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CANADIAN AID TO GREECE AND TURKEY

FINDINGS AND RECOMMENDATIONS OF AN
INVESTIGATION CONDUCTED TO DETERMINE
A ROUTE FOR A MICROWAVE SYSTEM TO
INTERCONNECT ATHENS WITH ANKARA

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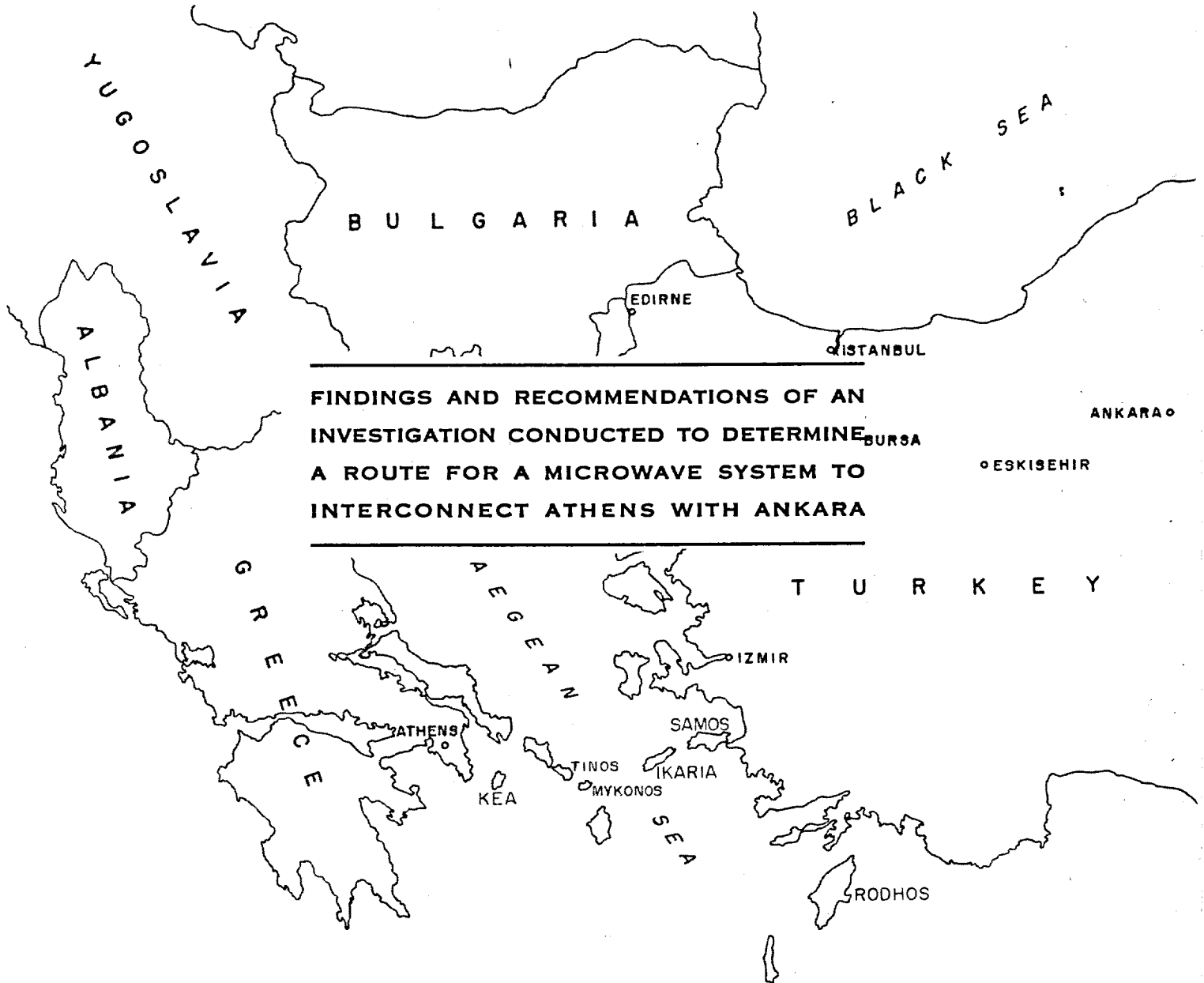
PREPARED FOR
THE SECRETARY OF STATE FOR EXTERNAL AFFAIRS
BY
HOYLES NIBLOCK INTERNATIONAL LTD.
CONSULTING ENGINEERS

Errata :

Page 15 - 5th line - Appendix III should read Appendix IV

Page 27, - 16th line - Appendix IV should read Appendix V

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1. Introduction

This report concerns Canada's program of assistance to two of its NATO allies, Greece and Turkey.

In February 1967 Canada offered financial aid of \$ 2,000,000 to Turkey and \$ 1,000,000 to Greece to facilitate construction of a 960 telephone channel microwave system to interconnect Athens with Ankara by a route via Izmir (Smyrna) and the Greek Aegean Islands; a route subsequently agreed to by Greece but not by Turkey.

To date progress towards realization of the microwave system has been negligible. Delays have occurred as a result of the political change which took place in Greece on April 21, 1967, and because of Turkey's preference, strongly stated on September 27, 1967, for a route via Turkish Thrace rather than via the Aegean as proposed by Canada and agreed to by Greece.

Hoyles Niblock International, Consulting Engineers, have been commissioned by the Secretary of State for External Affairs to provide engineering assistance to help resolve this question of a route for the microwave system, so as to clear the way for steps

to be taken to prosecute the project with as little further delay as possible.

For that purpose our engineers have recently visited Athens and Ankara where necessary technical discussions were held with the various authorities concerned with this microwave project. This report records the findings, conclusions and recommendations of the investigation.

Details with regard to the itinerary undertaken in respect of the investigation will be found in Appendix III to this report : this program was organized largely by officers of the Canadian Embassies in Athens and Ankara and was carried out with their generous assistance, for which we are grateful.

2. Scope of the investigation

The agreed scope of work was only loosely defined as it was desired that the Consultant be free to modify his work program in accordance with his findings, always bearing in mind that the Canadian Government required that advice be provided in respect of :

- the most feasible route for the microwave system, taking into full account the independent and joint objectives of the Turkish and Greek Governments.
- a suitable plan to govern the carrying out of the project.
- in keeping with the point above, the scope of the services that should be rendered by the Consultant in respect of the engineering and supervision of construction of the project; and the training of the Greek and Turkish personnel who would operate and maintain the system.
- alternative purposes - but in the military telecommunications field - for the aid program : these to be considered for implementation only in the event that it should be found

impossible to reach agreement in respect of a route
for the Athens / Ankara microwave system.

3.

TURKEY

3.1 Microwave developments undertaken by Turkey since February 1967

The Turkish preference for a route via Thrace rather than via the Aegean was the factor holding up the project program, but some 14 months had elapsed since that preference had been stated.

The investigation therefore first sought to determine whether the Turkish authorities still held the view expressed in September 1967 and if so, how firmly and for what current reasons.

It was found that an entirely different set of circumstances currently prevails in Turkey, as since February 1967 the development of two microwave systems of significance to the Canadian proposal to link Ankara with Athens has been undertaken. Specifically :

- a system with a capacity of 1800 telephone channels, and with provision to carry television on a separate radio path, is being constructed to link Ankara with Istanbul and Izmir, via Bursa. This system according to present estimates should be in service by October 1970; contractors are Telefunken of Germany and Northern Electric of Canada.

Present forecasts show the capacity of the system should be adequate to fulfil all traffic requirements up to 1972 for the section Ankara / Bursa / Istanbul and up to at least 1978 for the section Bursa / Izmir.

- a system with the capacity of some hundreds of telephone channels (exact number not established), and with provision to carry television, is to be constructed from Istanbul to Edirne. At the latter point it is intended to interconnect with Bulgarian facilities to provide telephone connections with Sofia and Europe, and also to connect with the Intervision (East Europe) television network. This system is scheduled to be in operation by mid 1971 and is to be constructed with the aid of NATO infrastructure funds. As of November 8, 1968 final approval of NATO in respect of the use of funds for that purpose had not been received; however, it was expected within a matter of days.

Appendix II shows the approximate routes of the systems noted above.

The two developments noted above in effect provide :

- (a) the principal part of the Turkish section of the Ankara / Izmir / Athens microwave route proposed by Canada in February 1967, since if the route presently being developed by Turkey were to be extended by about 80 kilometres, an interconnection with the Greek section of the route via the Aegean would be obtained, and also

- (b) the alternative route proposed by Turkey in its counter-proposal of September 1967.

(The route to Edirne from Istanbul is not exactly that proposed by Turkey in September 1967, but it serves the principal purpose which Turkey wished to achieve at that time, which on the basis of the present evidence was to provide a link between the sensitive Thracian regions of the country and Ankara and Istanbul.)

3.2 Present Turkish need for the microwave route proposed by Turkey
in September 1967

In response to the Canadian proposal of financial aid to assist in the construction of a microwave route between Athens and Ankara via Izmir and the Aegean, Turkey in a counterproposal dated September 27, 1967 suggested that Canadian consideration be given to a route from Ankara to Turkish Thrace, in the belief that a route following that course would be generally of greater benefit to Turkey. There is no present need for further consideration to be given to this Turkish proposal as the two Turkish microwave developments noted previously accommodate the requirements which Turkey had at the time this counterproposal was made.

It should be noted that a need to reconsider this Turkish counterproposal may arise if NATO should not approve funds for the construction of the route Istanbul / Edirne. On the basis of what we have been told we regard it as unlikely that NATO will disapprove use of funds for that purpose.

3.3 Turkish view regarding the purpose of the Canadian aid proposal

The very firm view of the Turkish military authorities is that the principal purpose of the Canadian aid proposal is to support Turkish plans for defense of the NATO alliance. Therefore, in the Turkish view, Turkish military telecommunication requirements which could be fulfilled by use of the Canadian assistance funds must be considered ahead of any other requirements which Turkey may have.

We note, however, that the Canadian aid proposal to Greece and Turkey has both commercial and military significance. It offers to assist the construction of a communication system which, at the time the proposal was made, was a militarily justifiable development but it also had, and still does have, a considerable commercial value. We estimate that about 95 % of the capacity of the system would be available to serve commercial traffic centres along its route, the normal military requirement being for about only 5 % of the total system capacity. Considering this dual significance of the Canadian aid proposal it was felt desirable that the independent views of the Turkish Department of Posts, Telegraphs and Telephones be obtained with regard to alternative purposes to which the Canadian aid might be put. We reached this

opinion because the P. T. T. is responsible for the installation, maintenance and operation of all commercial long distance communication facilities, and also of those facilities which have both a commercial and a military significance.

In practice, only the views of the military were obtained, as senior officials of the P. T. T. administration made it very clear that they were not empowered to discuss alternatives to the Canadian proposal without the prior approval of the military. We understood that such approval would not be forthcoming until after the alternatives proposed by the military had been fully explored, reported to Canada and decisions announced. Joint meetings of military and P. T. T. personnel were held to obtain joint views as to commercial / military alternatives but no views other than agreement with the military were expressed by the P. T. T. personnel.

3.4 Area in which Turkey presently requires Canadian assistance

The views expressed below were said by the Turkish military authorities to represent the views of all pertinent Turkish Government authorities.

In the course of stating what it is that Turkey desires should presently be accomplished with Canada's assistance, the Turkish authorities pointed out that there were many requirements for military telecommunication facilities. However, it was vital that one problem in particular be solved in a most urgent manner. Therefore, it would be preferred that discussion in respect of alternative plans for the utilization of the Canadian assistance be restricted, for the moment, to solution of that one urgent problem.

Some pressure was exerted to have the military disclose at least the nature of other alternatives but without success. The reaction of the military was quite specific and to the point : they agree that other needs do exist, but feel that Canada should first take full account of their principal need. Canada should consider most seriously the supply of what Turkey feels is truly required to permit its forces to operate to advantage in defense

of the common cause, before discussion of lower order priority is entered into.

The present Turkish requirement is for a number of low capacity radio links (equipment details, such as are available, will be found in Appendix III) to be operated exclusively for the purpose of carrying military traffic: the radio equipment would be installed in readily transportable shelters and the links put into service in areas of Turkey of great importance to the defense of the country, where no other reliable communication service could be obtained. The installations would be transportable as it would be intended that they should be moved from place to place in the event of a national emergency, or should a centre presently to be served by this means be provided in the future with reliable commercial communication service. The equipment would be provided with a means of rapidly changing the operating radio frequencies. The specific areas or points to be served by the links was not made known but would be if agreement by Canada to provide the links is obtained. The number of links required was similarly not stated, but it was implied that the number would be to the extent of the amount of the Canadian aid offer. In addition to the basic radio and multiplex equipment Turkey would also require that electric power supplies, test equipment, spares,

and training and operating assistance be provided and any other material (other than equipment shelters, which could be constructed in Turkey to Canadian designs) or services deemed necessary to permit the communication links to be put into service.

In the course of discussing the Turkish requirement as recorded above no indication could be given regarding whether or not it would or would not be acceptable to the Canadian Government; however, it was indicated that Canada does manufacture for its armed forces, and for others, equipment of the type presently required by the Turkish military.

Considerable emphasis was laid by the Turkish military authorities on the urgent need to place into service communication links of the form described above, and it was stated that it was hoped that the Canadian Government would approve the supply of such links from Canada and that a decision to such an effect would be made known with the least possible delay.

There is no doubt that Turkey welcomes the availability of Canadian financial aid, but we must record that there is a feeling within Turkish military circles that implementation of Canada's aid proposal has been unduly and unnecessarily delayed. The Turks

do not accept that a change of government in Greece need have been allowed to cause delay in the implementation of the Turkish part of the Canadian aid offer, and remarked to the effect that some difficulty has been experienced in the planning of military communication facilities as Canada has been unduly slow in prosecuting its intention to assist Turkey.

3.5 Present Turkish need for the microwave system proposed by
Canada

It is apparent that no useful purpose would be served by the construction of the entire Ankara / Izmir / Athens microwave route proposed by Canada in February 1967. The new construction being undertaken independently by Turkey will provide adequate facilities Ankara / Izmir, and their duplication would not be technically or economically defensible.

As stated elsewhere in this report, there is a sound basis for provision of a Greek system from Athens to the Aegean islands, even if this system were not extended to interconnect with the Turkish microwave network : a likely terminating point for the Greek system is the island of Samos.

The key issue is therefore Turkey's need to construct the short extension of its planned network, westwards from Izmir to Samos.

The issue is complicated by the present existence of a 400 MHz 120 channel radio system Izmir / Khios / Andros / Athens.

This carries both military and commercial traffic, and is stated by the Turkish military authorities to be adequate for their needs,

for an indefinite period ; particularly bearing in mind the availability of alternative circuits provided by other means e.g. scatter.

The situation concerning commercial traffic is much less satisfactory. The 400 MHz system is obsolescent and does not offer the reliability or performance which would make it suitable for inclusion as one link of very long-haul connections extending possibly from North America or Western Europe, through to Pakistan.

It is not possible to make such categorical statements regarding the traffic capacity which is needed Turkey / Greece. This will include not only the traffic from Turkey to Greece, and vice versa; but also through traffic. Experience on other developing international telephone routes suggests that when high-grade circuits become available from Ankara to Athens and beyond, the requirement will be met only by availability of a major microwave route viz. 600 channels or greater, which incidentally are the smallest systems which can also carry television.

We have no doubt that there is a pressing commercial need to interconnect the Greek and Turkish microwave systems, as now

planned or projected. We believe, in fact, that assuming the Athens / Samos link is built, the interconnection Samos / Izmir will be provided, whether or not this is supported by Canadian aid. The Turkish P. T. T. is fully aware of the economic arguments; it is also relevant that the Turkish television broadcast authority intends to acquire the Eurovision television network via Greece. It is probable that the need for future international connections was a major reason for construction of the new Turkish microwave system Ankara / Izmir.

The development of commercial facilities may have effects on military facilities which the Turkish authorities have not yet foreseen. Thus, they are satisfied by the facilities provided by the existing Izmir / Khios / Andros / Athens system. However, this is maintained mainly by the Greek authorities, since most of the stations are on Greek territory. It is doubtful whether the Greek authorities would be willing to make the considerable maintenance effort which is required, if the commercial traffic now handled by this system were transferred to the projected new Athens / Samos microwave system.

In summary, there are compelling commercial reasons why an interconnection Izmir / Samos should be provided. However,

there is no need to provide the other parts of the microwave system which were proposed in February 1967 for installation within Turkey.

3.6 Acceptability of presently stated Turkish requirement

Acceptability of this requirement must depend to a large extent on whether or not it is in keeping with the spirit and intent of Canada's offer of assistance. As we are not aware of all of the principles on which that offer is based, it will not be in order for us to arrive at a conclusion for or against acceptance of what Turkey presently suggests that Canada should supply. Our remarks in this area will therefore be limited to the following general observations:

- equipment of the type required is certainly available from Canadian sources; manufacturers such as Canadian Marconi Company and Radio Engineering Products would probably be interested suppliers as both have developed equipment of a special type specifically to meet the sort of requirement presently expressed by Turkey. A high Canadian content could be achieved.

- provision of equipments of the type presently required would minimize the need for counterpart funds with which to construct system support works, roads,

buildings, etc.

- agreement to the Turkish requirement would probably be of long term commercial benefit to Canadian industry as, in all likelihood, the Turkish forces would standardize on the Canadian equipment and would purchase further quantities from time to time.

- agreement to the Turkish requirement would mean that early steps could be taken towards completion of the project, both in Greece and Turkey. On the other hand further and probably lengthy delays may be expected if agreement is not forthcoming, as then it would be necessary to obtain details of other Turkish requirements (probably on a one-by-one basis), and there is no guarantee that they would be found any more acceptable than is the present requirement. In the meantime progress in respect of the Greek part of the project would be stalled, unless it could be agreed to develop the Greek requirement separately from the Turkish requirement.

4.

G R E E C E

4.1 Present Greek view of the Canadian proposal

We find there are no major problem areas, as there is general agreement to the proposal put forward by Canada in February 1967.

There would however, be major opposition from Greece if the route of the proposed microwave system should be changed now, as Greece is presently heavily committed to construction of a route through the Aegean. It has never been believed that Canada would support any other route to interconnect Greece with Turkey, and plans have been made accordingly, though the Greeks have been aware that Turkey had proposed a northerly route via Thrace and that this was being considered by Canada. As far as this latter route is concerned, the Greek military authorities state that it would not be acceptable to Greece, as it would be "too vulnerable" (to what, is not stated).

In any event, it is agreed by the Greek telephone company that a southerly route via the Aegean would be of far greater economic benefit to Greece, because of revenues that would be derived by expansion of telephone facilities through the islands (the basic Canadian microwave system would be expanded by the addition of routes north and south from Ikaria), and by providing a reliable

interconnection with Turkey. In this latter respect the Greeks are sure that Turkey will build between Izmir and Samos, as there is informal agreement between the telephone companies to the effect that international telephone and television traffic is to be exchanged by this route.

Also, the Aegean route is of advantage to Greece because once the basic microwave system is installed it will be relatively easy and economical to expand it to provide for the transmission of television programs to the islands, a major Greek goal. It is to be noted that contracts already have been let to build television transmitter stations on some of the islands: installations which will be of restricted value unless a microwave system is provided to carry programs from the mainland, as the intention is to create a national network with all programs being originated in Athens.

We find that Greece is very anxious to proceed with the microwave project as defined in the Canadian proposal of February 1967. It is accepted that the delays which have arisen in prosecution of the project have been due in part to the political change in Greece, but there is an inclination to lay much of the blame at the feet of the Turks for having suggested a different route to that proposed by Canada.

There will be a need to review the form of the proposed agreement between Canada and Greece (as provisionally laid down in an aide memoire of February 7, 1967) as Greece would not agree to the award of supply contracts on the basis of an evaluation conducted by the Canadian Commercial Corporation and the Consultant to the Canadian Government. The Greek telephone organization would wish to be represented on the evaluation committee, as decisions would be made then in respect of types of equipment to be supplied which would tend to make the telephone company a captive customer of the supplier chosen, in so far as system additions would be concerned. Therefore Greece would wish to be assured that competitive prices were being obtained, and that the equipment would be technically acceptable for long term use.

Basic Greek system objectives were obtained and are recorded in Appendix IV.

There was limited discussion concerning planning of the implementation of the microwave project but of limited scope, as the Greek authorities were not anxious to discuss detailed plans until such time as it is firmly decided that the project is to be carried out.

4.2 Other Greek requirements

Greece recognizes that the foreign exchange required with which to acquire the necessary equipment and services in respect of the Athens / Samos route will be in excess of Canada's \$ 1,000,000 aid offer. Exactly how much in excess cannot be stated at this time, as the route must be surveyed and detailed system objectives must be established before a worthwhile estimate can be arrived at. However it is quite certain that \$ 1,000,000 will not be adequate; therefore Greece wishes that Canada should consider increasing its aid offer by an amount to be established after system cost estimates are completed.

Also, Greece wishes to build a new route westwards from Athens to Agrinnion to interconnect with a route presently being constructed from that point to Italy. A route is presently available between Agrinnion and Athens but it is felt that this will probably be overloaded once it becomes practicable to carry significant international traffic between Greece and Turkey. Greece would welcome the assistance of Canada in respect of the construction of this route, either in the form of aid or a long term, low interest loan.

5. Principal conclusions of the investigation

Our principal conclusions follow :

- Canada's aid offer to Turkey of February 1967 should not be implemented exactly as specified, as Turkey has subsequently undertaken to develop adequately the Ankara / Izmir section of the proposed Ankara / Athens microwave route via the Aegean ; thus implementation in full of the Canadian proposal to Turkey would duplicate, to no advantage, facilities already to be provided by Turkey.

- Contingent on NATO approval for the planned microwave route to Edirne, Turkey no longer requires Canadian assistance to construct the microwave route Ankara / Turkish Thrace ; therefore Turkey's counterproposal of September 27, 1967 need not be considered further.

- Turkey still does require assistance from Canada, but presently in respect of the supply of a number of transportable radio communication links to provide service to military installations.

- Greece is anxious that Canada should implement its aid offer of February 1967, and agrees that the route of the proposed microwave system should be via the Aegean as specified.

(The Greek section of the Ankara / Athens microwave route via the Aegean would extend from Athens to (probably) Samos ; Turkey is presently building from Ankara to Izmir ; to complete the Ankara / Athens route would therefore require that Turkey and Greece jointly construct the short link Samos / Izmir. Greece would agree to this ; the Turkish military may not if Canadian aid funds are to be used for the purpose. However, the Turkish telephone organization will very probably agree with Greece to build the link once it becomes evident that Greece is about to proceed independently with the route Athens / Samos.

The Turkish P. T. T. would probably finance this equipment requirement via commercial circles, as the amount of money required is not large : probably less than \$ 200,000. However, it is unlikely that a

decision in this regard will be forthcoming from Turkey until after a decision is reached regarding Turkey's present proposal, to the effect that Canada should supply military communication links in place of the microwave system initially offered.)

Both Greece and Turkey will expect the present investigation to result in an early decision on Canada's part with regard to the future course its aid program is to take.

6. Recommended course of action

It is not practicable at this time to compile a detailed plan to show how the project will be carried out, and in what time interval, as the nature and magnitude of the project must first be defined more closely. The recommended course of action is therefore limited to preliminary steps, which need to be taken in order to obtain a firm definition of the project.

- (a) The factor limiting further progress is acceptability to Canada of the present Turkish requirement; therefore, a decision in this regard must be arrived at before other steps can be taken.

- (b) If the Turkish requirement is acceptable to Canada a brief survey of Canadian industry should be undertaken, to determine which manufacturers are able to offer suitable equipment to Turkey, at what price and in what time interval. Concurrently a brief statement should go forward to Turkey, indicating Canada's acceptance of the principle of its proposal and stating what action is being taken towards implementation of it.

- (c) Concurrently with the step above the Greek Government should be made aware of developments and should be given advice with regard to when further developments may be expected.

- (d) Having determined what can be offered by Canadian industry to fulfil the present Turkish requirement, then it would be necessary to decide whether or not tenders should be called for, or whether the contracts should be directed to selected suppliers. On the basis of a decision in that regard, a proposal would be prepared to convey to Turkey details regarding the type or types of equipment that could be made available, together with pertinent contractual conditions. This proposal would have to be discussed with the Turkish military authorities at some length, as it would be necessary to reach agreement regarding their preferences for certain equipments, equipment configurations, supporting services, etc. Informal agreements reached at that time would be expected to form the basis of a contractual agreement between Canada and Turkey in respect of the supply of equipment and services.

- (e) If the present Turkish requirement is not acceptable to Canada it would be necessary to re-open discussions with the Turkish military authorities to define other alternative plans so that they may be presented to Canada for consideration.
- (f) We would suggest that if the present Turkish requirement is found to be unacceptable, serious consideration be given to separate approval of the Greek part of the project so that it may proceed without suffering a further delay : particularly one which Greece could attribute to Turkey.

NOTE :

It has already been noted that the first decision which must be reached is whether the Turkish counterproposal is consistent with Canada's objectives, in offering aid.

Unless the conclusion concerning this aspect is an unqualified negative, it is suggested that consideration be given to conditional agreement : typically, to a formula by which the majority of the Canadian aid would be devoted to the military equipment which Turkey requires, but by which a relatively small sum - possibly, an additional sum - would be earmarked for provision of the

important Izmir / Samos interconnection.

It should be borne in mind that this small project could not, reasonably, be tied to Canadian sourcing : the Turkish P. T. T. will wish to extend the German Telefunken system already ordered, in the interests of equipment standardization. The exception seems very well worth while, since it will permit large numbers of telephone users in Turkey and points east to talk to the western world, via the Canadian-provided system in Greece. It should not be difficult to make known the origin of this contribution, or to establish that Turkey had received an even greater contribution, if of a kind which is less obvious to the civil population.

The foregoing proposal may seem redundant, in that the opinion has been recorded that the Izmir / Samos interconnection will be provided, regardless of the availability of Canadian aid. The psychological factor does exist, however, not so much of whether the job will be done, but of when it will be done. For the Canadian aid to create optimum impact, it should permit the Greek system to the Aegean to carry through-traffic as soon as it is commissioned. This may not occur unless some solution is devised, similar to that discussed above.

7. Probable scope of Consultant's services

The extent and arrangement of the engineering and management services to be provided by the Consultant cannot be determined, with exactness, until the shape and probable term of the project is established. However, we can anticipate the nature of the services that we shall be required to render in the interest of the Canadian Government, to plan and to engineer the project and to supervise and coordinate the carrying out of it.

The Consultant would :

- assist, as determined necessary by the project officer in assessing the availability and suitability of Canadian equipment to fulfil the Turkish requirement : and to prepare, present and discuss a proposal directed to the Turkish Government to demonstrate what equipment and services Canada would offer, and in what circumstances.

- alternatively (and in the event Canada should not accept the present Turkish requirement), return to Turkey to discuss other alternatives and to prepare

a report and recommendations.

- provide technical advice in respect of the writing of agreements between Canada and the recipient countries.

- plan, in conjunction with the three Governments concerned, the carrying out of the project. Provide liaison services and suitable documentation, so that all those concerned with the implementation of the project should be aware of their responsibilities and of the way in which they would be required to inter-relate with, and be dependent upon, the activities and responsibilities of others.

NOTE :

In view of the problems that may be anticipated in coordinating the activities of the numerous authorities that would play a part in the implementation of the whole project, we would regard the use of the Critical Path planning method as an essential management tool.

- carry out radio surveys, and such path tests as may be necessary to locate sites for the microwave stations.

- in association with relevant authorities in Canada, Greece and Turkey, design the technical facilities (with the exception of civil engineering works which would be the responsibility of the local Governments), and prepare specifications for tendering purposes; or, alternatively or additionally, prepare technical documentation as may be required for the purpose of negotiating supply contracts with selected Canadian manufacturers.

- evaluate tenders and make recommendations as to the award of supply contracts.

- provide technical assistance to those who would be responsible for writing supply contracts.

- provide resident engineering services to supervise installation, commissioning and acceptance of the project.

- conduct type tests to ensure that equipment to be supplied conforms with the pertinent specifications.

- provide technical support services in respect of the training of maintenance and operations staff.

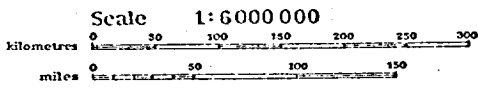
- provide such other services, of like nature to those noted above, that may be determined to be necessary from time to time as the project develops.



APPENDIX I
MAP OF THE REGION

Route Greece would develop with Canadian assistance

Routes presently being developed by Turkey



APPENDIX II

MICROWAVE SYSTEM ROUTES

Appendix III

Investigation itinerary

- Oct. 30, 1968 Travel, Vancouver to Ottawa
- Oct. 31, 1968 Ottawa. Meet with officers of the
Department of External Affairs and
the Department of Trade and Commerce
to obtain project background and direction
as to the scope of the investigation.
- Nov. 1 / Nov. 2, 1968 Travel, Ottawa to Athens.
- Nov. 2, 1968 Athens. Meet with officers of the Canadian
Embassy, Athens ; to discuss scope of the
investigation and to arrange an itinerary
for the Greek portion of the work.
- Nov. 3, 1968 Travel, Athens to Ankara.
- Nov. 4 / Nov. 8, 1968 Ankara. Carry out Turkish portion of the
investigation.

Nov. 9, 1968

Travel, Ankara to Athens.

Nov. 11 / Nov. 14

Athens. Carry out Greek portion of the investigation.

Nov. 18 / Nov. 19

Travel, Athens to Ottawa.

Nov. 20, 1968

Ottawa. Meet with officers of the Department of Trade and Commerce and the Department of External Affairs to convey verbal report of findings and conclusions of the investigation.

Nov. 21, 1968

Travel, Ottawa to Vancouver.

Appendix IV

Technical aspects of the present Turkish requirement

Minimum technical specifications concerning the present Turkish requirement are available :

- capacity of each link should be about four voice channels.
- radio terminals and radio repeaters should be provided.
- performance of systems should be adequate to permit connecting up to five systems in tandem.
- systems should operate in the band 400 - 600 MHz.
- equipment should operate from a single phase 220 volt 50 Hz power source.
- diesel/electric generating plant of adequate size should be provided.

- equipment should operate in an ambient temperature of between - 30° C to + 70° C.
- a suitable complement of spare parts, spare units and test equipment should be provided.
- a test centre, complete with training aids should be provided.
- engineering services in respect of the setting to work of the equipment and the training of maintenance and operating personnel should be provided.
- all equipment should be suitable for mounting in small transportable shelters.
- equipment should be transistorized to the maximum extent practicable.
- equipment should be new.

Appendix V

Greek microwave system objectives

Basic system objectives were obtained in sufficient detail for present purposes : they are :

- the system should extend from Athens to Samos by the shortest practicable route : all intermediate stations should be heterodyne repeaters except for the station on Ikaria, which should be a back-to-back terminal to permit traffic destined for future north and south routes to be dropped.
- solid state equipment is preferred ; Klystron equipment would not be acceptable, travelling wave tube equipment would be acceptable.
- capacity of system should be 1800 CCITT telephone channels.
- a full standby radio channel should be provided as well as complete supervisory and remote control facilities

to enable stations to be operated unattended.

- power supply should be d. c. to enable operation from batteries.
- design of the system should provide for the ready addition of a facility to carry television in addition to telephony : probably by means of the addition of a third radio channel.
- the system could operate in either the four or six Ghz band.
- an auxiliary system should be provided to carry order-wire and other subsidiary traffic : this system to operate in the same band as the main system and to offer access to traffic at every station.
- the system should include a high frequency cable "tail" at Athens to carry traffic to the first station of the microwave system as the latter should be located outside the city.

- the multiplex system should be designed to permit ready expansion to 960 channels at least ; initial multiplex requirement is somewhat indefinite at this point.

- a reasonable complement of consumable spares and spare panels or units should be provided.

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