mobile radio telephone service has been provided to senior officials working out of the Directorate for the past eight years. The service permitted officials at various telephone extensions within the Directorate building to speak directly with other officials who might be traveling throughout the city of Amman and within District boundaries. The telephone switchboard operator made the "patch" between the telephone extension and the base station transmitter/receiver permitting direct conversation between an official at his desk and the official in a radio equipped automobile. Messages were not normally dispatched by the switchboard operator as his function was to merely make the patch and to activate the radio equipment.

This equipment is eight years old and operation has degraded to the point where little use is now being made of the system. The equipment, manufactured by Pye of England, consists of the local base station operating in the 150Mc range and an automatic relay station located on a high hill which retransmits on a frequency in the 78 Mc. range. Mode of operation is amplitude modulated (AM) and output power limited to fifteen watts. Mobile equipment power output is a nominal five watts.

The real need for a separate radio system for the use of senior officials appears to be very minimal. However, as it becomes necessary to retire present equipment from service, replacement mobile units comparable to and compatible electronically with the City of Amman Radio Patrol units should be procured, and messages then dispatched via the City Police control station.

F. CIVIL DEFENSE

The new Civil Defense organization has an approved budget of about \$2,000,000 for personnel and commodity support. Among other things, the CD Director wishes to create his own CD communications system. It was pointed out to him that in the United States the CD responsibility was largely a matter of coordination with other

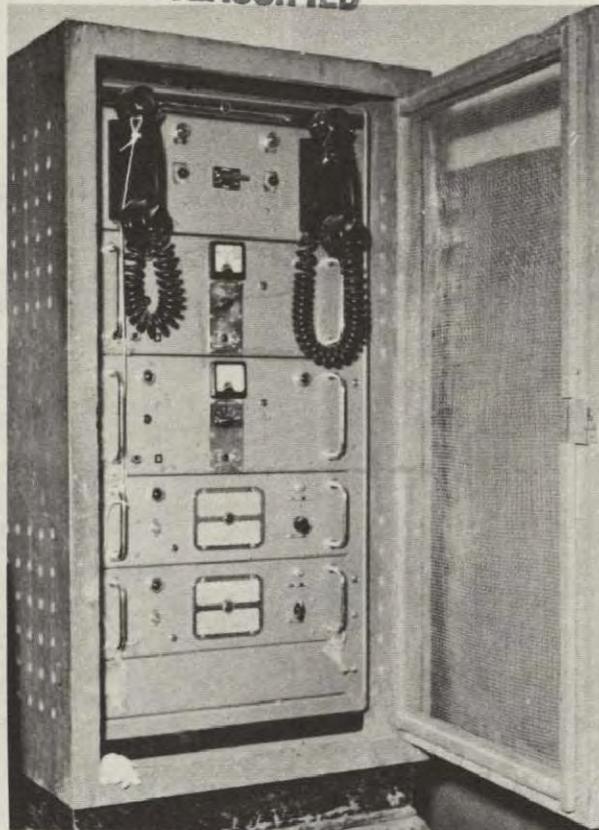


DIRECTORATE TELEPHONE EXCHANGE AND
RADIO TELEPHONE PATCH TERMINATION

Agencies and that CD merely supplemented with equipment those areas which were deficient. For example, in the U.S. the major portion of CD communications was handled over existing police radio systems with CD merely supplementing with equipment where needed, with control of the system still being with the Police. The CD Headquarters is ideally located in the same compound area with the three net control stations of the Police, thus providing easy access in times of civil emergency of disaster to the Police radio system. Undoubtedly, the CD forces will require a number of easily portable radio equipment to be used at the scene of a disaster; however, the CD budget is easily adequate to handle such procurement without support from USAID/J.

G. GOVERNMENT FACILITIES

The Government Post Office (GPO) telephone facilities are extremely limited. Although the GPO is presently installing additional equipment to provide tone carrier multiplex channels between major cities over existing open-wire lines, they anticipate no possibility in the immediate future of being able to provide additional circuits for Police use. Officials suggested that the Police procure their own multiplex equipment to be used over the limited number of circuits already leased by the Police from the GPO.



AUTOMATIC RELAY RADIOTELEPHONE STATION LOCATED IN
A GOVERNMENT HOSPITAL BUILDING SITUATED ON
A HIGH HILL OVERLOOKING AMMAN

Jordanian Army officials also indicated that they had no unused facilities, and no multiplex channels, which could be shared with the Police. The equipment they were using and new equipment on order was intended for tactical use, rather than point-to-point as needed by the Police.

H. MAINTENANCE AND LOGISTICS

All major maintenance is performed at the Signal Headquarters in Amman, with the one exception that minor maintenance is handled in a sub District headquarters adjacent to Jerusalem. A staff of five technicians at Amman do excellent maintenance work with the somewhat limited amount of test and alignment tools available to them.

The major portion of equipment serviced consists of the type 19 units described previously. Because of the large number of spare sets available, sets which become defective in operation at the various Districts and Posts are shipped to Amman for repair and return.



ONE OF SERVICE POSITIONS – MAINTENANCE SHOP
 SECTION OF STOCK ROOM AND ISSUANCE OFFICER

The spare parts depot is well organized, a perpetual inventory is maintained and a very accurate record of stock issuance and disposal is in use.

I. SECURITY REGIMENT

The Security Regiment is a special duty organization intended to cope with unusual situations, such as riot control. Physically based within the City of Amman, it provides guard protection to each of the Foreign Embassies, is available for possible riots and mob action, and available for other contingencies. Radio equipment consists of three type 19 stations; two mounted on LandRovers for portable/mobile operations and the other used as a base station. In addition four backpack portable stations are available (Army type No 41A VHF, .5 watt).

The police are doing the best they can with what they have in this organization. However, the radio equipment is not coordinated with the City Police radio as it should be. The base radio station and the two mobiles should be replaced with VHF-FM equipment compatible with the City Police radio system. The back-pack portables should be replaced with VHF-FM hand-carried portables using the same radio frequencies as the mobiles.



SECTION OF STOCK ROOM AND ISSUANCE OFFICER

J. TRAINING REQUIREMENTS

A police communications training facility is not considered by the police to be a requirement. Most of the radio telegraph operators and all of the radio technicians have received their training while in the Army, or as policemen detailed to the Army for such training. Arrangements have been made to supply the police technicians with refresher courses as required. There are no commercial technical courses available in Jordan which would fulfill police training needs.

The organization and administration of the Police Signal Division could be improved considerably. The Chief of Signal and his assistant would benefit through a study of Telecommunications Management as U.S. Participants.

In addition, at least two of the five radio technicians should receive participant training in police radio communications. All participants would derive much benefit through observation of American police communications operations and maintenance techniques, particularly through visits to State Police operations utilizing point-to-point radiotelegraph and radio/wire teletype networks.

K. TECHNICAL ASSISTANCE

A study of the methods used by the police in the selection and procurement of communications equipment disclosed the need for technical assistance. Through preceding years and under other administrative officials, equipment was selected without adequate engineering or technical support. This resulted in accumulating several types of equipment, not compatible as a system, and not best suited to the particular requirement for which they were purchased.

In Jordan, and in most countries including the U.S., top administrative officials do not seek nor want the advice or guidance of technical people whose status is some degree lower in the administrative or social scale, yet who may have a very considerable skill in their particular field. Lack of acceptance of technical guidance from lower echelon staff members, regardless of competence, was observed.

Assignment of a Communications Advisor to work with both the top administrative people and especially with the technical staff people would do much to alleviate the problem discussed in the preceding paragraph. In addition, assistance should be immediately provided to plan for future expansion, for replacement of marginal equipment, to initiate a time-phased budgetary program and to offer day-to-day suggestions for increased operational competence and efficiency.

FACTORS OBSTRUCTING MAXIMUM EFFECTIVENESS

There are many areas within the police telecommunications organization and operation which need attention in order to effect more efficient fulfillment of its mission. Major factors contributing toward inadequate or inefficient operation of the telecommunications system are recapitulated below, although covered generally in the preceding chapter under observations:

A. TECHNICAL GUIDANCE, LACK OF

The newly appointed chief signal officer and his staff assistant have not received technical training, having risen through the ranks as telegraph operators, not technicians. As in many countries, top staff officers do not welcome nor accept guidance from technicians below their own staff level. Such officers, however, will usually accept guidance from an "expert" of specialist.

B. INFERIOR CITY RADIO PATROL OPERATION

Improper method of patrol operation and spotty radio coverage of the city of Amman contribute to inefficient handling of police/public service matters. Both guidance in methodology and commodity support would alleviate this highly unsatisfactory condition. Transfer of equipment to a smaller city, and replacement with higher-power, completely transistorized mobile models is recommended for FY 1965.

C. HIGHWAY PATROL

The police have an obligation to the public to provide assistance in times of emergency within a reasonable time throughout the length of the major highways in Jordan. To operate with any efficiency at all, and to reduce the total number of police vehicles required to patrol the highways, it is imperative that the vehicles be equipped with two-way voice radio. To fulfill this need, it is important that the police initiate a program to acquire basic equipment for the major segments of the highways immediately, and to continue to add to the system on a yearly basis until completed.

D. IMPROPER SELECTION OF NETWORK FREQUENCIES

Radiotelegraph operators experience unnecessary radio interference from foreign stations and extremely poor signals from network stations because of improper net operating frequency selection. This results in a marked degree of inefficiency which could easily be improved. Immediate purchase of "crystals" to stabilize

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operation on correctly assigned frequencies would permit the correction of this unsatisfactory condition.

E. LACK OF GOOD LOCAL TRAINING

One of the major factors contributing to inferior operation of the overall communications system is the lack of information and knowledge on the part of both administrators and technicians who have not had the opportunity to observe more modern and efficient operations in other countries. For this reason, it is important that Participants receive opportunity for extended observation of modern police communications departments, in addition to their specialized electronic training.

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RECOMMENDATIONS

Public Safety project planning should be directed toward the improvement of the police communications system through both technical assistance and commodity support.

Technical guidance is needed in the proper selection of equipment as segments of the system are replaced or portions expanded, to initiate new ideas and techniques in city and highway patrol operation, to render on-the-job training to technicians in the proper use of test and maintenance instruments, and other related types of personal assistance.

Modest commodity support should be rendered to the police to assist them each year in the procurement of required components to accomplish the desired improvement in operation.

A. TECHNICAL SERVICES

It is recommended that the services of a Public Safety Advisor, Communications, be provided to help assure adequate guidance in the successful progress of this sub-project. The arrival of the Advisor should be arranged to be coincident with the arrival of the commodities recommended under paragraph B. below.

B. COMMODITY SUPPORT

USAID/J has budgeted less than \$25,000 to support the Telecommunications sub-project for FY 1965. In an effort to maintain procurement costs within this very modest budget, items selected represent those most needed to initiate an improvement program. Continuation and expansion of the project will require additional support for ensuing fiscal year budgeting.

A detailed description and itemized list of components and materials required to support the recommended program is provided as Appendix I of this report.

1. CITY RADIO PATROL, AMMAN

It is recommended that USAID/J provide one VHF/FM base radio station to be installed at the Government Hospital location (adjacent to the Directorate automatic radio relay station) and to be operated by remote control apparatus at the City Police Headquarters. In addition, four VHF/FM transistorized mobile stations be provided to operate in conjunction with the four units already in operation. Equipment to include all necessary accessories and spare parts. Estimated cost -- \$6000.

2. HIGHWAY PATROL

It is recommended that USAID/J provide four VHF/FM 100 watt base radio stations to be located at Amman, Jerusalem, Ma'an and Irbed and to be equipped with remote control apparatus (wire-line). Six VHF/FM 50 watt mobile stations (transistorized) are also required. Equipment will be operated as SIMPLEX, that is, both base and mobile stations will operate on the same frequency (35.0 Mcs.), thus providing car-to-car communications as well as base-to-car. Accessories and spare parts to be provided. Estimated cost -- \$14,600.

3. MISCELLANEOUS ITEMS

It is recommended that USAID/J provide under priority "B" procurement and air post shipment, forty radio "crystals" urgently required to provide new operating frequencies for the SSB equipment now operating unsatisfactorily in the primary radiotelegraph network. (Table of frequencies -- Appendix II)
Approximate cost -- \$400.

Other miscellaneous items include text books and manuals, small hand tools and limited number of test instruments. \$1000.

Total estimated costs including spares & C&F -- \$22,000

4. PARTICIPANT TRAINING

With FY 65 participant training funds limited to the extent of providing training to but one participant from the Signal Division, it is recommended that C. W. O. Ahmed be nominated to receive the Police Radio Communications course of six months as outlined in the Manual describing participant training courses available. Two months of additional time should be included to provide time for observational visits to communications service maintenance shops and factory production testing and equipment alignment laboratories.

FY 66 and FY 67 should include funding to provide participant training for a minimum of two people each year; one to receive Management training in communications, and the other to receive repair technician training as listed in the preceding paragraph.

APPENDIX I

PUBLIC SAFETY TELECOMMUNICATIONS COMMODITIES
LIST AND COST ESTIMATE

The following list of commodities and estimated costs are given to provide the USAID/Jordan Mission with information needed to prepare project implementation documents for Fy 1965.

The justification for and the utilization of the following specified equipment is covered in the preceding report under the heading of Observations and Conclusions, and under Recommendations.

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>COSTS</u>
1	40	CRYSTALS Mounted in HC/6U pin type holders Frequency tolerance .0025% Individual crystal frequencies and the quantity of crystals for each frequency as follows:	
		. quantity frequency	
		. 8 3300 Kcs.	
		. 6 3455 Kcs.	
		. 3 3985 Kcs.	
		. 3 4240 Kcs.	
		. 6 4760 Kcs.	
		. 6 4840 Kcs.	
		. 5 5015 Kcs.	
		. 3 5385 Kcs.	
		Total estimated cost including AIR POST	\$400.
2	1 ea	VHF/FM BASE STATION WITH REMOTE CONTROL Transmitter - 100 watts RF output; frequency 87.3 Mcs. Receiver frequency - 72.6 Mcs. Modulation - wide band, ± 15 Kc deviation/ acceptance. Remote control console to	

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>COSTS</u>
		provide required function (via metallic pair) All specifications to be in accordance with OPS Standard Specifications. To be provided with non-directional, low angle radiation antenna (co-axial) and 100' of RG-8U cable with appro- priate fittings. Microphone and other required accessories to be included. Power source for equipment will be 200/230 volts, 50 cycle A. C. Manufacturer's recommended spare parts to insure a minimum of two years operation shall be included; cost not to exceed 10% of cost of major station unit.	\$2000.
3	4 ea	VHF/FM MOBIL RADIO TRANSCEIVERS Trunk Mounting; Frequency range 66-88 Mc, Single Channel Minimum RF power output - 25 watts. Transmitter Frequency - 72.6 Mcs. Receiver Frequency - 87.3 Mcs. Power Source 6/12 volts D. C. Antenna: Spring loaded, 1/4 wave whip; universal joint for attachment to vehicle body. Modulation: \pm 15 Kcs., wide band. Specifications of equipment must meet OPS Standard Specifications. Manufacturer's recommended spare parts to insure a minimum of two years operation of equipment shall be included; cost not to exceed 10% of cost of major units.	\$4000.
4	4 ea	VHF/FM BASE STATION Transmitter: 100 watt output, frequency 35.0 Mc. Receiver frequency: 35.0 Mc (simplex). Modulation: \pm 15 Kc., wide band. Power Source 230 Volt, 50 cycle A. C. Enclosure type: floor, 19" rack/ cabinet preferable. Remote Control: to provide all required standard functions over telephone metallic pair circuit. All equip- ment to meet OPS Standard Specifications. All standard accessories to be provided (microphones, cables, etc.). Antennas to be non-directional, low angle (co-axial skirt) provided with 100' RG 8U cables	

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>COSTS</u>
		with necessary fittings, and antenna mounting hardware. Manufacturer's recommended spare parts to insure minimum of two years operation to be provided; cost not to exceed 10% of purchase cost of basic items.	\$8200.
5	6	VHF/FM MOBILE RADIO TRANSCEIVERS Mounting: Trunk Frequency range: 25-54 Mc. Number of Channels: 1 Operating frequency: Transmitter 35.0 Mc.; Receiver 35.0 Mcs. Power Source: 12 Volts D.C. Antenna Type: 1/4 wavelength whip. Mounting: car body. Transmitter RF Power Output: Minimum 50 watts. Modulation: ± 15 Kcs. Wide band. Must meet OPS Standard Specifications. Shall provide Manufacturer's recommended spare parts to insure minimum of two years operation, not to exceed in cost 10% of cost of major units supplied under this item.	\$6400.
6	1 lot	Miscellaneous small tools and test instruments. 1 ea Grid Dip Meter (Millen or equal) 1 General purpose oscilloscope 3 Volt-Ohm-Milliameter (Simpson 260) 3 Electricians Tool boxes provided with common small hand tools: e.g. hand drill and drill sets; screwdrivers, pliers of various types, hacksaws, ballpeen hammer, hex wrench sets, allen sets, etc. etc.	\$50. \$350. \$200. \$400. <u>\$1000.</u>
Total commodity cost			\$22,000.
(includes 10% spares & shipping)			

APPENDIX II

RECOMMENDED OPERATING FREQUENCIES

PRIMARY RADIOTELEGRAPH NETWORK

AREA	NETWORK FREQUENCIES	CRYSTAL FREQUENCIES
<u>WEST BANK NET</u>		
Amman	Ch. 1 (night) 2100 Kcs.	3300 Kcs.
Hebron, Jenin,	Ch. 2 (night) 2255 Kcs.	3455 Kcs.
Jerusalem,	Ch. 3 (day) 3600 Kcs.	4760 Kcs.
Nablus	Ch. 4 (day) 3640 Kcs.	4840 Kcs.
<u>EAST BANK NET</u>		
Amman	Ch. 1 (night) 2785 Kcs.	3985 Kcs.
Zerqa, Irbed,	Ch. 2 (night) 3040 Kcs.	4240 Kcs.
Salt, Ma'an,	Ch. 3 (day) 3815 Kcs.	5015 Kcs.
Kerak	Ch. 4 (day) 4185 Kcs.	5385 Kcs.
<u>DESERT NET</u>		
Amman	Ch. 1 (night) 2200 Kcs.	3400 Kcs.
Jafir	Ch. 2 (night) 2970 Kcs.	4170 Kcs.
Jiza	Ch. 3 (day) 4580 Kcs.	5780 Kcs.
Mafrak	Ch. 4 (day) 4965 Kcs.	6165 Kcs.

(Crystals to be mounted in Type HC/6U holders for use in Redifone Model GR 410 Transmitters. Frequency conversion of 1200 Kc.)

APPENDIX III

LIST OF RADIO EQUIPMENT AND DISTRIBUTION

<u>LOCATION</u>	<u>EQUIPMENT IN USE OR ON STANDBY</u>
AMMAN:	
City Police	1 50 watt FM Base (Redifone GR 287, 3 yr. old) 1 15 watt FM Base (Telefunken WE 107/2, 3 yr. old) 8 10 watt FM Mobile (Redifone GR 284) 6 in use 6 3 watt FM mobile (Telefunken FUGE 7A) unserviceable
Directorate HQ	1 VHF/AM Base & 1 Automatic Relay Station - 15 watt out. 10 VHF/AM 5 watt mobile (base & mobile PYE, 8 years old) 1 BC 399/BC 348 and 1 C11 Transmitter (telegraph use)
Radiotelegraph HQ. Net control	2 HF Redifone GR 410 & Linears, 500 watt SSB (new) 2 C-11 50 watt HF (1 year old) 6 Type 19, 10 watt HF (nearly new-surplus) 2 Collins 51J4 receivers (excellent condition, 10 years old)
Desert District Control	1 HF Redifone GR 410 & Linear, 500 watt SSB/CW (New) 2 Type 19, 10 watt HF (surplus) 1 Collins 51J4 Receiver (10 years old, excellent)
7 District Stations Identical equipment. Jerusalem, Nablus, Ma'an, Hebron, Jenine, Irbed, Kerak.	1 HF Redifone GR 410, SSB/CW New 2 19s HF 10 watt in service/standby 3 19s held as spares for replacement to Posts 1 Heavy Duty Westinghouse Brake Co. battery charger at each District & Post where 19s are in service, plus heavy duty batteries.
All Secondary Net POSTS have identical station equipment,	1 Type 19, 10 watt HF 1 Heavy duty battery charger and auxilliary batteries. In a limited number of Desert Posts, A/C power is not available and "Lister" engine-generators are used for battery charging (output at 24 volts D. C.)

Approximately 25 Type 19 sets are retained in stock at the Signal Company Depot in AMMAN. Although manufactured about 20 years ago, most of these 19s were obtained as surplus but unused so that they are relatively new in appearance.

APPENDIX IV

RECORDS AND MESSAGE FORMS/TRAFFIC COUNT

The communications staff have developed and are using an excellent variety of Forms to suit their various needs. Forms developed for stock control, unit maintenance history, inventory and issuance are well done and are being used as intended. Message Forms for the record and control of radiotelegraph communications are entirely adequate. Both message count and word counts are strictly monitored. During inspection visits to various District communications headquarters, a check of traffic accounting was always made. Invariably the Supervisor was able to quickly refer to the "log" and render a total word count for any day or month. A sampling of message and word count and some of the stations visited is given below:

<u>Desert District:</u> (Hdq.)	260 messages average per day transmission and reception 79,067 words received during month of October 235,905 words transmitted during the same month
<u>Nablus District:</u>	50 messages transmitted per day (average) 35 messages received per day " 4,000 words per day handled "
<u>Jenin:</u>	30 messages received per day (average) 50 messages transmitted per day " 2,500 words per day "
<u>Jerusalem:</u>	50 messages received per day (average) 45 messages transmitted per day " 6,100 words per day "

About 25% of all messages handled are enciphered.

APPENDIX V

MAJOR PROBLEM AREAS AND RECOMMENDED SOLUTIONS
(Notes Only)

1. Unsatisfactory operation of REDIPHONE SSB equipment, primary telegraph net.

Interference problem is the result of improper selection of the proper radio channels to accommodate the distances involved.

Solution: Assist local technicians select new channels based on engineering principles. Procure approximately \$400 worth of new crystals providing four selected channels per unit. Suggest that efforts be made to have police purchase new crystals from Rediphone. If funds are not available, then PSD should assist in procurement as this problem has priority.

2. Inferior Radio Patrol Methods and Operation, City of Amman.

Basic equipment, two years old, appears to operate satisfactorily. However, due to lack of normal cruising methods, mobile equipment must be operated from auxilliary heavy duty batteries which require replacement every 8 hours. Complaints are usually handled by officers from one of the 18 posts located throughout city, rather than being assigned to a patrol car.

Solution: Discard auxilliary batteries. Install new alternator type generating equipment. Order cruisers to keep moving rather than park at all times.

If a new method of operation is adopted, a large percentage of the posts can be discontinued, particularly if a few additional cruisers are put into operation. A new base station should be procured and located at the hospital location and operated by telephone line and a remote control board at the city headquarters. This would improve coverage in the deep valley areas. The base stations presently in use can continue as a standby unit.

3. Highway Patrol.

Problem: Determine need/justification for project; specify number of and location of base stations for FY 65; determine number of vehicles; degree of expansion in FY 66, FY 67, FY 68.

Solution: Base station cost (100 watt, 34-40 Mc band, FM) @ \$2,000.
Mobile - Motorola Motrac/equivalent @ \$ 850.

4. Participant Training.

Problem: Secure adequate U.S. training to insure better operations.

Solution: One participant FY 65 for Radio Communications & Observations
One participant FY 66 for Management/Administration & observations
One participant FY 66 for Radio Communications & observations
Two participants FY 67 for Radio Communications & observations

5. Battery Operation of Type 19 equipment at fixed locations.

Solution: Procurement of electronic components which can be assembled by police technicians to provide A.C. mains operation of 19 equipment, thereby eliminating need for presently excessive battery procurement and recharging. Estimated cost @ \$50. Recommend initial purchase of 20.

6. Technician requirement for service vehicle.

Solution: Recommend police fabricate required enclosure to provide secure space for required tools, test equipment and tools. Enclosure can be constructed locally and adapted to the dimensions of a police owned Land Rover. (Not recommended that a new vehicle be purchased). Vehicle can also be provided with mounting space for PA system and brackets mounted for installation of outdoor loudspeakers when needed (Special events).

7. Intelligence Service.

Problem: Desire to establish an independent communications network. Have no operators and do have equipment for headquarters station only.

Solution: Do not concur with need for an independent network. Do agree with their desire for secure communications. Recommend that Intelligence utilize existing police facilities, and provide their own personnel and methods for enciphering traffic being sent over police networks. There is no justification for the duplication of police facilities.

8. Test equipment and tools.

Problem: A few hand tools, limited test equipment and laboratory instruments are available. However, a few small items are badly needed to insure proper maintenance of radio equipment.

Solution: AID procurement of a modest amount of required test equipment and tools, total estimated not to exceed \$1,000.

9. Ultimate replacement of the type 19 equipment.

Problem: Type 19s are obsolete World War II surplus equipment. Although rugged in construction, they require excessive battery power for the power output obtained. (item 6 above). Spare parts are no longer available. Eventually the equipment will have to be retired.

Solution: It is recommended that AID consider assisting in the replacement of this equipment on a time-phased basis beginning in FY'66. Transistorized equipment which can be operated either from A. C. mains or small batteries (in remote posts) should be obtained. Equipment comparable with the Radio Industries "TR 35" would serve the purpose adequately.

10. Utilization of TELEFUNKEN Base and Mobile Equipment.

Problem: Equipment has been used for two years by City of Amman to dispatch patrol cars. Equipment has been used alternately with the Rediphone VHF equipment in order to "rest" the units. Patrol cars have been equipped with both types of units simultaneously. Telefunken equipment books are written in German - maintenance has been impossible to achieve.

Solution: It is understood that a German technician-factory representative is expected to arrive in early November. He is expected to repair the equipment and has promised to send one or two technicians to Germany for maintenance training.

The equipment is not needed to duplicate the Rediphone, nor is the power output adequate to provide good radio coverage for the Amman area. It is recommended that, subsequent to being reconditioned, the complete station and mobile units be transferred to some smaller city having more level terrain characteristics, where it should be capable of providing the limited coverage necessary.

11. Civil Defense Radio Requirement.

Problem: Civil Defense Director's belief that CD requires its own radio system.

Solution: The CD Headquarters is located within the same compound as the police communications operations center for long-distance, point-to-point operation. Messages relating to CD can easily be sent via the police network to all major districts and posts. There is no need for duplicating police network facilities. For any possible long distance mobile communications requirement, it is suggested that CD obtain (with their own funds) equipment compatible with the proposed police highway patrol system, enabling CD mobiles to contact highway patrol posts during travel throughout the Kingdom.

APPENDIX VI

TRIP REPORT

Field Trip: Amman to Nablus to Jenin and return - October 28, 1964

- Purpose:
- a. To test performance of Type 19 police radio equipment mounted in a police vehicle (Land Rover) while in motion and at rest, from various locations throughout the route traveled
 - b. To inspect communications facilities and their operation at Nablus, a district network station.
 - c. Identical to b. above, at the Jenin District.

Observations:

- a. Crew consisted of a radio-telegraph operator, a Sergeant in charge of radio maintenance, a 2nd Lieutenant (2nd in charge of all communications), a police driver and the writer. Equipment of the Land Rover included a complete Type 19 (English army equipment designed for tactical use), rated at 10 watts RF output for telegraph-3 watts telephone, operated from a 12 volt, 120 ampere-hour battery using a "V" type whip (approximately 10 feet long) mounted at rear of vehicle. Prior to leaving Amman, base stations at Nablus, Jenin, Amman and the vehicle equipment were "netted" to an approximate frequency of 3 megacycles (vfo). Both telegraph and telephone tests were made from many locations.

Reasonably fair contact was maintained with the base stations throughout the trip using telegraph. Radio-telephone operation was rarely satisfactory except in close proximity with a base station. Battery power consumption is such that the battery must be replaced or recharged after approximately 8 hours of continuous operation. Battery is not connected to vehicle generating unit and thereby receives no charge while the vehicle is in operation.

- b. Nablus - Basic radio equipment included: one 19 installation to net with Amman; one 19 installation to net with sub-districts and posts; and one Radiphone SSB (GR 410) for telegraph/telephone to Amman. Spare parts were limited to 5 complete 19s for replacement of sub-district/posts equipment when repairs are necessary, plus a very limited quantity of replacement tubes. Defective sets are sent to the Jerusalem District for repair.

A heavy duty battery charger, manufactured by the Westinghouse Brake & Signal Co., was being used to charge the spare batteries which operate the type 19 units. (This appears to be standard equipment at all district stations).

The telephone switchboard, manually operated, manufactured by Ericsson, supplied 80 internal extensions, and provided five external lines. Three of the externals connected with the GPO, one line to the Army commander and the remaining one to the Governor of the District. An additional telephone type intercom provides service between the six top police officials.

The communications staff consists of 11 men (NCOs and operators) plus one mechanic for repair of engine/generator equipment at the various posts. There are eight additional operators at the six posts.

Test operation of the Rediphone SSB equipment was of special interest because of previous discussions with various technicians regarding the merit or lack of merit of this specific type of equipment. Tests were conducted with Amman on both day and night channels and using both tone telegraph and sideband telephone. Voice communications were very good on the day channel, and useable on the night channel. In the beginning, some interference was noted while using the telegraph mode. (The receiver appeared to be overloading as a result of very strong interference). Later, the Amman telegraph signal was received extremely well.

Message traffic: Daily message counts indicated an average of 50 messages outbound and 30 to 40 messages incoming. In addition 15 to 20 cipher messages were handled each way daily. Total word count per day averaged 4,000 words incoming and about the same count outgoing. NCO in charge stated that considerably more traffic could be handled if required (negating immediate requirement for teleprinter equipment).

c: Jenin - Basic equipment at Jenin comparable to that at Nablus. Two "19"s for netting with Amman and with the sub-districts at Rumana. Also, one Rediphone SSB station for telegraph/telephone to Amman. In addition, one type RV9A communications receiver was used for monitoring.

Spare equipment included two 19 units for replacement use. Only a few spare replacement tubes were in stock; no other spare parts visible. One spare "Lister" engine generator was available for use in any post without power mains. (Output 30 amp. at 24 volt for battery charging).

Operating staff comprised of eight men including NCOs. Station open 24 hours per day. Message traffic considered light: 20 messages incoming and about the same average outbound

each day. An average of five cipher messages handled each-day. Total word count per day about 2500 words.

Operational tests of the Rediphone equipment were conducted. The daytime channel provided extremely strong telegraph signals, and good voice communication. The nighttime channel was also tried, but signals were too weak to be useable.

The telephone switchboard was a "T. E. L." manual board manufactured in England. It provided 20 internal extensions and five external lines: 2 to the GPO; 1 to the Army, 1 to the police guard at the city gate, and 1 to the UN observer team. The board has considerable capacity for additional trunks and extensions, if and when required.

Conclusions:

- a. Use of the type "19" equipment for regular highway patrol work is unfeasible. Has little value for phone operation due to extremely limited power. Telegraph operation under tactical operating conditions; special convoy application; unusual situations are feasible. However, the requirement for telegraph operators and the heavy load of batteries and equipment preclude the use of this type of equipment for mobile patrol purposes.
- b. Inspection of the radio stations at Nablus and Jenin demonstrated that the type "19" equipment was doing a good job of traffic movement at fixed locations. The need for reserve battery power and continuous charging problems in locations where power mains are available point up the future requirement for conversion of radio equipment to A/C power consumption, thereby eliminating the present battery charging and replacement problem.
- c. Operational tests of the Rediphone equipment (SSB) demonstrated that this equipment was capable of doing the required job if given proper opportunity. Although the equipment is designed for four-channel operation, crystals were available for only one day and for one night channel. With this limitation, and with strong interference present, it is impossible to change to a second channel, thereby the usefulness of the equipment is reduced greatly.

PUBSFTY:JAMacGregor:bdh
October 30, 1964

APPENDIX VII

Trip Report

Field Trip: Amman to Jerusalem, Ramallah and Hebron - October 31, 1964

Purpose: To inspect police communications facilities and operations.

Observations: Party consisted of Lt. Fuad, Chief of Communications; Sgt. Khalil, Chief Radio Technician; a driver and the writer. Vehicle used was a Landrover assigned to Lt. Fuad. (A second party consisted of Mr. Roy Carlson, Chief/PSD; Mr. Clark, PSD Advisor; Lt. Kudsi, attached to PSD; and a driver and a police vehicle).

Jerusalem - Basic radio equipment consisted of: one 19 unit to net with Amman; one 19 unit to net with the sub-district at Ramallah and posts; and one 19 unit as standby in event of failure of the other 19s. In addition, one Rediphone SSB unit, type GR410 for telegraph/telephone operation with Amman operable; but not being used. Two additional receivers were available: one BC 342 and one Collins type 51J4.

The type 19s operated from batteries (as usual) and spare batteries were available, being charged by a Westinghouse Brake & Signal Co. heavy duty charger.

A "Creed" teleprinter connected via land-line to Amman CID was operable, but not in use (Arabic keyboard) as no operator was available, or assigned to the post. It was understood that this machine would not be available to the Security Police as the CID wished to sever relations and maintain their own system independently in the future.

Telephone equipment consisted of two boards (manual) operated by one operator: one supplied six direct lines to the Army, one to Intelligence, one to Nablus and one to Ramallah; the other board furnished three trunk lines to the GPO with one spare; and 38 internal extensions, with 12 spares. Boards apparently about 20 years old but maintained in good condition.

Radio operating staff consisted of 12 men. Those on duty appeared very competent - handling telegraph messages at about 25 words per minute. Daily message count averaged 45 messages outbound

and 50 messages inbound, in addition to 50 cipher messages. Total word count per day averaged over 6000. The operations room and equipment was clean and efficient appearing. The type 19 equipment is capable of handling traffic requirements adequately.

The Rediphone SSB unit was activated and tests made with Amman. Both radio telephone and telegraph modes were used and good signal strength was observed during the test period. It was stated that severe interference was encountered during late afternoon and evening hours from foreign stations and that it was impossible to use the SSB equipment for that reason (time of tests - 10:30 a. m.)

Ramallah - This is a "sub-District" and serves as net control for six posts and in turn is one of the Jerusalem net stations. In addition, this unit performs radio maintenance for all stations located in the "West Bank".

At the time of this inspection, the radio maintenance mechanic was not available as he was on leave taking a refresher radio course with the Army. Shop equipment consisted of: one Marconi type F144 Signal Generator; one AVO-Ltd. tube tester; one Marconi RF output meter, range 10 watts; one Marconi RF output meter, range 25 watts. A badly needed volt-ohmmeter was not available. A few small hand tools were available, but left much to be desired. Spare parts for type 19 sets and for battery-charging engine-generators were available in quantity.

Radio operating equipment consisted of the usual type 19 units to net with the posts and with Jerusalem, plus one standby unit, all battery operated. The usual Westinghouse Brake & Signal heavy duty charger was in operation. Message traffic was considered to be very light.

The telephone switchboard, manually operated (T. E. L.) was in good condition although about 20 years old, provided accommodation for 10 trunks and 50 extensions. In use were three trunks to the GPO, one direct line to Jerusalem, and 39 internal extensions.

Hebron - Serves as net-control for nine posts, using one type 19 for this operation. An additional 19 is used for schedules with Amman. One type 19 is used for standby. A Rediphone GR410 is installed, but not used except for tests.

Other equipment available includes three spare 19s, three type HP31 VHF FM pack portable units, one 15 watt public address unit, and one portable megaphone.

Message traffic was very light, amounting to an average of 20 to 25 messages outbound and 30 inbound per day, including cipher. The Hebron communications staff consisted of a total of nine and each of the posts with only one operator each.

Telephone switchboard was a T. E. L., 20 years old, accommodating 10 trunks and 50 extensions. Forty-six extensions were in use, two trunks to the GPO and one direct line to Jerusalem.

Operational tests of the Rediphone SSB were made with both Jerusalem and with Amman. Both telegraph and telephone tests were good. Some distortion of the Amman voice signal was noted and attributed to the Amman operator shouting into the microphone rather than using a normal voice. No interference was noted on the channel, although the local operators stated that heavy foreign interference was encountered at night.

Conclusions:

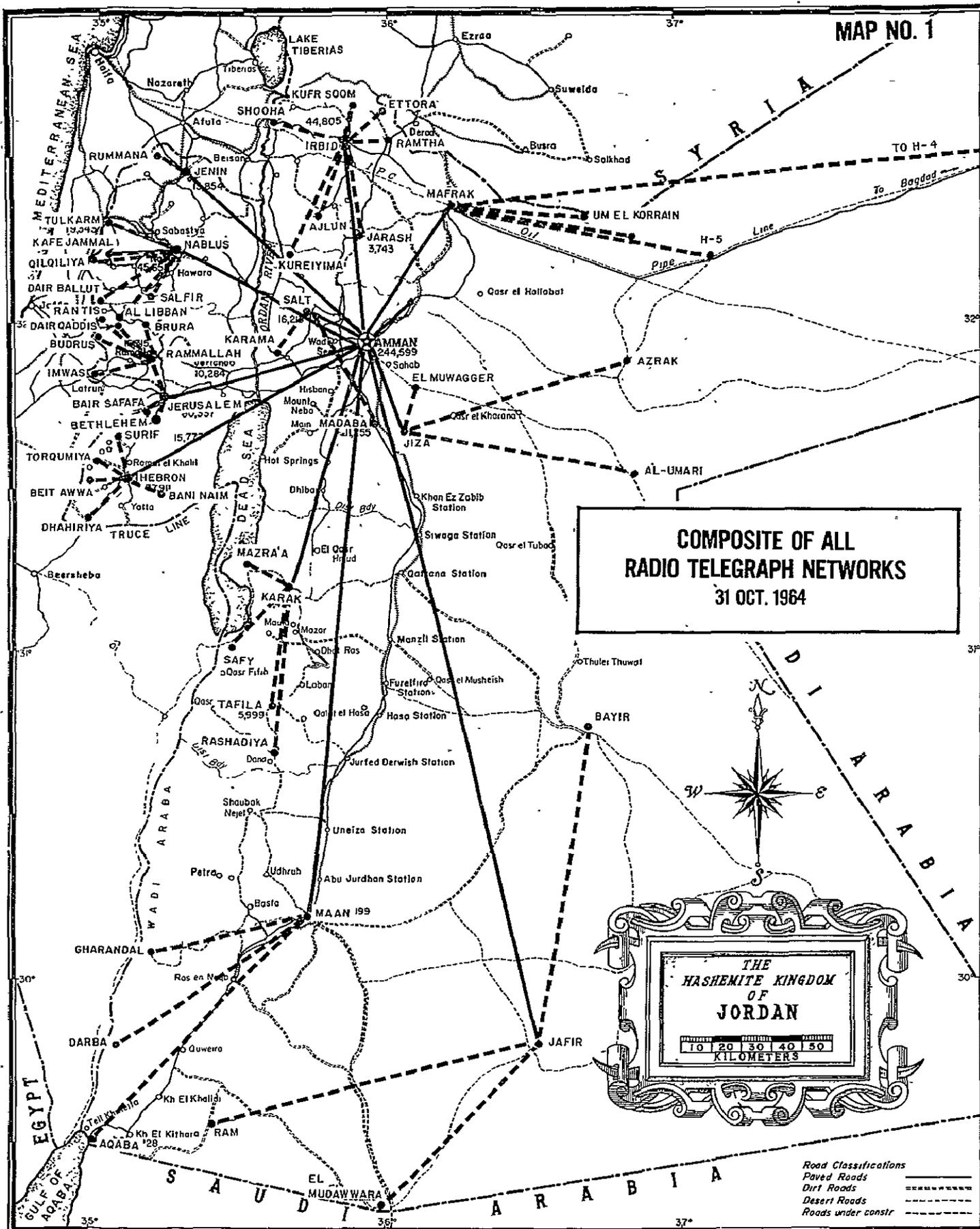
Skill of radio telegraphers and the maintenance of the type 19 units and their capability for handling the present message traffic loadings are adequate. Undoubtedly within the next five years, traffic will increase and the equipment will deteriorate.

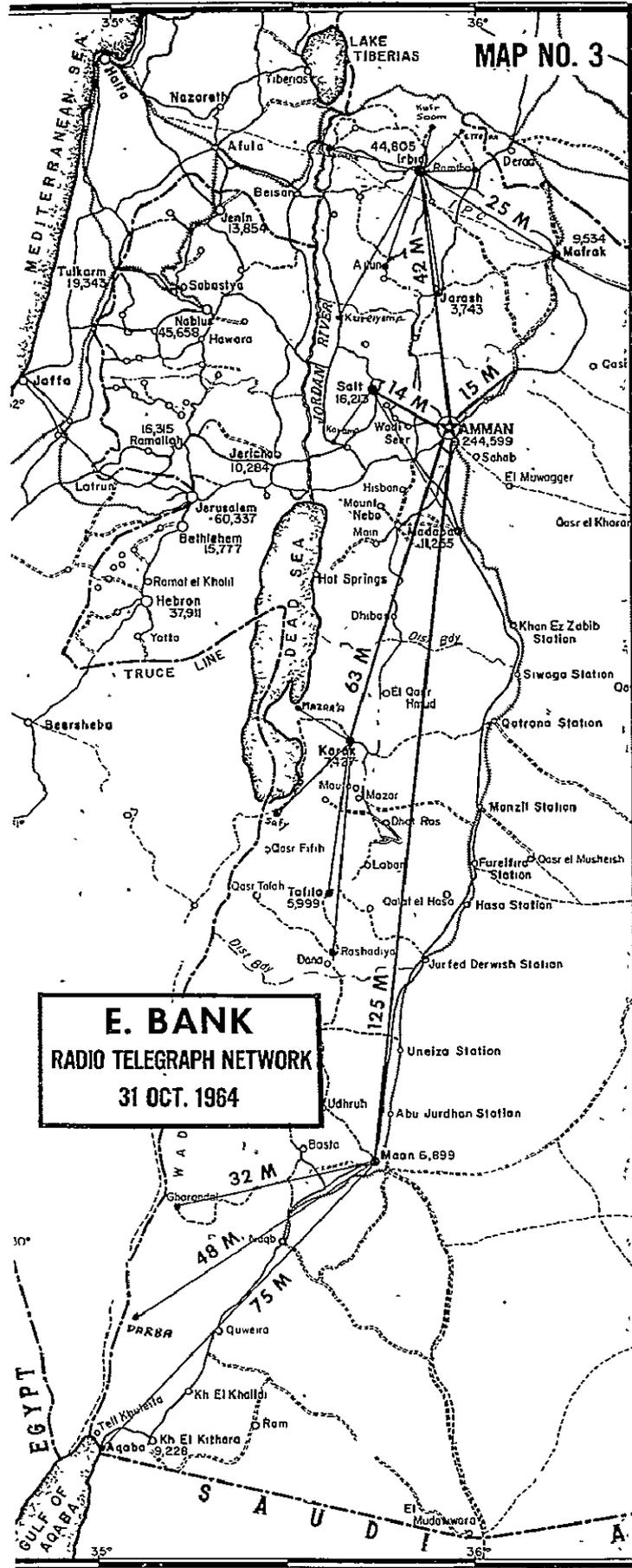
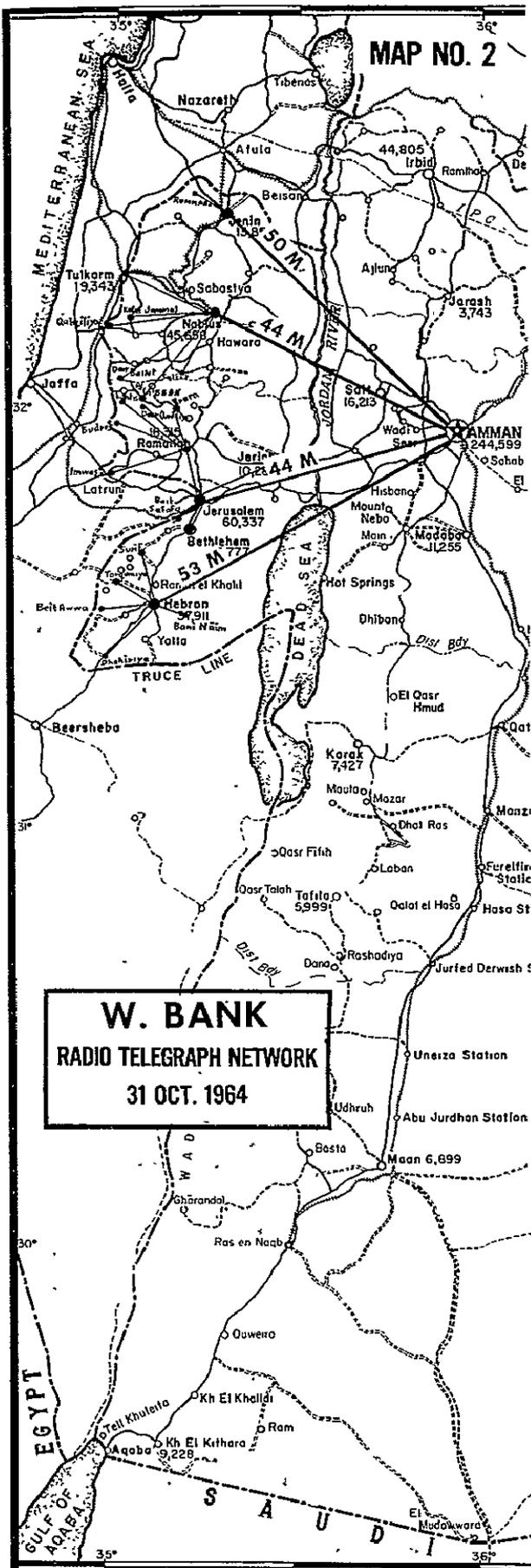
Operating the 19s from a battery source at fixed locations requires constant battery recharging and replacement. Converting the presently used power source to A/C power supplies at all fixed locations would eliminate the need to purchase a large quantity of batteries for replacement and eliminate the continued need for recharging. In addition, the power supplies could be designed to deliver somewhat more power than the batteries and the output power of the 19s doubled safely.

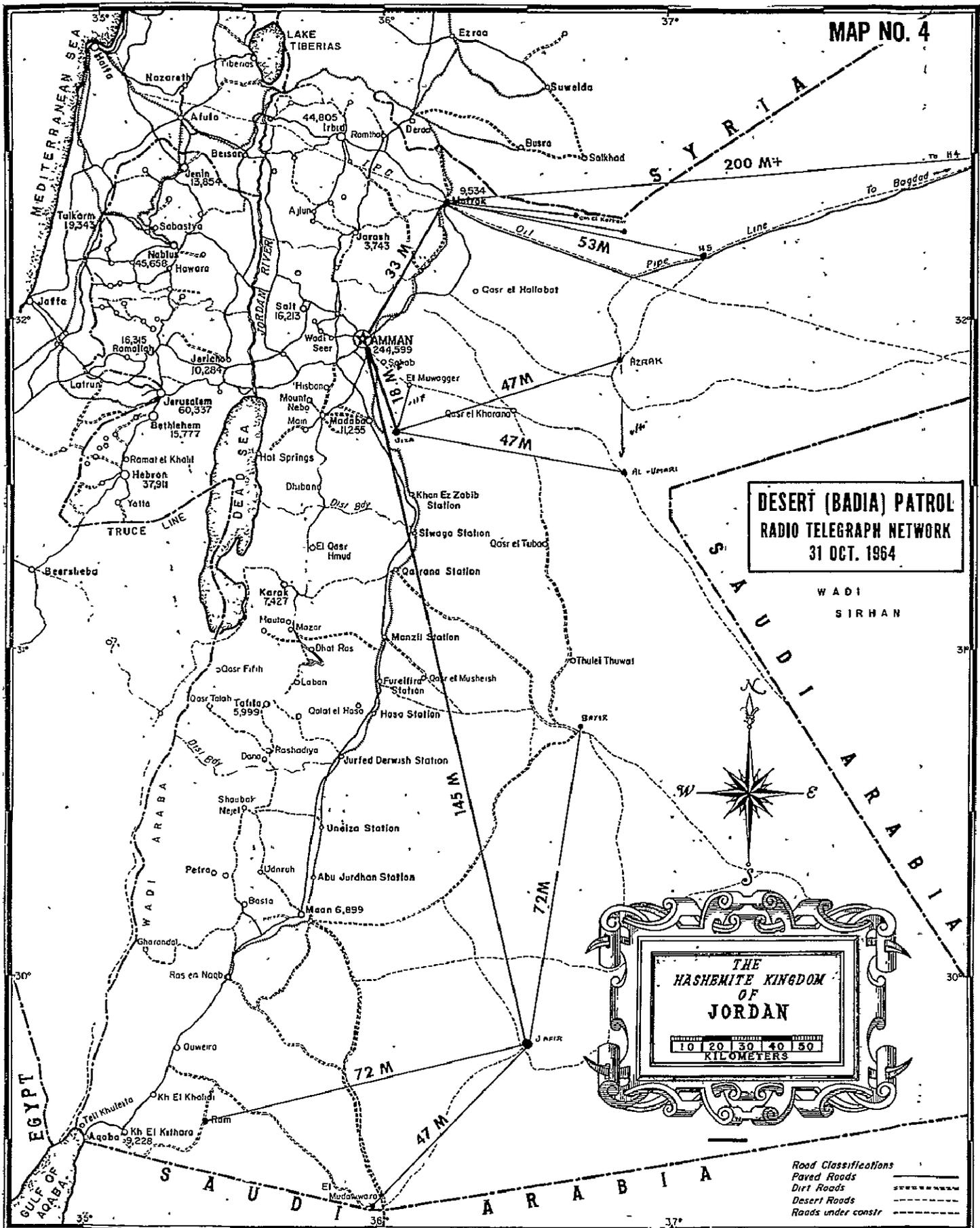
Tests of the Rediphone SSB equipment verified previously made tests at other Districts. Signal range from good to excellent when made at the right time of day on the proper channel. Repeated claims of night-time interference are undoubtedly valid. However, new channels should be selected, based upon distance/propagation characteristics and after monitoring various channels chosen, in an attempt to find frequencies unoccupied by strong interference.

Mr. Carlson and the writer discussed with the Commander of the District, the possible requirement for two-way radio coverage of the City of Jerusalem. Possible locations of equipment and antenna installations were surveyed. Final decision as to the immediate need for such a facility was not made during the visit.

PUBSFTY:JAMacGregor:bdh
11/2/64

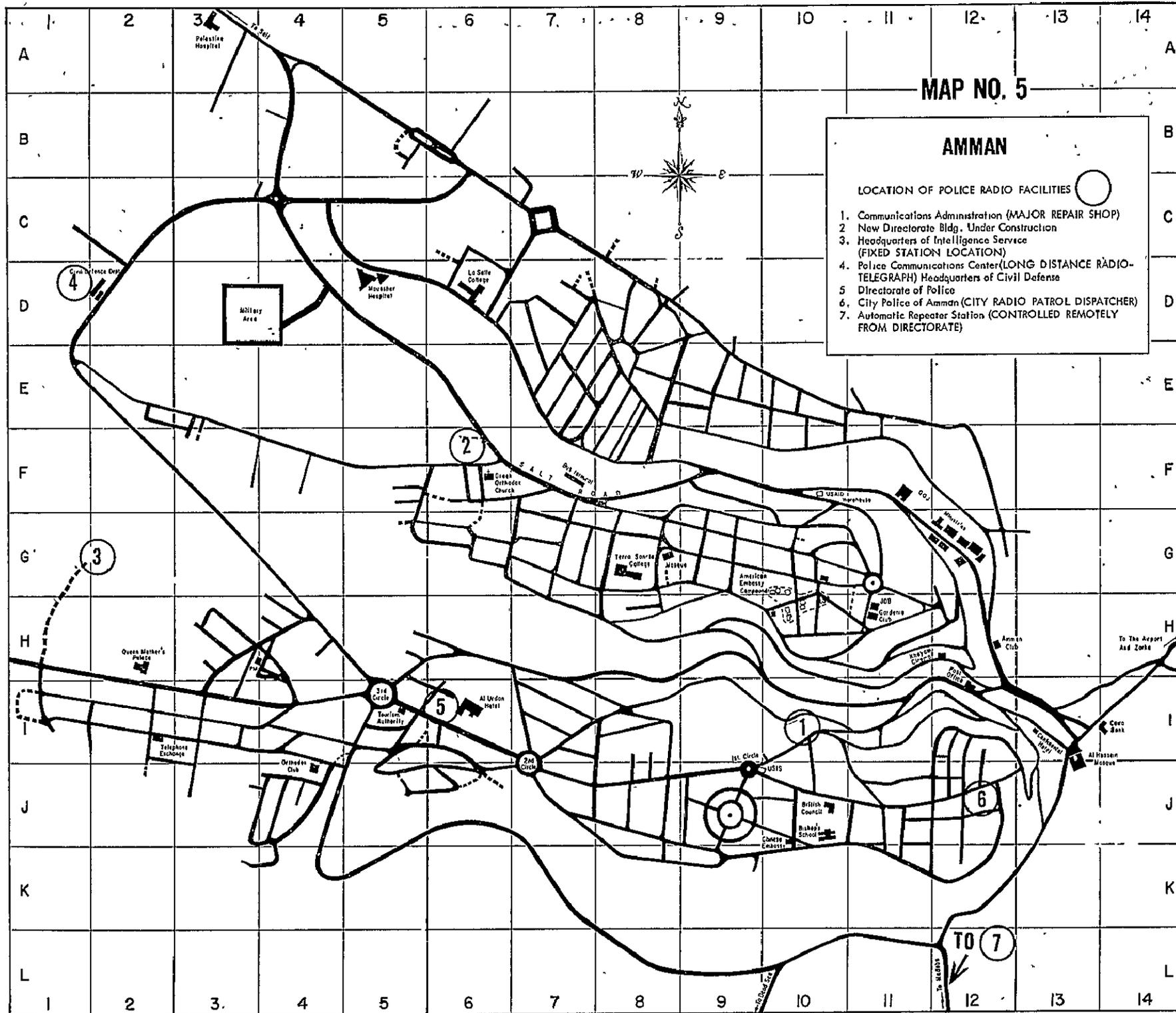






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MAP NO. 5

AMMAN

LOCATION OF POLICE RADIO FACILITIES

- 1. Communications Administration (MAJOR REPAIR SHOP)
- 2. New Directorate Bldg. Under Construction
- 3. Headquarters of Intelligence Service (FIXED STATION LOCATION)
- 4. Police Communications Center (LONG DISTANCE RADIO-TELEGRAPH) Headquarters of Civil Defense
- 5. Directorate of Police
- 6. City Police of Amman (CITY RADIO PATROL DISPATCHER)
- 7. Automatic Repeater Station (CONTROLLED REMOTELY FROM DIRECTORATE)

