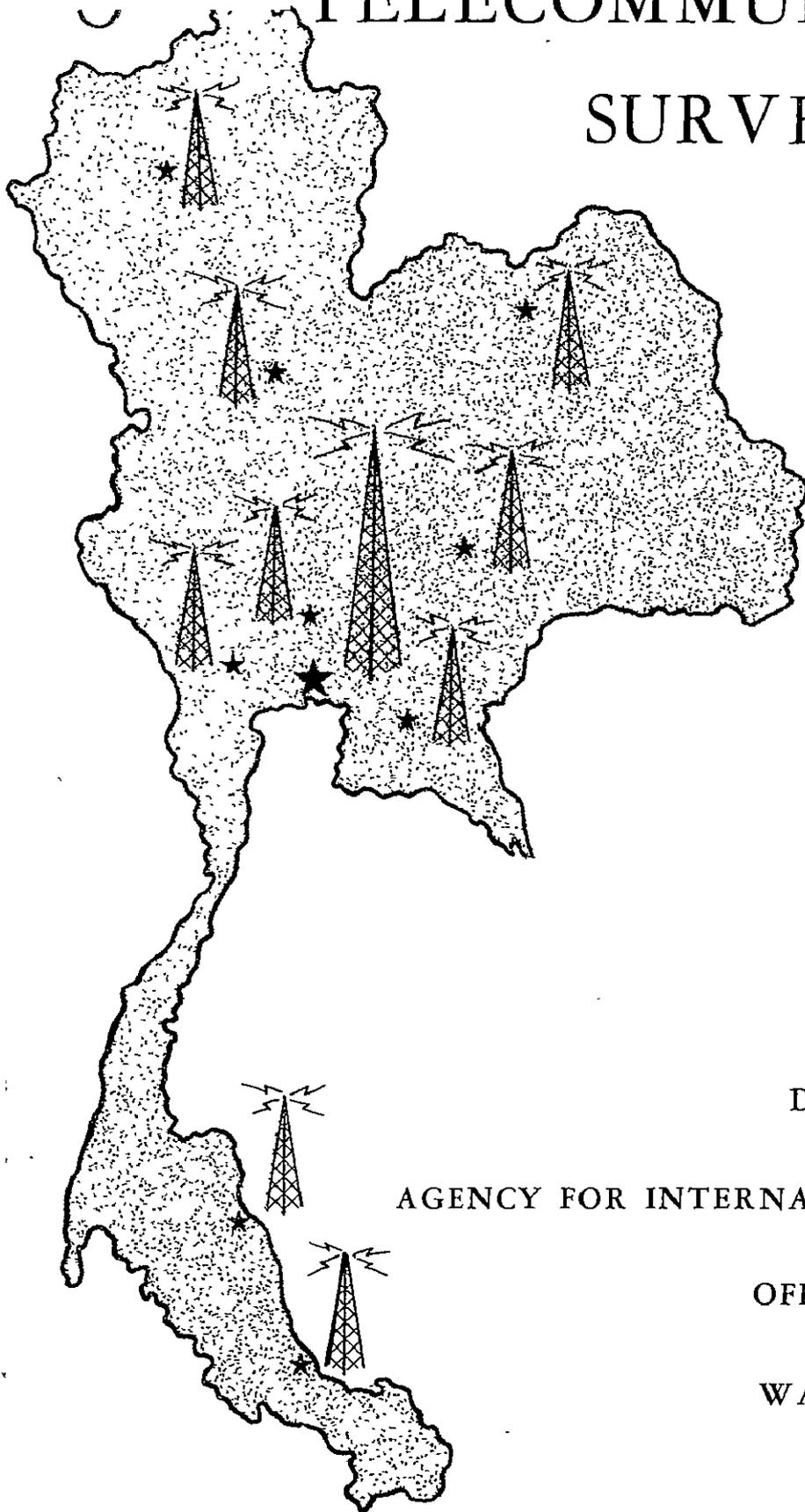


IAI PROVINCIAL POLICE TELECOMMUNICATIONS SURVEY REPORT

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DEPARTMENT OF STATE

AGENCY FOR INTERNATIONAL DEVELOPMENT

OFFICE OF PUBLIC SAFETY

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THAI PROVINCIAL POLICE TELECOMMUNICATIONS SURVEY REPORT

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FOREWORD

In response to a request made by the USAID Mission of Thailand, a survey was conducted from March 20, to June 10, 1963 of the Royal Thai Provincial Police telecommunications facilities by Mr. Thomas L. Moody, Public Safety Advisor Communications, of the Office of Public Safety, Technical Services Division, Washington, D. C. This survey was made to evaluate current Provincial Police telecommunications and determine the feasibility of assisting this force with its current internal security telecommunications problems. For the purpose of the survey and to evaluate the Provincial Police's present communications capability and requirements, the OPS representative traveled extensively throughout the kingdom visiting Provincial Police facilities at Bangkok and in each of the nine police regions.

In this report discussion is made of the following topics:

- (a) An evaluation of the Thai Provincial Police's communications capability and requirements regarding telecommunications operations, training, maintenance, and logistical support;
- (b) Conclusions derived of present Provincial Police telecommunications operational capabilities and limitations;
- (c) Recommendations for the improvement of present Provincial Police facilities to establish a telecommunications system that will adequately meet the tactical requirements for this force's internal security mission.

Information is given in this report to assist in the formulation of appropriate development plans for implementation of a system to provide adequate telecommunications facilities for the Provincial Police of Thailand under existing or expected conditions.

INTRODUCTION

Thailand is a kingdom located in Southeast Asia bordered on the north by Burma and Laos; on the east by Cambodia and the Gulf of Siam; on the south by Malaya; and on the west by Burma. This kingdom encompasses an area of 32,100 square miles of mountainous and flat terrain, 50% of which is covered by tropical rain forests. The main source of income for its national economy is derived from its minerals and agricultural resources. This nation has a total population of approximately 26,000,000, consisting of 21,600,000 Thais, 3,000,000 Chinese, 700,000 Malays, 70,000 Vietnamese, 30,000 Indians, 8,000 Europeans and Caucasians with the remainder comprised of other Asiatic races and aboriginal tribes located in its remote areas. Thailand has an average population density of approximately 120 persons per square mile.

The country has a mean average temperature of 84^oF which is accompanied by an average humidity of 73% with a fluctuation of temperature from 54^o to 90^oF throughout its seasonal changes. The climatic conditions in the area are based on a two season cycle consisting of a wet and a dry season.

Bangkok is Thailand's major seaport and the center of commerce; is the country's capitol and governmental center; has a population of 1,500,000; and is located inland, approximately 20 miles north of the Gulf of Siam on the Phraya River. This river empties into the Gulf permitting ships of 10,000 tons or less to utilize Bangkok's port facilities.

Most of Thailand's agricultural areas are located along its rivers and canals, which serve not only as transportation routes for small boats but facilitate the irrigation of approximately 10,000,000 acres of tillable soil.

The Kingdom of Thailand has approximately 3,120 miles of modern railroads which furnish a means of transportation to all major cities in the nation. The country's highway system consists of 7,500 miles of roads of which 2,250 miles are first class roads, 2,500 miles are second class roads, 2,500 miles are

third class roads and 1,250 miles are provincial highways. Of this total, 4,350 miles are classed as all weather roads usable in both the dry and rainy seasons.

These transportation systems provide the kingdom with reliable routes of commerce within the country over which its products are transported to Bangkok and other major cities in order to sustain its national economy.

The Thai nation is policed by several agencies which are under the supervision of the Director General Of the Royal Thai Police. The largest and most eminent of these agencies is the Royal Thai Provincial Police which has a strength of 28,000 officers and men. This force has the responsibility of enforcing civil law and maintaining order to insure the internal security of Thailand. The Provincial Police perform all routine uniformed police functions for the kingdom and thus exert influence throughout the nation. The Border Patrol Police is a relatively autonomous segment of the Provincial Police which is responsible for patrol of the country's borders.

SUMMARY

In summarizing the following report, it may be noted that shortages in the fields of staffing, operations, maintenance, budgetary planning, and logistical support greatly detract from the present Provincial Police telecommunications capability with existing facilities. Joint ownership of equipment on one hand and lack of fixed responsibility for system management by one organization on the other further complicates the aforementioned condition under which the Provincial Police system functions. Budgetary support problems cannot be resolved; and trained personnel to sustain efficient operation and maintenance and management of the system will not be realized until a single organization has definitely established ownership and responsibility of equipment for a Provincial Police radio net. This must be fostered and implemented by this force within its own organization in order to be effective.

In order to assist in the accomplishment of overcoming the above deficiencies it is recommended that a USAID Public Safety Advisor Communications be assigned by the AID Mission to Thailand to work with the Provincial Police. It is further recommended that an appropriate agreement be established and formalized to permit the working relationship needed to effect improvements and overcome deficiencies mentioned herein.

It is the opinion of the OPS representative that by utilizing current equipment and evaluating its life expectancy, rational planning can be made to expand the existing system to a level where it can meet current and future Provincial Police needs with a minimum expenditure of funds.

A recommended plan is submitted in the report to organize the current facilities in such a manner as to effect the expeditious transfer of radio message traffic from Bangkok to each of the nine regional headquarters; from these headquarters to the province (Changwad) and from these to the district (Amphur) level.

This can be accomplished only by an organization providing a direct chain of command from the general staff level subordinately downward. With the aforementioned organizational changes implementation of improvement plans can be started to overcome the deficiencies noted in training, maintenance, operations, and other support functions for Provincial Police telecommunications. With this program the system will expand and meet the forces needs to sustain operations for its internal security mission.

PROBLEMS

In the course of the study with which this report is concerned, observations and evaluations were made regarding operating conditions and practices, equipment, personnel and records. It is from these that the recommendations were formulated. Details of these observations and pertinent comments are given in this report. In summary the problems, which mitigate against an effective and economical telecommunications network for the Thai Provincial Police are given immediately below:

A. Operations

1. Message transmission was unreliable, requiring extended time periods for receipt.
2. A lack of staff organization to reflect command responsibilities for telecommunications.
3. Inadequate familiarity with good management practices on the part of staff officers.
4. Absence of a central control point for regulation of message traffic.
5. A lack of suitable budgetary support.
6. An absence of a sound procurement program based on suitable tests, measurements and evaluations.
7. A multiplicity of responsibilities assigned to communications personnel, some of which should be in other's hands.

B. Equipment

1. The use of improper antenna type and the injudicious location of antennae,

2. A lack of an adequate maintenance and repair program yielding greatly decreased efficiency of equipment in use,
3. A lack of adequate spare parts, regional shop facilities,
4. An apparent unfamiliarity with sound broadcast engineering practices in general on the part of all agencies in Thailand,
5. An absence of reliable frequency standards and measuring techniques,
6. A shortage of mainlink and manpack type patrol units,
7. Parallel radio circuits used by many police agencies.

C. Personnel

1. An insufficient number of personnel competently trained to operate existing equipment, maintain and repair it and administer the operation of the network,
2. The training facility has an insufficient capacity; the curriculum is limited, and too few instructors are available.
3. Staff and command personnel have insufficient knowledge regarding system operation and management.

D. Records

1. Inadequate record preparation regarding operations of the system.
2. Lack of maintenance or repair records for inventory and budget preparation purposes.
3. Records now kept are not transmitted to the command headquarters from the region.

In the course of the report recommendations are made to alleviate the above deficiencies and establish an adequate Telecommunications system for the Thai Provincial Police.

RECOMMENDATIONS

The following recommendations give basic particulars for the implementation of a radio communications system utilizing present radio facilities now being operated by the Provincial Police. The tables of organization and procedures needed to effect the transition of the present system into an effective organized unit are given in only the briefest form and must be expanded at the time of implementation.

The problem, as presented, is the lack of reliable point-to-point radio communications during a 24 hour period each day, or as near that period as can be achieved with limited facilities. This capability is needed to support Provincial Police functions and operations throughout the nation. In that the need is urgent due to political conditions of adjacent countries, it is recommended that present equipment be utilized to its utmost effectiveness as soon as possible to meet these needs.

In order to effect a transition of present capabilities to a point where they will meet the needs of the Provincial Police, a step-by-step reorganization must be undertaken. Reorganization planning must cover all the necessary functions and facilities needed to sustain a system and make its operation possible. The primary requisite is adequate staffing to supervise the organization and operations of this unit. All diagrams are simple to suggest clearly to Provincial Police Officials the organizational steps for proper management that must be taken to insure reliable Provincial Police communications for Thailand on a national scale. The need for each major element of this reorganization will be discussed briefly to clarify its implementation and function in the system.

A. Staffing

It is recommended that Provincial Police communications be elevated to the position of a command staff function on all staffing patterns in this organization.

The Commanding General should designate a Staff officer to serve on his staff as his communications officer and this officer should oversee and supervise all Provincial Police radio communications for Thailand. He must administer records, budgetary support, procurement, training, operations, and any other needed function that is necessary to support the Police communications system. (Refer to Figure #7). This officer should also coordinate Provincial Police radio, telephone, and other communication facilities with other Thai Police agencies to prevent duplication of equipment and systems. This will prevent an unnecessary expenditure of funds and multiplicity of responsibilities in emergency situations. The Provincial Police Communications Officer must have subordinates on the staffs of each Regional Commander who will act as the Communications Supervisor for the police in that region (Refer to Figure #8). Utilizing this direct chain of command controlled communications operations can be uniformly effected throughout the country.

B. Training

In order to organize the Provincial Police Staff as recommended, trained personnel are needed to control, operate and maintain the system. It is recommended that a school or training facility be established directly under the Communications Officer for training all police personnel in the specialties needed for a communication system's Operation, planning, maintenance, and regulation.

1. Staff

Staff training courses should be established covering subjects needed to provide staff personnel with adequate knowledge regarding their responsibilities. These subjects should include international and national radio law, message handling, report writing, routing, coding, message prioritization, etc., and presented as a 30 day program.

2. Operators

It is urged that a course for radio operators be established. Such subjects as appropriate Thai law, Morse Code, administrative procedures factual telecommunications operations, and associated courses should be provided. Such a course should be for a period of four months.

3. Maintenance

To assure continued operational reliability of the system equipment thorough training must be provided selected personnel regarding radio Theory, Maintenance repair procedures, telephone and teletype repair methods. Such a course should be for a period of one year, include shop practice and be a prerequisite to assignment as a telecommunications technician.

Additional personnel are needed who can be classified as semi-skilled. Formal classroom instruction is not required for these men, but sufficient training should be provided to allow each to perform his assigned tasks. Due to the large quantity of personnel involved, an organization must be established to effect this necessary training. An adequate records system must be formulated to record cost of operations, message counts, maintenance costs, and other expenditures for use in budgetary planning to support the system. Only when provisions and planning for the above functions have been completed, can system improvements be implemented.

C. Maintenance

It is recommended that a repair facility be established at Bangkok capable performing first, second, third and fourth echelon maintenance of all radio equipment for the Provincial Police. In conjunction with this repair shop provisions for spare parts stocking and storage should be initiated at this time to insure adequate spare parts to sustain operations for at least two years. This will require an accurate records system to account for parts used and services rendered in the upkeep of the system. These records should be kept so that a constant cross reference check can be made on services and spare parts utilization. The records can then be evaluated and an accurate cost figure for spare parts and maintenance derived. These figures will then furnish guidelines for stock replenishment procurements. It is advisable to start this system with at least two years spare parts on hand. This will facilitate the availability of one years parts on hand at all times cover for the replenishment lead and lag times encountered in stock replenishment without affecting the operating efficiency of the system. Unless this is provided, shortages will curtail and limit operations.

Maintenance facilities should be expanded as soon as personnel are available with one repair shop located at each region capable of performing all first,

second and third echelon maintenance for that area. Only limited spares should be kept on hand at the region locations to prevent dispersion of storage facilities and improper utilization of parts on other than police radio equipment.

The implementation of the above will require a large number of trained personnel in comparison with those presently available. It therefore becomes evident a staff is needed to supervise and direct the efforts of these men to assure their effectiveness. This maintenance facility is the systems lifeline, and if it fails, the system fails.

D. Operations

Present operational standards are unsatisfactory for net operation. It therefore becomes mandatory to revamp and organize a new communications unit. Only in this manner can past errors and misconceptions of radio net operation be eliminated. All operations should be of a police tactical or emergency communications nature, with the speed and accuracy of message handling and transmittal the primary objective.

Broadcast stations, jammers, and other radio facilities should be placed under the control and operation of another unit completely independent from the tactical operating unit for a Provincial Police system. It is also recommended that all large transmitters connected with these operations be located at sites remote to tactical police transmission points as emergency communications service cannot effectively be given if these units are in close proximity.

E. Supply and Procurement

It is recommended that efforts concerning supply and procurement be minimized until the system is organized and these functions can be performed intelligently. The need for spare parts for maintenance of existing equipment is a constant need that must be met. A spare parts system, however, cannot be established until the two basic requisites of organization and records have been instituted to substantiate needed expenditures.

F. Equipment

Present equipment should be utilized in the establishment of a Provincial Police system. A phasing out of old equipment and replacement with new must

be made as the need arises. This replacement is dependent upon radio set reliability which cannot be determined until an organized and functioning system is in operation. There is a definite need for new equipment but how best to specify and order it depends on the service it must perform and where it is to be located as these are the governing factors in writing specifications. Tests must be conducted. Operational test records are needed to substantiate any large scale future purchases of equipment. System planning techniques require accurate available data prior to any large scale implementation. Unless these practices are utilized, procurement money can be spent and ultimate goals of a tactical system never achieved. It is therefore recommended that the equipment now in the custody of the Provincial Police be turned over to them. This will permit the establishment of an effective communications organization, and furnish needed answers as to what can best be utilized to meet future Provincial Police needs.

G. Other Commodities

Many other commodities are needed to implement the recommended system. These items can be issued by the police from operational units or stocks on hand. Items such as vehicles for transportation, metal working facilities, and locally procurable commodities may be so obtained. The exact requirement for major items can be determined only after the basic organization of the system has been accomplished and specific operational and administrative requirements identified.

RECOMMENDED PROVINCIAL POLICE RADIO
SYSTEM IMPLEMENTATION PLAN

A basic radio system, which shall be referred to as the Primary Net, should be established with existing Single Side Band Units recently procured by the Thai Police. The Primary Net should be installed only after tests have been made over a period of time utilizing this equipment. These tests should be conducted between two units located approximately 100 miles apart so that travel from point to point can be accomplished readily in the event of malfunction or failure. These tests are needed to determine the capability of this equipment on 24 hour operations. Propagation data, frequency utilization, noise figures, operational difficulties, and many other unforeseeable factors can be resolved from these test results. Modification of units to meet the operating standard needed to assure reliable service can be achieved at this time. These modifications can then be incorporated in other units if necessary prior to their installation at remote points where travel time and costs make it difficult to accomplish and incorporate them.

Once the units have been modified, it is then possible to proceed with a set installation and implementation plan to place the net in operation. This operation should be conducted for the Primary Net in three phases:

1. Tests
2. Modifications
3. Total Net Installation

After these phases are complete, operations can be started. The establishment of a reliable control point at Bangkok is mandatory. This should be completed prior to the time actual operations are initiated. This control center and its operation will, to a great extent, determine the efficiency of the Primary System. Unless it is an efficient, well-organized unit, with definite control of operations, the system will fail. All operations should be controlled from a

common control point with an officer in direct command 24 hours a day of operations.

The physical layout of the control room to a large extent determines its effectiveness and functional ability. It should be planned with the thought in mind that one day it may have to control close to 2,000 field stations and rely upon a multi-channel operation to effect this.

Radio links should be established from Bangkok to each region headquarters and operations started on a 24-hour basis. When this is a dependable unit and functions smoothly, teletype equipment should be installed and tests made on one short link to evaluate its utilization with present equipment on hand. After its usage has been perfected and it is an operational advantage instead of a handicap, it can be installed at each region headquarters.

With the above accomplished, the region to province, (changwad), secondary system should be reorganized. All existing equipment should be checked, repaired and modified if necessary, one region at a time. Upon completion of the above, all antennae systems, etc., should be redesigned and reinstalled in the region. Any additional renovations required in buildings should also be made at this time. Once one region's provincial stations are renovated and in proper operating condition it may be determined how best to extend the operation to modernize all provincial stations throughout the country. They can then be netted with region headquarters acting as the regional control point. This will extend the influence of the Primary Net to the provincial level.

The last phase calls for the complete overhaul and reinstallation of the district or amphur stations and systemizing them at the provincial level to form a group of third nets. These netted stations can then be brought under the control of the primary or secondary system as needed.

The presently installed equipment will require some modifications to adapt it for operation in this system. It is imperative that from Bangkok to provincial levels the system must have standby equipment at each control point to forestall interrupted operation due to equipment failure. It is recommended that all 24-hour operating points be equipped in this manner to prevent a routine channel traffic breakdown in an emergency.

Only after the above has been accomplished, should an attempt be made to expand the system to cover mobile and remote foot patrol communications. These units must be controlled and coordinated with the system so that they become an asset instead of a hindrance to police operations.

It is recommended that all headquarter office buildings should be connected into the system via VHF radio links when direct wire phone operations are not feasible with patch-through facilities installed to facilitate direct connection into the system control center in an emergency.

It is of the greatest importance that the functions of supply, maintenance, records, and logistics are expanded comparable to the aforementioned system development as their neglect to render adequate system support would cause failure.

The information derived from the aforementioned renovation and reorganization will supply data on operating conditions, equipment life expectancy, and the need to make expenditures for an overall modernization program to supplement existing facilities.

RESUME

The present Provincial Police System cannot be classed as a true tactical support system until the following functions are performed:

1. Staff organization and Staffing.
2. Training program worked out and functioning to meet needs.
3. Reorganization of system and its supervision.
4. Definite assignments of equipment with established ownership.
5. Complete cooperation between agencies on police communications matters.
6. Methods of established enforcement of police communications rights.
7. Adequate records system established and functioning.
8. Demarcation of duties of communication personnel with proportionate pay scales for services performed.

9. Provisions made for adequate facilities to house all units needed to sustain a Provincial Police System.

10. Cooperation of all high governmental officials in planning, operation, maintenance, and procurement functions to support a Provincial Police System.

11. Prompt and adequate budgetary support when needed.

12. Cooperation of all field commands with prescribed communication requirements for efficient operation.

13. Inter-service facility utilization to relieve expenditures and outside repair costs on items or services police agencies can furnish.

14. Provision on all command staff levels for an officer trained in operational communications to handle and advise in these matters.

15. A general realization of the need for, value of, and provisions required to sustain a Provincial Police Tactical System.

Unless the preceding fifteen items are accepted to form the foundation for an effective development plan, it is useless to try and circumvent the obstacles their disregard can impose. Therefore, it would be useless to provide additional equipment within the existing system. If U.S. aid is to be given in Police communications, it is recommended that a sub-project agreement be negotiated between the United States and Thailand in which specific facts are set forth, clearly establishing the positions and obligations of both governments. It is recommended that if the above agreement is made, an A.I.D. Public Safety Advisor Communications be assigned to work with the Thai Police on a regular basis to advise and assist in this field.

ADDITIONAL RECOMMENDATIONS
FOR POLICE RADIO COMMUNICATIONS

The writer wishes to recommend, in addition to the Provincial Police Communications Report, that serious thought be given to the utilization of the Police Communications Unit to establish a National Training School for the training of police radio technicians. This unit should be established under the direct command of the Director General of the Thai Police, and used to properly coordinate all Police Communications for Thailand.

Present observed conditions warrant this move as it is the only facility available which can be utilized to perform this function. At present, it is improperly managed and poorly administered, but it can be made an efficient organization with proper planning, support and guidance. The condition found by the writer upon his inspection of radio equipment throughout Thailand indicate that unless this unit is utilized and an immediate training program established, 70% of all the radio equipment now in the hands of the Thai Police will be inoperable in a period of 12 to 24 months. This includes USOM commodities.

The aforementioned radio unit for the police is in a position to assist or hinder U.S. Police Communications efforts in this country. It therefore becomes wise to assist and subtly direct their efforts along lines beneficial to our efforts.

The writer visited numerous other police radio installations not connected with Provincial Police, and all are in about the same condition. The lack of adequate planning, spare parts procurement, preventive maintenance, proper service and management will deadline it in the aforementioned time.

It is very important that all existing facilities be utilized to prevent the loss of this equipment as replacement costs will run an estimated five million dollars or more. The Thai Police cannot function without radio communications to assist them.

It is better to save and utilize existing equipment by training and supervision of existing facilities than to plan a large-scale expensive replacement program which will still be confronted with the same shortages of adequately trained personnel.

In the course of inspections of radio facilities in Thailand, the writer has not seen one system that was operated or organized properly to sustain itself for any great period of time.

Provisions have not been made by the Thais or USOM to forestall these conditions.

The writer recommends that immediate attention be given this matter and competent personnel be placed in charge to effect the reorganization of police communications. This problem must be taken up at the highest police command level and agreements made for its solution.

It is impossible to overlook the future prospects of the neglect to establish adequate facilities to fulfill the needs to sustain police communications in this country. Budgetary support and technical know-how are lacking to install, maintain and operate an effective communications system for the Thai Police. These deficiencies will never be compensated for unless immediate action is taken to forestall them in the future.

The two enclosed figures show the following:

Figure A -- All emergency facilities of Public Safety now equipped with radio equipment.

Figure B -- A recommended staffing pattern for the utilization of the Police Communications Unit.

PROVINCIAL POLICE TELECOMMUNICATIONS SURVEY REPORT

The following report has been compiled after a two-month survey was made of the present system being utilized for telecommunications by the Thai Provincial Police. The writer traveled extensively throughout Thailand and visited many regional, provincial, and district stations. Group interviews were conducted with commanding and staff officers at each of these locations. The telecommunications needs and field operations of each location were discussed in detail in order to obtain a realistic picture of the present system and its functions in conjunction with police duties. The information obtained was used to substantiate this report.

I. Present Provincial Police Communications

A. The Provincial Police of Thailand

The Provincial Police of Thailand is a force of approximately 28,000 men deployed throughout the country who perform law enforcement and limited governmental paramilitary tasks. This is the largest single unit of the Royal Thai Police.

The Provincial Police are stationed throughout the country giving police protection from the largest region to the smallest village. Their duties are basically comprised of law enforcement, detaining prisoners, presentation of evidence in court, limitedly assisting the Special Branch, and in some localities assisting in joint operations of the Army, Special Branch, and other police agencies.

They perform the functions of Municipal Police Forces in all of the cities throughout Thailand, except Bangkok and Thonburi, as well as the patrolling of remote areas. This force is under the Commissioner of Provincial Police and works as a section of his command. The other unit under his command is the Border Patrol Police.

The coordination of units in this command is supposed to function through a liaison channel at the headquarters and region command levels. The effectiveness of these units on a combined operation has not been evaluated and therefore no comment is made on their composite duties with respect to each other.

The one basic function that is common to all police of the Royal Thai Force is preserving the internal security of that nation. With this in mind, we must consider the support functions that assist and coordinate their efforts in the performance of their duties.

Communications and supply are two supporting requisites needed to sustain any large field force, whose effectiveness is a reflection of the capabilities of these support resources.

B. Provincial Police Radio System

Radio communications are presently provided the Provincial Police by a system operating from Bangkok to each region headquarters; from regional headquarters to each provincial or changwad headquarters in this region; and from provincial or changwad headquarters to each district or amphur police station in this province. This organization is utilized throughout Thailand. (Refer to Figure #3.) Most of the communications are transmitted and received using high-frequency amplitude modulated equipment in the 3 to 12 megacycle frequency band. Present communications via radio are extended only down to the district level. Currently however, three 80 megacycle VHF, amplitude modulated links of about 50 miles each are installed and in operation. It was noted that with present tower facilities only fringe operational efficiency is being obtained.

This Provincial Police system functions through two Bangkok-control points located at sites several miles apart, which are connected by a telephone line teletype circuit, rated at about 85% efficiency.

The location of these centers and the organization of the radio transmission units staff prevent adequate system control. The system functions as a group of stations transferring information in message form from point-to-point with only local supervision at each location.

The function and control of the radio links from Bangkok to the regions are diagrammed in Figures #1 and #2. A third location near the airport is an emergency control station. The effectiveness of this location is limited as a one kilowatt broadcast transmitter is located within 200 yards of these facilities. Radiated energy from this station on its fundamental frequency and harmonics is so high that it interferes with all surrounding equipment. (NOTE: Radiated RE energy in the area is so great that meter readings taken with a VTVM on grid circuits at this location often cannot be relied upon.)

The Provincial Police Headquarters is located several miles from each of the aforementioned locations and connected with them by unreliable telephone lines therefore most messages are carried from location to location by courier causing delays and lost time in urgent situations. Message transfer often requires days instead of minutes.

Radio communications from region headquarters to the province is effected utilizing HF-AM equipment on a direct contact scheduled basis. Messages are transmitted by radio from provincial level to the district in the same way. (Ref. Figure #4.)

C. Operations and Traffic

It will be noted from Figure #3 that all radio Communications are supposed to be governed by a channel of operations. Deviations from this, however, are frequent and direct district to region communications contacts are made in emergencies.

Traffic is handled at scheduled times and 24-hour operations are not utilized. This imposes delays due to the wait of several hours for operating schedules. Without direct supervision of the transmittal of critical information many delays occur in the field that are avoidable, also the transmission of many lengthy incomplete reports cause delays and retransmissions to obtain clarification of information. All messages are logged and recorded on standard printed forms, however, lack of organized supervision makes their transfer impossible. Staff administrative procedures tie up operations at many locations, which requires additional time in obtaining proper authorization and clearances. It may be noted that the system functions with only staff

commanders permitted to grant operations authorization as provisions have not been made for communications officers in the present staffing patterns of field units. Traffic and operational time checks are not utilized by the police to evaluate the effectiveness of the system. This has fostered a condition where operations are conducted individually by each station without operational procedures being strictly adhered to.

Operations are conducted on single frequency, simplex, using four channels at each location. Greater efficiency could be obtained with proper frequency utilization and pertinent modifications to units.

Inquiries were made and station logs inspected at many of the locations visited to enable the writer to formulate a rough message count for the system under present operating conditions. These records disclosed that the average number of messages transmitted and received was as follows: District 10 per day at each location; Province 10 to 20 per day at each location; Region 10 per day at each location. Based on these figures, and considering that approximately 1000 stations are in operation at the present time, gives a daily total of 10,000 messages for the system. It was further established that 90% of this message traffic was for the police and the other 10% for other governmental agencies. It was not possible to check and authenticate the validity of the need for this message transmittal as all messages are written in Thai and considered classified. This aforementioned total message count for one day's operation cannot be substantiated by collective records at Bangkok as they are not forwarded for tabulation. As these records are not readily available it is impossible to accurately cost total daily operations and substantiate requests for additional procurements and budgetary support. Bangkok operational records are available but not accurate to depict total system operations. The Bangkok control centers transmit and receive over 100 messages a day in addition to the system total.

It is estimated that with proper records and management, the present system has a message capability of 200 messages per unit a day. This tends to indicate that present operations are far from a peak load for the system. The reliability of many links is low and the fact that stand-by equipment is not available at many key points tends to detract from the dependability of the total

system. Equipment break-down would prevent key supervised control of operations in an emergency.

D. Radio Equipment

1. Radio Communications Equipment

The present radio system being operated and utilized by the Provincial Police is equipped with the following:

RCA Model ETM 50-50 watt High-Frequency, Amplitude Modulated, Transceivers	Approximately 600
Pye Model PTC 931/914- 60 watt High- Frequency Amplitude Modulated Transceivers	Approximately 200
RCA Model ET 4339- 200 watt High-Frequency Amplitude Modulated Transmitters	Approximately 12
RCA Model CR 91 Communications Receivers	Approximately 20
Region and Province 3KW Emergency Generators	Approximately 100
District 1KVA gasoline Emergency Generators	Approximately 600

Most of this equipment is in need of minor repairs and circuit modifications to make it operable to meet current needs. The percentage of the above units which are out of operation due to component failure is undeterminable as no records are available to show the operational status of units in remote areas. Without standby facilities, these stations can not make contact due to equipment failure. The twelve RCA 200 Watt transmitters on region to Bangkok links are old and unfit to perform this service efficiently. They should be removed and placed in service for liaison work in areas of light operation with two units used at one location to give them a standby capability in event of failure.

Antennae used at most locations consist of openwire types that are improperly cut and constructed thus limiting the effective radiated power of operating units to that far below their rated output. This factor detracts greatly from the efficiency of the system as small effective power outputs are unable to work over high-noise levels and to reach required distances to effect reliable communications.

The above equipment is jointly owned by the Department of Interior and Royal Thai Police and was procured jointly by them. It is now being operated by the Provincial Police, but its ownership has not been granted them. It is maintained with police budgetary support from the Director General of Police on an annual grant basis by the police communications unit. The said equipment therefore is still partly owned by the Department of Interior and available for their use as well as for the police and other agencies. This joint ownership of equipment prevents it from being classed as totally usable for the Provincial Police as a tactical system. It may readily be seen that there is always the possibility of its withdrawal if high governmental officials see fit.

2. Test Equipment

Large quantities of radio test equipment are in the hands of the Police Communications Unit under the Director General of the Thai Police and are not in the custody of Provincial Police personnel. (Personnel problems will be discussed in detail under the section of this report under the heading of Personnel and Staffing.)

Repair shops are operated at two locations in Bangkok. One unit is located at Parusakawan Palace Communication Center and the other near the airport. A third unit is situated at Korat. All other areas are dependent upon these shops for service since no other established repair facilities exist. All of the available test equipment is concentrated at these locations. It is impossible to evaluate or estimate shop needs as present records of service are not up-to-date. This equipment is used to maintain the radio facilities of other police agencies in addition to this system. An evaluation of its adequacy is impossible as only limited knowledge has been obtained on this survey regarding the organization and operations of these agencies.

E. Personnel and Staffing

Current police communications for the various police units equipped with radio presents a problem as there is no definite communications staffing pattern for any one organization extending from Bangkok Control out into the regions, provinces and districts. The chain of command and responsibilities are split among services with no unified pattern where control of radio

operations can be supervised or enforced. Initial authority comes from the Director General of the Thai Police, but his staff does not contain a Communications Officer or Supervisor for Police Communications.

A special unit exists called the Police Communications Unit or Section that is under the command of one of the Director General's subordinates which serves all police agencies on a call-in basis. The Police Communications Section is commanded by a general and has approximately 200 men. This unit performs numerous tasks and yet has no direct authority over police radio communications operating throughout Thailand. It trains operators, and maintenance repairmen for all police agencies; assists in a technical advisory capacity on police communication procurements; maintains all radio equipment brought in for service by governmental agencies; operates program broadcast transmitters and their studios at Korat and Bangkok; operates jammers, direction-finding equipment and a multitude of other tasks including operating the Bangkok Communications Center for the system used by the Provincial Police. It functions on its own limited budget of which 500,000 baht per year are appropriated for spare parts to meet its service needs. Figure #5 depicts the unit's basic staffing pattern and how it is organized. The definite location of its immediate supervisor on the Director General's staff is not known as several of the staff officers handle communication section matters when they are submitted.

It may be noted on figure B that lines of authority do not extend on the chart to any police agency but stop in the unit itself. The Communications Section does work for the Department of Interior, Provincial Police, Special Branch (limitedly), Crime Suppression and many other organizations but receives no budgetary support from them.

Figure #6 gives a simplified block diagram of the position of this unit with respect to other agencies. In this diagram the relationships have been simplified to depict the status of the Police Communications Unit and show how its effective function is limited.

Operators of the system being used by the Provincial Police are Provincial Police Personnel trained by the Communications Unit to perform operations of the system but who are under the jurisdiction of the Provincial

Police Field Commanders. They are not required to comply with the Communications Unit's orders through a chain of command. Maintenance personnel in the regions are controlled and function in the same manner. They are paid by the Provincial Police and rated by them and do not come under the direct supervision of the Police Communications Unit. This organization and staffing creates a problem that tends to prevent rapid message handling techniques from being employed. It prevents the accurate and expeditious transferral of operational records through channels of authority between the field and the Communications Unit. Personnel records, message traffic records, operating expense data, and other vital statistical information is recorded in the station and never forwarded to the proper command in order to allow the employment of good management practices.

With the above staff and operating personnel picture, it is impossible for the system to function effectively and efficiently. The Communications Unit has limited budgetary support and no reliable source of procurement or for additional personnel needed to perform its tasks. The Provincial Police System is now operated by personnel under no obligation to work with a common National Radio Control Center. It is impossible to improve present telecommunications capabilities until there is an organization properly staffed and organized with considerations being made for the formation of a communications unit under the command of staff officers. These men must be appointed, trained, and serve as communications officers on the staffs of all police agencies. This chain of command must start at the level of the Director General's staff and extend down, to the region level.

Provision for adequately trained personnel and staff organization to establish command-supervision of police radio communications is the first step that must be taken to improve present conditions.

F. Training

The present Communications Unit operates a school as one of its functions which is intended to train operators and maintenance personnel to supply the police communication needs of the system and other agencies utilizing radio communications. At present, the school's facilities are limited as only 30

students can be under instruction at one time. There are only two instructors and limited facilities available for this purpose. The school consists of one classroom and a shop practice workroom. Most of the equipment and training aids are constructed on breadboards built by the instructors or other service technicians.

Each agency is supposed to send personnel to the school to be trained to care for its needs in the field of communications being utilized by it. This is not budgetarily supported and so only limited training can be given in basic radio and communications theory.

Each student receives eight months of training if he is to be a repair technician. No screening tests or special aptitude tests are given prior to his being sent to the school. Frequently, the eight months are wasted as the student does not have the ability to acquire the knowledge of the background to enable him to understand it.

Upon his return to the agency the graduate often transfers to a field unit as the opportunity for advancement is better than in the communications section. The result is wasted time, money, and effort to fill an urgent need for a specialist. The school can only produce 30 trained men in eight months and at present there is need for 100 or more in the Provincial Police to meet present needs. When this is considered and evaluated, it means that the school cannot meet present needs of one organization; needless to say, all units using communications equipment.

Trained instructors in single sideband and many other phases of modern communications theory are not available so these subjects are not taught; yet this type equipment is being procured periodically with police funds.

No systematic pattern is used in an effort to prepare the student for future eventualities he will encounter in the field. Courses consist of hours of theory and only a small amount of practical experience. This is far from adequate to meet the needs of a man who upon graduation is placed in remote areas where he must rely on his own experience and judgement to put a station back on the air. Service personnel are not competent for this assignment until they have had several years experience. It is very important that this part of the

Thai Police Communication picture be given much thought and greatly improved. Increased telecommunications capabilities are wanted and badly needed but great strides must be taken to eliminate present deficiencies in training. The preparation of training material and training aids to upgrade the school's present capabilities to a point where it could even begin to meet elementary needs of the Thai Police would take over one year.

G. Maintenance

Maintenance for police radio equipment is performed in two different ways. There are servicemen, who have had limited training in the field who go from place to place. Often one man covers as much as two regions and does minor repairs. All major repairs are made at either Korat or Bangkok. Provincial Police personnel operate the Korat repair shop while the two shops in Bangkok are operated by the Police Communications Units personnel. In areas where no repair personnel are available, servicemen travel from Bangkok to the area and repair all units out of service there. This is costly as they must travel by bus or train often traveling 600 miles one way.

The Bangkok shop facilities are adequate to perform up to fourth echelon maintenance on equipment. Korat can handle up to third echelon maintenance.

The police plan to establish a repair facility at each region headquarters as rapidly as trained personnel can be made available. The present class of students will be assigned to one region upon graduation. Men from one region at a time are being trained in an effort to overcome the deficiency caused by the lack of trained service personnel. The writer interviewed several of the technicians assigned to work in remote areas and found that tubes and spare parts are not stocked there, so difficulties were encountered in getting parts to make repairs. Frequently, they traveled by bicycle or walked to the stations and were several days on one call.

A check of test equipment and hand tools revealed that there is a need for more, but as the units or shops are far apart and repair facilities spread out, tools and test equipment are dispersed. Several well laid-out test benches were observed and all equipment was in good condition. It was further noted

that at some locations, Heath Kit units have been assembled by the staff and are in use.

Warehousing of spare parts and the method of storage should be improved and provisions for tropical storage made. This would prevent losses due to deterioration of new equipment. This has evidently been encountered as new units were observed and the plated chassis had already started to rust. There is much to be desired, but with present buildings and facilities, an excellent repair facility could be established with proper management. However, this will call for the relocation of the broadcasting transmitters and high powered transmission equipment now located adjacent to present maintenance repair facilities. Reasonable planning must dictate the location of facilities for radio operating and maintenance installations.

The average service technician needs advanced training in modern communications method and equipment. He also needs advanced training in antennae theory and basic wave propagation. Without this knowledge, he cannot hope to install and service existing equipment or new units and obtain proper rated results from the equipment.

Present repair and maintenance facilities can be developed into efficient units with proper training, supervision, and staffing. Budgetary support must be made available to finance these requirements and others that will arise as the unit changes into a capable organized facility.

H. Supply and Procurement

All parts storage is handled by the Police Communications Unit in Bangkok at a site near the airport. Warehouse records are kept but no stock procedures were noted. All supply equipment is stored in regular warehouses without proper tropical storage facilities to prevent deterioration. The Communication Unit procures spares limitedly while most new equipment is procured by other sources or agencies. It was noted that only radios are procured and no thought given to obtaining operating and special spares to sustain their operation. Four 1 KW RCA MK IV Single Side Band exciters and 1000 watt PEP linear amplifiers, also 20 Nippon Electric 60 watt PEP Single Side Band Units had been recently procured for use by the police from police budgetary funds.

Spares to sustain the units had not been procured. These units are limited to a short operational life, as parts are not readily procurable in Thailand to sustain them in routine operations. It is impossible to plan and operate a system without spare parts. The procurement transaction was handled by other than communications personnel. Further, no personnel was trained to service these units.

The procurement and supply of equipment and spares determines the life expectancy of a system. If these functions are not practically planned, time, funds, and efforts are wasted and the expected goal cannot be reached.

Available buildings are adequate to house the required supply functions.

I. Records

Accurate records are almost non-existent in the present system utilized by the Provincial Police. Records are meticulously kept at each station, but are not sent to the headquarter station.

A condition was found to exist where supervision, along lines to foster the transfer of information on operations from field units to a competent authoritative organization in Bangkok is not provided.

The records kept at present are too lengthy, yet incomplete to be of value as a reference source. It is impossible to obtain a true picture of operations, personnel, maintenance, procurement, supply, or other phases of this system's operations in brief report form. Until this can be done, its complete functions will never be understood or planned for.

J. Budgetary Support

The present system is financially supported by funds set aside and given to the Police Communications Unit. Police agencies, primarily the Provincial Police, must budget for telecommunications as an important integral of their overall budget. The present allocation of 500,000 baht per year is inadequate to support a national communications system for the police.

K. Teletype

The Thai Police has 12 complete Nippon Electric Teletype Units with keyers, converters, and control units. These units can print both English and Thai letters. They are standard page printers and have perforators similar in design and circuitry to standard U.S. Army units. The utilization of six segments instead of five, which is standard, makes the above dual character printing possible. The tapes use six lines of perforations instead of five to accomplish the character capability.

Most of this equipment was inspected and was found to be in fair condition. The units use Frequency Shift Tone Keying in (approximately 340) cycle channels, using standard frequency tones. This band information is accurate enough for reference in channel spacing. All the equipment needs cleaning and oiling. Two units were observed in operation between the control centers in Bangkok. Both functioned well but needed servicing. The following was noted:

1. These units can be adapted for use on Radio SSB links with no difficulty.
2. Spare parts are stocked by the police only to a limited extent.
3. One technician was trained at NEC factory and can be used to train additional service personnel.
4. One wire circuit is in use at present. The balance of the equipment is idle and stored under adverse conditions.

L. Telephone

The police communication unit at present has a telephone section. This section does all phone work for the police. All systems observed were bar-switch type dial systems and operate well. The wire circuits, however, are very poor. Equalization, isolation of circuits, utilization of line amplifiers, etc. . . . , are not considered.

As the Provincial Police throughout Thailand relies on local telephone service for communications, this section should be increased in size and personnel should be trained. At present, only a few men are assigned to this

section, and it must be enlarged to meet present and future needs. All telephone personnel are members of the Police Communication Unit.

In Bangkok, the police exchange consists of a 30-trunk main feed through an exchange to over 300 extension lines.

The present system has no phone loops capable of remote dispatch control of radio equipment. This service must be added in the future since all Police Headquarters Buildings are located in congested areas which prevent erection of large antennae arrays in their vicinity. Transmitter sites will, therefore, have to be located at remote points which will call for phone-line operation.

M. Transportation

The present Police Communication Unit has approximately 30 vehicles attached to it. Many of these vehicles are in need of repairs or replacement. The unit performs its own maintenance tasks which should be another unit's responsibility. The Provincial Police has auto repair facilities, yet they are not being utilized by the Communication unit. The organization of all functions in an operational police unit should always be dependent on the force as a total operating body. The cooperation between working divisions of the police is mandatory, and the limited number of radio technical personnel should not be required to work as auto mechanics.

Transportation, at present, is inadequate to support an efficient radio service unit. The requirements for vehicles cannot be identified, however, until a radio system is organized and records justify its transportation requirements. All phases of support are dependent on organization, and when it is lacking it is indeed difficult to justify expenditure in any form.

This facet of the Unit's capabilities also is not being properly administered at one level or the other.

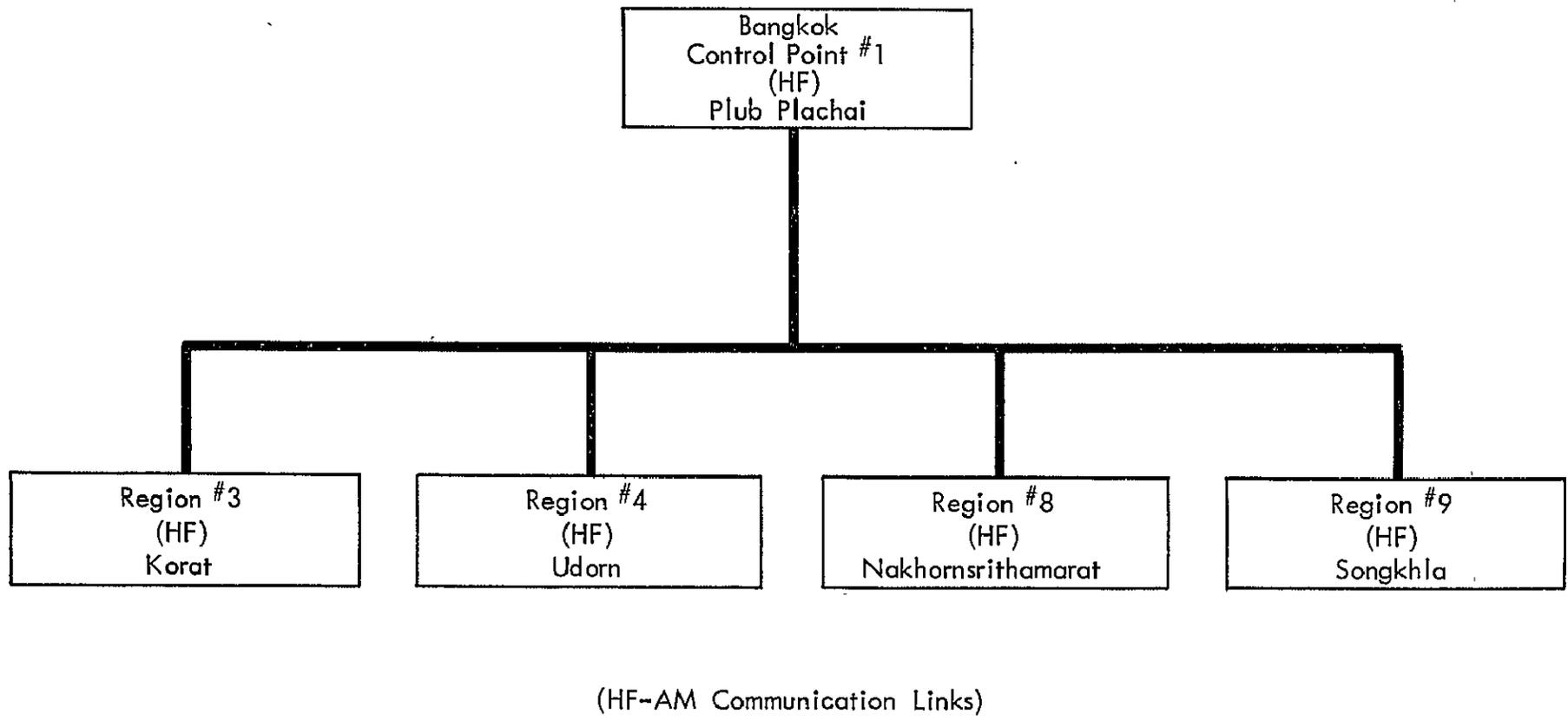


Figure 1.

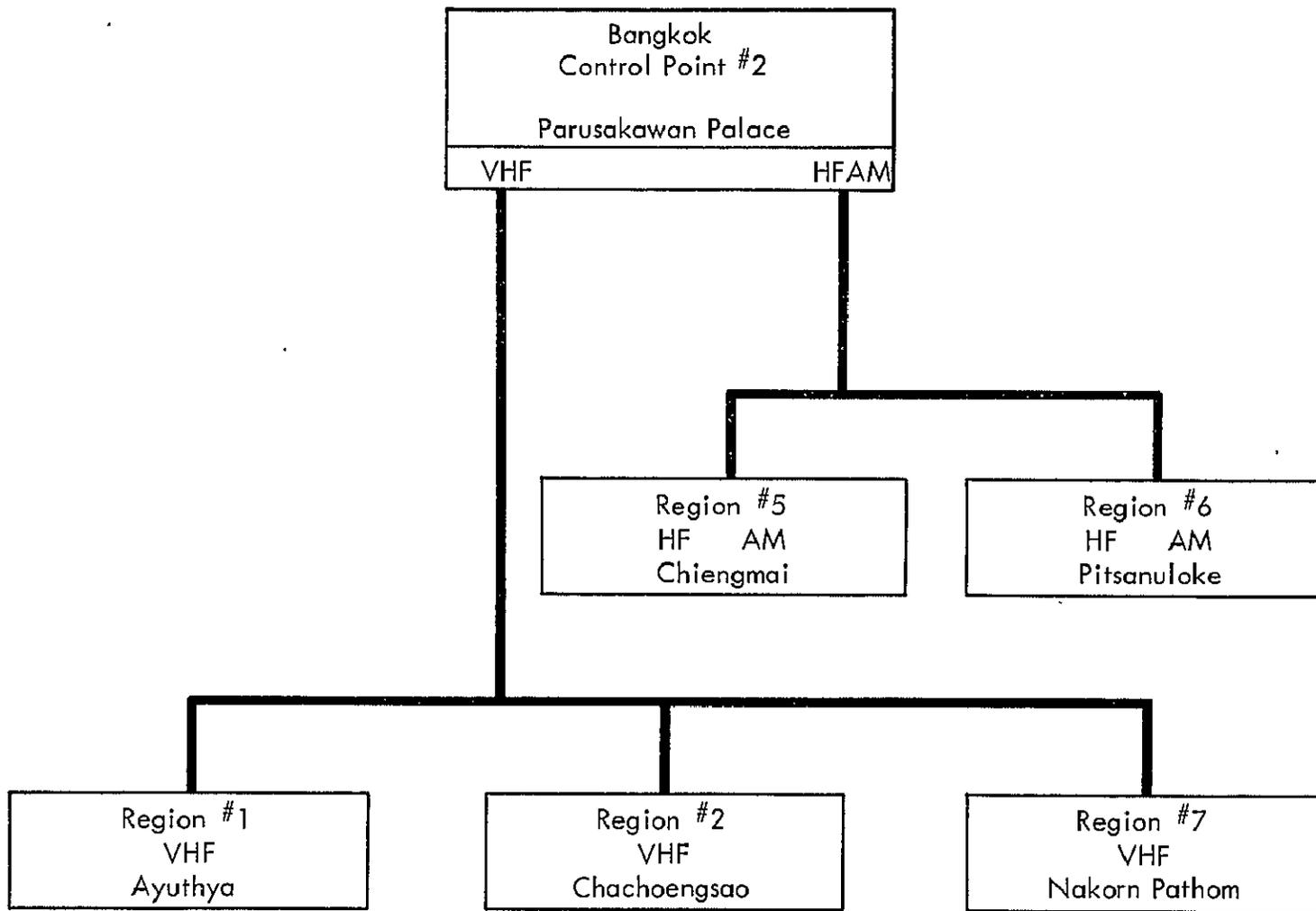


Figure 2.

PROVINCIAL POLICE UNITS UTILIZED

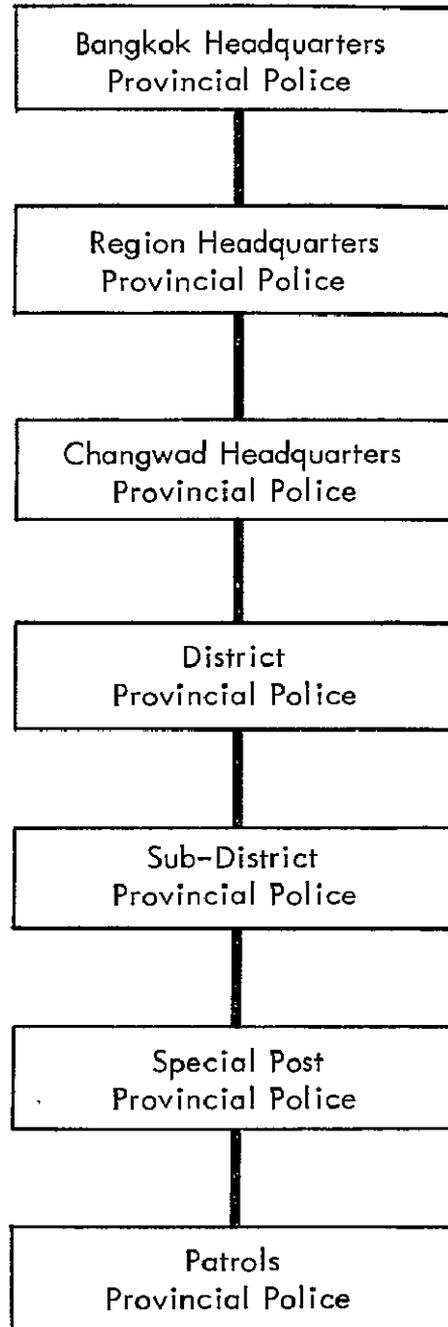
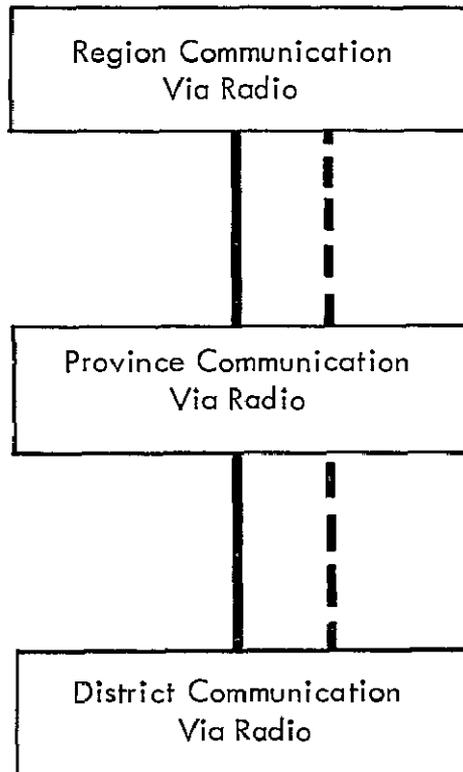


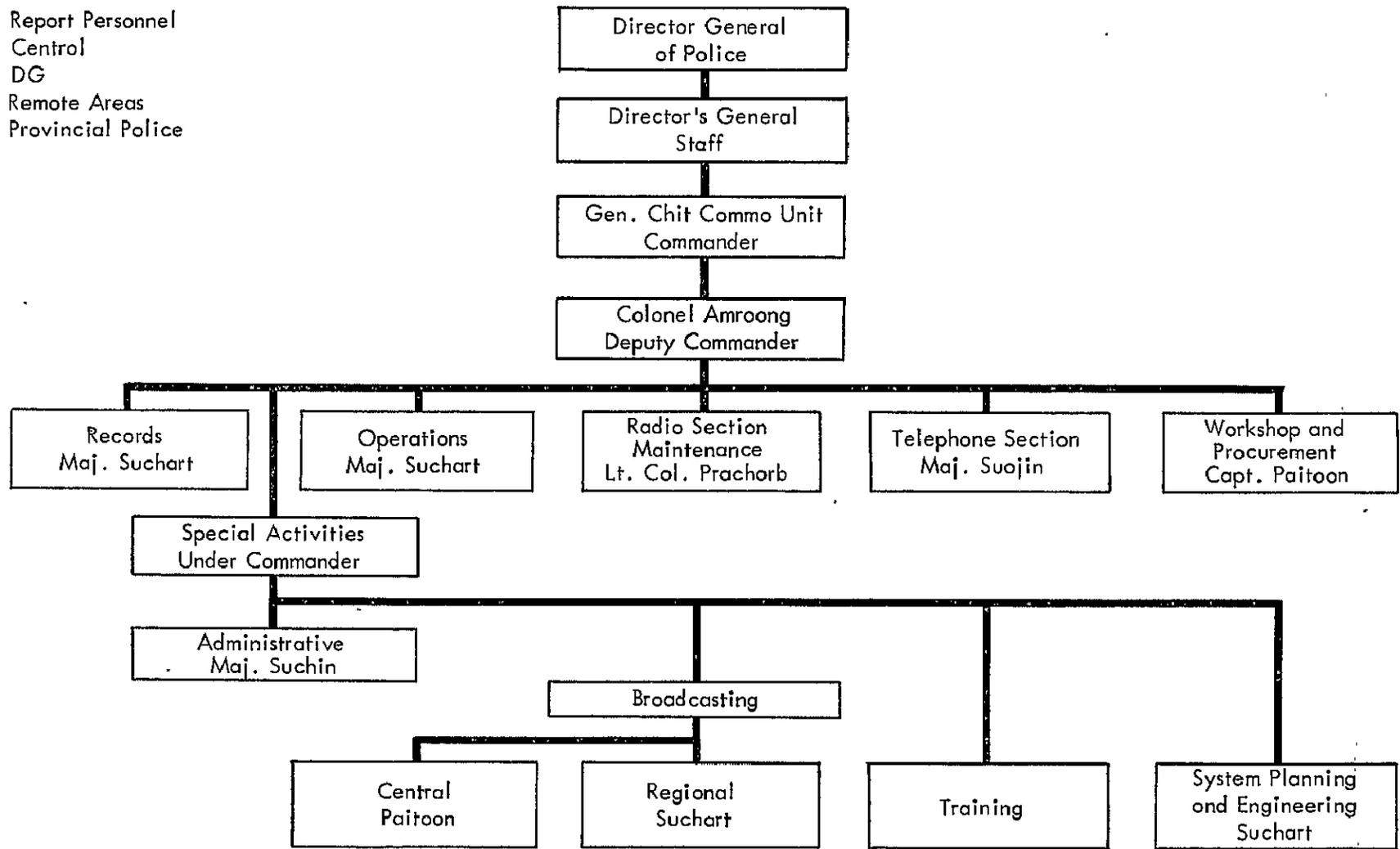
Figure 3.



TO **——**
FROM **- - -**

Figure 4.

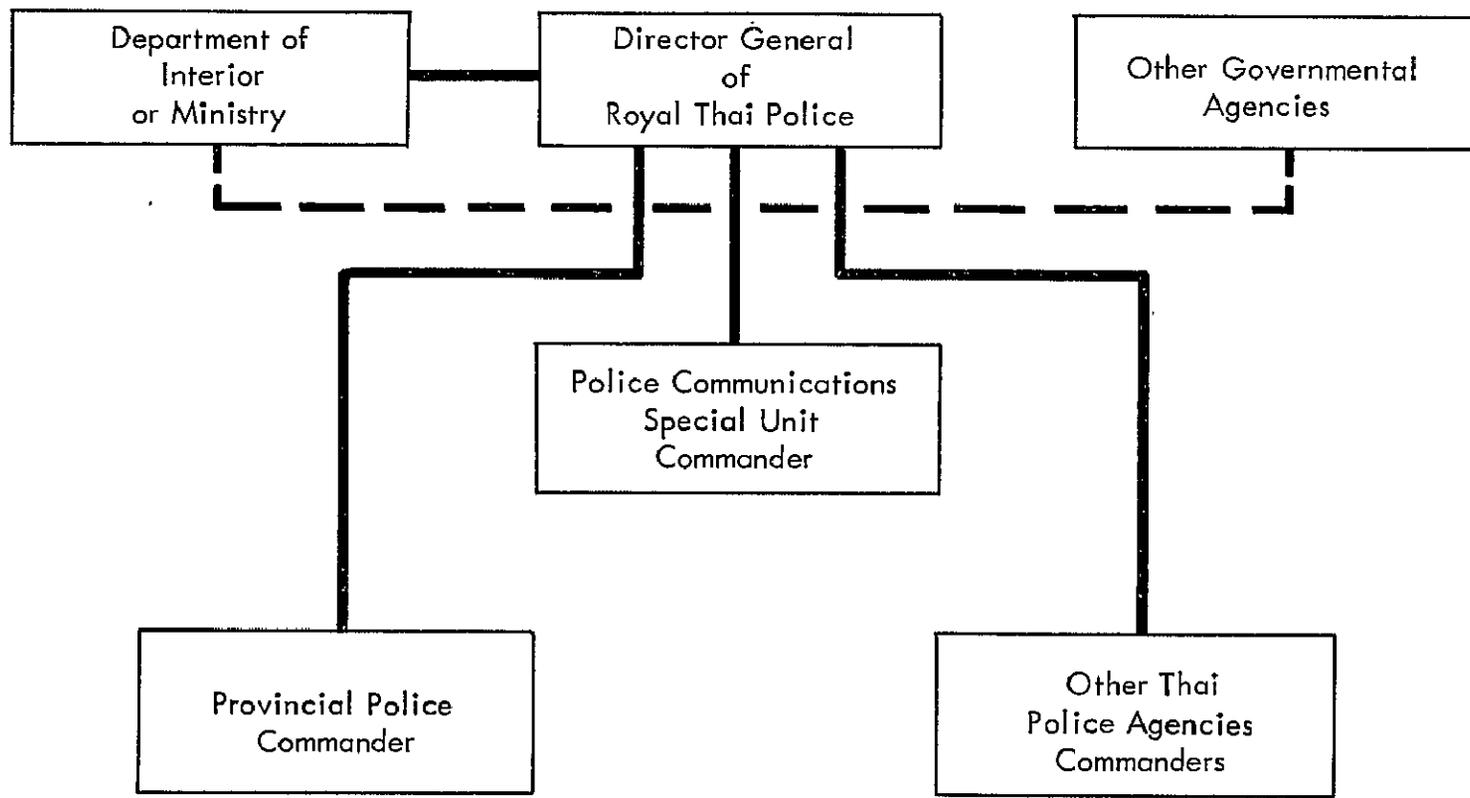
Report Personnel
 Control
 DG
 Remote Areas
 Provincial Police



36

Operators - Provincial Police
 Equipment - Procured by part Ministry of Interior Budget and part Police Budget
 Budget - Police Department Director General of Police
 Bangkok - Radio Police Section Personnel under Director General of Police
 Work as Technical Advisors in Communication to General Prachart and other Police Commanders - Technical Specifications prepared for all Police Units by Communication Section.

Figure 5.



————— direct request authority
 - - - - - indirect request authority

Figure 6.

**RECOMMENDED COMMUNICATION STAFF
AT HEADQUARTERS COMMAND LEVEL**

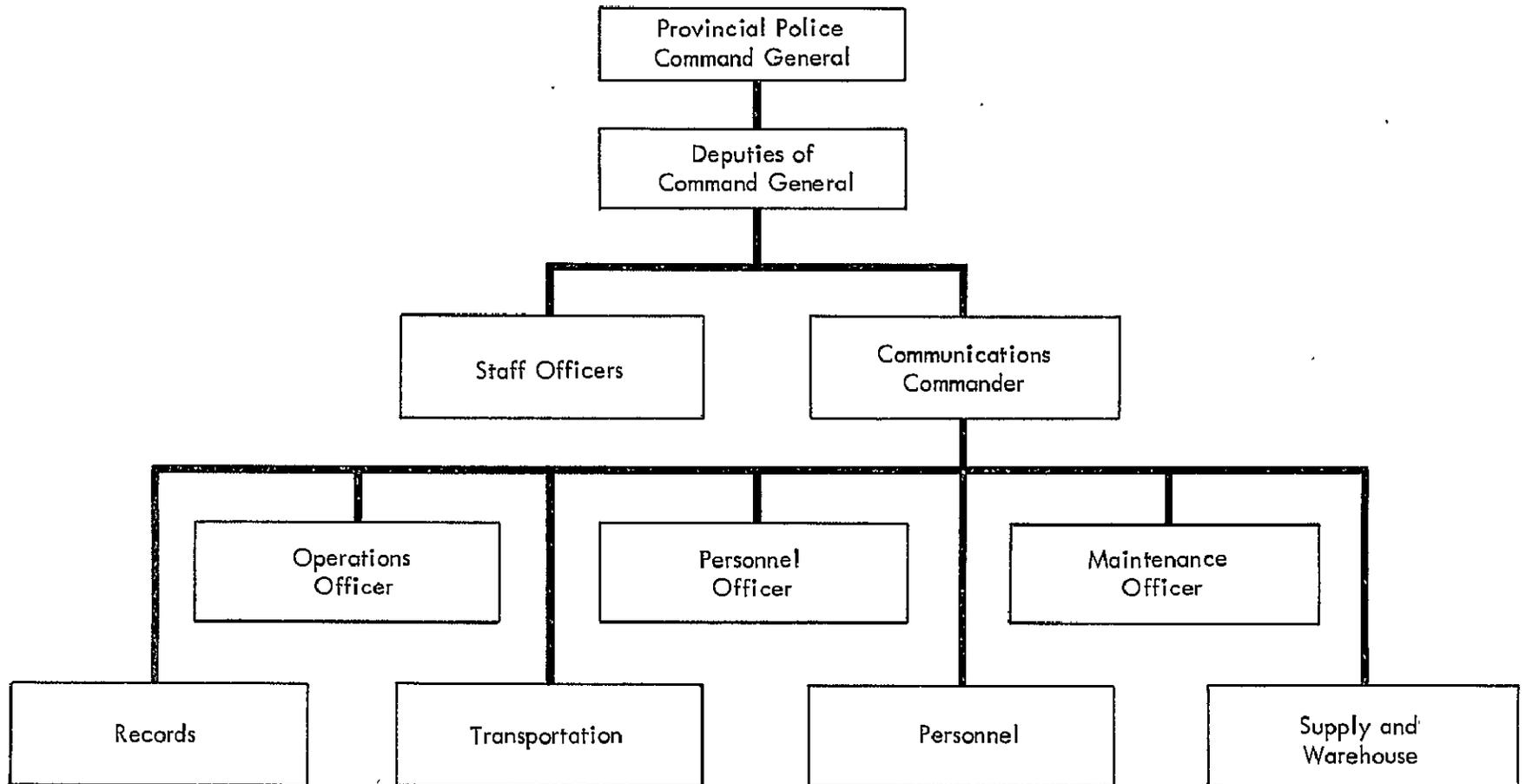


Figure 7.

RECOMMENDED COMMUNICATION STAFF AT REGION

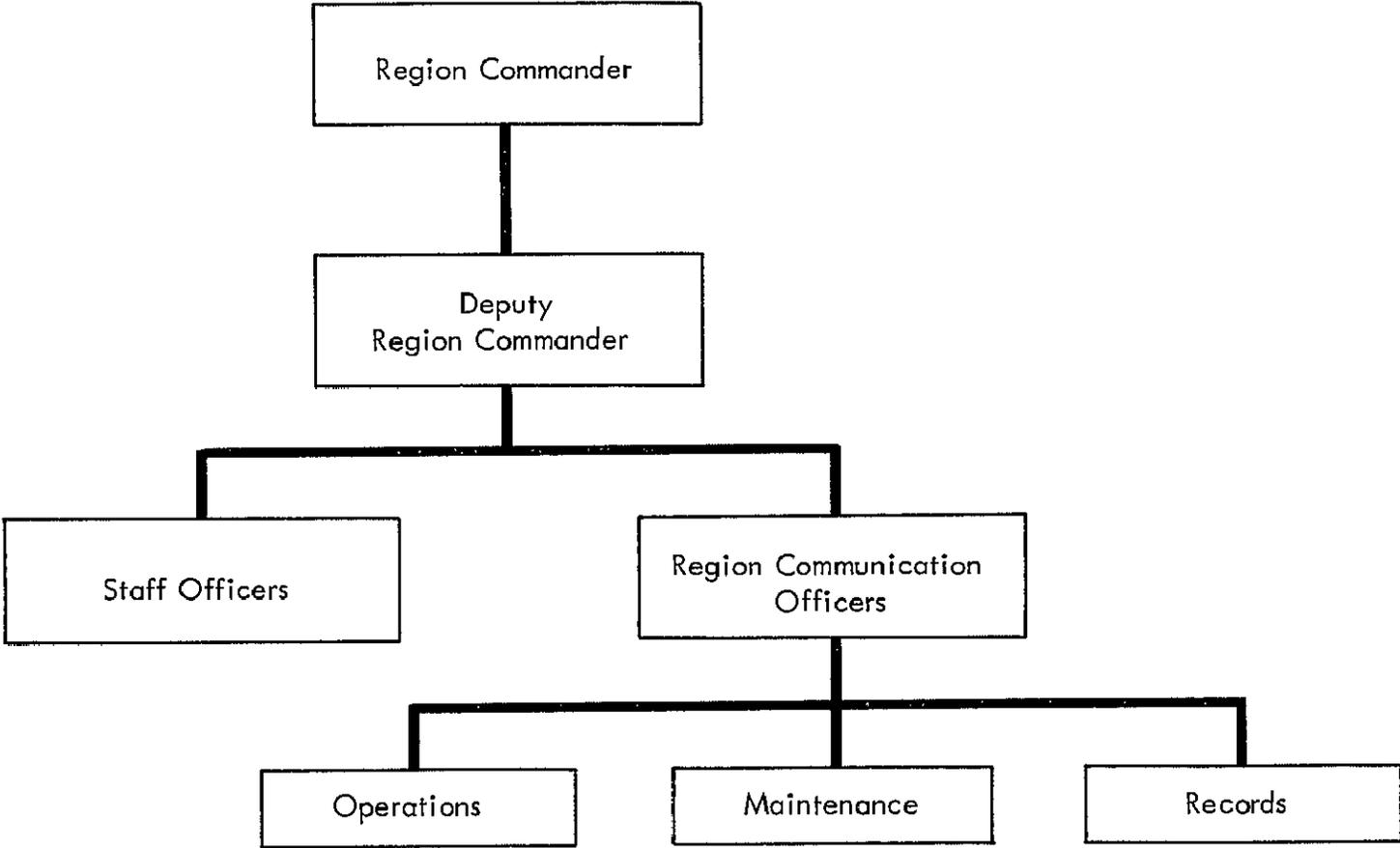


Figure 8.

RADIO COMMUNICATIONS CHAIN OF COMMAND

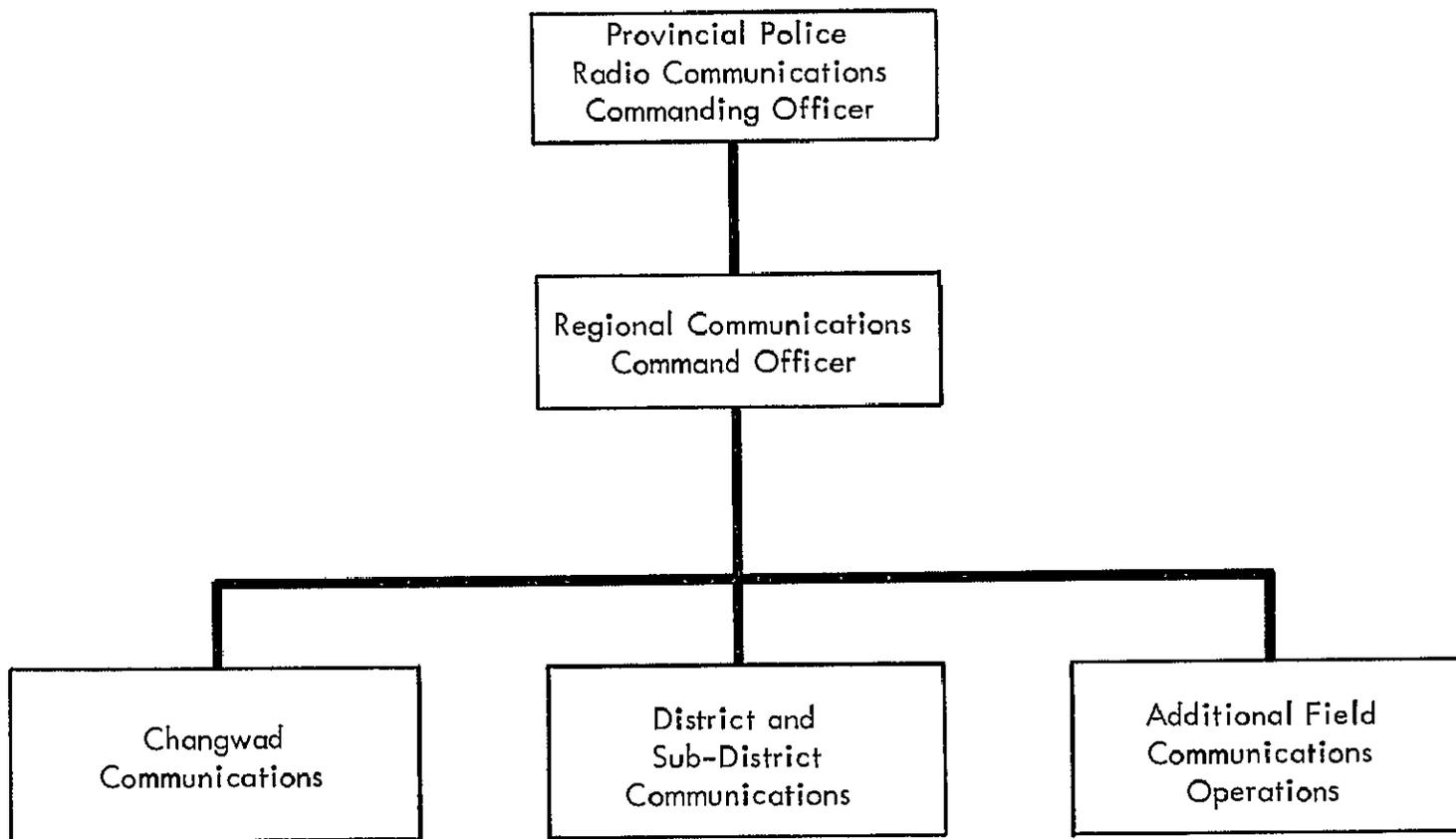


Figure 9.

DIRECT RADIO TRAFFIC CONTROL ROUTINE

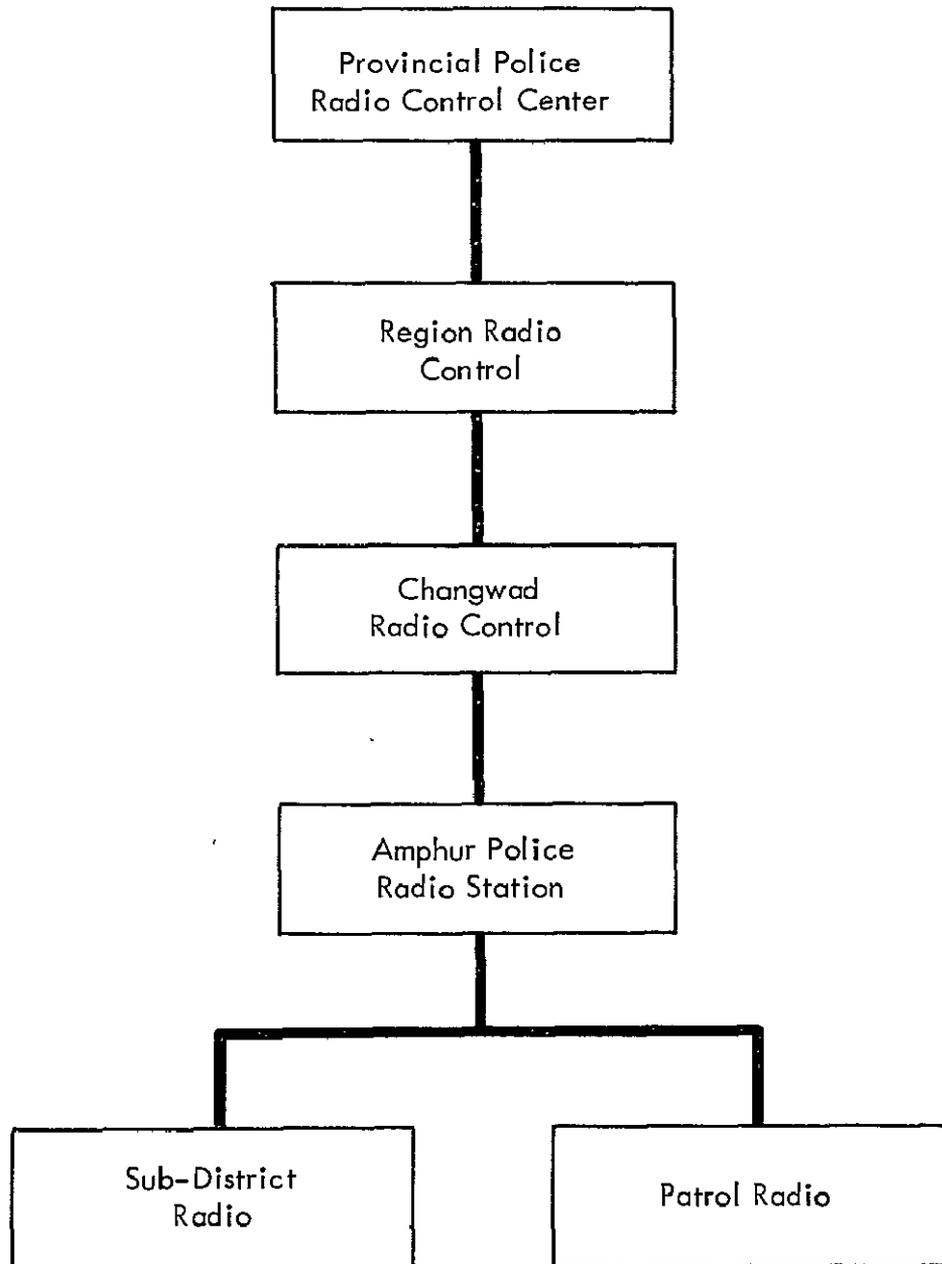


Figure 10.

PATCH THROUGH RADIO TRAFFIC CONTROL EMERGENCY

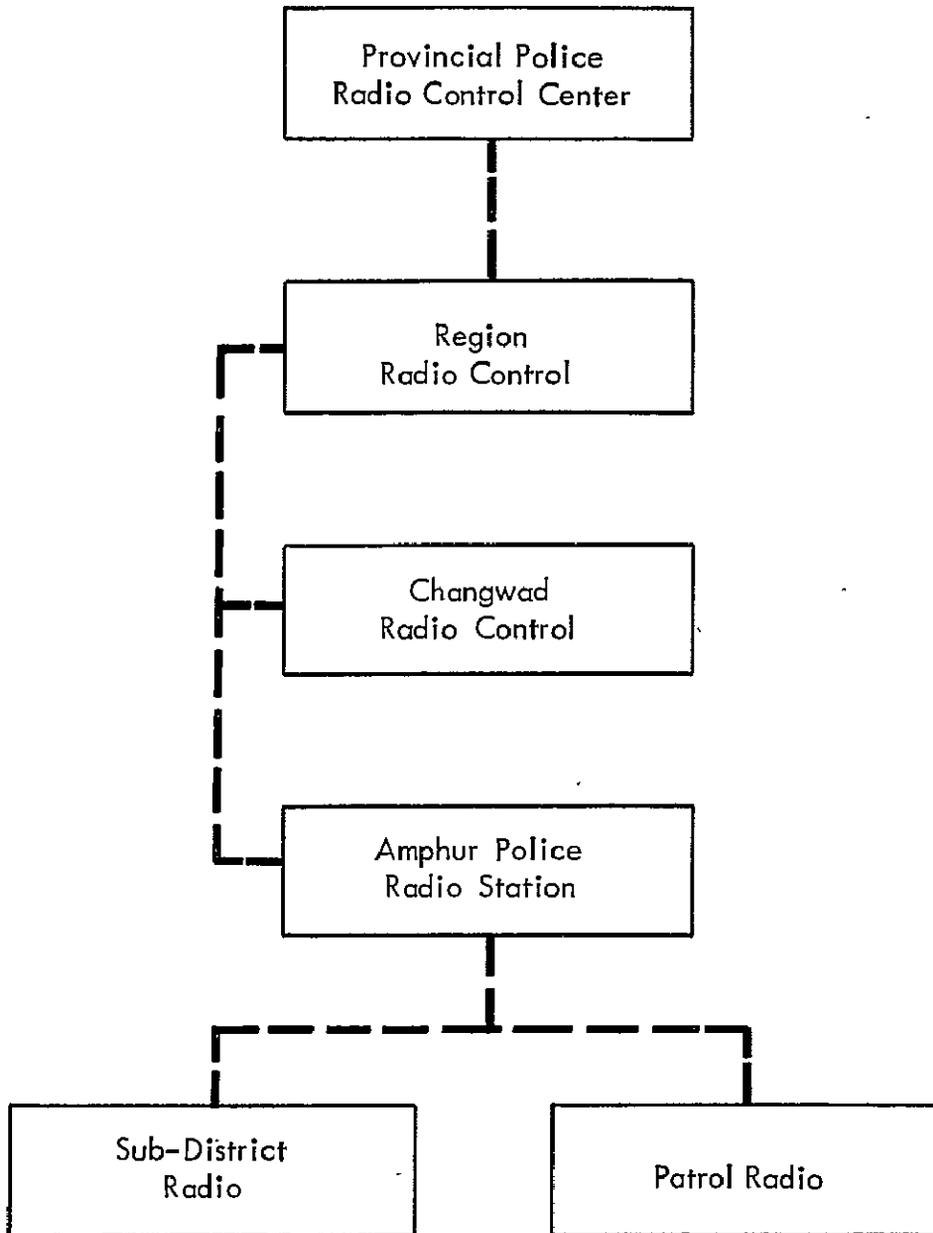


Figure 11.

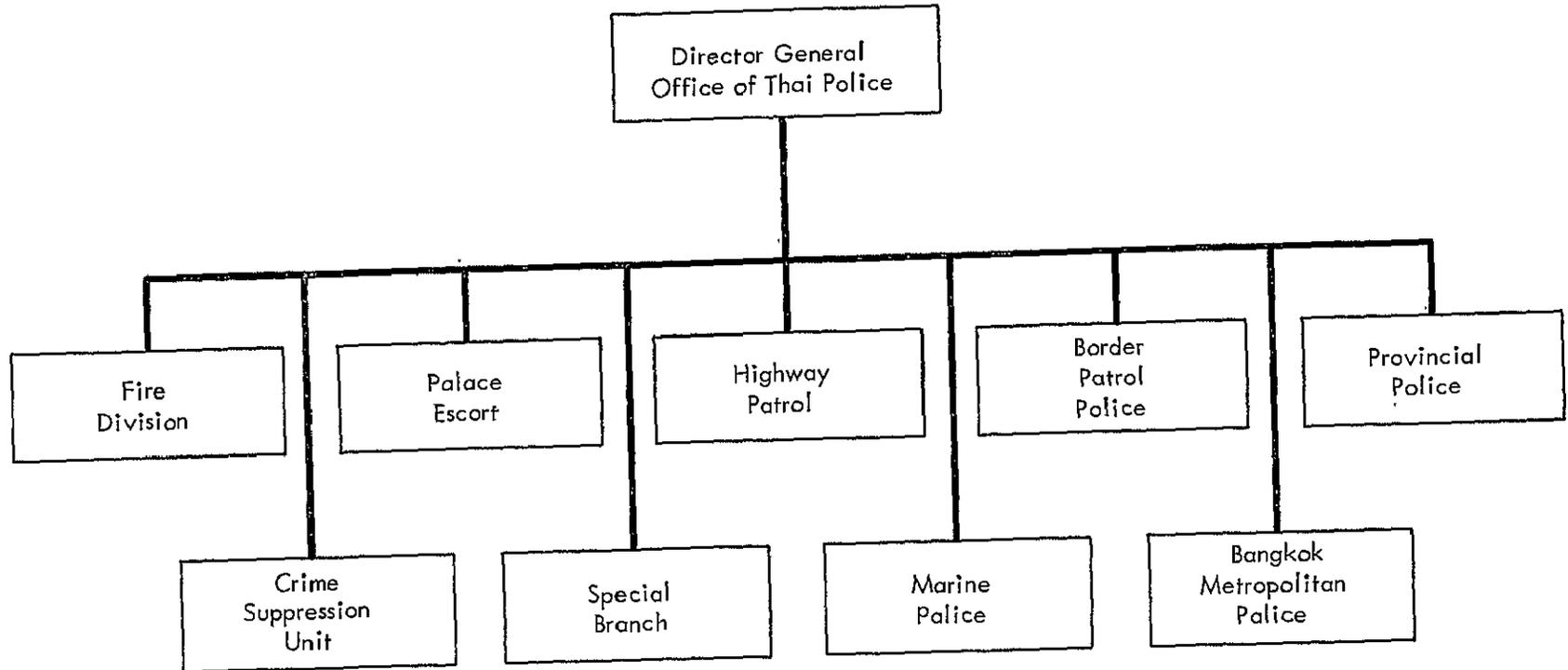


Figure A

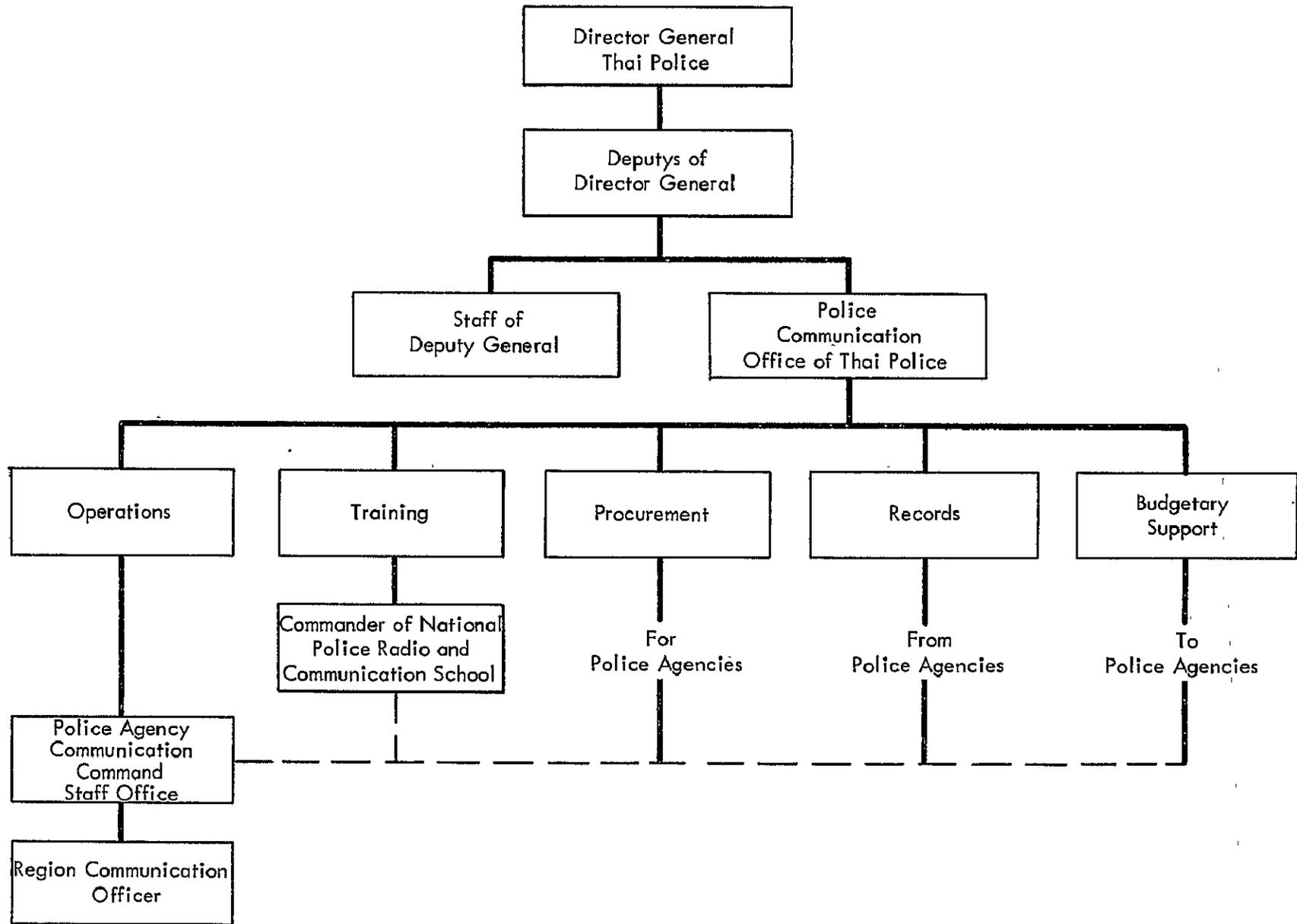
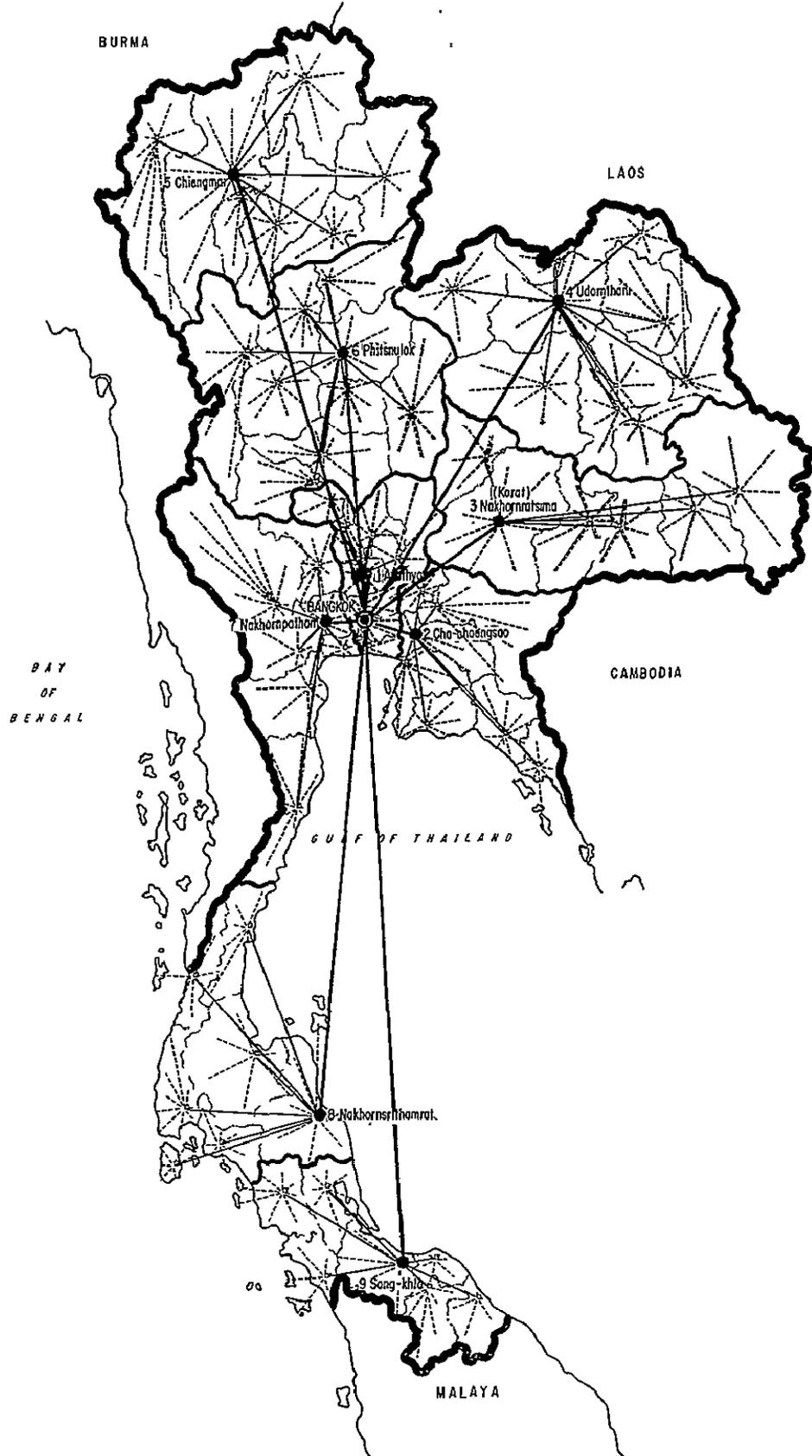


Figure B

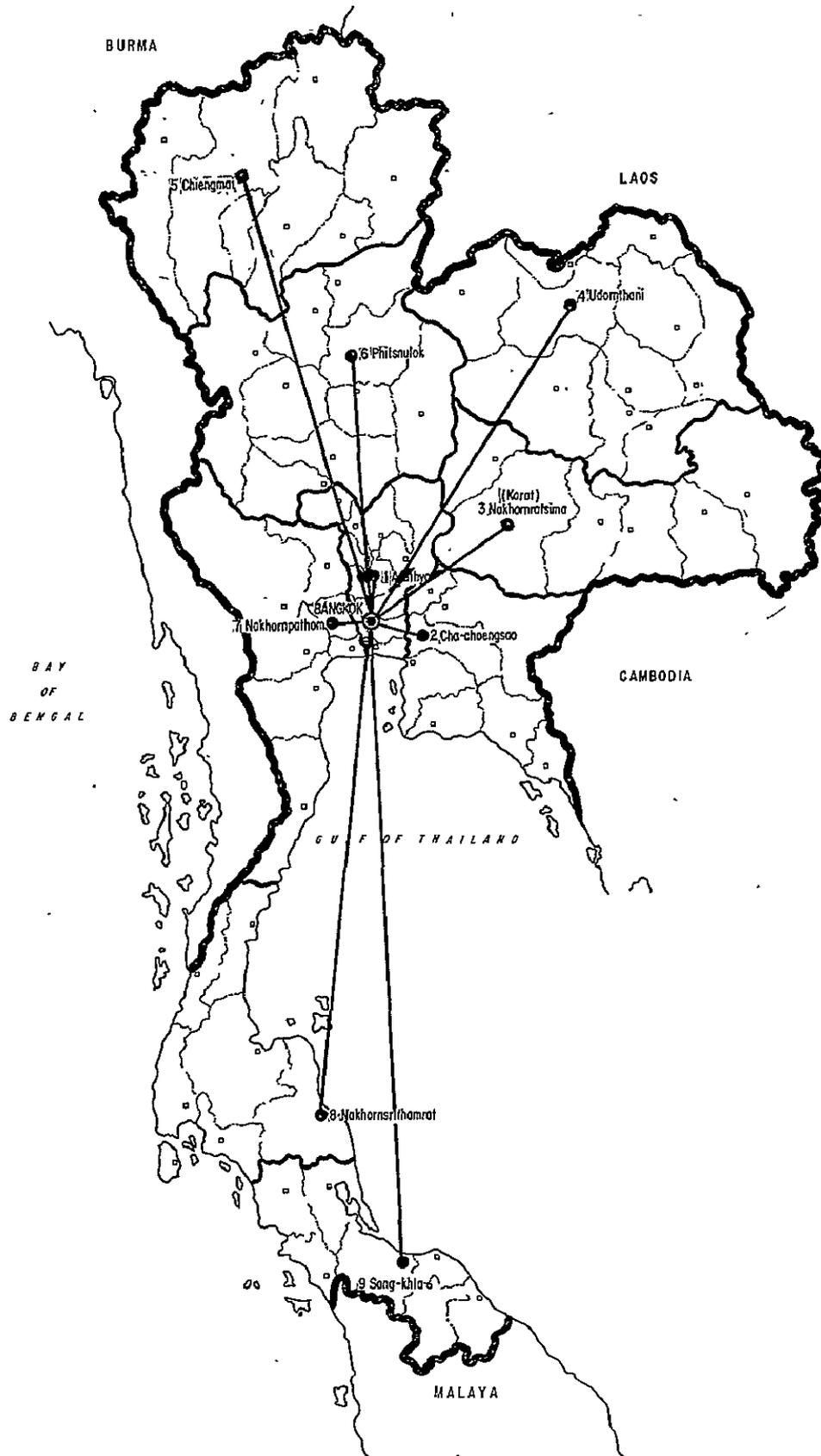
Map 1.

THAI PROVINCIAL POLICE COMMUNICATIONS SYSTEM



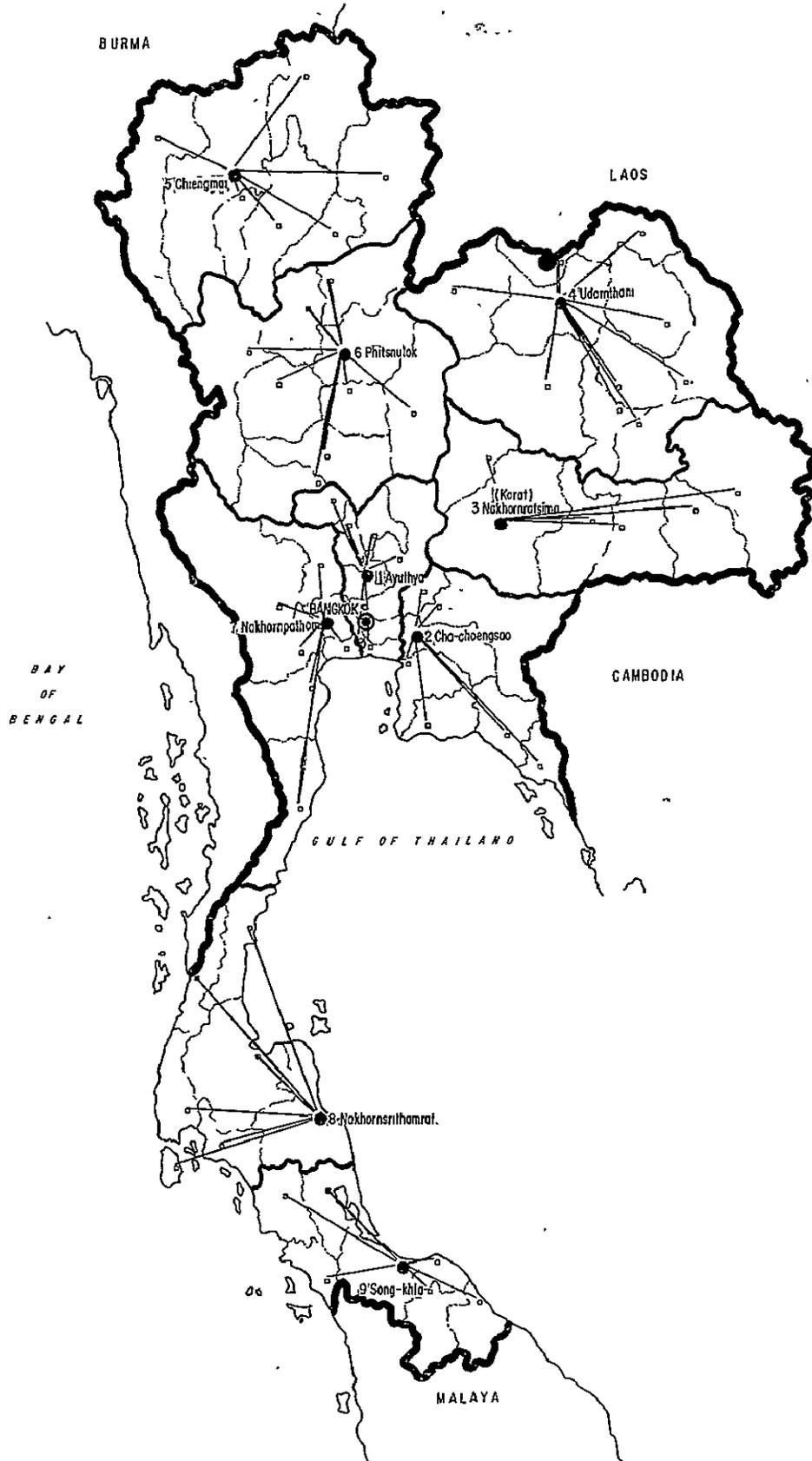
Map 2.

THAI PROVINCIAL POLICE COMMUNICATIONS SYSTEM



Map 3.

THAI PROVINCIAL POLICE COMMUNICATIONS SYSTEM



Map 4.

THAI PROVINCIAL POLICE COMMUNICATIONS SYSTEM

