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APPENDIX C

Memoranda to the President re Communications Satellites

DECLASSIFIED
E.O. 13526, Sec. 3.3h
By MW, NARA, Date 11/25/14

MEMORANDUM

CONFIDENTIAL

THE WHITE HOUSE

WASHINGTON

Tuesday, September 21, 1965
10:00 A. M.

MEMORANDUM FOR THE PRESIDENT

Recent events indicate that the future of the Communications Satellite Corporation and of United States participation in the development and operation of the global commercial communications satellite system are in jeopardy in several ways:

1. The European partners in the international consortium dedicated to the establishment of a single global commercial communications satellite system find that their financial interests are better served by the continued use of cable systems in which they have larger ownership participation than they have in the communications satellite consortium.

2. It appears that foreign members of the international consortium consider that their chances of exercising influence in effecting advantageous changes in the agreement establishing interim arrangements for the global commercial communications satellite system will be greatly enhanced in 1969, when definitive arrangements are to supersede interim arrangements, if there is lack of progress and coverage of the global system. Furthermore, delays in progress will facilitate foreign-owned cable system extension.

3. Actual and now anticipated usage of the initial Early Bird communications satellite is falling seriously behind the projected usage upon which tariffs were determined. Prospects are for continued serious short falls in usage and the resulting financial embarrassment of the Communications Satellite Corporation.

The President has indicated interest in recommendations made by Ambassador Korry for U. S. assistance to African nations in attaining early communications satellite service to further assist in the development of these nations and to bring them closer to the United States. To attempt to provide such service by a government-owned system would be contrary to established U. S. national policy and international agreement. Direct aid to the Communications Satellite Corporation and the international consortium might be politically criticized as subsidy.

There is a possibility that the Soviet Union may act soon to assist lesser developed nations attain communications by satellite. Early action by the United States is necessary to preclude this possibility.

The National Aeronautics and Space Administration has stated an urgent requirement to obtain communication services from the Communications Satellite Corporation. No facilities exist to provide acceptable service to meet this requirement.

CONFIDENTIAL

In response to a request for proposal, the Communications Satellite Corporation on August 26, 1965, submitted a proposal to provide communications services to meet the NASA Apollo Program requirements.

Contracting with the Communications Satellite Corporation on a commercial common carrier basis to meet the NASA requirement is consistent with established policy (National Security Action Memorandum No. 338) and U. S. international agreement dedicated to the early establishment of a single global commercial communications satellite system.

It is my view that satisfaction of the NASA requirement through contract with the Communications Satellite Corporation will accomplish the following important objectives:

1. Substantially advance the advent of global commercial communications satellite service through availability of the capacity of the satellites in excess of that required for the Apollo requirement;

2. Reduce the opposition of the international communications satellite consortium members to rapid growth of the global system;

3. Make possible early availability of communications satellite service for lesser developed nations at reduced cost; and

4. Strengthen the position of the United States in the 1969 international revision of the present interim arrangements and thus further the objectives of the Communications Satellite Act of 1962.

I strongly recommend that the President support me in the policy position that the urgent NASA requirement for communication satellite service in support of the Apollo Program be met through the Communications Satellite Corporation and that the Administrator, National Aeronautics and Space Administration immediately enter into direct negotiations for such services. The requirement and the procurement of services should be coordinated with the Executive Agent, National Communications System, to determine whether additional features or arrangements can be effected to enhance the contribution of the specialized services to the National Communications System without unduly jeopardizing the primary objectives for which the communications are being provided.

J. D. O'Connell

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MEMORANDUM

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THE WHITE HOUSE

WASHINGTON

Wednesday, 3:15 P.M.
November 17, 1965

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Suggestion by Ambassador Korry for Assistance to African Nations with Communications by Satellite

Ways and means for the provision of early communications service to African nations have been studied in conjunction with Mr. Bundy's staff, State Department, AID, FCC, NASA, and the Communications Satellite Corporation. Alternatives studied were:

a. Provision of a U.S. Government-owned experimental-operational satellite with an offer of earth station financing by the U.S. Government to African nations;

b. The early provision by the International ComSat Consortium of suitable additional satellites with the U.S. Government financing aid, if needed, to those African nations, initially Ethiopia and Nigeria, which can be furnished assistance without raising serious international problems.

The consensus strongly favors alternative b above for the following reasons:

- Much lower costs to the United States.
- The NASA Apollo Program communications service negotiations with ComSat Corporation (the International Consortium) will provide required satellite capacity by September/October 1966.
- Conflict with European nations having communications interests and investments in African nations can be avoided in nation-by-nation negotiation.
- Instead of competing with the International Consortium it can be supported and its expansion expedited.
- The U.S. Government can avoid competition with financial interests already negotiating with African nations. Nigeria, soon to become a member of the Consortium, reportedly has allocated five million dollars for an earth station.
- The orderly negotiation for regional groupings of African nations can be furthered rather than obstructed.
- Satellite service can be initiated to some African nations sooner than in any other way.

Without promising any U.S. assistance, the State Department has encouraged Ethiopia and Nigeria to consider early establishment of earth stations. No direct U.S. financial aid is presently expected. If these two nations were to request total U.S. financing, the estimated cost is $14,000,000 over three years.

I am coordinating actions of U.S. agencies and ComSat Corporation in determining the potential contribution of satellites to communication requirements of other developing nations, including those in Southeast Asia, South Asia, and Latin America.

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J. D. O'Connell

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APPENDIX B

U. S. National Policy Statement
re Communications Satellites

DECLASSIFIED
E.O. 13526, Sec. 3.3h
By MW, NARA, Date 11/29/12

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THE WHITE HOUSE
WASHINGTON

September 17, 1965

MEMORANDUM TO: Secretary of State
Secretary of Defense
Secretary of Commerce
Administrator, National Aeronautics and Space Administration
Chairman, Federal Communications Commission

SUBJECT: Policy Concerning U. S. Assistance in the Development of Foreign Communications Satellite Capabilities

The attached policy statement concerning U. S. assistance in the development of foreign communications satellite capabilities is promulgated in accordance with the approval of the President, as noted in National Security Action Memorandum 338, dated September 15, 1965. This statement was transmitted to the President by my memorandum dated August 25, 1965.

As noted in NSAM 338, my office will keep the subject policy under constant review. The cooperation and suggestions of the departments and agencies concerned are invited.

J. D. O'Connell
Special Assistant to the President
for Telecommunications and
Director of Telecommunications Management

Information copies:
Director, Bureau of the Budget
Executive Secretary, National Aeronautics and Space Council
Special Assistant to the President for Science and Technology
President, Communications Satellite Corporation

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August 25, 1965

POLICY CONCERNING U. S. ASSISTANCE IN THE DEVELOPMENT OF FOREIGN COMMUNICATIONS SATELLITE CAPABILITIES

GENERAL:

It is the policy of the United States to support the development of a single global commercial communications satellite system to provide common carrier and public service communications. The intent of the United States to exploit space technology for the service of all mankind, and to promote its use in support of peace, understanding and world order has been stated clearly in legislation and in Administration speeches and official releases. The U. S. Government is committed to use global commercial communications facilities for general governmental communications purposes wherever commercial circuits of the type and quality needed to meet government requirements can be made available on a timely basis and in accordance with applicable tariff or, in the absence of Federal Communications Commission jurisdiction, at reasonable cost. Separate satellite communications facilities including surface terminals may be established and maintained by the U. S. Government to meet those unique and vital national security needs which cannot be met by commercial facilities. The capacity of these separate facilities shall at all times be limited to that essential to meet such unique needs. These policies underlie the spirit and the letter of the Communications Satellite Act of 1962, its legislative history and the position of the United States in the negotiations leading to the signing of agreements establishing interim arrangements for a global commercial communications satellite system.

Provisions for the establishment of the global commercial communications satellite system and a U. S. national defense communications satellite system consistent with these policies have now advanced to the point where it is desirable to amplify and interpret these policies

GROUP 3
Downgraded at 12 year intervals; not automatically declassified

No Foreign Dissemination

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in order to guide United States relations with other countries in the development of communications satellite capabilities, and particularly with respect to providing technology and assistance therefor.

DISCUSSION:

Most major countries of the World other than the United States provide international public communications services through governmental agencies or chartered chosen instrument corporations partially or wholly owned by the government. Assistance to any of these foreign governments in the development of communications satellite systems can potentially develop competitors seeking to divert traffic from the single global system being developed by the international consortium established as a result of U. S. actions initiated by the Communications Satellite Act of 1962 and now joined by forty-six nations.

The communications satellite activities of U. S. Government agencies, including the Department of Defense and the National Aeronautics and Space Administration, have an important bearing on the U. S. support of the objectives of the Communications Satellite Act of 1962. These activities may contribute to the dissemination of scientific and technical knowledge of the subject to foreign countries which might be used to the detriment of U. S. policy in this field.

A policy to guide government agencies in the dissemination of satellite technology and in the provision of assistance which is consistent with the overall policies enunciated above is necessary. Such policy should be sufficiently comprehensive to give due regard to the specific requirements of national security.

For purposes of this policy statement it is intended that restrictions upon transfer of technology and provision of assistance refer to detailed engineering drawings, production techniques and equipment, and manufacturing or fabrication processes pertaining to complete communications satellites or a significant portion thereof, and to provision of launching services or launch vehicles for communications satellites. It is not intended that this policy statement apply to surface terminals and stations or limit dissemination of information concerning

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systems concepts, description of spacecraft and normal scientific and technical publications of a professional character Furthermore, it is not intended that this statement shall limit the dissemination of information required to be disclosed under the provisions of the Special Agreement of August 20, 1964, pertaining to the establishment of a global commercial communications satellite system.

Specific principles to guide United States arrangements for assistance to other countries in the development of communications satellite capabilities are:

1. The United States should conform fully with the 1964 Agreements Establishing Interim Arrangements for a Global Commercial Communications Satellite System.

2. The United States should refrain from providing assistance to other countries which would significantly promote, stimulate or encourage proliferation of communications satellite systems.

3. The United States should not consider requests for launch services or other assistance in the development of communications satellites for commercial purposes except for use in connection with the single global system established under the 1964 Agreements.

4. The United States should recognize the vital national security needs of other allied nations which can be met by satellite communications and which cannot be met by the commercial system. For example, the United Kingdom has indicated its need for highly reliable satellite communications from England to Australia and to other Far East terminals.

5. The United States aim is to encourage selected allied nations to use the U. S. national defense communications satellite system rather than to develop independent systems and to accommodate allied needs within the U. S. system (with additional costs normally to be borne by the participants). Recognized needs should be restricted to those, similar to ours, which are vital to the national security of the selected allied nations and which cannot be met by commercial facilities. To accommodate the needs within the U. S. national defense system it may prove necessary to include one or more satellites, synchronous or otherwise,

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whether of the same or different design. In this case, such satellite(s) should be designed to be electronically interoperable with the satellites of the basic U. S. national defense communications satellite system in order to permit mutual usage.

6. Agreements for direct assistance to allies which may significantly promote their communications satellite capability should require satisfactory assurance that the assistance furnished will be used only within the framework of agreements and arrangements to which the United States is a participant and will not be transmitted or transferred to a third nation without prior U. S. authorization. No agreement should be concluded with any nation until information has been made known to other allied nations concerning the U. S. willingness to cooperate in meeting other nations' national security needs which are similar to ours.

7. U. S. firms are required to comply with the Munitions Control licensing procedure prior to communicating satellite or related technology, transferring equipment or components as embraced by the United States Munitions List, including booster technology and launch services, to foreign nations or firms.

8. U. S. firms are also required to comply with the Department of Commerce's export licensing requirements prior to communicating or transferring to foreign nations or firms certain other relevant technology, equipment or components, not covered by the U. S. Munitions List.

9. All transactions approved under paragraphs 7 and 8 involving technology and assistance pertaining to complete communications satellites or a significant portion thereof, and to provision of launching services or launch vehicles for communications satellites should be conditioned upon express (written) assurances to this government by the foreign nation(s). The assurances should be that technology and assistance obtained will be used only within the framework of the existing international consortium agreements for a single global system or the framework of such special agreements as are referred to in paragraph 6 above and will not be transmitted or transferred to a third nation without prior U. S. authorization .

10. The principles and policy set forth in this document should be reviewed and updated as communications satellite system developments progress and definitive requirements are determined and after the global commercial communications satellite system has been established and is in substantial use.

POLICY:

Therefore, in keeping with the above, it is the United States policy to:

1. Promote the prompt establishment and successful operation of a single global common carrier and public service communications satellite system in cooperation with other nations as part of an improved global communications network which will provide expanded telecommunications services and which will contribute to world peace and understanding.

2. Avoid measures which would adversely affect either the continued expansion of participation in the existing international agreement for a single global commercial communications satellite system or acceptability of the basic premises of the present agreements on a permanent basis.

3. Make use of commercial communications facilities for general governmental purposes wherever commercial circuits of the type and quality needed to meet government requirements can be made available on a timely basis and in accordance with applicable tariff or, in the absence of Federal Communications Commission jurisdiction, at reasonable cost. Establish and maintain separate satellite communications facilities including ground terminals with capacity limited to that necessary to meet those unique and vital national security needs which cannot be met by commercial facilities. The capacity of these separate facilities shall at all times be limited to that essential to meet such unique needs.

4. Encourage selected allied nations to use the U. S. national defense communications satellite system rather than to develop independent systems and accommodate their needs within the U. S. system (with additional costs normally to be borne by the participants). Recognized needs should be restricted to those, similar to ours, which are vital to the national security of the selected allied nations and which cannot be met by commercial facilities.

5. Withhold provision of assistance to any foreign nation in the field of communications satellites which could significantly promote, stimulate or encourage proliferation of communications satellite systems.

6. Provide technology and assistance in the field of communications satellites to foreign nations: (a) only if such nations are to participate in the U. S. national defense communications satellite system and then only to the extent required for that participation to be effective; or (b) only for use in connection with the single global commercial communications satellite system in accordance with the provisions of the Interim Agreement and Special Agreement of August 20, 1964; and only if there exist appropriate assurances that such technology or assistance will not be transmitted or transferred to a third nation without prior U. S. authorization.

The policies expressed above will be kept under review by the Special Assistant to the President for Telecommunications/ Director of Telecommunications Management and the agencies and departments concerned.

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APPENDIX G

Television Transmission Demand

Paper prepared by
ComSat Corporation

November 1965

ICSC-14-10E W/12/65
17 November 1965

REPORT ON SYSTEM CAPABILITY TO MEET TELEVISION TRANSMISSION NEEDS THROUGH 1969

(Paper by the Communications Satellite Corporation)

The Corporation, as Manager, has undertaken a study of satellite capability to meet television transmission needs through 1969 in compliance with the United Kingdom's request for inclusion of this question in the Agenda of the Fourteenth Meeting of the Interim Communications Satellite Committee.

The resultant study seems to indicate that the following satellite capacity would be required for the period under consideration:

In the Pacific:

Between U. S. and Japan - 1 occasional TV channel (one way, either way)

Between Mainland and Hawaii - 2 occasional TV channels (one way, either way)

Between U. S. and Australia - 1 occasional TV channel (one way, either way)

Since it appears improbable that during this period two different television programs would be transmitted simultaneously between the United States and Japan, Hawaii and Australia, it is estimated that the requirement for the Pacific area would be two occasional one-way TV channels. The demand for television in this area can be more accurately calculated when the television tariffs for the area are developed.

In the Atlantic:

Between U. S. and Europe - 2 occasional TV channels (one two-way or two one-way or simultaneously in the same direction)

Between U. S. and Puerto Rico - 1 occasional TV channel (one way, either way)

Between U. S. and South America - 1 occasional TV channel (one way, either way)

It is possible that in the Atlantic area one television program would be transmitted between the United States and Puerto Rico or South America at the same time as a different, two-way program is being transmitted between the United States and Europe. Consequently, it is estimated that three occasional TV channels would be required for this area during the period through 1969. When television tariffs between the United States and Puerto Rico and South America are developed, more accurate estimation can be made of television demand in this area.

The table below indicates the points between which it can be expected that television transmissions will be conducted, as well as the number of television channels for occasional use which would be required to handle such transmissions through 1969.

	U. S.	Hawaii	Japan	Australia	Canada	Puerto Rico	Europe	South America
Hawaii	2	-	-	-	-	-	1	-
Japan	1	-	-	-	-	-	1	-
Australia	1	-	-	-	1	-	1	-
Canada	-	-	-	-	-	-	1	1
Puerto Rico	1	-	-	-	-	-	-	-
Europe	2	1	1	1	1	-	-	1
South America	1	-	-	-	1	-	-	-

ICSC-14-10E W/12/65
Revision No. 1
26 November 1965

REPORT ON SYSTEM CAPABILITY TO MEET TELEVISION TRANSMISSION NEEDS THROUGH 1969

(Paper by the Communications Satellite Corporation)

1. TELEVISION TRANSMISSION NEEDS

Studies conducted within Comsat indicate that demand for television transmission through 1969, will require the following satellite capacity:

Pacific

Between U. S. and Japan - 1 occasional TV channel (one-way, either way)
Between Mainland and Hawaii - 2 occasional TV channels (one-way, either way)
Between U. S. and Australia - 1 occasional TV channel (one-way, either way)

During this period, it is unlikely that two different television programs would be broadcast between the U. S. and Japan, Hawaii and Australia at the same time. Consequently, it is estimated that a total of one occasional, one-way TV channel would be required in the Pacific area most of the time, and rarely 2 channels at a time.

A more accurate estimate of the demand for television in the Pacific area can be made when the television tariffs for that area are developed.

Atlantic

Between U. S. and Europe - 2 occasional TV channels (one two-way, or two one-way, simultaneously in the same direction)
Between U. S. and Puerto Rico - 1 occasional TV channel (one-way, either way)
Between U. S. and South America - 1 occasional TV channel (one-way, either way)

In the Atlantic area although it is possible that different TV programs would be desired between these regions at the same time, it will be assumed that such needs will rarely exist and that one program or the other can be shifted in time. Consequently, it is estimated that a total of one occasional TV channel would be required in the Atlantic area most of the time and occasionally two channels simultaneously.

A more accurate estimate of the demand for television in the Atlantic area can be made when television tariffs between the U. S. Europe and Puerto Rico and South America are developed.

The following table indicates the points between which it can be expected that television transmissions will be conducted, and the number of television channels for occasional use (in either direction) which would be required to handle the TV transmissions through 1969:

	U.S.	Hawaii	Japan	Aus-tralia	Canada	Puerto Rico	Europe
Hawaii	2	-					
Japan	1	0	-				
Australia	1	0	0	-			
Canada	0	0	0	1	-		
Puerto Rico	1	0	0	0	0	-	
Europe	2	1	1	1	1	0	-
S. America	1	0	0	0	1	0	1

Several avenues are available for the transmission of TV via satellite between now and the implementation of the Global System presently planned for the beginning of 1968.

1. Early Bird Satellite

A. At present, 73 voice circuits are furnished to the IMC's via Early Bird between the hours of 1100 and 2400 GMT. (The earth stations operate between 0900 and 2400 GMT.) This leaves the relatively undesirable hours of 2400 to 1100 GMT

that could be made available for non-CCIR quality* TV transmissions for either one-way, or simultaneous two-way between the U.S. and Europe. The hours of operation of the earth stations would have to be increased, and a new tariff filing would be necessary. Although 73 telephone circuits can be, and have been interrupted for TV programs, this is undesirable operationally and is not a method that meets with approval by the users of these circuits.

B. If the "60 circuits plus one-way TV" plan (described in ICSC/T-6-13E W/6/65) were to be implemented, one-way, non-CCIR quality TV could be transmitted at almost any time between the U.S. and Europe. This plan requires that additional equipment be installed at the existing large earth stations and that agreement be obtained from the users of 13 circuits for their interruption during TV transmissions. There is the practical operational problem of putting all the "interruptable" circuits in one group, and other problems of terrestrial network modification in Europe.

2. Additional Early Bird Satellite

The installation of a second Atlantic Early Bird satellite would permit simultaneous two-way, non-CCIR quality, TV channels at all times, but is obviously a very expensive way to provide part-time TV facilities.

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* Throughout this paper reference is made to "non-CCIR quality" TV channels. Such channels would differ in that the bandwidth would be somewhat reduced and/or the S/N ratio lowered. This should not rule out consideration of furnishing such channels, since the standard conversion equipment that would be necessary for transmissions between most areas of the world would degrade the quality by itself. Thus, picture quality via "non-CCIR quality" channels might be no worse-- or only a little worse--than that supplied via full-CCIR quality channels.

The second North American earth station (Mill Village, Nova Scotia, Canada) would have to be operational before such a satellite could be utilized at the same time the present Early Bird is carrying telephone traffic. It should be pointed out that such operation of Mill Village would preclude its use to back up Andover for either Early Bird or NCS operation. Similarly, two of the three large earth stations in Europe would have to operate simultaneously--one for each Early Bird.

An Early Bird satellite placed over the Pacific with a modified antenna squint could be used for 55 circuits plus TV during the period when fewer that 55 voice circuits have been sold. This plan must await the completion of the Japanese, Hawaiian and Washington earth stations, before it could be put into full operation.

3. HS 303A Type Satellites

A. The capacity of the HS 303A satellite in excess of NCS requirements could provide a one-way, non-CCIR quality TV channel at all times. This quality would be about equal to the present Early Bird TV quality. Operation of a large earth station in Europe and North America would be required for all HS 303A commercial service. No commercial voice circuits would be left.

B. Some of the excess capacity plus the additional ERP provided by the fourth TWT in the HS 303A satellite could be used for a non-CCIR quality TV channel for a total of about six hours per day (but no more than four hours continuously) by operating the fourth TWT on the presently planned spacecraft batteries.

Such operation would reduce the number of commercial circuits from about 100 to about 80.

The estimate of four hours plus two hours is based on an assumed maximum permissible 40% depth of battery discharge. Calculations indicate that about 12 hours would be required for complete recharge after a 4-hour operating period which brings the batteries to the 40% condition. A second operational period of 2 hours would be permitted in any 24-hour period. See Figures 1 and 2.

If no specific time each day must be reserved for the 4-hour period, then obviously a 4-hour on, 12-hour off, cycle can be employed. This means that the usable 4-hour period is shifted 8 hours later each day. Thus, there is no assurance that the batteries will be charged to a level high enough to transmit a program of given length on short notice at any arbitrarily chosen time on a particular day.

The recent Early Bird measurements that indicated that the batteries now have significantly less than their design capacity have not been fully explained. Only after they have been, and appropriate corrective measures taken if necessary would reliance on this method be advisable.

During eclipse periods, the batteries must carry 3 TWT's plus the basic receiver load. Although twelve hours are required to recharge following the eclipses, some time is still available for fourth TWT operation. Calculations indicate about 2.75 hours per day could be supplied, again assuming a maximum 40% depth of discharge. Figure 3 indicates the time relationships.

Note that full continuous 2.75 hour operation is not possible for 12 hours after the eclipse is over. This would be about 1230 hours at the sub-satellite point. For an Atlantic satellite at 30° W longitude, this would mean not until 1430 GMT in England or 0930 EST in the U, S. If turn-on is delayed, the usable time decreases as shown in Figure 4. If turned on before 12 hours after eclipses, two shorter operational periods can be derived totaling the 2.75 hours mentioned above.

With 4 tubes in operation, the calculated lifetime of an HS 303A satellite (3.5 years for NCS requirement, 3 years for commercial use) would be less than 3 years but more than 2 years.

The Comsat HS 303A filing with the FCC (as approved by the ICSC) specified up to 4 TWT's operating at a time so no modification of the filing would be required in this regard.

The influence of 4 TWT operation on incentive and performance requirements for the contractor (Hughes) would have to be explored.

C. If the entire normal capacity (3 TWT operation) of the HS 303A were to be leased back from NASA for commercial use during times when no Apollo mission were planned, about 480 voice channels (240 voice circuits) could be derived between large earth stations.* About 240 of these channels would be required for a one-way, non-CCIR quality TV channel. Alternatively, simultaneous two-way, non-CCIR quality TV could be supplied. Two operating large earth stations would be required in both North America and Europe. (One pair for Early Bird, one pair for this HS 303A.)

D. The same capacity mentioned in C above could also be obtained, obviously, if an HS 303A were to be launched exclusively for other than NCS use. Three operating earth stations would be required in North America (two large ones for Early Bird and commercial HS 303A operations and one 42' station for NASA), and two large stations would be required in Europe for Early Bird and commercial HS 303A operations. Such a satellite would also serve as an Early Bird spare in orbit, but this is still a very expensive solution for part-time TV requirements.

E. If the present, squinted Early Bird antenna were to be used on an HS 303A, about 2 times the Early Bird capacity could be realized between the existing large earth stations.* Such a satellite could provide about 1080 voice channels (540 circuits). Alternatively, a portion of this capacity could be used for one CCIR-quality TV channel, providing one such TV channel would leave about 500 channels (250 voice circuits). Two such TV channels could not be provided with full 6 db margin. However, if occasional TV channel outage due to use a 3 db margin for these channels were acceptable, two such TV channels could be supplied and would leave about 240 voice channels, (120 voice circuits). Such a satellite could also serve as an Early Bird spare in orbit. Such a satellite would not provide service to the Southern Hemisphere, but such telephone circuits could be supplied by the 100 channel excess capacity of the presently planned Atlantic HS 303A.

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* For elevation angles of 12° or higher and at latitudes of 45° to 55° North or South.

4. More Efficient TV Transmission Techniques

In view of the occasional nature of the TV demand, it is desirable to provide such transmission using the least possible satellite ERP. Various processing techniques can be used to improve the efficiency of ERP utilization for television transmissions, including basehead and RF bandwidth reduction.

A. In FM systems, the efficiency of RF spectrum utilization can be increased significantly over present usage by appropriate processing. Examples of this, such as "non-linear pre-emphasis," "positive synch" and "over-deviation" have been demonstrated during the TV transmissions of the Olympics in October, 1964, from Japan to Point Mugu, California, via Syncom III. At the present time, these techniques are suitable for black and white TV only. However, additional research is likely to extend these as well as develop new methods of processing color TV also.

B. Slow-scan TV might be utilized via Early Bird. (Slow-scan TV has been in use for transatlantic transmission over the cables for some years. The quality is poor because of the extremely narrow frequency band that can be made available and because, to save time, a proportion of the frames are suppressed.)

However, good quality slow-scan transmission is possible with say, 2.4 Mc/s baseband and an eight times time expansion with consequent baseband reduction to 240 kc/s. A 15-minute original would take approximately two hours to transmit and would require a super group, or 60 telephone circuits. This method would be much faster than any "film in aircraft" technique.

The reduction of bandwidth to 2.4 Mc/s does not imply a degradation beyond that now encountered due to present-day optical standards conversion equipment which would be necessary in any event, and which now limits the resolution to a value commensurate with a 2.4 Mc/s bandwidth. The greatest advantage in this method besides offering the possibility of some lower

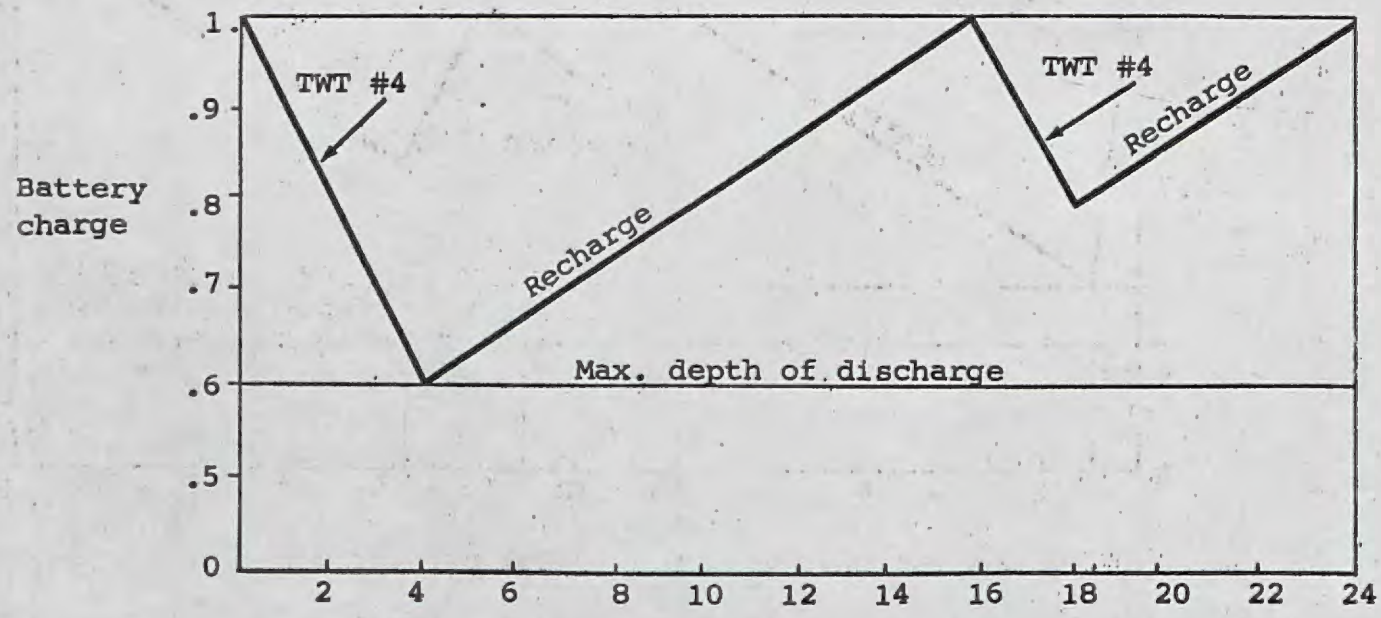
cost in off-peak hours, is the significant reduction in peak hour charges that could be made. This would be of particular interest to European broadcasters whose prime viewing hours would now dictate the use of peak hour transmission in Early Bird.

This method might well meet most of the broadcasters' requirements and the baseband would be such that it could be accommodated all the time without disturbance in peak or off-peak hours, to regular telephony circuits. The question of cost of modifying a conventional video tape recorder would have to be resolved to insure that this necessary piece of equipment would be available and at a cost commensurate with anticipated revenues.

One recently developed "slow-scan" technique relying on helical scan video tape recorders was tested (but not used for actual programs) during the TV transmissions in October, 1964, from Japan to Point Mugu, California, via Syncom III. These transmissions produced a 2:1 bandwidth reduction by transmitting only every other field in twice the normal time. Horizontal resolution is only affected slightly but vertical resolution is halved (hence, any slanting line appears jagged) and "naturalness of motion" was adversely affected.

B. Baseband reduction by means of correlation techniques that rely on the high degree of redundancy in typical TV scenes has long been proposed. Extensive work at the BTL and RCA, to name only two organizations, had been conducted for at least two decades with little progress in practical terms, and is not now being actively pursued.

One possibility might be for the space segment owners to sponsor such research and, to that end, issue an RFP to research organizations. However, it should be pointed out that we have no knowledge of promising correlation techniques or fruitful lines of investigation. Moreover, such research may require several years, and, thus, would not produce results (operational equipment) until a time era when the space segment would have considerably more satellite power in orbit available to it.



4th TWT Operation During Non-eclipse Days
Fig. 1

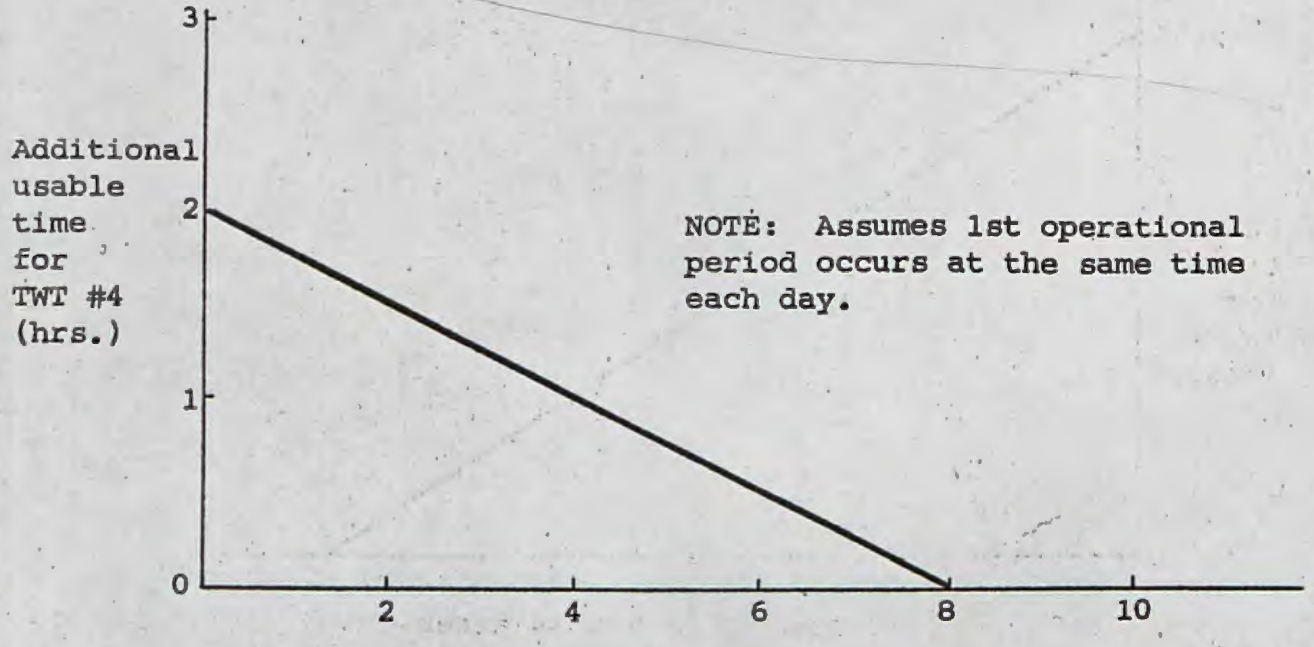
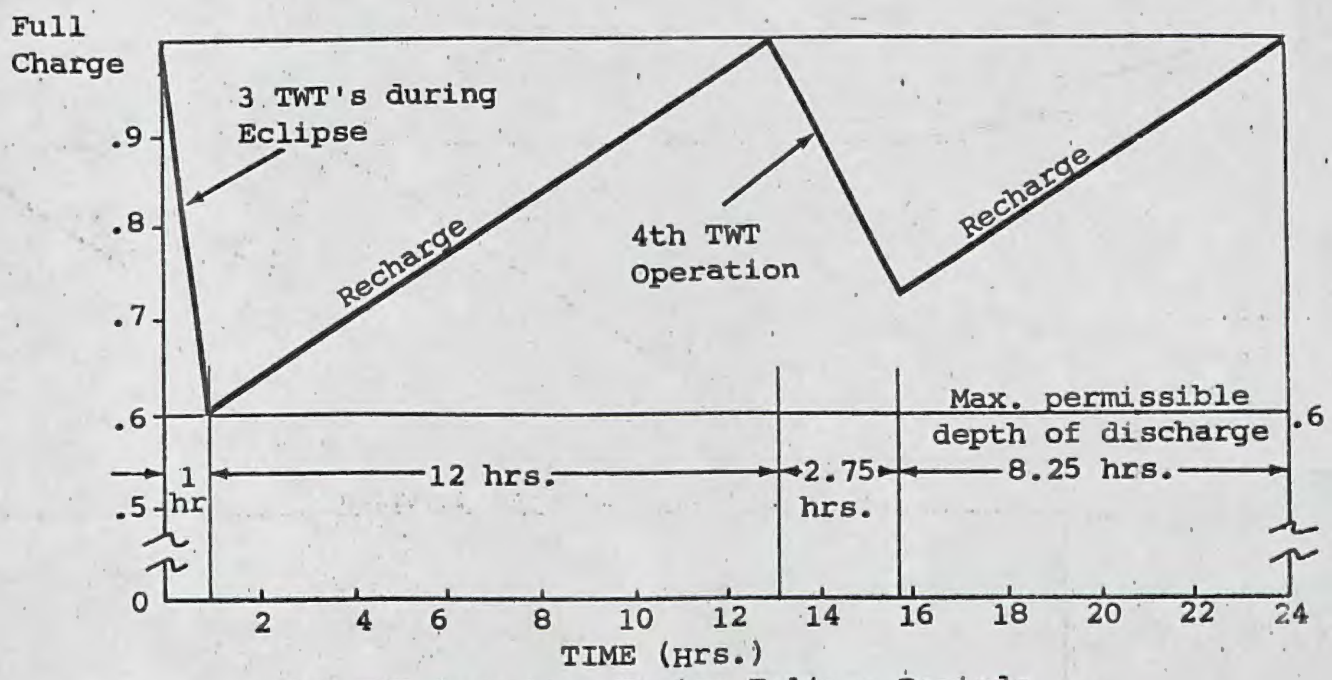
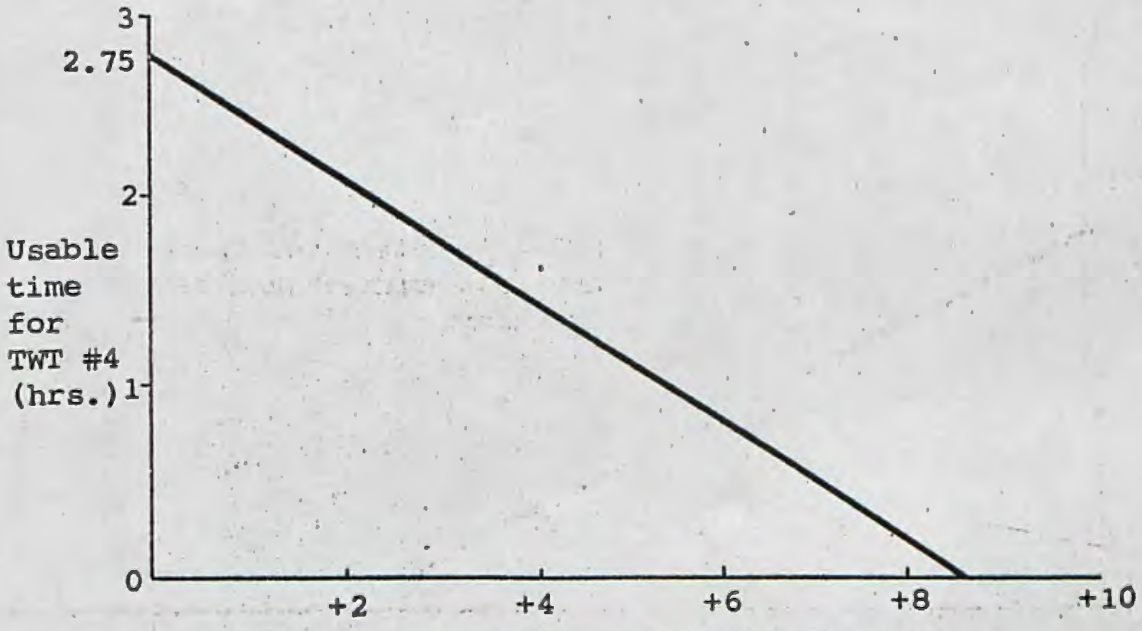


Fig. 2



4th TWT Operation During Eclipse Periods

Fig. 3



Turn on of TWT #4 after Eclipse Recharge is Complete (Hrs.)

Fig. 4

Method	Satellite Available	Ground Stations Available Atlantic	Ground Stations Available Pacific	Limitations	Excess Cost of TV Capability
1A Early Bird after hours or by interrupting telephone circuits	Now	Now	N.A.	1. Non CCIR-quality TV 2. Undesirable time or interruption of telephone service 3. North Atlantic only	None
1B Early Bird with "60 Channels plus TV"	Now	2 months from decision	N.A.	1. One channel only 2. Non CCIR-quality TV 3. Requires interruptions of 13 circuits now, increasing throughout time. 4. North Atlantic only 5. Requires modification of earth stations and terrestrial network in Europe	Moderate
2 Additional Early Bird	Spring 1966	Spring 1966 (Depends on Mill Village)	Brewster, 1966 Hawaii, 1966 Japan, 1966 Australia 1967?	1. Non-CCIR quality TV 2. Ground station availability in Pacific 3. No South American coverage 4. High cost 5. Antenna development required for Pacific satellite	Maximum $5.25 M (with incentive) Launch 3.5 M $8.75 M Plus cost of antenna development
3A The presently planned HS 303A (using entire excess capacity)	August 1966	"	"	1. One TV channel only 2. Non-CCIR quality TV 3. No voice circuits left 4. Ground station availability in Pacific & S. America	None

	Method	Satellite Available	Ground Stations Available Atlantic	Ground Stations Available Pacific	Limitations	Excess Cost of TV Capability
3B	Presently planned HS-303A with 4 TWT's operating	August 1966	Spring 1966 (depends on Mill Village)	Brewster, 1966 Hawaii, 1966 Japan, 1966 Australia, 1967?	1. One TV channel only 2. Lifetime less than 3 years for 4 TWT's operating 3. Ground station availability in Pacific & S.America 4. Non-CCIR quality TV 5. Reduces excess capacity telephone circuits to about 80	None
3C	Presently planned HS 303A (lease-back of NCS capacity)	August 1966	"	"	1. Not available during Apollo missions 2. Ground station availability in Pacific & S.America 3. Non-CCIR quality TV 4. No voice circuits left with 2 TV channels	Reimbursement to NCS
3D	Additional HS 303A (Fifth Flight Model)	About Sept. 1966 if ordered soon	None planned	"	1. Ground station availability in Pacific & S.America 2. High cost 3. Non-CCIR quality TV 4. No voice circuits left with 2 TV channels	Satellite: $2 M minimum 4 M maximum with incentive Launch: $3.5 M
3E	Additional HS 303A (Fifth Flight Model with squinted antenna)	Fall, 1966 If ordered soon	"	"	1. Limited coverage in Pacific, none in S. America 2. High cost	As above plus nominal amount for antenna

ICSC-14-IOE W/12/65

Method	Satellite Available	Ground Stations Available Atlantic	Ground Stations Available Pacific	Limitations	Excess Cost of TV Capability
4A Improved FM Modulation Techniques	12 months	6 months for earth station modifications		Some reduction in picture quality	?, but "moderate"
4B Slow-scan (Via Early Bird or HS 303A	Technique: Now	--	--	Limited length of programs No "round table" programs possible	Negligible
4C Baseband Reduction by Correlation Techniques	Probably at least 2 year development time & then no assurance of success	--	--	No assurance of success	Probably on the order of several millions of dollars

Discussion

Television has so far been transmitted on an occasional, part-time, basis and is likely to continue to be in the next several years. Consequently, it would be most desirable if facilities necessary for TV required only unused, excess or part-time capacity.

The one difficulty, of course, is that the needs and the available capacity must coincide in time. If they do not, either TV must be delayed or voice circuits interrupted. The first alternative is undesirable, but the second is probably unacceptable. The various possibilities (summarized in the Table) can be ranked on Operational and Technical grounds. However, in the final analysis, the decision of which, if any, of the plans to be implemented must be made largely on financial considerations, coupled with an intelligent appraisal of market potential.

At present, Comsat has firm plans to install only one 85' antenna (and associated transmitting and receiving equipment) at Brewster Flat, Washington, and Paumalu, Hawaii, by 1 January 1967. It is our understanding that the Japanese station at Ibaraki will also be equipped with one 85-foot antenna by that date. While there has been some informal indication from a Japanese representative that a second station might be constructed in a more westerly location in Japan, there is no firm plan to do so that we are aware of, and in any event the first antenna at that new station would presumably be used for Japan - Europe telephone service.

Plans 3A, 3B, 3C, 3D, and 3E, could provide TV service in the Pacific. Of these, the plans that require separate satellites for TV and telephone (3D, 3E) have the financial and operational disadvantage of requiring second antennas in Japan, Hawaii, and Washington, and must be delayed until such facilities are installed. Plans 1A and 1B do not provide the possibility of any TV service in the Pacific.

With regard to TV to South America and/or Puerto Rico, earth stations would be a significant limitation or delaying factor.

The plans that would be usable for this service are 3A, 3B, 3C, and 3D. 3A would provide no voice circuits. Not usable because of satellite antenna pattern limitations would be Plans 1A, 1B, and 3E.

Summary

Plan 1A is quite unattractive operationally. It does, in fact, represent the present undesirable situation.

Plan 1B precludes Pacific and South American service. It becomes less attractive as time goes by when more voice circuits must be interrupted. Grouping of interruptable channels may be quite difficult to achieve operationally.

Plan 2 is expensive and violates the "Principle" of Part-time Facilities for Part-time Needs. It would be acceptable only if these satellites were also to be considered necessary as a spare in orbit for Early Bird.

Plan 3A has the disadvantage that no earth stations in South America, Africa, or in the Pacific may be served with voice circuits by the capacity that would have been excess in the HS 303A's, since it is all needed for the one non-CCIR quality TV channel. However, it is a partially acceptable solution for the North Atlantic requirements because it provides only one TV channel, and simultaneous two-way TV is not possible.

Plan 3B is a partially acceptable solution since only one non-CCIR quality TV channel is provided and simultaneous two-way TV is not possible.

Plan 3C does provide simultaneous two-way, non-CCIR quality TV (or 2 separate channels), except that no TV service is possible during Apollo missions.

Plan 3D is expensive and violates the "Principle." It would be justified only if the additional satellite is also considered necessary as a "spare in orbit."

Plan 3E is even more expensive than 3D and also violates the "Principle." It might be acceptable if this satellite were to satisfy voice circuit requirements not able to be fulfilled by Early Bird.

Plan 4A offers the possibility of requiring less satellite power in reasonable time and with a relatively modest research program.

Plan 4B is relatively inexpensive to implement, but would not satisfy all the Broadcasters' requirements.

Plan 4C is quite desirable in theory, but costly to bring to fruition and with no guarantee of eventual success.

Recommendations

On balance, it appears that Plan 3B in conjunction with 3C when needed, offers the best compromise between cost and capability even though there is no absolute guarantee that the required number of TV channels can be furnished for a given number of hours any time of the day, or any given month of the year.

In addition, serious consideration should be given to prompt implementation of Plan B as a limited interim solution and for those types and lengths of programs for which it is satisfactory.

Plans 4A and 4C should be studied with a view to the space segment sponsoring research in this field if promising ideas are forthcoming.

Only if additional satellites are deemed necessary to fulfill increasing voice circuit requirements, or if required otherwise as spares in orbit, would plans 3D and 3E become attractive.

APPENDIX H.

Evaluation of Terrestrial Telecommunications

and Broadcasting Capabilities in:

Nigeria
Ethiopia
Korea
Thailand
Colombia
Chile

Prepared through courtesy of USIA

December 1965

3.7. Terrestrial Communication Distribution Networks

On a relative basis, telecommunication facilities in Nigeria are more advanced than in most other African countries. However, although the rate of expansion has accelerated in the past few years, present facilities are considered to be barely adequate to fulfill the basic telecommunication requirements of the government and economy.

Presently available telecommunication services include the following:

a. Voice: Overhead open-wire lines and relay links tie together most of the cities and towns in the country having telephone service. A major line extends from Lagos to Kano, via Kaduna and Zaria. Other lines run from Lagos to Yola, from Lagos to Calabar, and from Zaria to Sokoto. The radio relay facilities provide up to 100 channels in some links, and some of the open-wire equipment is carrier-type. There are approximately 55,000 telephones in the country. While telephone service is said to be available in nearly 150 communities, most of the telephones are concentrated in Lagos, Ibadan and Port Harcourt. These and several other towns have automatic exchanges.

Direct international voice circuits are available from Lagos to Accra, Ghana; Bathurst, Gambia; Buea, Cameroon; Porto Novo and Cotonou, Dahomey. Circuits also exist between Calabar and Buea. An h.f. circuit from Lagos to London connects Nigeria with almost any other point in the world.

b. Record and data: Telegraph service is available throughout most of Nigeria over the same facilities used for voice transmissions. In addition, many communities presently without telephone service are linked to the main lines for telegraph service. International telegraph service is handled on the same circuits as the voice service, with additional direct service available to Freetown, Sierre Leone; Fernando-Po; Gaoua and Douala, Cameroon; Zinder, Nigeria; Fort Lamy, Chad; Leopoldville; Abidjan; Addis Ababa; Nairobi; Cairo and Paris. Very limited subscriber teleprinter service (telex) is available between Lagos and Accra, Ghana and to the major towns and cities in Nigeria. Limited facsimile service is available on domestic and international networks.

c. Television: At the present time there are no wide band transmission telecommunication services available in Nigeria.

Domestic telecommunication facilities are government owned and are operated by the Nigerian Posts and Telegraph Department, which is part of the Ministry of Transport and Aviation.

Nigeria - continued

Some major improvements, now in the planning stage, are expected to increase the capacities of both domestic and international telephone and telegraph facilities substantially in the near future. A trans-Nigerian SHF system with 1000-voice channel capacity is planned between Lagos and Kano for 1966. Sixty channel SHF links are planned for 1968 between Lagos and Accra, Ghana and Lagos and Lome, Togo. Thirty-six channel VHF links are planned for 1968 between Kano and Zinder, Niger and Kano and Fort Lamy, Chad. A five circuit VHF channel is planned between Calabar and Fernando-Po in 1967. Nigeria is also expanding its HF voice and telegraph circuits, and by 1967 it is expected that direct circuits will be possible to every country in Africa, several European countries and the United States. Increased telex and facsimile services are also expected to be available during 1966 and 1967. Specific plans for the period 1964-1969 call for U.S. aid to the Nigerian government for telecommunication improvement and development at the rate of between $5 and $10 million annually. Nigeria also receives assistance for telecommunication development from the United Kingdom, the International Telecommunication Union's Technical Assistance Program and from the United Nation's Economic Commission for Africa.

The Nigerian government has shown a keen interest in space communications. It has permitted the United States to establish space flight tracking facilities in Lagos and Kano, and participated in early Syncom satellite experiments. At various ITU conferences, Nigerian delegates have expressed the desire to have a regional earth station located in their country to serve future space communication of West Africa.

3.8. Broadcast Capabilities Within Nigeria

a. Radio: Radio broadcasting is considered to be the most important medium for the circulation of public information in Nigeria, both in size of audience and geographic coverage. It reaches a vastly greater audience than the next most important medium, newspapers. During 1964, there was estimated to be between 600,000 and 900,000 radio receivers in Nigeria (for a population of approximately 52,000,000), supplemented by a rediffusion system, comprising some 100,000 wired speakers located in community centers.

By the end of 1965, there were a total of 20 medium wave (standard band) radio broadcast stations operating in 16 cities and towns in Nigeria, as follows:

Nigeria - continued

LOCATION	FREQ. (KC)	POWER (KW)	OWNERSHIP
Lagos	1458	5	government
Lagos	602	10	commercial
Ibadan	1358	10	government
Ibadan	656	10	commercial
Ijebu-Ode	1397	0.25	government
Warri	1397	0.25	government
Enugu	1320	10	government
Enugu	953	10	government
Onitsha	1397	0.25	government
P. Harcourt	1397	0.25	government
Calabar	1397	0.25	government
Kaduna	1416	1	government
Kaduna	940	10/250	commercial
Kano	1376	0.25	government
Jos	1397	0.25	government
Sokoto	1397	0.25	government
Ilorin	1397	0.25	government
Maiduguri	1397	0.25	government
Zaria	1397	0.25	government
Katsina	1397	0.25	government

Nigeria - continued

In addition to the medium wave transmitters, ten shortwave transmitters are used to cover rural areas, and to fill in the gaps in medium wave broadcast coverage. Shortwave transmitters are used as follows:

LOCATION	POWER (KW)	OWNERSHIP
Lagos	20	government
Lagos	5/10	government
Ibadan	10	government
Ibadan	10	commercial
Enugu	5/10	government
Enugu	10	commercial
Kaduija	20	government
Kaduija	10	government
Kaduija	7.5	government
Kaduija	10	commercial

More complete details concerning ownership, operation and broadcast schedules of the medium and shortwave broadcasting stations in Nigeria are shown in Attachment 1 (from the 1965 edition of the World Radio-TV Handbook.)

The Nigerian government also operates a limited international service using four 100 kw and two 10 kw shortwave transmitters. Programs are beamed primarily to Africa and the Middle East.

There are no frequency modulation broadcasting stations in operation in Nigeria at the present time.

b. Television: Television has developed faster and to a greater extent in Nigeria, than in any other African country except Egypt. The first television station in Nigeria went on the air in October 1959. At the present time, a total of seven stations are on the air as follows:

Nigeria - continued

LOCATION	CHANNEL	OWNERSHIP
Lagos	10	government
Lagos	3	commercial
Enugu	2	commercial
Aba	4	commercial
Jaji	4	commercial
Kano	10	commercial
Ibadan	4	commercial

Television systems in use in Nigeria are in accordance with the CCIR 625-line standard, using horizontal antenna polarization.

There were an estimated 15,000 television sets in operation in Nigeria during 1965.

Additional information concerning television stations in Nigeria appears in attachment 2 (from the 1965 edition of the World Radio-TV Handbook).

The present medium wave broadcast stations in Nigeria cover the major cities with an excellent signal. The shortwave stations provide good national coverage. Future plans call for raising the power of the commercial station in Enugu on 953 kc from 10 to 500 kw; raising the power of the commercial station in Ibadan on 656 kc from 10 to 50 kw; install a new 10 kw commercial transmitter at Akure, and raise the power of some of the shortwave transmitters. These plans are expected to be completed by 1967.

In television, future plans call for commercial stations to be installed in Oshogbo in 1966 (channel 5) and Akure in 1967 (channel 11), and increasing the power of the present stations at Lagos (channel 3) and Ibadan (channel 4) by 1966.

According to information provided the ITU by the Nigerian government at the recently held African Broadcasting Conference, Nigeria has future plans for the development of a VHF FM broadcasting system.

Attachment 1

...O AMELIA (Emissor Reg. de Cabo Delgado):
...ese: Sun 05.30–07.30 on 1421/7115kc, 09.30–12.00 on 7115kc, ...20.00 on 1421/3395kc; W 10.30–12.00 on 1421/7115kc, W exc. ...16.00–19.00 on 1421/3395kc –
...o Medo: Sun 09.30–10.30 on 1421/7115kc, 16.00–17.30 on ...Wed 16.30–19.00 on 1421/3395kc.
...A (Emissor Reg. do Norte):
...W 04.30–05.30, 09.30–11.30 on 1223/4855/7190kc, Sun ...al on 1223/4855kc, 08.30–11.30 on 1223/4855/7190kc, ...18.00 on 1223/3200kc, 18.00–20.00 on 1223/3200/4855kc – ...D 17.00–18.00 on 4975kc. Sun also 06.00–08.30 on 7190kc.
...EMANE (Emissor Reg. da Zambézia):
...guese: 10.15 (Sun 08.00)–12.00 on 935/4865kc, 16.00–19.30 on ...s (Sun also 935kc) – Chuabo: Sun 05.00–06.00, 10.00–11.00 on ...5kc. D 17.00–18.00 (Sun, Wed, Sat 19.00) on 3210kc –
...E: Four 25kW sw-tr's and one 50kW mw tr. under construction. ...st. at Beira mid 1965 using 1295, 1358, 3355, 4895, 6040, 7265, ...5kc on sched. identical to other Regionals.
...n Boveri, Switzerland: mw+sw tr (Matola) 100kW – Wilhelm ...er KG, Germany, EMT studio equipment.

MISSORA DO AERO CLUBE DA BEIRA (Priv, Comm.)
...Bv ads – ADDR: C.P. 3, Beira. Cable: Aero. Te: 2505 –
...P. Dir: F. J. Silvério Moiteira.
...ATIONS: mw 5kW, sw 0.3kW.
...5kc – 3255kc 92.15m – 7255kc 41.35m.
...ME SCE. in Portuguese: W 04.30–06.00, 09.30–11.30(Sat 12.00), ...-21.00, Sun 05.00–21.00. N: 04.50(W), 10.00, 16.50, 17.45, 20.15.
ANN: "Aqui Portugal, Moçambique fala-vos a Emissora do Aéro ...ce da Beira" – INT-SIG: Gong – V. by QSL-card. Records ...epted.

RADIO PAX (Rel, owned by Franciscan Fathers)
...By gifts and state – ADDR: C.P. 594, Beira. Cable: Radio Pax. ...2763 – L.P: St. Mgr. Dr. M. Reis M. Dir. Tec: A. Especial.
...ME SCE. in Portuguese, Vernaculars: W 04.00–05.30 (I), 09.30–...(Sat 12.00) (II), 15.30–21.00 (III); Sun 05.00–13.00 (I) 15.00–...(II) 17.00–21.00 (III).

...c	...m	kW	h of tr.	kc	m	kW	h of tr.
...5	207.7	1	I+II+III	5025	59.70	5	III
...2	258.0	0.5	I+II	7205	41.64	5	I+II

...Mc, 0.05kW: I+II+III
...a Portuguese: 04.30(Sun 05.30), 10.15, 17.30, 20.30.
...naculars: W 15.30–16.30, Sun 12.00–13.00.
ANN: "Aqui Beira, Moçambique á R. Pax, Emissora Católica" – ...by QSL-card or letter – INT-SIG: Chimes. Prgr's open with ...gious choir – F.PL: 3 kW mw, 10 kW sw.

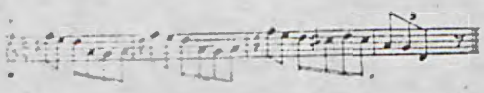
NIGER (Republic)

...T, GMT+1 h – Pr.L: French, Hausa, Djerma, Tamachek, Peulh,

RADIO NIGER (Go.)
ADDR: B.P. 361, Niamey. Cable: Radioniger. Te: 2272 – L.P: Dir: ...Dir. Tec: L. Vigié. Dir. Prgr: A. Alirou.
STATIONS (System TRT):

...c	m	kW	Net	kc	m	kW	Net	kc	m	kW	Net
...11	198.4	1	I	4785	62.70	30	II	6060	49.50	4	I+III
...20	92.02	4	I	5020	52.76	4	II	7135	42.05	4	II

...ME SCE: Net.I: W 05.30–06.30 on 1511/3260kc, 11.30–13.17 on ...kc, 17.00(Sat 15.00)–21.15(Sat 22.30) on 1511/3260kc; ...16.30 on 1511/6060kc, 17.00–21.00 on 1511/3260kc. Net.II: ...30 on 5020kc, 11.30–13.17 on 7135kc, 17.00(Sat 15.00)–...22.30) on 4785/5020kc; Sun 07.00–16.30 on 7135kc, 17.00–...4785/5020kc. Net.III: W 06.30–11.30 on 6060kc. N: French ...W 06.00–12.00, 13.00, 17.00, 18.45, 21.10, Sun 09.00, ...18.45, 21.10, Net.III: 07.30(W), 09.00(W), 10.30(W) – L.L. ...06): Mon, Tues, Thurs, Fri 17.15(Net.I+II) – N. in English: ...Sat 17.15(Net.I+II) – Vernaculars: Net.I: 12.20, 18.00 Djerma, ...Tamachek, 17.45 Peulh. Net.II: 12.20, 18.00. Hausa, 17.30 Beri-...Net.III: 09.05, 10.35 Djerma, 09.10, 10.40 Hausa.
ANN: At opening and close down "La Nigerienne". Local flute and ...Niamey Radiodiffusion de la République du Niger".
INT-SIG: Local Flute.



...QSL-card. Records accepted – F.PL: Mw, rel. st's at Ni Guigmi, ... – PUB: Prgr.schedule (weekly).

NIGERIA (Republic of)

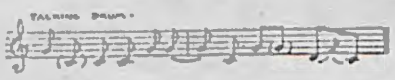
L.T: GMT+1 h – Pr.L: English, Yoruba, Hausa, Ibo.

THE NIGERIAN BROADCASTING CORPORATION
(Statutory Corporation)
FI: By state plus comm. revenue – AD: 11 times per day: 05.20, 05.33, 06.10, 11.18, 12.10, 13.03, 13.30, 14.10, 17.45, 18.20.
ADDR: Broadcasting House, Lagos. Cable: Broadcast. Te: 26411.
L.P: Dir. Gen: I. V. Badejo. Dir. Tec: D. M. T. Oke. Dir. External Sce: C. Achebe. Dir. Prgr. (Ag): Y. Olumide. Dir. Adm: H. N. Osakwe. Secr: O. Fashina. Dir. N. & Current. Affairs: H. Agedah.

NATIONAL PRGR. (from Lagos):
1458kc 206m 5kW: 05.00–22.30 (Sat 23.00, Sun 05.00–22.00).
4990kc 60.12m 20kW: 05.00–09.00, 14.00–22.30 (Sat 23.00. Sun 05.00–09.00, 14.00–22.00).
7255kc 41.35m 5kW: 08.00–16.00 (Sun 08.00–22.00).
N: English: 05.30, 06.00°, 07.00, 09.00, 10.00, 11.00, 12.00°, 13.00, 14.00°, 15.00, 16.00, 17.00, 18.00°°, 19.00, 20.00°°, 21.00, 22.00.
° 10 min. °° 15 min. other times 3 min. news-summary.
Educational Prgr's in English: D 07.45, 09.30, 10.03, 11.03, 15.30.
N. in Hausa, Ibo, Yoruba: 08.00, 17.03, 21.03.
WEST REG. PRGR. (from Ibadan):
1358kc 221m 10kW: as Lagos 1458kc.
1397kc[1] 215m 0.25kW: as Lagos 1458kc. [1] = Ijebu-Ode, Warri.
3204kc 93.64m 10kW: Mon–Fri 05.00–07.00, 16.45–22.30. Sat 05.00–07.08, 16.45–23.00. Sun 05.00–07.08, 16.45–22.00.
7285kc 41.18m 10kW: D 07.15–16.30.
N. in English, Yoruba: 13.30, 19.00.
EAST REG. PRGR. (from Enugu):
1320kc 227m 10kW: 05.00–22.30 (Sat 23.00, Sun 05.00–22.00).
1397kc[2] 215m: as 1320kc.[2] = Onitsha, P. Harcourt.
1397kc[3] 214m 0.25kW: as 1320kc.[3] = Calabar.
3980kc 75.38m 2.5/5kW: 16.45–22.30 (Sat 23.00).
6145kc 48.82m 2.5/5kW: 07.15–16.30.
N. in English, Ibo, Efik: 14.30, 19.00.
NORTH REG. PRGR. (from Kaduna):

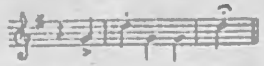
1416 kc	212m	1kW:	05.00–22.45(Sat 23.15, Sun 22.15).
1376[4] –	218 –	:	05.00–22.30(Sat 23.15, Sun 22.35).
1397[5] –	214 –	:	05.00–22.30(Sat 23.15, Sun 22.35).
3326 –	90.20–	7.5/20 – :	05.00–08.00, 16.45–22.45(Sat 23.15, Sun 22.15).
3396 –	88.36–	10 – :	16.45–22.45(Sat 23.15, Sun 22.15).
6175 –	48.58–	20 – :	07.30–16.30.
9655 –	31.07–	10 – :	09.30–16.30.

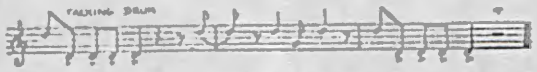
[4] = Kano. [5] = Jos, Sokoto, Ilorin, Maiduguri, Zaria, Katsina.
N. in English, Hausa: 14.30, 19.00.
EXTERNAL SERVICES to No, Ea, C. and So. Africa, M. East (from Lagos): 13.00–20.00 on 7275/9690kc (10kW), 11900/15255 kc (100 kw). English: 14.00–15.00, 17.00–19.00. N: 14.00, 17.00, 18.00° – French: 16.00–17.00, 19.00–20.00. N: 16.00°, 19.00 – Arabic: 15.00–16.00. N: 15.00 – Hausa: 13.00–14.00. ° 10 min. newscast.
ANN: "This is R. Nigeria" or "This is Voice of Nigeria"
INT-SIG: National prgr: Talking Drum.



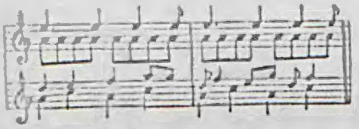
North Regional Programme: Trumpet-Type Instrument.

West Regional Programme: Talking Drum.





East Regional Programme: Snake Drum-Xylophone Bass.



V. by QSL-card. Re. will be welcomed by Chief Engineer – PUB: Monthly: Transmission schedules are distributed free of charge.

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For details of Programmes, please write TO:

DIRECTOR OF EXTERNAL BROADCASTING

NIGERIAN BROADCASTING CORPORATION

LAGOS, NIGERIA

The Nigerian Radio Times available on a subscription basis.

The Marconi Company Ltd, G.B: Sw-tr's: 1×7½, 1×20, 4×10kW (Lagos).

EASTERN NIGERIA BROADCASTING SERVICE (Go.)
ADDR: Box 350, Enugu. Cable: Easteller. Te: 2579.
L.P: Gen. Mgr: K. Okoronkwo. Sen. Eng: A. S. Alaribe.
STATIONS: 953kc 315m 10kW – 4855kc 61.79m 10kW.
HOME SCE: W 05.00–23.00, Sun 06.00–22.00. N. in English: 05.30, 11.00*, 13.00*, 13.45, 17.00, 18.00*, 20.00*, 20.45, 22.55(W) – Vernaculars (Ibo, Efik, Ijaw): 06.15, 06.30, 06.45, 12.00, 18.09, 18.20, 18.30. *=BBC.
ANN: "This is the Eastern Nigeria Broadc. Sce" or "This is the Voice of Eastern Nigeria" – INT-SIG: Drum (repeated) – V. by letter or QSL-card. Records accepted – F.PL: 500kW mw-tr. to commence operation mid 1965.

RADIO TELEVISION KADUNA (Comm.)
FI: By commercials but subsidised – ADDR: P.O. Box 250, Kaduna, No. Nigeria. Cable: Radionorth. Te: 2294 – L.P: Man. Dir: L. A. W. Diamond. Chief Eng: R. Sharpe.
STATIONS: 940kc 10/250kW – 6090kc 49.26m 10kW.
HOME SCE. in English, Hausa: 05.00–09.30, 14.00–21.00 on 940/6090kc – N: English: 05.30, 09.00, 14.15, 18.30. Hausa: 05.40, 09.10, 14.25, 18.40.
ANN: "This is Radio Television Kaduna" – INT-SIG: Bauchi Drums. V. by letter. Records accepted.

Brown Boveri, Switzerland: One 250kW mw-tr. (Jaji) one 10kW sw-tr.

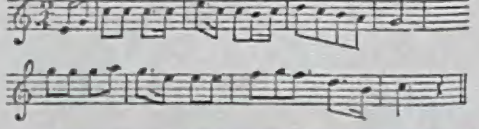
WESTERN NIGERIA RADIOVISION SERVICE LTD. (Comm.)
FI: 100% from We. Reg. Go. of Nigeria – AD: D 6 min. each h – ADDR: P.O. Box 1460, Ibadan. Cable: Radvision. Te: 24381 – L.P: Dir: V. O. Fayemi. Secr: A. Oyelowo. Dir. Tec: J. O. Oyeleye. Contr. of Prgr's: S. Rhodes. Public Rel. Officer: J. O. Olagboju.
STATIONS: Abafon 602kc 10kW – Ibadan 656kc 10kW
Ibadan *3380kc 88.70m 10kW – **6185kc 48.50m 10kW
* 05.00–06.15, 16.40–23.05 ** 06.15–16.40.
HOME SCE: W 05.00–22.05(Sat 23.05), Sun 06.00–22.05. N. in English: 05.30, 06.00, 07.00(BBC), 17.00 – N. in Yoruba, Edo, Hausa: 15.00 – ANN: "This is the Western Nigeria Broadc. Sce" or "This is WNBC, Ibadan" – INT-SIG: Chimes – 2 notes only (G & E) – V. by QSL-card or letter, Re. to Chief Eng – F.PL: 50kW on 650kc; New 10kW mw-tr. at Akure. Increase power sw-tr.

REUNION (French)

L.T: GMT + 4 h – Pr.L: French.
RADIODIFF.-TELEVISION FRANCAISE (RTF)
ADDR: B.P. 309, St. Denis, La Réunion. Te: 868 – L.P: Chef des Sce's: B. Guyot. Dir. Tec: H. Pottier. Dir. Inf: J. Vincent-Dolor.
STATIONS (System TRT): * St. Pierre. Others St. Denis.

620 kc	483.9 m	8 kW	all times
*1124 –	266.9 –	1 –	all times
2246 –	122.6 –	4 –	02.30–05.00, 13.00–18.30
3380 –	88.76 –	1.5 –	all times
4807 –	62.41 –	4 –	all times
7245 –	41.41 –	4 –	05.00–13.00

HOME SCE. in French: W: 02.30–03.45, 07.30–09.45, 14.00–18.00. Sat: 02.30–03.45, 07.30–18.30. Sun: 03.00–18.00 – N: W: 02.30, 03.30, 08.30, 14.07, 16.00. Sun: 04.00, 08.30, 16.00 – Wrp: W: 03.30, 14.07, 16.00. Sun: 04.00, 14.00, 16.00.
ANN: "Ici La Réunion, office de Radiodiff. Télévision Française" – V. by letter. Rp – INT-SIG: "Madina" (Reunion Folklore) played on guitar.



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Subscription Agencies in countries other than the United States. Write for full details.

World Radio TV Handbook Co. Ltd.
Sundvej 6, Hellerup, Denmark.

LIBERIA

LIBERIAN BROADCASTING CORPORATION (Go.)
Addr. & L.P: see radio – Station: ELTV ch E6 2.25/0.45kW.
D.Prgr's: 19.45–23.00.

MAURITIUS

MAURITIUS BROADCASTING CORPORATION (Comm.)
Addr. & L.P: see radio – Stations: Forest Side ch E4 5/1 kW H, Port Louis (satellite) ch E7 0.3/0.06kW H.
D.Prgr: 14.30–18.00 (from around 1/1 65).
The Marconi Company Ltd, G.B: 1 × 1, 1 × 5 kw tr.

MOROCCO

RADIODIFFUSION TELEVISION MAROCAINE (Go.)
Addr. & L.P: see radio.
Stations: Rabat 187.25/192.75Mc 24/4.8kW H – Casablanca 211.25/216.75Mc 15/3kW H – Marrakech 179.25/184.75Mc 0.3/0.06kW H.
Relay stations: Zerhoun 163.25/168.75Mc 1.2/0.24kW H – Sarsar 203.25/208.75Mc 0.6/0.12kW H – Cap Spartel 171.25/176.75Mc 30/6W H – Fes 211.25/216.75Mc 30/6W H – Chorf 195.25/200.75Mc 30/6W H – Tazekka 195.25/200.75Mc 1/0.2kW H – Kouali 171.25/176.75Mc 1/0.2kW H – Oujda 187.25/192.75Mc 0.5/0.1kW H.
D.Prgr's: 19.30–24.00. French: 19.30–21.00. Arabic: 21.00–24.00.

MOCAMBIQUE (Port. Ea. Africa)
Television under consideration – installation may commence 1965.

NIGERIA

NIGERIAN TELEVISION SERVICE (NTS - Go. Comm.)
Fi: By state and comm. revenue – Ad: Approx. 10% of time – Addr: Television House, Victoria Island, Private Mail Bag 12005, Lagos. Cable: Nivision. Te: 26391 – L.P: Man. Dir: G. Roger Bower. Dir. of Prgr's: C. Kolade. Dir. of Eng: J. Burrell. Dir. of Adm: B. Shaw. Comm. Dir: R.H. Lunquist.
Station (System RCA): Lagos ch E10 40/8kW H.
D.Prgr's in English, Yoruba, Ibo, Hausa: 18.00–21.15.

EASTERN NIGERIA TELEVISION (ENTV):
Addr: & L.P: See radio – Stations: Enugu ch E2 60kW H, Aba ch E4 60kW – D.Prgr: W 17.00–21.30(Sat 23.00).
Pye TVT, GB: studio equip – RCA, USA: tr's aerials, studio equip.

RADIO KADUNA TELEVISION (RKTV)
Addr: RKTV, Box 250, Kaduna, No. Nigeria. Cable: Radionorth. Te: 2294 – L.P: See radio.
Stations: Jaji chE4 40kW H – Kano chE10 25kW H.
D.Prgr: D exc. Sat 18.00–21.00.

WESTERN NIGERIA RADIOVISION SERVICE
Fi, Ad and L.P: see radio – Stations: Abafon (Lagos) chE3 15/4kW H – Ibadan chE4 1.5/0.4kW H.
D.Prgr: D. 17.25–21.15 (or 21.30) – F.Pl: chE3 60kW(Dec 65), chE4 50kW(June 65) – Oshogbo chE5 50kW(Dec 66), Akure chE11(Dec 67).
The Marconi Company Ltd, G.B, delivered tr's, antennas, OBV.

REUNION

RADIODIFFUSION TELEVISION FRANCAISE (Go.)
Addr. & L.P: see radio – Stations (625 lines, system K): St. Denis 207.25/213.75 Mc 50/10W
D.Prgr's: not yet fixed, but tr's to start around Jan 1st, 1965.

SENEGAL (Republic)

TELEVISION DU SENEGAL (Go.)
A TV St. early 1965 at Dakar: 625 lines, CCIR, Band III, chR9 0.05kW V – Later on st's at Thiès (20kW), St. Louis, Kaolack, Ziguinchor.

SIERRA LEONE

SIERRA LEONE TELEVISION (Go.)
Ad: Comm. adv. spots accepted – Addr: Ministry of Information, Freetown – L.P: Gen. Mgr: V. Hallack, Chief Eng. Designate: A. Khanu. Chief Eng: D.S. Reid – Station: ch E2 0.1kW H – D.Prgr: Mon–Fri 18.30–22.30, Sat–Sun 18.00–23.00.
Pye TVT, GB: tr, ant, studio equip.

SOUTHERN RHODESIA

SOUTHERN RHODESIA BROADCASTING CORPORATION (Go.)
Addr: P.O. Box 8008, Salisbury – L.P: Dir. Gen: J.H. Parry, O.B.E. Gen. Mgr: J. Terry. Chief Eng. M.N. Smuts, B. Sc(Eng) A.M.I.E.E.
Stations: Salisbury chE4 20kW – Bulawayo chE3 3kW.
D.Prgr: W 15.25(Sat 15.00)–21.00.

SUDAN

A Go, comm. st. planned to operate from Khartoum in 1965.

UGANDA (Rep.)

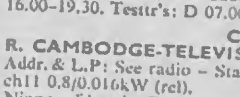
UGANDA TELEVISION SCE. (Comm – operated by Ministry of Inf. Broadc. and Tourism) – Addr: P.O. Box 4260, Kampala – L.P: Gen. Mgr: G. Blackledge. Dir. Tec: H. G. Toomba.
Station: Kampala ch 5 & 10 60kW H – D.Prgr: 15.00–19.00.
A relay network of 5 st's to operate early 1965 (Mbalé, Soroti, Lira, Masaka, Mbarara).
The Marconi Company Co. Ltd, G.B: 1 × 1, 1 × 5 kw tr's to Kampala, Mbale, Soroti, Kimabalu, Masaka, Mbarara.

UPPER VOLTA

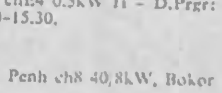
VOLTA VISION (Go.)
Addr. & L.P: see radio.
Station (SystemD 625lines): Ouagadougou 175.25/181.75 Mc 0.05kWV.
D.Prgr's: D. exc Sat 19.30–22.00.
Projected: Koudougou 1kW H – Bobodioulasso 1kW H.

ZAMBIA

ZAMBIA TELEVISION (Comm.)
Fi: by adv – Fee: £5 (combined radio & TV).
Addr: P.O. Box 1100, Kitwe. Te: 3507. Cable: Tee-Vee. Telex: KE 5728 – L.P: Gen. Mgr: I. Salmon. Dir. Tec: J.E. Northeast. Prgr. Mgr: J.O. Evens.
Station: Kitwe chE4 13.6/2.7lkW H – D.Prgr: 15.00–19.30 – F.Pl: St. at Lusaka.



ASIA



ADEN (Federation of So. Arabia)

SOUTH ARABIAN TELEVISION SERVICE (Comm.)
Fi: Part advertising, part Go – Ad: 16.00–19.30 – Addr: & L.P: see radio.
Stations: CCIR Standards, 625 lines: Al-Aineh chI 10 0.5kW V, Al-Bargh chE7 0.5kW H – Jabel Muzalkam chE4 0.5kW H – D.Prgr: 16.00–19.30. Testtr's: D 07.00–09.00, 13.30–15.30.

CAMBODIA

R. CAMBODGE-TELEVISION (Go.)
Addr. & L.P: See radio – Stations: Phnom Penh ch8 40/8kW, Bokor ch11 0.8/0.016kW (rel).
Nippon Electric Company, Japan, delivered TV tr. (Phnom Penh) and studio equip.

THE PEOPLES REPUBLIC OF CHINA

Stations:	Vision Mc	Sound Mc		Vision Mc	Sound Mc		Vision Mc	Sound Mc
Peking								
1st Prgr.	57.75	64.25	Harbin	49.75	56.25	Taiyuan	49.75	56.25
2nd Prgr.	77.25	83.75	Shenyang	93.25	99.75	Hofei	85.25	91.75
Shanghai	93.25	99.75	Changch.	57.75	64.25	Nanking	49.75	56.25
Tientsin	93.25	99.75	Canton	57.75	64.25	Wuhan	93.25	99.75
			Sian	49.75	56.25			

Relay st's: Changli* chR1, Soochow** 57.75/64.25Mc, Tan[illegible]n* chR4, Wusih** 57.75/64.25Mc.
* repeating Peking; ** repeating Shanghai.
Experimental st's: Anshan, Changsha, Chengtu (all 57.75/64.25Mc), Chiamsu chR1, Foochow chR5, Fushun chR1, Hefung chR4, Kirin chR1, Kweiyang chR5, Lanchow chR1, Tsinan chR3, Tsitsihar 57.75/64.25Mc.

TAIWAN

NATIONAL EDUCATIONAL TELEVISION STATION (Go.)
Fi: by Go. appropriation – Fee: $8.50 – Addr: 41 Nan-hai Rd, Taipei. Te: 36166 – L.P: Dir. Prof. C.C. Liu. Dir. Tec: H.Y. Lee. Prgr. Mgr: T.C. Yü.
Station: NETV chA11 4/2kW – D.Prgr: 09.30–15.30.
Planned: 8 low-powered repeater st's.

TAIWAN TELEVISION ENTERPRISE (Comm.)
Addr: 990 Chung Cheng Rd, Taipei. Cable: Television – L.P: Gen. Mgr: T.S. Chou.
Station: BET31, chA7 5/2.5kW – D.Prgr: 10.50–13.00.

CYPRUS

CYPRUS BROADCASTING CORPORATION (Go. Comm.)
Fi. & Addr: see radio – L.P: Dir. Gen: V.I. Mavrides. Pub. Rel. Officer: I. Hadjiossif. Dir. Prgr: G. Mitsides. Dir. Tec: P.T. Astreos.
Stations: Nicosia chE2 1.5/0.3kW H – Mt. Olympus: chL6 40/8kW V – Mt. Sina Oros: chE8 40/8kW V.
D.Prgr: 17.00–20.00(exc. Mon, Thurs) – Test Tr's: W 08.00–10.00.
The Marconi Company Ltd, GB, delivered 1 × 0.25kW, 1 × 0.5kW tr's Pye T.V.T, GB: Tr's studio equip.

HONG KONG (British)

REDIFFUSION TV HONG-KONG (Comm.)
Addr: P.O. Box 121, Hong Kong – Closed circuit 405 line network –
D.Prgr: Mon–Fri 09.00–16.30, Sat/Sun 06.00–16.30.
Pye T.V.T, GB: Studio equip.

INDIA

ALL INDIA TELEVISION (Go.)
Addr: Television Centre, All India Radio, Akashwani Bhawan, 5th Floor, Parliament Street, New Delhi 1. Te: 30101 – L.P: Dir. TV Centre: R. Chander. Engineer-in-Charge: M.R. Rao.
Station: New Delhi chE4 10kW H.
D.Prgr: Social Education Prgr: Tues 13.30–14.10, Fri 13.30–14.40. May–March: For Schools: Lessons in Chemistry and Physics for

3.7. Terrestrial Communication Distribution Networks

Although telecommunication development has been accelerated during recent years, such facilities in Ethiopia are among the least developed in Africa. Present facilities are barely adequate to meet the basic requirements of government and economy, and could not support any economic or technical expansion dependent upon such facilities.

Presently available telecommunication services include the following:

a. Voice: Domestic telephone service is available from Addis Ababa to many towns in the northern half of the country. Open-wire lines are used, some equipped with carrier equipment. Channel capacity is extremely limited, with no more than four channels generally available at any time. No underground cable is used in Ethiopia except in a few towns for local distribution systems, and for a new 17-mile multiconductor cable from Addis Ababa south to Debre Zeyt. Telephone lines extend from Addis Ababa to Diredawa and Harar; to Dase and Assab; to Massaua via Dase, Makale and Asmara; and to Asmara via Dabra-Markos, Baherdar-Giyorgis, and Makale. A line also exists from Asmara to Khartoum, Sudan going via Agordat. Other lines exist from Addis Ababa to Nakamet; to Jima; and to Dilla via Debre Zeyt, but these are used mainly for telegraph traffic.

About 25 domestic h.f. stations are located in towns not on the wire networks, particularly in the south, where they are the sole means of communication. About half these stations, most of which are equipped with small, old, surplus World War II transmitters, handle telephone traffic.

There are approximately 15,000 telephones in the country, most of which are located in Addis Ababa and Asmara. About 80% of the instruments are operated automatically.

The unavailability of technically trained Ethiopian personnel, poor original construction standards for all domestic facilities and low operating and maintenance levels have led to a very low degree of reliability for the domestic telephone system. It has been termed "primitive" by many American telecommunication experts who have observed the system.

Direct international voice circuits are available to Khartoum (4 channels in an overhead line); to Djibouti, French Somaliland (1 h.f. channel, 2 channels in an overhead line); and single h.f. channels from Addis Ababa to Nairobi, Aden, Athens, Bombay, London and Rome. Radiotelephone connections to almost all areas of the world can be made through London and Rome.

Ethiopia - continued

b. Record and Data: T raph is mposed al n-wired lines that carry telephone t ic. T on, som f th s to the southern part of the c try, alf of h.i ons provide telegraph service onl ele e, ther re, re geographically exten han to and is wha ble.

International raph ser ilable London, Rome, Cairo, Djibo den, Beir rt, Sa , New York. World-wide connec are made t on, Rome Very limited telex and mile serv lable on n national circuits.

c. Television: he present time t e no wide ar nsmission telecommunicatio rvices available i pia.

The main a for the administrat f telecomm nic ns in Ethiopia is the Imperial Board of Telecom cations. is an almost autonomous agency, with the Minister of P Telegrap nd Telephones serving as President of the Board of Direc

Plans exist for improving practically hase ecommunications in Ethiopia, but adequate funds are not ava A W nk loan of $2.9 million has made possible some improver dome munications, including the installation of some new overl es. ng program being funded by the International Telecommun Union to raise the technical and operating competency of the . Ethio so plans to receive assistance for telecommunication d pment from nited Nations' Economic Commission for Africa.

3.8. Broadcast Capabilities Within Ethiopia

a. Radio: The domestic radiobroadcast syste very limited. The main station is Radio Addis Ababa, located just ou e the capital city. Radio Addis Ababa consist of a 1 kw medium wave tr itter operating on 870 kc and three 10 kw sho wave transmitters. The um wave station can be heard well only in Addis Ababa. The shortwave ations are intended to service the remainde of the country, but thei ignal is generally poor. Radio Addis Ababa is overnment owned, and the ortwave transmitters are also used for a limited international service to the Middle East, Europe and Africa.

Ethiopia - continued

Also at Addis Ababa is a broadcasting station operated by the World Federation of Lutheran Churches in accordance with an agreement signed with the Ethiopian government. The station consists of two 100 kw shortwave transmitters beaming broadcasts in more than a dozen languages to Africa and the Near and Middle East, and a 1 kw medium wave transmitter on 995 kc, servicing the Addis Ababa area.

It is estimated that there are between 200,000 and 300,000 radio receivers in Ethiopia for a population of approximately 20,100,000. Ethiopia, therefore, has one of the world's least developed broadcasting systems.

The government has plans to improve broadcasting in Ethiopia. A 100 kw shortwave transmitter is expected to be brought into service for Radio Addis Ababa by early 1966. It is hoped that this transmitter will improve reception throughout the country. New 100 kw medium wave transmitters are planned for Addis Ababa and Harrar, and a 50 kw medium wave transmitter is planned for Asmara. There are no VHF-FM broadcasting stations in operation in Ethiopia at the present time, although the government has plans to install one in Addis Ababa in the near future.

More complete details concerning ownership, operation and broadcast schedules of the medium and shortwave broadcasting stations in Ethiopia are shown in Attachment 1 (from the 1965 edition of the World Radio-TV Handbook).

b. Television: A government-operated television station was opened in Addis Ababa during late 1964. The transmitter was manufactured in Holland and installed by British engineers. The operation of the station appears to be somewhat erratic, and it is only on the air short periods of time each day. There are not many television receivers in Addis Ababa at the present time, but the number is increasing. There appear to be no future plans for any additional television stations in Ethiopia in the near future.

Since World War II the U.S. Army has operated a large radio relay installation at Kagnew, near Asmara. This station is a key point in the U.S. Government's world-wide communication system, and is equipped to handle all forms of h.f. traffic. At Kagnew, the U.S. Army operates a low-power medium wave broadcast station and a low power television station for U.S. personnel stationed in the area.

RADIO VOICE OF THE GOSPEL

Owned and operated by the Lutheran World Federation Broadcasting Service

PROGRAMS IN –

English, Afrikaans, Arabic
Amharic, Malagasy, Nyanja
Persian, Sinhalese, Sotho ,
Swahili, Tamil, Telugu, Zulu

FOR LISTENERS IN –

Africa
Middle East
Southeast Asia

RADIO VOICE OF THE GOSPEL
P. O. BOX 654
ADDIS ABABA, ETHIOPIA

ETLF

...ICE OF ARABS:
...00 on 620/1178/7050/11745kc, 07.00–09.00(Tues 10.00) on ...1178/7050/11745kc, 09.00(Tues 10.00)–14.00 on 620/1178/7050/...745kc, 14.00–00.20 on 620/1178/7050/9495/11745kc.
...03.30, 04.00, 04.30, 09.30, 11.30, 13.15, 13.30, 15.05, 18.00, ...30, 20.30, 23.00, 24.00 – Palestine Prgr: 05.00–07.00, 14.00–...

...CHANGE PRGR:
...6.00 on 710/11915kc, 13.00–16.28 on 872/9475/11915kc.
...Commentary: 06.15, 14.20, 14.45, 16.30.

...IOND PRGR. (Cultural): 19.00–22.15 on 872kc.

...PULAR CULTURAL PRGR: 14.00–23.30 on 710kc – N: 14.30, ...15, 22.30.

...EXANDRIA REG. PRGR: 15.00–22.00 on 1277kc – N: D 17.30, ...

...ORN LANGUAGE PRGR (Local Service):
...30, 08.30–10.30(Fri & Sun only), 10.30–22.30 on 557kc.
...Comm: English: 05.30, 12.30, 18.00 – French: 06.00, 12.00, 19.00 – ...am: 05.45 – Greek: 05.00, 13.00 – Italian: 16.20.

...RAAN PRGR: 04.00–09.00 & 12.00–21.00 on 602/9750kc.

...DDLE EAST COMM. PRGR: 05.00–06.00 on 773kc, 15.00–21.00 ...10kc – N, Comm: 05.30, 16.00, 17.00, 18.00, 20.00.

FOREIGN SERVICE

...So. & So.Ea. Asia: 10.30–15.30 on 17920kc (Arabic 10.30, Bengali ...30, English 13.30, Urdu 14.30), 11.00–14.30 on 17690kc (Malayan ...00, Thai 11.45, Indonesian 12.30, Pushtu 13.30).
...Ea. & C. Africa: 14.45–17.00, 17.45–19.45 on 17785kc (Amharic ...45, Swahili 15.30, Lingala 17.45, Sesotho 18.30, Portuguese 19.00), ...00–18.30 on 17920kc (Nianga 16.00, Somali 16.45, English 17.45).
...W. Africa: 18.45–21.45 on 15210kc (French 18.45, Folani 19.45, ...glish 20.45), 20.15–21.45 (Hausa) on 17690kc.
...Mid. East: 16.30–18.30 on 9475/11915kc (Kurdish 16.30, Turkish ...00, 17.00, 19.30 (Persian) on 11980kc.
...Europe: 18.30–23.30 on 9475/11915kc (Italian 18.30, French 19.30, ...rman 20.30, English 21.30, Arabic 22.30).
...No. & So. America: 00.00–02.45 on 9595/9780kc (Portuguese 00.00, ...anish 00.45, Arabic 01.30).
...rew Prgr: 04.00–05.00, 14.00–17.00 on 557kc.

Dictation Speed News: 06.00–06.30 on 7075/11915kc Arabic, 06.30–07.00 on 7075/11915kc English, 13.30–15.50 on 7075/9495kc Arabic. INT-SIG: Camel Bells – V. Re. wanted. They are answered by QSL. card. Reports should be adressed to Propagation & Monitoring Dept-U.A.R. Broadcasting and TV, Maspero, Cairo – PUB: Prgr-schedules twice per year. Weekly and quarterly magazines in Arabic.

ETHIOPIA

L.T: GMT+3 h – Pr.L: Amharic, Arabic, English, Somali.

RADIO ADDIS ABABA (Go.)

FI: By Go – AD: After N in all languages – ADDR: R. Division, Ministry of Information, P.O. Box 1364, Addis Ababa. Cable: Ethiopress. Te: 12356 – L.P: Minister: B. G. T. Hawariat. Asst. Minister: J. Tesfazgi. Dir. Gen: Z. Reta. Gen. Mgr: H. Ruud. Dir. Tec: T. Y. Dafla.

STATIONS: Addis Ababa.

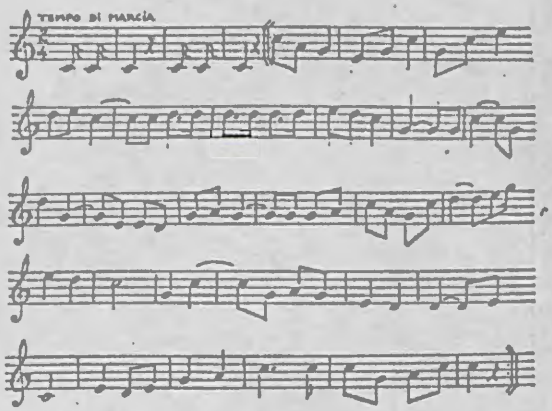
kc	m	kW	kc	m	kW	kc	m	kW	kc	m	kW
870	345.0	1	6185	48.50	10	9610	31.22	10	15300	19.60	10
5056	50.33	10	7290	41.15	10	11760	25.51	10	17775	16.88	10

HOME SCE: Amharic: 04.30–05.00(W) on 870/6185kc; 05.00–05.30(W) on 870/6185/7290kc; 05.30–06.00 on 870/5056/6185/7290kc; 07.00–08.00(Sun) on 870/6185kc; 11.00–12.00(Sat 13.00, Sun 13.30) on 870/7290/9610kc; 17.00–18.00 on 870/6185/7290kc; 18.00–19.00 on 870/6185kc; 19.00–20.00(Foreign Music) on 870/6185/7290kc – Somali: 04.00–04.30(W) on 870/6185kc; 06.00–07.00 on 870/5056/6185/7290kc; 10.00–10.15(W) on 870/7290/9610kc; 16.30–17.00 on 870/7290kc – Arabic: 16.00–16.15 on 870/6185/7290kc – Swahili: 04.30–05.00(W), 16.45–17.00 on 7290kc – English: 10.15(Sun 10.00)–11.00 on 870/7290/9610kc; 16.15–16.30 on 870/6185/7290kc. N: 10.15, 16.15.

INTERNATIONAL SCE: Arabic: To M. East: 15.10–15.50 on 17775 kc. N: 15.10 – English: To Europe: 18.10–18.30 on 11760kc. N: 18.25. To We. Africa: 20.10–20.30 on 15300kc. N: 20.25 – French: To Europe: 18.30–18.50 on 11760kc. N: 18.45. To We. Africa: 20.30–20.50 on 15300kc. N: 20.45.

ANN: E: "This is the Internal (or External) Service of R. Addis Ababa, the Voice of Ethiopia" – F: "Ici R. Addis Ababa la Voix de l'Ethiopie" – Amharic: "Yih ye Ethiopia Radio New" – Somali: "Halkani wa Addis Ababa Radio Ethiopia" – Arabic: "Huna Addis Ababa saut

Ethiopia" – Swahili: "Hii ni idhaa ya kiswahili ya Radio Addis Ababa sauti ya Ethiopia" – INT-SIG:



V. by QSL-card. Re. in E, F or Amharic – F.PL: 100kW mw- and sw-tr. at Addis Ababa; 50kW mw-tr's at Asmara 100kW mw-tr. at Harrar; Addis-Ababa FM (1kW) – PUB: Radio Journal (quarterly).

RADIO VOICE OF THE GOSPEL – LUTHERAN WORLD FEDERATION BROADCASTING SERVICE (Educ, Rlg)
FI: By free will offerings by church – ADDR: P.O. Box 654, Addis Ababa. Cable: Lutherworld. Te: PBX 47190.
L.P: Dir. Gen: Dr. Sigurd Aske. Dir. Prgr: U. Fick. Dir. Tec: E. Kraemer. Adm: T. Manson. Chmn. of the Board: Dr. Clark Fry.

STATIONS: "Radio Voice of the Gospel", ETLF; 2 tr's each 100kW.

4905kc	61.15m	9755kc	30.75m	11940kc	25.12m
6050 –	49.59 –	9765 –	30.72 –	15265 –	19.66 –
7120 –	42.13 –	11755 –	25.52 –	15355 –	19.52 –
7145 –	41.99 –	11875 –	25.26 –	15410 –	19.47 –
9705 –	30.91 –				

Schedule: 1/11/64–28/2/65 (alternative freq's in brackets).

Times	kc	Areas	Languages
13.00–14.30	9705 (9765)	India	Telugu, English
13.00–15.00	15410 (15355)	India/Ceylon	English, Tamil, Sinhalese
14.30–16.30	9705 (9765)	Ea.Arab countries	Arabic
15.00–15.45	9755 (11875)	Madagascar	Malagasy
15.45–17.00	6050 (4905)	Ethiopia	Amharic, English
16.30–18.00	9765 (9705)	Ea.Africa/Malawi	Swahili, Nyanja
17.00–18.30	7120 (7145)	We.Arab countries	Arabic
18.00–19.30	9705 (9765)	So. Africa	English, Zulu, Setho, Afrikaans
18.30–19.30	11755 (15265)	We.Africa	English

NEWS: English: 13.15, 14.30, 15.45, 17.00, 19.00. Arabic: 14.30, 15.20, 17.00, 17.50. Amharic: 16.00.

Medium Wave Sce (for Addis Ababa): 16.15–20.00 on 995kc 1kW. N: English: 17.30, 19.00. Amharic: 16.15, 18.30.

ANN: "This is R. Voice of the Gospel, ETLF, Addis Ababa, Ethiopia" INT-SIG: First four notes of "A Mighty Fortress" (three high and one low) on drums – V. by QSL-card. Records accepted – PUB: Newsletter (4 times a year).
Brown Boveri, Switzerland: 2×100kW sw-tr's.
Wilh. Franz KG, Germany: EMT studio equip to "R Addis Ababa.

GABON (Republic)

L.T: GMT+1 h – Pr.L: French.
RADIODIFFUSION TELEVISION GABONAISE (Go.)
FI: By Go. – ADDR: B.P. 150, Libreville. Cable: Radio-Gabon. Te: 2952 – L.P: Dir. Gen: G. Rawiri. Dir. Tec: M. Bitran. Dir. Prgr's: M. Folly.
STATIONS (System TRT):

1313 kc	228.5 m	1 kW	–	4777 kc	62.80 m	30 kW
1520 kc	197.3 m	1 kW	–	7270 kc	41.27 m	4 kW

HOME SERVICE in French: Nat. Net: W 05.00-06.30 on 1520/4777 kc, 10.30–13.30 on 1520/4777/7270kc, 17.30–21.30 (Sat 16.00–23.00) on 1520/4777kc. Sun 07.00–17.00 on 1520/4777/7270kc, 17.00–23.00 on 1520/4777kc – N: 05.45(W), 12.00, 13.25(W), 19.00, 19.35(W), 20.55(W) – L.L (English): Tues 17.45, Fri 17.50.
Reg. Netw: D 19.00-21.00 on 1313kc – ANN: "Radiodiff. Télévision Gabonaise émettant de Libreville et de Moanda" – V. by letter – F.PL: Reg. st's at Oyem, Port-Gentil – PUB: Prgr.schedule (weekly).

R. MOANDA-FRANCEVILLE (Go.)
ADDR: B.P. 150, Libreville – STATION: 6030kc 49.75m 4kW. Re of R. Nationale Gabonaise.

GAMBIA (British)

L.T: GMT – Pr.L: English, Mandinka, Wolloff, Fula, Serahuli, Jol Serere.
RADIO GAMBIA (Go.)
ADDR: Bathurst – L.P: Broadc. Adviser: A.P. Cox (on secondmen from BBC). Broadc. Officer: A.M. Lowe. Dir. Tec: P.J. Warrer
STATION: 4820kc 62.24m 3.1kW
HOME SCE in English, Woloff, Mandinka principally:
Mon–Fri 17.55–20.00. N: 18.00(BBC) – V. by letter.

GHANA

L.T: GMT – Pr.L: Akan, Ewe, Dagbani, Ga, Hausa, Nzema.
GHANA RADIO AND TELEVISION CORPORATION (Go
FI: By appropriation and subscriptions from wired broadc.
ADDR: Broadc. House, P.O. Box 1633, Accra. Cable: Broadcast Te: 77551 – L.P: Dir. of Broadc: W. F. Coleman, B.Sc., M.I.E.I M.B.E. Eng-in-Chief: J. K. Asare, B.Sc, A.M.I.E.E. Head of Ne Sce: J. Ghartey. Head of External Sce: J. Asmah, B.A.

STATIONS:

kc	m	kW	kc	m	kW	kc	m	kW	kc	m	kW
3366	89.12	20	7295	41.12	10	11800	25.42	100	17910	16.75	10
4915	61.04	5	9545	31.43	100	15190	19.75	100	21545	13.92	10
6070	49.42	100	9640	31.12	10						

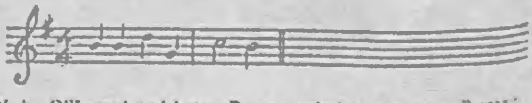
HOME SCE: W: 05.30–08.00 on 3366/4915kc, 12.00–16.00 on 491 7295/9640kc, 16.00–16.30 on 4915/7295kc, 16.30–18.15 on 3366/491 7295kc, 18.15–22.20 (Sat 23.05) on 3366/4915kc. Sun 05.30–07.15 3366/4915kc, 07.15–08.00 on 3366/4915/7295kc, 08.00–12.00 on 491 7295kc, 12.00–16.00 on 4915/7295/9640kc, 16.00–16.30 on 4915/72 kc, 16.30–18.15 on 3366/4915/7295kc, 18.15–22.20 on 3366/4915 N: English: 06.00, 07.00, 13.00, 18.00, 20.00 (African), 21.00, 22.0 Ghana Languages: 06.30, 16.30 – L.L: English: Mon–Fri: 06.25, 19.2 French: Mon–Fri: 06.15, 20.15.

FOREIGN SERVICE: 4 tr's 100kW each.
Areas: I = Sudan, Ethiopia, Somali; II = Angola, Mozambique; III Ea. Africa; IV = So, SoWe, SoEa. Africa; V = We. Africa; VI = U.A.R Sudan, Libya; VII = Port. Guinea; VIII = Congo, C. Africa, Ma gascar; IX = Ea. Africa & NoEa. Congo; X = U.K, Europe; M Morocco, Algeria, Tunisia.

Arabic	kc	Area	French	kc	Area
15.45–16.30	21545	VI	17.45–18.30	11800	VIII
20.05–20.50	11800	XI	17.45–18.30	6070	V
			19.15–20.00	11800	VIII
English			19.15–20.00	6070 9545	V
14.00–14.45	15190	I	20.45–21.30	6070/9545	V
14.45–15.30	17910	III	Hausa		
14.45–15.30	21545	IV	15.45–16.30	6070	V
14.45–15.30	6070	V	18.30–19.15	6070/9545	V
16.30–17.15	17910	IV	Portuguese		
17.00–17.45	6070	V	14.00–14.45	21545	II
18.30–19.15	11800	I	16.45–17.30	21545	II
20.00–20.45	9545	IV	16.45–17.30	11800	II
20.00–20.45	6070	V	Swahili		
20.50–21.35	11800	X	14.00–14.45	17910	III
21.30–22.15	6070/9545	V	15.45–16.30	17910	III
			17.15–18.00	17910	III

N. in English: 14.00, 14.45, 17.00, 18.30, 20.00, 20.50, 21.30 – Here's Ghana: Tues, Thurs: 15.20, Thurs: 22.05, Sun: 17.35, 19.05 – F Freedom Fighters: Sun: 14.35, 15.20, 22.05, Mon: 21.25, Wed: 14 15.20 – N. in French: 17.45, 19.15, 20.45 – N. in Portuguese: 14 16.45 – N. in Arabic: 15.45, 20.05.

ANN: "This is the Nat. Sce. of the Ghana Broadc. Corpo." pre by drumming or "This is R. Ghana" – INT-SIG: Guitar: Fir bars of Ghana National Anthem



V. by QSL-card and letter. Re. on technical matters to Progs Eng. on prgr's to Head of External Sce. Records accepted – PU "Radio Review & TV Times" (weekly), External Service bulle (monthly) – F.PL: Ejura – two 250kW sw-tr's for External Sce 10kW sw-tr's for Nat. Sce, to be in operation early 1965.

The Marconi Company Ltd, G.B: Four 100kW tr's (Tema); one 20kW two 10kW tr's (Accra).

3.7. Terrestrial Communication Distribution Networks

While much inferior to the Japanese telecommunication system, the system in Korea is more advanced than in most other countries of the Far East and Southeast Asia. Rehabilitation of war-damaged telecommunication facilities is now complete, and improvement, expansion and modernization has been going on at a slow, but steady pace during the past few years.

Presently available telecommunication services include the following:

a. Voice: The primary transmission medium for the domestic intercity telephone system is open-wire lines owned and operated by the Ministry of Communications. Long-lines of this type run from Seoul to Pusan via Pohang; from Seoul to Kwangjo; from Kwangjo to Pusan and from Pusan to Kangnung via Pohang. These circuits are augmented by a multiconductor cable artery which runs in a northwesterly direction from Pusan to Munsan, near the North Korean border, servicing Taegu, Taejon, Seoul and intermediate points.

Telephone service in South Korea is available almost on a national-wide basis, and can be considered to be operating in a relatively efficient manner. There are approximately 120,000 telephones in use today of which nearly half are connected to automatic equipment in Seoul and Pusan.

Direct international voice circuits are available to Japan (via a cable from Pusan to Fukuoka) and by h.f. radio to Hamburg, San Francisco, Hong Kong, Manila, Saigon, Taipei and Tokyo. Almost any other point in the world can be served by connection through these terminals.

b. Record and Data: Telegraph service is available throughout most of South Korea over the same wire facilities used for voice transmissions. Wire facilities are supplemented by a 20-station point-to-point domestic radiotelegraph system, with principal stations located at Pusan, Kwangju, Taegu, Taejon, Chongju, Chunchon, Kangnung, and Seoul. Telegraph facilities generally employ manual Morse equipment, although limited teleprinter service is also available. Direct international telegraph service is available to the same points as the voice service. Facsimile service is available on most international circuits, and telex is available by direct circuit to Japan, and via Tokyo to many other major telecommunication centers throughout the world.

Upgrading of domestic and international circuits is going on at a slow but steady pace in South Korea. Future plans call for the automation of the telephone exchanges of the principal cities, expansion and rehabilitation of long-distance telephone and telegraph networks, and expansion of international services. Maintenance and construction assistance has been, and continues to be provided by the U.N. Command since it has partly integrated some of its facilities into the Korean networks. Some telephone and telegraph circuits between Pusan, Taegu and Seoul are provided by a U.S. Army radio-relay link in addition to the wire and radio networks operated by the Korean government discussed previously.

Korea - continued

c. Television: At the present time there are no wide band transmission telecommunication services available in South Korea.

Domestic telecommunication facilities, except for the circuits operated by the U.S. Army, are owned and operated by the government. International telecommunication facilities are owned by the government, but are operated jointly by the government and the International Telephone and Telegraph Company.

3.8. Broadcast Capabilities Within Korea

a. Radio: Radiobroadcast service is available throughout the country. Twenty-seven government owned and seven privately owned medium wave stations operate as follows:

LOCATION	CALL	FREQ KC	POWER KW	OWNERSHIP
Andong	HLCO	920	1	Government
Cheju	HLKS	940	1	Government
Chinju	--	560	1	Government
Chongju	HLKQ	920	1	Government
Chonju	HLKF	570	10	Government
Choogju	HLCH	1090	1	Government
Choonchun	HLKM	650	1	Government
Chulwon	HLCO	920	1	Government
Hwachun	HLCG	1030	1	Government
Kangnung	HLKR	860	10	Government
Kwangju	HLKH	750	10	Government
Masan	HLKD	570	1	Government
Mokpo	HLKN	860	1	Government
Namwon	HLKL	1030	1	Government
Pohang	HLCP	1420	0.3	Government

Korea - continued

LOCATION	CALL	FREQ KC	POWER KW	OWNERSHIP
Pusan	HLKB	890	50	Government
Samchok	HLCO	1120	1	Government
Seoul	HLSA	600	100	Government
"	HLKA	710	100	Government
"	HLCA	970	250	Government
Sogwipo	HLCF	540	1	Government
Sokcho	HLCS	1030	0.3	Government
Taegu	HLKG	740	10	Government
Taejon	HLKI	880	1	Government
Wollungdo	HLCU	1320	0.3	Government
Wonju	HLCW	1190	1	Government
Yosu	HLCY	1340	1	Government
Inchon	--	1060	50	Private (1)
Iri	HLCM	1400	1	Private (2)
Kwangju	HLCL	1000	1	Private
Pusan	HLKP	1400	1	Private
"	HLKU	1035	1	Private (3)
Seoul	HLKY	840	10	Private (2)
Taegu	HLKT	1000	1	Private

(1) Religious operated by Evangelical Alliance Mission.
(2) Religious operated by Christian Broadcasting System.
(3) Commercial

Korea - continued

In addition to the above, the U.S. Army operates a country-wide network of 16 medium wave stations for U.S. personnel stationed in Korea.

The government also operates four shortwave transmitters (1-50 kw, 2-10 kw and 1-5 kw) for internal broadcasting. These are used to reach the few areas in the country where medium wave is not effective. A limited international service, with broadcasts beamed to China, Japan, Russia, Europe and Latin America are also carried on these shortwave transmitters.

VHF-FM broadcasting facilities include government owned stations at Seoul, Chong Dong and Suwon, and a privately owned (Christian Broadcasting System) station in Seoul (HLKY-FM).

There are presently estimated to be 1,400,000 radio receivers in the Republic of Korea, for a population of approximately 28,000,000. More complete details concerning radio broadcasting stations in Korea is contained in attachment 1, which is taken from the 1965 edition of the World Radio-TV Handbook.

The Korean radio broadcasting system provides excellent coverage of almost the entire country and there are no plans for major improvements in the system for the immediate future.

b. Television: A single, privately owned (Daihan Broadcasting Corp.), organization operates a television station in Seoul. The station operates on Channel 9 with 2 kw and vertical polarization.

The U.S. Army operates a network of low power television stations in Seoul, Hwaakson, Kunsan, Taegu, Taejon and Pusan intended primarily for U.S. personnel.

There are a total of approximately 35,000 television receivers in the Republic of Korea at the present time.

Although no definite plans have been announced, it is believed that the Korean government plans to install television stations in the major cities of the country sometime in the future.

Additional information concerning television stations in Korea is contained in attachment 2, from the 1965 edition of the World-Radio-TV Handbook.

Attachment #1

FAR EAST NETWORK (AFRTS)

The network serves the members of the U.S. Forces serving in the Far East – Authority: The st's in Japan broadcast by authority of the Commander, U.S. Forces, Japan, in co-operation with the Japanese Radio Regulatory Bureau. St's are linked by land line, and operated 24 h daily – ADDR: Headquarters, Far East Network, APO 67, San Francisco. Tel: Tokyo 516-6-2234 – L.P: Chief: Lt.Col. L. T. Pardee. Lt.Col. Dir. Prgr: J. T. Buey, Dir. Tec: H. Yaskal.

STATIONS: – Short Wave.

	kc	kW		kc	kW
Tokyo	810	10	Chitose	1570	0.25
Iwo Jima	1800	0.1	Sasebo	1570	0.25
Itazuke	1550	2.5	Misawa	1580	0.25
Wakkanai	1550	0.1	Twakuni	1580	1

Short Waves: • – Tokyo.

3910 kc	76.73 m	10 kW:	08.40–22.40, 1kW: 22.50–08.30[1]
6155 –	48.74 –	10 – :	24 h[2]
11750 –	25.53 –	10 – :	22.30–08.40, 1kW: 08.50–22.20[3]
15260 –	19.66 –	1 – :	24 h[4]

N: Every h on the h.
[1] exc. Mon 15.05–19.58. [2] exc. Thurs 15.05–19.58. [3] exc. Tues 15.05–19.58. [4] exc. Wed 15.05–19.58. • Power and direction vary to meet point to point commitments for rebroadc. from AFRTS st's in Japan, Korea, Okinawa, Taiwan, Iwo-Jima.
ANN: "This is the Far East Network... Far East Network, Tokyo (Chitose, Itazuke etc.)" plus freq's on shortwave – V. by QSL-card – PUB: Master schedule (monthly).

JORDAN

L.T: GMT+2 h – Pr.L: Arabic, English.

THE BROADCASTING SERVICE OF THE HASHEMITE KINGDOM OF JORDAN (Go.)

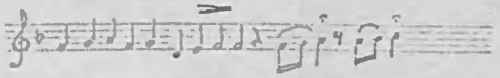
ADDR: P.O. Box 909, Amman. Cable: Broadcasting. Tel: 27711.
L.P: Minister of Inf: H. H. S. Abuzeid. Dir. Gen. of Broadc: N. E. S. Aweidan. Asst. Dir. Gen. Eng: A. Bayat. Asst. Dir. Gen. Adm: G. Sunna. Dir. Tec: A. Bayat.

STATIONS: 677kc Jerusalem. Others, Amman.

kc	m	kW	kc	m	kW	kc	m	kW
800	375.0	100	9530	31.48	100	11870	25.27	100
677	443.0	20	9560	31.38	100	11970	25.06	100
6020	49.83	3	9740	30.80	100	15170	19.78	100
7155	41.92	100	11810	25.40	5	15345	19.55	100

HOME SCE: Amman: Arabic: 03.30–07.30 on 677/800/6020/7155/11810kc; 07.30–14.00 on 800/6020/9530/11810kc; 14.00–23.00 on 800/6020/7155/9530/11810kc; also on 677kc at 14.00–15.00 and after 17.00. N: 05.00, 06.00, 08.00, 12.00, 13.00, 16.00, 17.00, 19.00, 21.00, 22.00.
Jerusalem: English: 11.00–12.00, 15.00–17.00. N: 11.30–16.00. Arabic: 12.00–15.00, 17.00–23.00. N: 12.00, 17.00, 19.00, 21.00, 22.00.
FOREIGN SERVICE
So. American Sce: Arabic, Spanish: 23.00–01.00 on 15170 (stand by 11870, 15345kc) – N: Spanish 23.00, Arabic 00.30.
No. American Sce: Arabic, English: 01.15–03.15 on 9560 (stand by 9530kc) – N: English 01.16, Arabic 02.45.

ANN: Arabic: "Hunna Amman Ithaatul Mamlakate Al Urdoniete Al Hashemieh" – E: "This is Amman the Broadcasting Service of the Hashemite Kingdom of Jordan" – Sp: "Aqui Radio Amman, R.Dif. Del Reino Hashemita De Jordania".
INT-SIG: Clarinet, piano



V. by QSL-card or letter. Records accepted.
F.PL: Jerusalem 2×100kW on 677kc (1/3 65) 03.30–23.00; a new 100kW-tr. at Amman in parallel with 800kc (1/3 65).

The Marconi Company Ltd, GB, delivered: 1×7.5kW, 2×100kW sw-tr's, 1×100 kw mw-tr.

Your voice is heard all over the world . . .
when you place your sales messages in the WRTH . . . because the reader of the WRTH holds your markets in the palm of his hand . . . For estimation of readership write for full particulars to
World Radio TV Handbook Co. Ltd.
Sundvej 6, Hellerup, Denmark.

KOREA (People's Democratic Republic)

L.T: GMT+9 h – Pr.L: Korean.
ADDR: Korean Central Broadc. Committee, Pyongyang.
STATIONS: Medium Waves:

585kc	660kc	785kc	860kc	1045kc	1150kc	1285kc
625 –	685 –	800 –	935 –	1080 –	1275 –	1335 –
655 –	725 –	850 –	1000 –	1120 –		

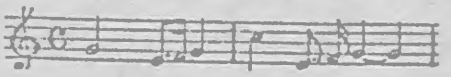
Short Waves:

kc	m	kc	m	kc	m	kc	m
2850	105.3	6141	48.85	6350	47.24	9752	30.77
3320	90.34	6195	48.43	6600	45.45	15240	19.69
5044	59.48	6250	48.00	7225	41.52	17850	16.80

HOME SCE, in Korean:
1st Prgr: 20.00–15.00 on 725, 785, 850, 860, 935, 1000, 1045, 1120, 1150, 1275, 1285, 1335kc.
2nd Prgr: 20.00–17.00 on 585, 625, 655, 660, 685, 800, 3320, 6250, 6350kc.

FOREIGN SERVICE: a) to Near & Middle East/Europe; b) to Latin America; c) to So. E.a. Asia; d) to Japan.
Chinese: 11.30–12.30 on 9752/15240kc – English: 19.00–21.00 on 7225/9752kc (a), 03.00–04.00 on 9752/15240kc (b), 10.30–11.30 on 9752/15240kc (c) – French: 21.00–22.00 on 7225/9752kc – Japanese: 04.30–05.30 on 7225/9752kc, 07.30–08.30 on 6141/7225kc, 13.00–15.00 on 5044/6141kc – Korean: 21.00–21.30 on 1080/6250kc, 10.30–11.00 on 785/2850/6600kc (d); 22.00–23.00 on 7225/9752kc (a), 02.00–03.00 on 9752/15240kc (b), 06.00–07.00 on 15240/17850kc (c) – Russian: 16.00–19.00 on 7225/9752kc, 09.00–10.00 on 6141/7225kc.

ANN: E: "This is the Korean Central Broadcasting Station, Pyongyang" – V. by letter.



KOREA (Republic of)

L.T: GMT+9 h – Pr.L: Korean.

THE KOREAN BROADCASTING SYSTEM (Go.)

ADDR: Overseas Broadcasting Station, Yejangdong 8, Chung-ku, Seoul. Tel: 3-1696 – L.P: Bureau Dir: C. Hong. Chief Eng: I. K. Lee Overseas Sce (HLSA): J.H. Lee. Home Sce: St. Dir. (HLKA): H.S. Lee. Dir. TV(HLCK): J.Y. Kim.

STATIONS:
Medium Waves: °=Short Wave.

Name	Call	kc	kW	Name	Call	kc	kW
Sogwipo	HLCF	540	1	Chulwon	HLCO	920	1
Chinju	—	560	1	Andong	HLCR	949	1
Chonju	HLKF	570	10	Cheju	HLKS	940	1
Masan	HLKD	570	1	Seoul	HLCA	°970	250
Seoul	HLSA	°600	100	Sokcho	HLCS	1030	0.3
Choonchun	HLKM	650	1	Namwon	HLKL	1030	1
Kwangju	HLKH	750	10	Hwachun	HLCG	1030	1
Seoul	HLKA	°710	100	Choongju	HLCH	1090	1
Taegu	HLKG	740	10	Samchok	HLCI	1120	1
Kangnung	HLKR	860	10	Wonju	HLCW	1190	1
Mokpo	HLKN	860	1	Wollungdo	HLCU	1320	0.3
Taejon	HLKI	880	1	Yosu	HLCY	1340	1
Pusan	HLKB	890	50	Pohang	HLCP	1420	0.3
Chongju	HLKQ	920	1				

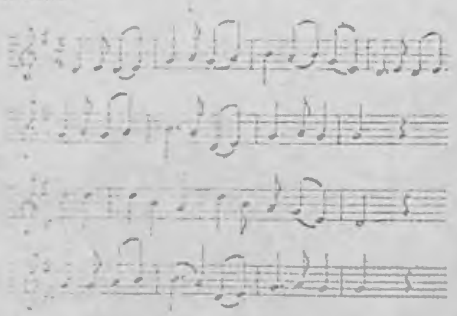
Short Waves: 1) Seoul, 2) Suwon.

Call	kc	m	kW	Call	kc	m	kW
1) HLK50	2510	119.50	10	1) HLK30	7190	41.72	1
1) HLK51	3910	76.73	5	2) HLK5	9640	31.12	50
1) HLK22	5975	50.21	10	2) HLK6	11925	25.17	50
2) HLK31	6015	49.88	50				

HOME SERVICE:
1st Prgr. (Korean): 20.00–17.00 on 710/2510/3910/5975/7190kc. N: 21.00, 22.00, 23.00, 01.00, 03.00, 04.00, 06.00, 07.00, 08.00, 09.00, 10.00, 12.00, 13.00, 14.00.
2nd Prgr (Korean) 20.00–08.00, 10.00–17.00.

FOREIGN SERVICE:
On 970kc: 20.00–21.00, 12.30–16.00 – Korean: 20.00–21.00, 12.30–13.00, 14.00–15.30 – Japanese: 13.00–14.00 – Chinese: 15.30–16.00
On 9640kc: 21.00–23.00, 01.00–02.00, 05.00–05.30, 10.00–11.30, 12.00–14.00 – Japanese: 01.30–02.00 – Chinese: 22.00–22.30, 10.00–10.30, 13.00–13.30 – Russian: 22.30–23.00, 13.30–14.00 – Korean: 21.30–22.00, 01.00–01.30, 11.00–11.30, 12.00–13.00 – English: 21.00–21.30, 05.00–05.30, 10.30–11.00 (Gen. Sce.).

[illegible] 06.00, 06.30, 07.30, 13.30–16.30.
[illegible] (Gen. Sce): 13.30–16.00 (to So. Eu, [illegible] 07.00–7.30 (to Europe), 10.00–16.30 (to So. Eu, [illegible] 03.30–04.30 (to Latin America) – Chinese: 15.00–[illegible]
[illegible] 16.00; 12.00–15.30 – Chinese: 08.00–08.30 – French: [illegible] Japanese: 07.00–16.00, 12.00–13.00 – Korean: 13.00–[illegible]
[illegible] 21.00, 01.00, 03.00, 06.30, 08.30, 10.30, 15.30 – French: [illegible] Spanish: 01.30; Chinese: 22.00, 08.00, 14.00, 18.00, [illegible] 22.45, 13.45; Japanese: 01.30, 09.00, 12.00.
(Pacific broadcast) Eng Thurs: 01.15 on 11925kc, 05.15 on 9640kc, [illegible] on 11925kc, 10.45 on 9640kc, 15.45 on 11925kc, 21.15 on 9640kc.
(XN: Korean: "KBS Seoul Chaong-ang bang song kuk che il bang [illegible] HLKA" (KBS this is the first network of Seoul Central [illegible] Station, HLKA). English: "This is the Voice of Free Korea, [illegible] Broadcasting System in Seoul, Korea".
(WE-SIG: Foreign Sce: Korean Folk Music played as Yang-geum [illegible] orchestra:



[illegible] QSL-card or letter – PUB: pamphlet, pennant free to listeners. [illegible] Korea & TV" (English) yearly.
[illegible] Boveri & Co: 1 ×250 kw mw tr. – Nippon Electric Co: [illegible] 1 × 1 kw mw-tr.

CHRISTIAN BROADCASTING SYSTEM

Non-comm. (independent)
Fi: By contributions from lis. groups and interested individuals.
ADDR: 91 Changno 2-Ka, Seoul. Te: 74-1761 – L.P: Dir: E. O. De. [illegible] Man: Y. H. Choi, Dir. Tec: Y. H. Park.

STATIONS:	kc	m	kW		kc	m	kW
HLKX[a]	860	357	10	HLKP[a]	1400	214	1
HLKT[b]	1000	300	1	HLCM[a]	1400	214	1
HLKU[c]	1040	300	1	HLKY-FM	104Mc.		

[a] Taejon. [b] Pusan. [c] Kwangju. [d] Irl.

HOME SCE: Korean: 20.20–24.00, 02.30–14.30 – N, Wrp: 21.30, 22.50, 02.50, 03.50, 04.50, 06.50, 08.50, 10.50, 12.50. English: [illegible] Sun 23.00–03.00, 12.30–13.00 (Rlg. prgr) – ANN: "This is CBS, The Christian Broadc System, HLKY, Seoul" – V. by [illegible] Records accepted – F.PL: St. at Taejon – PUB: Special Music [illegible] (monthly).

RADIO STATION HLKX (Religious, Educational)

Operated by the Evangelical Alliance Mission, 2845 W. McLean Av, Chicago 47, Ill, USA – Fi: By contributions and free-will offerings.
ADDR: also 16, Inchon. Cable: Team Radio. Te: 2910 – L.P: St. Mgr: [illegible] Livingston.
STATION (Siemens; RCA): 1060kc 285m 50kW.
HOME SCE: in Korean, Chinese, Mongolian, English, Russian, Ukrainian: 20.00–23.00, 07.00–17.00 (Sat 06.00–Mon 17.00 without [illegible] – Korean: 22.00–23.00(Sun 23.30), 21.00–23.00(not Sat), 17.00–[illegible](Sun only). N: 22.55, 09.30(W) – English: Mon–Fri 07.00–09.00, [illegible] 06.00–15.00, Sun 23.30–09.00 – Russian: 11.00–13.00, 15.00–[illegible] – Chinese: 20.00–22.00, 13.00–15.00.
ANN: "This is the Voice of Gospel" – Team Radio HLKX, Inchon Korea – a missionary project of the Evangelical Alliance Mission Chicago Ill" – V. by QSL-card or letter. Records accepted – PUB: Prgr.schedule free. HLKX-Echoes (quarterly).

RADIO STATION HLKU (Comm.).

ADDR: No. 3, 3-Ka, Choong-Ang Dong, Pusan.
STATION: 1040kc 1kW – HOME SCE, in Korean: W 21.30–01.30, [illegible] 06.00, 09.00–14.30. Sun 21.30–06.00, 09.00–14.30.

AMERICAN FORCES KOREA NETWORK

ADDR: Headquarters Com. Armed Forces Korea, American Forces Korea Network, APO 301, S. Francisco, Calif, USA. Te: Yongsan 2495 – L.P's: Commanding Officer: Lt. Col. Infantry: J. E. Melanson. Dir. Prgr: L. Murrow, Dir. Tec: T. J. Daugherty.

STATIONS: 24 h	kc	kW		kc	kW
"Seoul"	560	5	Tongduchon[g]	1260	1
"Taejon"	580	1	Osan[h]	1360	1
Mokpo-Ni[b]	580	1	Uijchon-Ni[i]	1400	1
Osan[c]	730	1	Wonju[e]	1440	1
Chunchon[d]	1050	1	Kunsan[k]	1440	1
Kwangju[e]	1150	0.25	Taejon[f]	1480	0.25
Chinhae[f]	1150	0.25	Pohang	1510	0.25
Kwangju[g]	1160	0.25	Pyongyangdo	1510	0.25

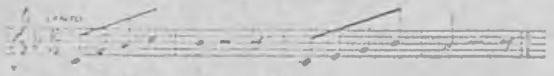
[a] "Vagabond". [b] "Bayonet". [c] "Chime". [d] "Cavalier". [e] "Homesteader". [f] "Killer". [g] "Gypsy". [h] "Mercury". [i] rel. 560kc.
N: Every h on the h – ANN: "This is the American Forces Korea Network". Local identification: "This is R. "Vagabond" in Seoul" etc. V. by QSL-card. Rec. to Hqs, AFKN, APO 301, S. Francisco, Calif, USA. Rep.

KUWAIT

LT: GMT + 3 h – Pe.L: Arabic.
KUWAIT BROADCASTING & TELEVISION SERVICE (Go.)
ADDR: P.O. box 397, Kuwait. Cable: Kuwait Broadcasting. Te: 45011 – L.P: Ministry of Guidance and Inf: H.H. Shaikh Mubarak Al-Abdullah Al-Ahmad Al-Sabah, Dir. Tec: R. Karrer (sound), A. Kesselhut (TV), Sr. Consultants: M. Ghoosain.
STATION mw: 1/10/100kW; sw: 1/10/50kW (6055kc also 100kW)

kc	m	kc	m	kc	m	kc	m
1130	265.0	*4967.5	60.25	11940	25.12	17750	16.90
1345	223.2	**6055	49.55	15150	19.80	21525	13.94

* Throughout the year; ** Wi. only; " Sun only.
HOME SCE: in Arabic: 03.00–21.00 – N, Wrp: 03.00, 04.00, 05.00, 10.00, 13.00, 17.00, 19.00, 21.00 – ANN: "Huna I'tha't Al Kuwait" – V. by QSL-card. Records accepted – F.PL: 100kW sw-tr, One 100kW mw-tr, four 250kW sw-tr's, three 500kW mw-tr's (1965).
INT-SIG: Violin.



Brown Boveri, Switzerland delivered 4 sw-tr's 250kW – The Marconi Company Ltd, G.B. delivered two 100kW mw-tr's.
Wilh. Franz KG, Germany: EMT studio equip.

LAOS (Kingdom of)

LT: GMT + 7 h – Pe.L: Laotian, French.
RADIODIFFUSION NATIONALE LAO (Go.)
ADDR: Vientiane. Cable: Radio Lao. Te: 2457 – L.P: Dir. Gen: Bounmanaly. Dir. Tec: Viengsavan. Dir. Adm: B. Halsacda.
STATIONS: (System: Marconi) 370kc 219m 10kW
6130kc 48.94m 10kW – 7145kc 41.99m 1kW.
HOME SCE: in Laotian, French, Vietnamese: 23.30 02.00, 05.00–, 00.30, 10.00–14.00 – N: Laotian: 00.00, 06.15, 12.00, French: 05.45 12.30, Vietnamese: 12.45–13.00.
ANN: F: "Ici Vientiane, R.and. Nationale Lao" – INT-SIG: Music on Khene, instrument of bamboo – V. by letter, Rp.
F.PL: Nat. net. with 6 reg. st's.

LEBANON

LT: GMT + 2 h – Pe.L: Arabic, French, English.
LEBANESE BROADCASTING STATION (Go.)
ADDR: R. Lebanon, Ministry of Orientation, Information and Tourism, Beirut. Cable: Radioliban. Te: 251880 – L.P: Dir. Gen: B. Dib. Dir. of Broadc: H. Al Hassan. Dir. Tec: J. Rouhayem. Dir. Prgr: N. Khoury.
STATIONS: 989kc 10kW, others 100kW.

836kc	359 m	– 5980kc	50.17m	– 9680kc	30.99m
989 –	303.3	– 9545 –	31.43 –	– 11770 –	25.49–

HOME SCE: Prgr. I (Arabic): On 836kc: 04.30–07.30, 09.25–22.30. On 5980kc: 04.30–07.30, 14.15–18.20. On 5945kc: 09.30–14.00 – N: 05.00, 06.00, 07.00, 10.00, 11.00, 12.00, 16.00, 17.00, 18.00, 20.00, 21.45.
Prgr. II (on 989kc): French: 05.30–06.00, 11.00–12.30, 17.00–20.00 – N: 05.30, 11.30, 12.00, 17.45, 19.55 – L.L. English: Thurs 17.15. French: Wed 17.15 – English: 15.00–17.00. N: 15.00 – Arabic, English, French: 06.00–09.00, 12.30–15.00.
FOREIGN SCE: 18.30–20.30 on 11770kc to Africa in English, Arabic, French; 23.00–01.00 on 9680kc to So. America in Portuguese, Arabic, Spanish; 01.30–04.00 on 9680kc to No. America in English, French, Arabic, Spanish.

Call	ch	kW/W
Yokohama-Nioke		
[1] ZQ 6		3W
[2] ZB 12		3W
Kikuma		
[1] – 57		100W
[2] – 54		100W
Kochi		
[1] RK 4		1
[2] RB 6		1
Nakamura		
[1] – 1		0.25
[2] – 11		250W
Minami-Uwa		
[1] ZQ 9		0.1
[2] ZB 12		0.1
Sukumo		
[1] – 4		10W
[2] – 2		10W
Suzaki		
[1] – 2		20W
[2] – 12		20W
Sagawa		
[1] – 1		3W
[2] – 11		3W
Aki		
[1] RK 1		10W
[2] RB 11		10W
Tosamura		
[1] – 2		10W
[2] – 12		10W
Motoyama		
[1] 4		100mW
[2] – 6		100mW
Otoyo		
[1] – 3		100mW
[2] – 5		100mW
Toyonaga		
[1] – 4		3W
[2] – 6		3W
Tokushima		
[1] XK 3		1
Ikeda		
[1] – 6		2W

Call	ch	kW/W
Hiwasa		
[1] – 9		100W
[2] – 8		50mW
Higo-Oguni		
[1] GK 6		10W
[2] GB 10		10W
Aso		
[1] GK 3		10W
[2] GB 12		10W
Kurume		
[1] LK 46		0.3
[2] LB 54		0.3
Omuta		
[1] LK 52		0.1
[2] LB 50		0.1
[*] Kumamoto		
[1] GK 9		1
[2] GB 2		1
Minamata		
[1] – 4		0.5
[2] – 1		0.5
Ushibuka		
[1] – 9		3W
[2] – 2		3W
Hitoyoshi		
[1] – 3		75W
[2] – 1		75W
Takamori		
[1] GK 8		10W
[2] GB 1		10W
Yabe		
[1] – 4		10W
[2] – 8		10W
Fukuoka		
[1] LK 3		10
[2] LB 6		10
Kurume		
[1] LK 46		0.3
[2] LB 54		0.3
Omuda		
[1] – 52		0.1
[2] – 50		0.1

Call	ch	kW/W
Kitakyushu		
[1] SK 6		1
[2] SB 12		1
Nagasaki		
[1] AG 3		1
[2] AC 1		1
Fukue		
[1] AG 9		30W
[2] AC 12		30W
Isahaya		
[1] – 47		0.1
[2] – 45		0.1
Sasebo		
[1] AT 8		1
[2] AY 2		1
Hirato		
[1] – 3		10W
[2] – 1		10W
Izuhara		
[1] – 5		0.3
[2] – 11		0.3
Gonoura		
[1] AT 59		0.3
[2] AY 56		0.3
Matsuura		
[1] AT 9		30W
[2] AY 6		30W
Kagoshima		
[1] HG 3		5
[2] HC 5		5
Naze		
[1] HG 3		0.25
[2] HC 4		0.25
Kanoya		
[1] – 4		75W
[2] – 2		75W
Makurazaki		
[1] – 4		100W
[2] – 9		100W
Akune		
[1] – 8		0.1
[2] – 12		0.1

Call	ch	kW/W
Tanegashima		
[1] – 8		0.1
[2] – 12		0.1
Okuchi		
[1] HG 9		10W
[2] HC 2		10W
Miyazaki		
[1] MG 8		1
[2] MC 12		1
Nobeoka		
[1] – 4		0.25
[2] – 2		0.25
Takachiho		
[1] MG 3		30W
[2] MC 12		30W
Imo		
[1] – 4		10W
[2] – 3		10W
Ebino		
[1] – 9		100mW
[2] – 4		100mW
Oita		
[1] IP 3		3
[2] ID 12		3
Saeki		
[1] – 7		30W
[2] – 1		30W
Hita		
[1] – 5		16W
[2] – 2		16W
Tsukumi		
[1] – 6		3W
[2] – 2		3W
Takeda		
[1] – 8		3W
[2] – 1		3W
Kusu		
[1] – 52		0.1
[2] – 50		0.1
Karatsu		
[1] – 50		10W
[2] – 47		10W
Imari		
[1] – 51		0.3
[2] – 53		0.3

D.Prgr: Gen: 21.00–14.55(Sun 14.57) – Educ: W 22.00–23.00, 00.00–07.00(Sat 05.00), 09.00–14.50, Sun 22.00–05.00, 09.00–14.50. L.L: German: W 22.30–23.00, 09.30–10.00. English Conversation: W 09.00–09.30, 13.30–14.00. (Classified by broadc. h's %): Gen-TV: N. 28.5, Educ. 10.4, Cultural 35.5, Entertainm. 25.6. Educ-TV: Educ. 81.2, Culture 16.6, N: 2.2.

F.Pl: The second 6-year plan (started in 1962) aims to increase the number of st's in both netw's to 461 and Educ. TV to the same daily average of 18 h's with that of the General TV.

PRIVATE STATIONS: Call JO-TV chJ. * = Color TV. 525 lines.

D.Prgr: General (approx.) W: 23.00–24.00 or from 02.00–05.00, 08.00–15.00. Sun approx. 23.00 (or 00.00)–15.00.

Call	ch	kW(ERP)	Name
HR	1	10	Hokkaido Broadc. Corpo, Sapporo: 21.50–16.00.
FX	1	10	Tokai Television Broadc. Co, Nagoya
IR	1	10	Tohoku Broadc. Co, Sendai
LR	1	3	Kita-Nihon Broadc. Co, Toyama
IF	1	10	Kyushu Asahi Broadc. Co, Fukuoka
CF	1	5	R. Minami-Nihon Broadc. Co, Kagoshima
GR	1	5	R. Aomori Broadc. Co, Aomori
JX	1	1	Nihon-Kai Telecasting Co, Tottori
FR	4	10	RKB Mainichi Broadc. Co, Fukuoka
OR	4	10/2.5	MBS Mainichi Broadc. System, Osaka: 21.30–16.00
[1] AX	4*	50/12.5	Nippon TV-Network Co, Niban-cho, Tokyo: 21.40–15.00(Sat 16.30)
ER	4	10	R. Chugoku Co, Hiroshima: 22.40–07.00
AR	5	10	Chubu-Nippon Broadc. Co, Nagoya
DR	5	5	Broadc. System of Niigata, Niigata
KX	5	10	Sapporo TV Broadc. Co, Sapporo
JF	5	3	Yamanashi Broadc. System Inc, Yamanashi
GF	5	3	R. Oita Broadc. Co, Oita
UR	5	1	Nagasaki Broadc. Co, Nagasaki
DF	6	3	Iwate Broadc. Co, Morioka
[2] KR	6*	50/12.5	Tokyo Broadc. System: 21.15–15.00
[3] NR	6*	10	Asahi Broadc. Corp: 21.30–16.00
MR	6	3	Hokuriku Broadc. Co, Kanazawa
HO	6	1/0.25	Hakodate
HW	6	1/0.25	Obihiro
[4] DX	8	100/25	Kansai Telecasting Co, Osaka: 21.30–16.30
[5] CX	8	50	Fuji Telecasting Co: 21.20–15.30
ZR	8	1	R. Kochi Broadc. Co, Kochi
KF	9	10	Nishi-Nippon Broadc. Co, Takamatsu
AF	10	5	Nankai Broadc. Co, Matsuyama
EF	10	3	Yamagata Broadc. Co, Yamagata
IX	10*	10	Yomiuri TV Broadc. Corp, Osaka
[6] FX	10	50/12.5	Nippon TV Network Co: 21.50–07.00, 07.30–15.35
YTV	10	10/25	Osaka
YR	11	10	Sanyo Broadc. Co, Okayama
TR	11	5	Akita Broadc. System, Akita
PR	11	3	Fukui Broadc. Co, Fukui
SR	11	1	Shinetsu Broadc. Co, Nagano
HE	11	1/0.25	Asahikawa
QL	11	1/0.25	Kushiro
QF	11	1/0.25	Muroran
NF	10	1	Miyazaki Broadc. Co, Miyazaki
PE	11	1	Yamaguchi Broadc. Co, Tokyuama
VR	11	1	Shizuoka Broadc. System, Shizuoka
JR	1	1	Shikoku Broadc. Corp, Tokushima
BF	11	1	Kumamoto Broadc. Corp, Kumamoto
PX	11	3	Fukushima Television Broadc. Co, Fukushima
LX	11	10/2.5	Nagoya Broadc. Co, Nagoya: 22.00–15.00
HX	10	1	Television Nishi-Nippon Corp, Yawata
HF	10	1	San-In Broadc. System, Yonago
KSDW	10	5	Okinawa Television, Naha
KSAR	12	5	Ryukyus Broadc. Corp, Naha Okinawa
NX	12	10	Hiroshima Television, Hiroshima
[7] TX	12	50/12.5	Japan Science Foundation, Tokyo

[1] Color TV 20 h weekly –
[2] 36 Hitotsugicho, Akasaka, Minato-Ku, Tokyo. L.P: Chmn: T. Adachi. Pres: K. Shikakura. Color TV 1 h weekly –
[3] Asahi Broadcasting Corpo, TV Station, Dojima, Kitaku, Osaka. Cable: Jontv. Te: 361-1191. L.P: See radio. Color TV 1 h weekly.
[4] 51 Umegae-cho, Kitaku, Osaka. L.P: Pres: Y. Kobayashi. Gen. Mgr: K. Hirabayashi.
[5] Chiyoda-ku, Tokyo. L.P: Dir. Gen: N. Shikanai. Dir. Tec: E. Nishiyama.
[6] 55 Azabu Zaimokucho, Minato-ku, Tokyo. L.P: Chmn: Y. Akao. Pres: H. Okawa. Man. Dir: F. Nishonomiya.
[7] 2, Daikan-cho, Chiyoda-ku, Tokyo. L.P: Chmn: C. Kurata.

KOREA (Rep.)

SEOUL TELEVISION STATION (Go.)
Addr: Namsandong 3 ka 34, Chungku, Seoul. Te: 8-4127.
L.P: St. Mgr: J. Y. Kim.
Station: Seoul ch9 2kW V – D.Prgr: 08.00(Sun 02.30)–14.30.

AMERICAN FORCES KOREA NETWORK (US Go-Funds)
Addr: APO 301, S. Francisco, Cal, USA. Te: Yongsan 2495 – L.P: Dir. Gen: Lt. Col: J. E. Melanson, Commander. Dep. Dir. Gen: Lt. W. A. Burke. Dir. Prgr: L. Morrow. Dir. Tec: T. J. Daugherty.
Stations: Pol– H. * separate film chain.
Seoul chA2 40kW – Hwaakson chA12 2kW – Kunsan chA2 0.4kW – Taegu chA3 2.5kW – Taejon chA12 0.3kW – *Pusan chA2 0.1kW.
D.Prgr: 08.00(Sat 01.30, Sun 00.00)–16.00.

KUWAIT

TELEVISION OF KUWAIT (Go.)
Addr: Ministry of Guidance and Inf. P.O. Box 621, Kuwait.
Cable: Alirshad. Te: 39411 – L.P: See radio.
Stations: Dasman chE8 (Retma) 0.1kW H – Mutlaa chE8 (14.2kW to Kuwait Town 31.6kW to No, 29.8kW to So) – D.Prgr: 16.00–20.00. Test-tr's: 12.00–14.00, 15.30–16.00. Projected St's: Mutlaa chE10, Roudatein chA8 (Retma) – So. Repeater chA6.

The Marconi Company Ltd, G.B: delivered 3 OBV.

LEBANON

COMPAGNIE LIBANAISE DE TELEVISION (Comm.)
Fi: By adv – Addr: B.P. 4848, Beirut – L.P: Pres. & Dir. Gen: Gen. S. Nofal. Vice Dir. Gen: B. M. Givadinovitch. Dir. Tec: N. Loutfi. Prgr's: W. Ezzedine.
Stations: Beirut 5kW H: chE7 (Arabic), chE9 (French/English) – Fih (No. Lebanon) 1.2kW V: chE2 (relay chE7) – Maasser el Chouf 60kW H: chE4 (relay chE7 & E9).

WANTED
Sales Representatives to sell advertising in countries where we are not now represented.
For details, write:
World Radio TV Handbook Co. Ltd.
Sundvej 6, Hellerup, Denmark.

Thailand

3.7. Terrestrial Communication Distribution Networks

Except for the Bangkok area telecommunication facilities in Thailand at the present time are seriously underdeveloped and fall far short of satisfying the requirements of the government, economy, or population. However, expansion and improvement of telecommunication facilities have been given high priority, and projects are now underway which are expected to give Thailand the most advanced telecommunication facilities in Southeast Asia within the next few years.

c. Voice: Adequate telephone service is available in Bangkok and in the other major population centers. Bangkok is equipped with automatic telephone exchanges, as are the exchanges in several other cities. Most telephone exchanges of the smaller cities and towns are manually operated. Telephone service within the cities vary between excellent and poor, depending upon weather conditions (heavy rains short out the open wire lines), circuit loading and operating condition of the equipment. Inter-city, or long-distance telephone service is generally either poor or non-existent at the present time.

Present inter-city telephone service is limited to the cities and towns in the Bangkok area and a few short routes between provincial exchanges in some more isolated areas. Open wire lines are used on these links. High frequency radio circuits of poor quality provide limited voice communications from Bangkok to other populated areas in Thailand. The limited amount of inter-city telecommunication facilities presently available in Thailand is old, poorly maintained, and of low capacity. There are approximately 50,000 telephones in the country, of which 40,000 are located in the Bangkok area.

International voice service is available by h.f. radio from Bangkok to Bern, Karachi, Manila, San Francisco, Tokyo, Penang, Saigon, Singapore, Taipei and Hong Kong. Other circuits are planned to Moscow and Rangoon.

b. Record and Data: Domestic telegraph service is available in Thailand somewhat more extensively than voice communications. Open wire telegraph facilities supplemented by h.f. radio circuits provide the primary means of communication in the country, and link together most of the inhabited areas.

International telegraph service is provided by overhead open wire lines to Cambodia and Malaysia. High frequency radio provides service to Europe, India, Southeast Asia, the Far East and to Shanghai as well.

Thailand - continued

Limited landline teleprinter service is available in the Bangkok area, while telex service is available from Bangkok to Tokyo, Manila and Hong Kong by means of h.f. radio.

A direct radiofacsimile circuit connects Bangkok with Japan and Taiwan.

The domestic telecommunication system is in the process of being renovated and expanded. A major trunk system of cable and radio relay, which will extend to over 2,200 miles in length and reach every key area of the country, is being installed jointly by three U.S. firms. This system is to have an initial capacity of 480 voice channels with an expansion capability to 1,800 voice channels. The system will provide circuits for inter-city telephone, leased channels, broadcast programs, telegraph, digital data, facsimile and narrow band video programs. The new system is expected to give Thailand the most modern telecommunication facilities in Southeast Asia. The system is being installed at the present time, and some parts of it are already in operation. The part of the system covering the Bangkok area and the eastern section of the country is expected to be in full operation during 1966. The north western and southern parts of Thailand will be tied into the system at a somewhat later date.

The Japanese government is planning the installation of a submarine cable connecting Tokyo, Taipei, Manila, Saigon, Bangkok, Singapore, Djakarta and Hong Kong. The cable is expected to be completed by 1967 or 1968. When it is completed, this will improve all international telecommunication services from Bangkok to Southeast Asia, the Far East and the rest of the world.

A major telecommunication problem facing Thailand is the shortage of Thai engineers and technical personnel to operate and maintain present equipment. This is further aggravated by additional demands for qualified personnel to service the expanding telecommunication network. To help alleviate the shortage of trained technical personnel, the U.S. and Japanese governments have begun intensive training programs. Private U.S. engineering companies and the University of Hawaii are also conducting training programs in Thailand.

Almost all telecommunication facilities are government owned and operated. Public facilities are operated and maintained by the Post and Telegraph Department (PTT) and the Telephone Organization of Thailand (TOT), both under the Administration of the Ministry of Communications.

3.8. Broadcast Capabilities Within Thailand

a. Radio: There are more than 100 medium wave broadcasting stations throughout Thailand, including 52 presently on the air in Bangkok. Bangkok thus has more radio stations than any other city in the world! Forty-nine other medium wave stations are presently on air as follows:

Thailand - continued

Bhuket (1)
Chantaburi (2)
Chiengmai (6)
Cholburi (1)
Chumporn (1)
Khonkaen (2)
Korat (3)
Lampang (2)
Lopburi (3)
Mahasarakem (1)
Nakornsawan (3)
Nakurnsrithamaraj (2)
Pattani (1)
Petchburi (1)
Pisanulok (1)
Pitsanuloke (1)
Prachub (2)
Sakolnakorn (3)
Samburi (1)
Songkhla (2)
Surajthani (1)
Surin (1)
Trang (1)
Ubol (3)
Udorn (2)
Uttaradit (1)
Yala (1)

All of these stations, except for two located in Bangkok, are owned and operated by one government organization or another. The power of the stations range between 1/8 and 20 kilowatts, with at least half 5 kw or higher.

The Ministry of Defense (Army, Navy and Air Force) operates more than 70 of these stations; the Public Relations Department of the Ministry of Communications more than 12, with others operated by the Prime Minister's Office, the Ministry of Education, the Post and Telegraph Department, and the Police Department.

Fifteen shortwave transmitters (between 1 and 5 kw) are used to cover the rural areas of the country, and the Ministry of Communications uses a 50 kw shortwave transmitter for a limited international service to North America, the Far East and Southeast Asia.

At least 8 VHF-FM stations are on the air in Bangkok, of which two transmit multiplexed stereophonic programs.

Under construction, and nearing completion at Khonkaen and Korat are two 50 kw medium wave transmitters, the most powerful in Thailand at the present time. The transmitters are being installed by the Australian government as a gift to Thailand, and will be operated by the Public Relations Department of the Ministry of Communications.

Thailand - continued

Under a recently concluded agreement between the United States and Thailand, the U.S. will give Thailand a gift of a 100 kw medium wave transmitter which will be located in the vicinity of Chiengmai. The Thai government will also share with the Voice of America the use of a 1000 kw medium wave transmitter which will be located north of Bangkok. The Thai government is also planning to expand its international shortwave service with the addition of at least one, and possibly more, 100 kw transmitters.

Present estimates place the number of radio receivers in Thailand at more than 1,750,000 for a population of 30,000,000.

b. Television: Six TV stations are operating in Thailand at the present time as follows:

LOCATION	CHANNEL	OWNER
Bangkok	4	Thai Television Co.
Bangkok	7	Army Signal Corps
Khunkaen	5	Thai Television Co.
Lampang	8	Thai Television Co.
Hadyai	9	Thai Television Co.
Songkhla	9	Thai Television Co.

All of the above stations are government controlled, but the Thai Television Co. accepts commercial advertisements. All stations operate on modified U.S. standards using horizontal polarization.

Thailand's original television plans called for a radio relay network of 17 stations to interconnect the Thai Television Company station at Bangkok with remote terminal stations so that programs originating in Bangkok could be broadcast immediately throughout the country. Low-power broadcast transmitters were to be installed at each relay station throughout the network. At present these plans have not been implemented, and the existing stations depend on video tape and film for their programing. The government is still trying to obtain funds to complete the radio relay system.

Thailand - continued

It is estimated that there are approximately 180,000 television receivers in use in Thailand at the present time, most of them located in the Bangkok area.

All U.S.-manufactured TV equipment exported to Thailand must be modified for operation at 50 cycles, the basic electrical power frequency of the country.

Additional information concerning radio and television broadcasting stations in Thailand are given in attachments 1 (radio) and 2 (television). The source of this data is the 1965 edition of the World Radio-TV Handbook.

Attachment #1

India, Pakistan, Ceylon:

m.b.	m.b.
13.00–14.00 25	14.15–16.15 31, 19
14.00–14.15 25, 19	16.15–16.50 31, 25, 19
	Australia:
	13.00–13.15 25

Relays of Asian Service:

	Language	H of tr.	m.b.
Japan:	Japanese	11.00–11.30	25
China, Vietnam Laos, Cambodia:	Standard Chinese / Cantonese	12.00–12.30	25, 19, 16
		12.30–12.45	25, 19, 16
Vietnam, Laos Cambodia:	Vietnamese	11.30–12.00	31, 25, 19
Thai		13.15–13.45	19, 25
Indonesia:	Indonesian	10.30–11.00	41, 31, 25
Burma, Thailand:	Burmese	13.45–14.15	25, 19
India, Pakistan, Ceylon:	So. Asian Reg*	15.45–16.15	25
	Urdu	14.15–15.00	25
	Hindi	15.00–15.45	25

*Sinhalese: Tues, Fri, Tamil: Sun, Thurs, Bengali: Mon, Wed, Sat.
Wilh. Franz KG, Germany: EMT studio equip.

SYRIAN ARAB REP.

L.T: GMT + 2 h (Su: GMT+3 h) – Pr.L: French, Arabic.

SYRIAN BROADCASTING AND TELEVISION (Go.)

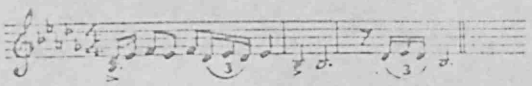
ADDR: Rue de la Victoire, Damascus – L.P: Techn. Dir: A. Ayas.

Stations:

kc	m	kW	kc	m	kW	kc	m	kW
566	530	300	953	31.50	30	11750	25.53	0.33
665	451	50	5287	56.75	0.33	11915	25.17	20
719	417	2	6165	48.66	20	15165	19.78	50
746	402	20	7390	40.60	7.5	15190	19.75	50
786	381	10	7700	38.90	0.33	17865	16.80	20
863	348	10	9555	31.40	20			

HOME SCE: Arabic: 04.00–08.00, 11.00–23.00, on 566/665/746/786/953kc, 19.00–21.30 on 719/863/9555kc, 04.00–23.00 on 5287/6165 (to Egypt Libya)/7700/11750kc, 04.00–08.00, 11.00–14.00 on 11915kc to No. Africa), 22.00–23.00 on 9555kc.
English & French: 05.00–07.30 on 719/863/7390kc, 16.00–19.00 on 719/863kc. N. in English: 05.30, 17.00. N. in French: 06.30, 18.00. Hebrew, German, Yugoslavian (mixed): 14.00–15.00 on 863/9555kc – Turkish: 15.00–16.00 on 863/719/7390kc.

FOREIGN SCE: English & French (to Europe): 16.00–19.00 on 15165 kc. N. in English: 17.00–17.15. N. in French: 18.00–18.15.
Arabic Spanish Portuguese (mixed): 23.30–02.00 on 11915(No. America) 15190(So. America) 17865kc(Ce. America).
ANN: Arabic: "Houna Dimashk". E: "This is Damascus Calling". F: "Ici Damas". S: "Aqui Damasco". Hebrew: "Kol Damassek" – INT-SIG: Guitar. V. by QSL-card and letter.



Telefunken AG, Germany: 50kW mw-tr (Damascus).
Wilh. Franz KG, Germany: EMT studio equip.

THAILAND

L.T: GMT+7 h – Pr.L: Thai.

THE THAI NATIONAL BROADCASTING STATION (Go.)

ADDR: Public Rel. Dept, Bangkok. Cable: Radio Thailand. Te: 48881 – L.P: Dir. Gen: Lt. Gen: K. Punnakanta. Dep. Dir. Gen: P. Hongsanand, Dr. W. Siwasariyananda. St. Mgr: I. Kanchanakooha. Dir. Tec: A. Pojanapisut. Chief, Overseas Broadc. Division. V. Ampaivorn.

STATIONS: Medium Waves:

Call	kc	m	kW
HSK26	674	445.1	10
HSK27	815	366.9	2.5
HSK1	830	370.4	10
HSK28	856	350.4	10
HSK32	890	337.1	10
HSKK	910	329.7	1
HSKL	927	323.5	1
HSK22	1130	265.5	0.5
HSKQ	1140	263.3	10
HSK24	1210	247.9	5
HSK32	1256	239.5	1
HSK30	1520	197.4	5

Short Waves:

HSK4	4830	62.10	5
HSK5	6070	49.20	1
HSK5	6097	49.20	1
HSK4	6160	48.70	1
HSK7	7185	41.75	1
HSK7	7305	41.07	1
HSK9	11910	25.18	50
HSK9	15385	19.50	50

HOME SCE. in Thai: 00.00–01.00, 12.00–15.30 on 830/927/4830/6070/7305/11910kc. N: 13.30 – Other languages: Chinese: 02.30–02.45 on 856/6097kc. French: (Mon–Fri): 05.30–06.00 on 815/830/11910kc. Laotian: 01.05–01.10 on 815/830/4830kc; 13.00–13.30 on 856/6097kc. Malay: 06.30–06.45 on 856/4830kc.

OVERSEAS SCE: To No. America: 04.15–05.15 on 6160, 7305, 11910kc, 17.00–18.00 on 11910kc N. in English 04.25, 17.15 – To Thai Forces in Korea, Vietnam, Cambodia: 09.30–10.20 on 11910kc. N. Thai 09.32, Vietnamese 09.45, Cambodian 10.00 – General Overseas Sce: 10.25–11.57 on 6160, 7305, 11910kc. N. English 10.30, Malay 11.30, Chinese (Knoyu) 11.45. – Rel. Home Sce. 13.00–14.00 on 11910kc. N. Thai.

ANN: E: "This is the Overseas Broadc. St. of Thailand". F: "Ici Radio Bangkok". Thai: "Thini Stani Vitayu Krajai Sieng hang Pra Thes Thai" – V. by letter. Re. to Overseas Broadc. Division, Public Relations Dept, Bangkok.

MINISTRY OF EDUCATION (Go.)

ADDR: Division of Educ. Inf, Ministry of Education, Bangkok. Te: 46139 – L.P: Dir. Div. of Educ. Inf: K.A. Meesook. Dir. Tec: P. Saysombhoon.

STATIONS:
1180kc 254.2m 2kW – 3202kc 91.69m 2kW – 6062kc 4948m 2kW.
HOME SCE. in Thai, English: Mon–Fri 02.00–07.00 School prgr's (in term time), W 11.00–13.00, Sun 09.00–13.00 (General Prgr's) (in Thai and occ. English). N: 11.35–12.55.
ANN: E: "This is the Educ. Broadc. St. of Thailand, broadc. on a frequency of..." – V. by letter – F.PL: 10kW for 1180kc (1965) – PUB: "R. Times" (in Thai).

THAI TELEVISION CO. LTD. (Comm.)

ADDR: Mansion 8, Rajadamnern Ave, Bangkok. Cable: "Thaitevi". Te: 27952 – L.P: Dir. Gen: K. Punagunta. Man. Dir: P. Hongsanand. Chief. Eng: A. Rajprasit. Prgr. Mgr: Mrs. S. Siddhichai.

STATIONS: (System: Gates (mw)):
1500kc 200.0m 10kW Prgr. I – 5010kc 59.88m 1kW Prgr. I
1146kc 262.0m 10kW Prgr. II – 7105kc 42.22m 1kW Prgr. II
FM: 100.5Mc (Prgr. I), 94.5Mc (Prgr. II music), 96.5Mc (Prgr. III), 95.0Mc (Prgr. IV).
HOME SCE. in Thai: Prgr. I: 23.00–16.00 – N. in Thai: 00.00, 00.45, 01.00, 02.30, 03.35, 04.20, 05.40, 07.45, 08.30, 09.30, 10.40, 11.30, 13.00, 13.40, 15.00.

ANN: "This is the regular Sce. of TTV Radio broadc. everyday on the freq's of 1500kc, 5030kc and 100.5Mc on FM. Transmission comes to you every day, from six o'clock to eleven o'clock" – V. by letter. Records accepted – F.PL: 50kW – PUB: TTV Mirror (monthly).

OTHER STATIONS

Short Waves:

Call	kc	m	kW	Name
HSU90	3700	81.81	0.5	Royal Thai Airforce
HSU90	3805	78.85	0.5	Royal Thai Airforce
HS2PN	4755	63.09	0.3	Post & Telegraph St.
HSIJS	4875	61.54	0.5	Thai Army
HSVSS2	4890	61.35	0.1	Thai Army

Medium Waves:
HSU-01 1200kc 5kW 01-Broadcasting St: 00.00–07.00, 10.00–16.00 RTAF Donmuang AFB, Bangkok – L.P: Dir. Gen: Lt. Col. S. Thareechat. Dir. Tec: Maj. C. Maneesiri. D.Prgr: N. in Thai: 02.00, 03.00, 04.00, 11.30, 14.15 – Ann: "This is Zero-one Broadc. St. operating on a freq. of 1200kc from Donmuang AFB, Thailand" – V. by letter – F.PI: 10kW.

TIMOR (Portuguese)

L.T: GMT+8 h – Pr.L: Portuguese.

EMISSORA DE RADIODIFUSÃO DO TIMOR PORT. (Go.)

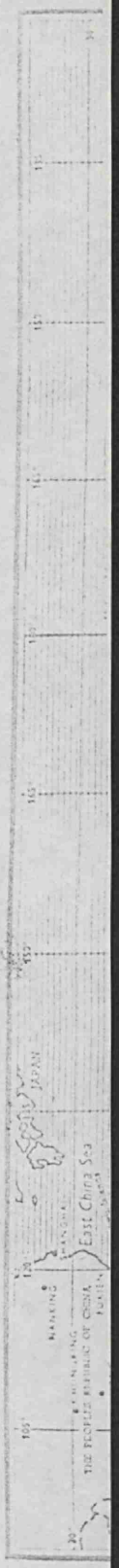
Fi: By Go. adv, license payments – Fee: $ 100.–
ADDR: Dili. Te: 295 – L.P: Dir. Gen: D. S. M. de Carvalho Braga. St. Mgr: J. J. das Neves. Dir. Tec: L. P. Lourenco.
STATION (System: Gates): 3268kc 91.78m 1kW.
HOME SCE. in Portuguese: D 04.30–06.00, 10.00(Sun 07.20)–14.00 (Sat 14.30) – ANN: "Aqui Emissora de Radiodifusão de Timor Português, funcionando na banda dos 90 metros, freq. de 3268kc" – INT-SIG: Gong – V. by QSL-cards or letter. Records accepted.

TURKEY

L.T: GMT+2 h – Pr.L: Turkish.

TURKISH RADIO AND TELEVISION ESTABLISHMENT (Indep.)

ADDR: Radyo-Televizyon Kurumu Genel Mündürlügü, Ankara. Cable: TRT – L.P: Dir. Gen: A. Öztirak. Dir. R. Ankara: O. Y. Heyilmaz. Dir. R. Istanbul: S. Akgöl. Dir. R. Izmir: C. Ozankan. Chief for Transcription Sce: R. Gongur. Dir. Tec. Dept: H. Kamov. Chief Tech. Councellor: M. Eke. Dir. Central Prgr. Office: M. T. Öngören.



D.Prgr: ch E2, 16.30–21.00 (Sat/Sun 14.30–21.00), chE9: 17.30–21.00. Pubs: TV Magazine (weekly).

TELE ORIENT (Comm.)
Fi: By Go. – Addr: Box 5054, Beirut. Te: 280001. Cable: Telibar. L.P: Dir. Gen: L. Dabbah. Dir. Tec: A. Madani. Dir. Foreign Rel: R. Benlolo.
Station: chE11 100/20kW H.
D.Prgr: 16.00–22.00 in Arabic, English, French.

MALAYA

MALAYSIAN TELEVISION SERVICE
Addr: Dep. of Television, c/o Dewan Tunku Abdul Rahman, Ampang Rd, Kuala Lumpur. Cable: Tivimalaya. Te: 23181 – L.P: Dir: Ow Kheng Law. Head of Prgr: R. I. bin Raja Zahid. Eng. in charge: K. K. Loh – Stations (625 lines): Kuala Lumpur ch M10 (209–216Mc) 10/4kW H – Kuala Lumpur ch M5 (174–181Mc), ch M8 (195–202Mc) 100/10kW – D.Prgr: 11.30–15.30.

Pye TVT, GB: Tr, ant, studio equip.

PAKISTAN

Two st's are being set up at Lahore & Dacca and may operate early 1965.

PHILIPPINES

ASSOCIATED BROADC. CORPORATION–ABC (Comm.)
Addr: Malugay St, Makati, Rizal, Manila – Station: DZTM-TV ch A5 D.Prgr: Mon, Wed, Fri 09.25–13.30; Tues, Thurs 09.25–15.00; Sat 09.00–14.30; Sun 03.55–14.30.

BOLINAO ELECTRONICS CORP. (Comm.) – Addr: ABS Bldg, Dewey Blvd, Manila. Te: 8-46-84. Cable: Bolinao – Stations: DYCB-TV ch A3 2/1kW – DZAQ-TV ch A3 2/1kW – Davao City ch A7 0.5kW – D.Prgr: DYCB-TV: 08.00–14.00, DZAQ-TV: 07.00–16.00.

CHRONICLE BROADC. NETWORK (Comm.) – Addr: P.O. Box 1593, Manila. Cable: CBN. Te: 300–61 – Station: DZXL-TV ch A9 0.2/0.18kW – DXYL-TV ch A4 2kW – D.Prgr: 02.00–14.00.

INTER-ISLAND BROADC. CORP. (Comm.) – Addr: 61 Muralla, Intramuros, Manila – Stations: DZTV ch A13 25/5kW, DXTV (Davao City) ch A13 0.5kW – D.Prgr: 07.00–15.00.

METROPOLITAN BROADC. CO. (Comm.) – Addr: 964 Taft Ave, Manila – Station: DZRH-TV ch A11 24/49kW H – D.Prgr: 08.00–15.00 – F.Pl: Davao ch A11 3.5/7kW.

PHILIPPINE BROADC. SERVICE (Go. with comm. prgr's) – Addr & L.P: See radio – Station: DZRP-TV ch A10 H 1.5/1.2kW – DZBS-TV ch A12 0.5kW – D.Prgr: 09.00–14.00.

REPUBLIC BROADC. SYSTEM (Comm.) – Addr: E de los Santos Ave, Diliman, Quezon City. Te: 700221. Cable: "Bobstew" – Station: DZBB-TV ch A7 5/2.5kW – DYBB-TV ch A7 0.1kW (Ceby City). D.Prgr: Mon–Fri 07.30–15.00, Sat 00.00–14.00, Sun 00.00–15.30.

FEATI UNIVERSITY (Non. comm.) – Addr: Helios Street, Sta. Cruz, Manila – Station: DZFU-TV ch A14 0.4kW.

Projected st's: Chronicle Broadc. Network: Bacolod City ch A2 0.5kW, Baguio City ch A2 0.5kW, Cebu City ch A3 2kW, Cagayan de Oro ch A5 2kW – Manila Times Publications, Inc: Davao City ch A3 10kW, Cebu City ch A13 10kW – Visayan Broadc. Network: Cebu City ch A7 0.5kW, Bacolod City ch A9 0.5kW.

Ampex Videotape, USA; Chronicle Broadc. Netw, Republic Broadc. System – Pye T.V.T, GB: Studio equip (Rep. Broadc. System). Nippon Electric Co, Japan: TV tr's and studio equip. to Philippine Broadc. Service, Metropolitan Broadc. Co.

RYUKYU ISLANDS

RYUKYUS BROADCASTING CORPORATION (Comm.)
Addr: CPO Box 4, Naha, Okinawa – L.P: See radio.
Station: KSAR-TV chA12 5/1kW – D.Prgr's: 03.00–15.00 in Japanese & English.
Nippon Electric Co, Japan, delivered 5kW tr, studio equip.

OKINAWA TELEVISION BROADC. LTD. (Comm.) – Addr: Ichihone, Matsuyama-cho, Naha, Okinawa – L.P: Pres: T. Guschken – Station: KSDW-TV chA10 5/2kW – D.Prgr: 03.00–15.00 in Japanese, English.
Nippon Electric Co, Japan: 5 kw tr, studio equip.

SAUDI ARABIA

ARAMCO-TV (Non-comm, private Co.)
Fi: Arabian American Oil Co – Addr: Box 1359, Dharan. Te: 3061. Cable: Aramco – L.P: Producer: S. Al Mozaini. Asst. Producer: S. Kubeisy – Stations: chA2 6/3.15kW – chA13 6/3.15kW.
D.Prgr: Sign on approx. 15.40; Prgr. time: Sat/Sun/Mon/Tues: 4 hrs, Wed, Fri: 5 hrs, Thurs: 6½ hrs (times vary with Sun) – Pub: weekly schedule.

SINGAPORE (Federation of Malaysia)

TELEVISION MALAYSIA SINGAPURA (Go.)
Fi: By Go. appropriation – Addr: Malayan $ 36 – Addr. & L.P: See radio.
Stations: Bukit Batok: ch E5 (Singapore I), ch E8 (Singapore II) 16kW H – D.Prgr: ch E5: 11.00(Sat/Sun 05.30)–16.30, ch E8: 12.15–14.45. Test Pattern: ch E5 W 02.30–04.30, ch E8 Mon–Fri: 06.30–09.30 – F.Pl: Two additional st's in band IV (1964/65).

The Marconi Company Ltd, GB, tr's: 2 × 5kW vision, 2 × 1kW sound – AWA, Australia, 2 – 2kW vision, 2 – 0.4kW sound – Nippon Electric Co, Ltd, Japan: TV-OBV equip.

SYRIA

SYRIAN TELEVISION SERVICE (Go.) – Addr & L.P: See radio. Stations: Damascus chE5 150/10kW, Homs chE7 30/2kW – Sheikh Dahor chE9 4.5/0.075kW, Aleppo chE5 30/2kW, Saraukhiyah chE8 2.25/0.075kW – D.Prgr: 16.00–22.00.

THAILAND

THAI TELEVISION CO. LTD. (Semi Go, Comm.)
Fi: By adv. and Go – Addr: Mansion B, Rajdamnern Ave, Bangkok. Cable: Thaitevi. Te: 22273.
L.P: Dir. Gen: Lt. Gen: K. Punagunta. Gen. Mgr. & Film Buyer: R. Hongsanand. Dir. Tec: A. Pojanapisute. Dir. Prgr: Ch. Rangsikul. Stations (System RCA): Bangkok chA4 29/14.5kW H – Relay st's: Khonkaen chA5 33/16.5kW H, Lampang chA8 21.4/10.7kW H, Hadyai chA9 10.7/5.35kW H – D.Prgr: 10.00–17.00, Sun also 04.00–09.00.

THE ARMY TELEVISION STATION (Comm.)
Operated by the Thai Army Signal Corps – Fi: By state and adv – Addr: Sanam Pao, Bangkok. Te: 70428 – L.P: Chmn. Gen: C. Navisathri. St. Mgr: Col. C. Sudhiraksa. Chief, Eng. Dept: Col. K. Kengradomying – Station: HSA-TV chA7 60/6kW H – D.Prgr: 04.45(Sat/Sun 02.00)–06.00, 10.15–17.00.

TURKEY

ISTANBUL TEKNIK UNIVERSITESI (Go. exp.)
Fi: By the Technical University – Addr: Elektrik Fakültesi, Yüsek Frekans Tekniği Kürsüsü, Istanbul. Te: 482250 – L.P: Prof. Dr. A. Ataman – Station: Ch E4 50W H – D.Prgr: Thurs 15.00–17.00 only during the Academic Year.



AUSTRALIA (Commonwealth of)

Standards: Def: 625 – Picture freq: 25 – Ch width: 7Mc FM.

AUSTRALIAN BROADCASTING COMMISSION (ABC)
National Television is controlled by the Australian Broadcasting Commission, which is responsible to the Postmaster-General, whose department controls the transmitters – Addr. and L.P: see radio.
Stations: One each in Sydney (ABN), Melbourne (ABV), Brisbane (ABQ), Adelaide (ABS), Perth (ABW) and Hobart (ABT), Canberra (ABC). Operate on Australian ch2 on 63–70Mc 100/20kW exc. ABC Canberra ch3. Po: H exc. Canberra V.
ABHN Newcastle ch5, H – ABEV Bendigo ch1, V – ABRV Ballarat ch3, H – ABNT Launceston ch3, H – ABDQ Toowoomba ch3, H – ABWN Wollongong ch5, H – ABCN Orange ch1, V – ABLV Latrobe Valley ch4, H – ABGV Goulburn Valley ch3, V – ABRQ Rockhampton ch3, H – ABRN Richmond Tweed ch6, H – ABTQ Townsville ch3, H.
D.Prgr's: Mon–Fri 01.30–01.50, 04.00–04.50, 06.45–13.00; Sat 03.30–13.00; Sun 01.00–02.15 (fortnightly church service), 03.00–12.50 – Projected st's: ABAV ch1, H (December 1964) – ABMN ch0, H (March 1965).

PRIVATE STATIONS (Comm.)
Adv. accepted under conditions of Australian Broadc. Control Board. The first two letters are an abbreviation of the name of the licence, the third indicates the state and the numeral signifies the channel. All st's 100/20kW.

1) ATVQ	9) ADS7	16) TNQ7	23) TNT9
2) NBN3	10) TVW7	17) CBN8	24) NWS9
3) RVN2	11) HSV7	18) RTN8	25) NEN9
4) WIN4	12) ATN7	19) BCV8	26) GLV10
5) AMV4	13) BTQ7	20) TCN9	27) DDQ10
6) TVT6	14) CTC7	21) GTV9	28) NRN10
7) BTV6	15) RTQ7	22) QTQ9	29) TEN10
8) GMV6			

1) Australama TV Pty Ltd, 489 Swanston Str, Melbourne. Te: 340291. L.P: Gen. Mgr: L. A. Mauger. D.Prgr: 06.00–13.15 (Sat 06.30–13.00, Sun 04.30–13.15).

Colombia

3.7. Terrestrial Communication Distribution Network

For many years Colombia had a fairly efficient telecommunication system in all but the eastern regions of the country. Over the past decade, while facilities have been improved and expanded, the system has not been able to keep pace with the demand for more and better services. A poor national economy, financial instability and lack of sufficient revenue from the public telecommunication system have hindered rapid development of Colombia's telecommunication system.

Presently available telecommunication services include the following:

a. Voice: The facilities for inter-city telephone service consist of well-integrated VHF radio relay networks, an extensive open-wire network, and h.f. point-to-point circuits.

The VHF radio relay networks contain up to 96 voice channels and connects about 25 urban centers in the north western third of the country. Trunk routes extend from Mt. El Ramo to Buenaventura via Calamar, Sincelejo, Yarumal, Medellin, Armenia and Cali. Another trunk route extends from Mt. El Ramo to Armenia via Bucaramanga, Tunja, and Bogota. Spur routes connect many other towns and cities to the trunks. The VHF network is being extended to the southern cities of Posto, Papayan, and Neiva. Some links of this VHF network are already overcrowded, and a UHF - microwave network with 960 channels is planned so services can be expanded. Initially, the UHF - microwave network will connect Bogota with Cali, Medellin, Bucaramanga and Barranquilla.

The open-wire network for the most part, provides spur routes from the VHF trunk system to smaller towns and rural areas.

There are no wire or radio relay facilities in the eastern half of the country, and telecommunication services are provided entirely by h.f. radio. The h.f. facilities are being greatly expanded with low power single sideband equipment for voice communication. These new facilities are expected to bring badly needed communications to the public in the eastern regions of Colombia. There are approximately 375,000 telephones in use in Colombia at the present time, of which about half are in Bogota.

Direct international voice service is available by cable between Cucuta and San Cristobal, Venezuela and by h.f. radio to Buenos Aires, Caracas, Havana, New York, Panama, Quito and Santiago, Chile.

Colombia - continued

b. Record and Data: Telegraph service is available over the same VHF radio relay, open wire line and h.f. radio networks as those that provide voice communication. Telegraph service to some additional areas in the interior of the country is provided by spur lines from the main trunk systems and h.f. radio circuits capable of handling only telegraph traffic.

International telegraph service is provided to the same points as voice service, as well as to Hamburg; Lima; London; Mexico City; Miami; Montevideo; Rio de Janeiro; Iquitos, Peru and Manaus, Brazil by h.f. radio. On most of these circuits telex and facsimile services are also available.

c. Television: At the present time there are no wide band transmission telecommunication services available in Colombia.

3.8. Broadcast Capabilities Within Colombia

a. Radio: There are about 220 medium wave broadcast stations in operation in Colombia. The largest number, 34, are located in Bogota, with 24 in Medellin and 16 in Barranquilla. The remainder are located in 64 other cities and towns in the country. The following is a list of cities and towns with medium wave broadcasting stations, and their number.

Anserma (1)
Armenia (5)
Armero (1)
Barrancabermeja (2)
Barranquilla (16)
Belencito (1)
Bogota (34)
Bucaramanga (6)
Buenaventura (1)
Buga (2)
Caicedonia (1)
Calarca (1)
Cali (15)
Cartagena (5)
Cartago (1)
Cerete (2)
Chaparral (1)
Chiquinquira (1)
Cienaga (2)
Copa Cabana (1)
Cucuta (6)
Darien (1)
Duitama (1)
Elbanco (1)
Espinal (1)
Florencia (1)
Floridablanca (1)
Fusagasuga (2)
Garzon (1)
Girardot (3)
Giron (1)
Honda (1)
Ibague (4)
Ipiales (2)
Ladoranda (1)
Lorica (1)
Magangue (2)
Manizales (7)
Medellin (24)
Monteria (3)
Neiva (4)
Nemocon (1)
Ocana (1)
Palmira (3)
Pamplona (2)
Pasto (6)

Colombia - continued

Pereira (7)
Qitalito (1)
Popayan (2)
Puerto Boyaca (1)
Rio Hacha (1)
Rosa de Cabal
S Andres Isla (2)
San Gil (1)
Santa Barbara (1)
Santa Maria (2)
Santa Marta (1)
Sevilla (1)
Sincelejo (3)
Socorro (1)
Sogomoso (1)
Sonson (1)
Tunja (5)
Turbaco (1)
Valledupar (2)
Villavicencio (2)
Villamaria (1)

Seventy of these transmitters are rated at 10 or more kilowatts in power, while most of the remainder are 1 kw.

A total of approximately forty shortwave transmitters, almost all of which are operated in conjunction with medium wave transmitters beam broadcasts to the rural areas of the country.

There are approximately 100 VHF-FM stations in operation in Colombia. Most of them operate in conjunction with a medium wave station, and they are located in almost every major city and town in the country.

Except for a radio network of a half-dozen or so stations operated by the Columbian government (Instituto Nacional De Radio Y TV), the great majority of stations in the country are privately owned and commercially operated.

There are approximately 1,500,000 radio receivers in Columbia, for a population of 15,000,000.

b. Television: Television is completely government operated, but limited commercial advertising is permitted. Two stations are located in Bogota (channels 7 and 10), with nine other stations at Manizales (channel 11); Las Jurisdicciones (channel 6); El Carmen (channel 9); Monteria (channel 7); Santa Marta (channel 2); Medellin (channel 8); Tunja (channel 10); Madrono (channel 9) and Belencito (channel 7).

Television equipment in Colombia operates on U.S. technical standards. There are approximately 230,000 television receivers in the country at the present time.

Colombia - continued

An inter-American telecommunication network is now under study by the International Telecommunication Union. This project proposes development of an integrated multi-channel, wideband telecommunication network employing radio relay, coaxial cable, submarine cable, tropospheric scatter systems and possibly communication satellites to interconnect all the capitals of the western hemisphere.

See attachments 1 and 2 for more complete details concerning radio and television broadcast stations in Colombia (from 1965 edition of World Radio-TV Handbook).

[illegible] CB76/CE970: Cas. 13130, Santiago. CB73/CE1190: Cas. 37V, Valparaiso. Cable: Vitalradio. AD: 15 min. per h – L.P: CB76: Exec. [illegible] C. A. Vial F. CB73: Gen. Mgr: R. Reyes B. Dep. Gen. Mgr: V. [illegible]scheske G. Dir. Tec: R. Renard S. – D.Prgr: N: CB76/CE970: 11.30, 12.15, 13.00, 16.00, 16.45, 17.15, 18.00, 19.00, 19.20, 20.00, 21.00, 22.00, 23.00, 00.15, 02.00; CB73/CE1190: 11.00, 11.30, 12.00, 13.00, 14.00, 15.00, 16.00, 16.45, 17.15, 18.00, 19.00, 20.00, 21.00, 22.30, 00.00, 02.00, 03.00, 04.00 – Ann: "Emisoras La Voz de Chile, La Voz de Chile, por sus estaciones R. La Cooperativa" – [illegible] Radial, La Voz de Chile, por sus estaciones R. La Cooperativa" – [illegible] Song with central theme of "Pomp and Circumstance" – V. QSL-card and letter. Records accepted.

[illegible] Cas. 244V, Santiago – L.P: Dir: S. Fernandez – D.Prgr: N: Every [illegible] the h – Ann: "Transmite CB114, R. Corporación, Santiago de [illegible] R. Corporación en el mejor lugar, su hogar".

[illegible] Escuela de Derecho Universidad de Chile, Box 211V, Valparaiso – L.P: Dir: R. Alba – Ann: "Esta es R. Valentin Letelier, de la Escuela de Derecho de Valparaiso, de la Universidad de Chile, transmitiendo [illegible] Onda Larga CB103, en 1030kc, en Onda Corta CE965, en 9550kc, en Frequencia Modulada CE104.3 en 104.3Mc por segundo" – V. QSL-card or letter. Rec. in Sp or E.

[illegible] Cas. 3051, Santiago – Ann: "CB101 y CE766 Estaciones de R. [illegible] de la Corporación de Radiodifusion, Santiago de Chile" – [illegible] First movement of the song "Donde el Azul de la Noche [illegible] en el Ove del Dia" – V. by letter.

[illegible] 9255, Santiago. Cable: R. Nuevo Mundo.

[illegible] Dir. Gen: J. Raggio – D.Prgr: N: 11.30, 12[illegible] 16.00, 18.00, 19.00, 20.00, 21.00, 22.00, 23[illegible]

[illegible] "Estas son Las Emisoras Nuevo Mund[illegible] [illegible] transmiten por CB93, CE1174 estacion[illegible] [illegible] 25 metros y su equipo de FM en 93Mc" – V. [illegible] [illegible]-card and letter. [illegible] to Sp, E.

[illegible] Plaza Bulnes 47, Santiago – L.P: Mgr: Claudio Poblete – D.Prgr: [illegible]12.30, 17.45, 01.45, 04.45 – FM: 95.5Mc – V. All rc. to be sent to [illegible] V. Hugo Olguin D, Departamento de Relaciones Internacionales, [illegible] will be answered by QSL-card or letter – F.Pl: 50kW mw-tr.

Medium Waves:

[illegible] R. Ignacio Serrano, Ugalde 615, Claudio.
[illegible] R. Condor, Ca. 486, Concepción. D.Prgr: 11.00–04.00.
[illegible] R. Minería, Hotel Turismo, Antofagasta – L.P: Dir: A. Lieux.
[illegible] R. La Reina, Cas. 244V, Santiago. L.P: Dir: M. Lavin.
[illegible] R. Esmeralda, Cas. 209, Iquique. Te: 572.
[illegible] R. Pres. Prieto, Cas. 37V, Valparaiso.
[illegible] R. Sur, Cas. 60-D, Valdivia. D.Prgr: 11.00–04.00.
[illegible] R. Norte Verde, Cas. 252, Ovalle. L.P: Dir: F. Morales.
[illegible] R. El Sur, Cas. 482, Concepción. L.P: Dir: J. Valenzuela.
[illegible] R. Chilena, Cas. 10277, Santiago. L.P: Dir: E. Menchaca.
[illegible] R. El Libertador, Rubio 259, Rancagua.
[illegible] R. Lautaro, Cas. 214, Talca. L.P: E. Tarud.
[illegible] R. Santiago, Cas. 10195, Santiago – L.P: Dir. Gen: R. Vergara. [illegible] Tec: P. del Campo. D.Prgr: N: 11.30, 17.00, 00.45, 01.30. English [illegible] 13.00. Ann: "CB69 y CE97.1 R. Santiago, en Santiago de Chile".
[illegible] R. La Frontera, Cas. 516, Temuco – 31) R. Coya, Maria Elena, [illegible]gestad, or Cas. 13260, M. Elena.
[illegible] R. Caupolican, Cas. 506, Valparaiso – 33) R. del Salitre, Cas. 7-D, [illegible].
[illegible] Del Pacifico, Cas. 3591, Santiago – L.P: Dir: R. Vivado & J. [illegible]. D.Prgr: 24 h – 35) R. Concordia, Cas. 119, La Union.
[illegible] R. Recreo, Cas. 596, Viña del Mar. L.P: Mgr: J. Gonzales. Dir. [illegible] C. Triburzio. D.Prgr: 12.00–04.00.
[illegible] R. Almirante Latorre, Cas. 358, Talcahuano. L.P: Dir: A. Deij.
[illegible] R. Sago, Cas. 35-O, Osorno. Cable: Radiosago. L.P: Dir: Ro- [illegible] Luna. D.Prgr: 11.30–04.00.
[illegible] R. Bulnes, Cas. 1555, Santiago. L.P: Dir: C. Briceño.
[illegible] R. Interamericana, Cas. 97, Concepción. L.P: Dir: M. Fonseca.

PARA TODOS LECTORES HABLANDO ESPAÑOL

A fin de emplear el WRTH sin dificultades ofrecemos a todos nuestros lectores, que hablan el castellano, un vocabulario inglés-español que contiene todas palabras y frases que se utilizan por lo general en todos resumens y tablas en el manual. Este vocabulario capacitará a todas personas con un poquito o sin conocimiento ninguno al idioma inglés para entender y emplear el WRTH sin difficultades. Si quiere un ejemplar, libre de gastos, sírvase escribir a

WORLD RADIO TV HANDBOOK CO., LTD
Sundvej 6, Copenhague—Hellerup, Dinamarca

[illegible] R. Polar, Cas. 13-D, Punta Arenas. L.P: Dir: P. Torreso. D.Prgr: 11.30–04.00. V. by letter.
[illegible] R. El Roble, Cas. 37, Parral. L.P: Dir: J. Rogazy.
[illegible] R. Vicente Perez Rosales, San Felipe 80, Puerto Montt.
[illegible] R. Riquelme, Cas. 92, Coquimbo – 45) R. José Miguel Carrera, Tenderini 115, piso 9, Santiago – 46) R. Condell, Yungay 10, Curico.
[illegible] R. Camilo Henriquez, Cas. 28-A, Valdivia.
[illegible] R. Payne, Cas. 97, Puerto Natales. L.P: J. Navarro.
[illegible] R. Llanquihue, Cas. 356, Puerto Montt. D.Prgr: 11.00–04.00.
[illegible] R. Caulin, Cas. 40-D, Temuco. L.P: Dir: M. Fernández M.
[illegible] R. La Portada, Cas. 410, Antofagasta. L.P: Sra. Raymunde Prieta.
[illegible] R. La Serena, Cas. 118, La Serena – 53) R. Toco, Cas. 808, Tocopilla.
[illegible] see no. 100) – 55) R. Chiloe, Chiloé. L.P: Dir: F. Mihovilovic.
[illegible] R. Viña del Mar, Cas. 514, Viña del Mar.
[illegible] R. Austral, Cas. 40-D, Punta Arenas. L.P: Dir: J. Navarro.
[illegible] R. Simon Bolivar, Cas. 348, Concepción. L.P: Dir: A. Jaén.
[illegible] R. Universidad Tecnica del Estado, Avda. Ecuador 3469, Santiago. Te: 92981. L.P: Dir: M. T. Temenias. Dir. Tec: J. Arenas K. D.Prgr: 17.00–04.00. N: 17.30, 02.00.
[illegible] R. El Litoral, Cas. 2001, Tocopilla. L.P: Dir: Antonio Arce.
[illegible] R. Atacama, Cas. 57, Copiapo. Te: 171.
[illegible] R. Valparaiso, Cas. 1096, Valparaiso. L.P: Dir: J. O'Shee.
[illegible] R. Andrés Bello, Mac Iver 142, Santiago – L.P: Mgr: J. Morris.
[illegible] R. Talca, Cas. 450, Talca – 65) R. Nacional, Cas. [illegible]987, Santiago.
[illegible] Nueva R. Noble, Cas. 267, Chillan. L.P: Dir: [illegible]. Vaccaro.
[illegible] R. Patrocinio [illegible]53, Coyhaique.

[illegible]: Gen. Mgr: C. Cockbaine.
[illegible]: Dir: P. Vergara.
[illegible] R. Prat, Cas. 10210, Santiago. L.P: Dir: P. Valenzuela. D.Prgr: 11.00–05.30. Ann: "Esta es CB97 todo el dia informando".
[illegible] R. Discusión, Cas. 14-D, Chillan. L.P: Dir: A. Lagos.
[illegible] R. Cervantes, Cas. 4650, Santiago. L.P: Dir: G. Holtehuer.
[illegible] R. Malleco, Cas. 204, Victoria. L.P: Dir: G. Servanti.
[illegible] R. Pampa, P. de Valdivia – 76) R. Minerva, Cas. 339, Rancagua.
[illegible] R. General Marchant, Puerto Ausén. L.P: Dir: D. Martinez.
[illegible] La Voz del Sur, Cas. 53, Punta Arenas. D.Prgr: 11.30–04.00 – V. by letter – 78) R. Panamericana, Alameda 924, Santiago.
[illegible] R. Eleuterio Ramirez, Ramirez 652, Osorno.
[illegible] R. Rengo, Urriola 85, Rengo. L.P: Dir: F. Gandarillas.
[illegible] R. Padeto, Edif. Yuri, Ancud. L.P: Dir: José Leal.
[illegible] R. Antofagasta, Cas. 439, Antofagasta. L.P: Dir: A. Garcia.
[illegible] R. Chacaburo, Cas. 370, Quillota – 84) R. Araucania, Cas. 462, Concepción. L.P: Dir: R. Arjona – 85) R. Chañaral, Comercio 53, Chanaral. L.P: Dir: Hoguer Garrao – 86) R. Alonso de Ercilla, Cas. 369, Illapel. L.P: H. Pinochet.
[illegible] Univ. Tecnica Santa Maria, Cas. 110-V, Valparaiso. L.P: Dir: C. Ceruti. Dir. Tec: G. Feik. D.Prgr: 01.00–02.30.
[illegible] R. Independencia, Cas. 132, Molina. L.P: Dir: J. Aravena C. D.Prgr: 11.00–06.00. V. by QSL-card.
[illegible] R. El Cobre, Cas. 125, Rancagua. L.P: Dir: Julio Romero.
[illegible] R. Central, Cas. 202, San Carlos. L.P: Dir: Victor Busto.
[illegible] R. Turismo, Puerto Varas – 92) R. Magallanes, Cas. 13940, Santiago – 93) R. Arauco, Cas. 6, Angol. L.P: Dir: J. Abasolo.
[illegible] R. Estrella del Norte, Cas. 13, Vallenar. L.P: Dir: L. Morales.
[illegible] Trasandina, Cas. 307, Los Andes – 96) R. Maule, Cas. 196, Cauquenas – 97) R. Manuel Rodriguez, Cas. 147, San Fernando – 98) R. Limache, Cas. 92, Limache – 99) R. Sudamerica, Cas. 1346, Santiago.
[illegible] R. Rancagua, Cas. 21, Rancagua. L.P: Dir: J. Romero.
[illegible] R. Almirante Lynch, Vivar 489, Iquique. L.P: Dir: L. Roldán.
[illegible] R. Soberania, Cas. 11-D, Linares. L.P: Dir: R. Abasolo.
[illegible] R. Aroncagua, Cas. 100, San Felipe. L.P: Dir: R. Grez Gonzáles.
[illegible] R. Chronos, Plaza Bulnes 79, Santiago.
[illegible] R. Centenario, Cas. 18, San Javier. L.P: Dir: Mario Gaete.
[illegible] R. Regional, Cas. 293, Traiguen. L.P: Dir: Hugo Cuadra.
[illegible] R. Sargento Aldea, Cas. 38, San Antonio. L.P: Dir: R. Filippi.
[illegible] R. Provincial, Cas. 73, Putaendo.

COLOMBIA

L.T: GMT – 5 h – Pr.L: Spanish.
STATIONS: a) Go. st's – b) Cultural – c) Cultural or non-comm, private – d) to m) Comm. networks – n) Comm. st's – y) & z) Professional Association.
Hours of tr: 12.00–05.00 exc. where indicated.
Short waves: Call HJ---. *=inactive.

Call	kc	m	kW	Name & h of tr.
1) GW	3250	92.31	10	Accion Cult. Popular, Bogota b)
2) AB	3290	91.18	25	Inst. Nac. de Radio y TV, Bogota a)
3) GI	4755	63.09	2.5	Reina de Colombia, Chiquinquira c)
4) KW	4775	62.84	1	La Voz de Maria, Bogota c)
5) FU	4795	62.57	1	La Voz del Comercio, Armenia c)
6) AU	4805	62.43	0.5	Universidad de Antioquia, Medellin c)
7) HC	4825	62.18	1	R. Nariño, Pasto: 10.45–05.00 e)
8) AM	4835	62.05	1	R. Buenaventura n)
9) GF	4845	61.92	1	R. Bucaramanga: 11.00–04.00 q)

	Call	kc	m	kW	Name & h of tr.
10)	FV	4855	61.79	1	R. Néiva: 11.00–04.30 d)
11)	BG	4875	61.54	2.5	La Voz del Norte, Cúcuta n)
12)	CH	4895	61.29	5	La Voz de la Victoria, Bogotá n)
13)	AG	4905	61.16	1	Emis. Atlántico, Barranquilla: 11.30–04.00 z)
2)	CQ	4955	60.54	25	Inst. Nac. de Radio y TV, Bogotá a)
14)	AL	4965	60.42	2.5	R. Santa Fé, Bogotá, 24 h n)
15)	GV	4985	60.18	10	Transmis. Independencia, Tunja n)
16)	FW	5020	59.76	10	Transmis. Caldas, Manizales 24 h e)
17)	IC	5035	59.58	1	La Voz del Caquetá, Florencia n)
18)	NE	5040	59.52	1	R. El Sol, Cali 11.00–05.00 11 z)
1)	GC	5075	59.11	25	Accion Cultural Popular, Bogotá 10.20–03.10 b)
1)	GG	5095	58.88	50	Accion Cultural Popular, Bogotá 10.20–14.00, 19.00–03.10 b)
19)	CF	5960	50.34	1	Voz de Bogotá 11.00–04.00 (z)
20)	KA	5970	50.25	1	R. Horizonte, Bogotá: 12.00–03.00 n)
21)	LY	5980	50.17	1	La Voz del Río Grande, Medellín 11.00–07.00 f)
22)	FQ	5995	50.64	1	La Voz del Pueblo, Pereira 12.00–04.00 f)
23)	FK	6010	49.92	1	La Voz Amiga, Pereira 12.00–04.00 i)
2)	ZI	6030	49.75	1	Inst. Nac. de Radio y TV, Bogotá a)
24)	CB	6040	49.67	10	La Voz del Tolima, Ibaqué f)
25)	EK	6055	49.55	5	R. Pacífico, Cali e)
1)	GC	6075	49.38	10	Accion Cultural Popular, Bogotá 10.20–03.10 b)
26)	DX	6085	49.30	1	Ecos de Pasto d)
27)	IQ	6095	49.22	1	La Voz del Llano, Villavicencio: 13.00–05.00
28)	NB	6105	49.14	1	R. Visión, Medellín 10.30–05.30 hm)z)
29)	KE	6125	48.98	1	R. Continental, Bogotá 10.00–05.30 f)z)
30)	ED	6145	48.82	1	La Voz del Cauca, Popayan f)z)
31)	KJ	6160	48.70	10	Emis. Nueva Granada, Bogotá e) 10.00–06.00
2)	CT	6180	48.54	25	Inst. Nac. de Radio y TV, Bogotá a)
32)	EZ	6195	48.43	1	La Voz de Cali 11.00–05.00 f)z)
2)	ZM	*9635	31.14	25	Inst. Nac. de Radio y TV, Bogotá a)
1)	GQ	*9750	30.76	10	Accion Cultural Popular, Bogotá b)
2)	ZN	*11795	25.43	25	Inst. Nac. de Radio y TV, Bogotá a)
2)	ZO	*11825	25.37	25	Inst. Nac. de Radio y TV, Bogotá a)
1)	GL	*15235	19.69	10	Accion Cultural Popular, Bogotá b)
2)	ZP	*15335	19.56	25	Inst. Nac. de Radio y TV, Bogotá a)
2)	ZQ	*17865	16.79	25	Inst. Nac. de Radio y TV, Bogotá a)
2)	ZR	*21510	13.94	25	Inst. Nac. de Radio y TV, Bogotá a)
2)	ZS	*25750	11.65	25	Inst. Nac. de Radio y TV, Bogotá a)

Medium Waves: Call: HJ—. *) also on SW

Call	kc	kW	Call	kc	kW
20) KA	*540	10 n	1) CY	*810	10 b
2) HF	*550	10 a	49) ED	820	50 d
15) GS	*560	10 n	28) DM	*830	10 hm, z
2) ND	*570	100 a	50) BI	840	10 q
2) HG	*580	50 a	51) KC	850	50 d
1) CR	*590	10 b	52) EP	860	10 f
33) HJ	600	10 n	24) LA	*870	10 f
31) KL	*610	25 e	53) NW	880	30 n
34) EL	620	10 g	54) HO	890	10 n
35) FD	630	20 f, z	19) CE	*890	10 i, z
36) BJ	640	10 e, j	32) EY	*900	10 f, z
23) KH	*650	10 i	21) DO	*910	10 f
37) NX	670	10 g	55) AE	920	10 k, z
38) AQ	680	10 e, j	29) CS	*930	10 f, z
39) CZ	690	10 hm, z	56) GB	940	10 i, y
1) FU	*700	10 b	57) EN	950	10 d
40) FT	710	10 d	2) HK	960	10 a
41) AN	720	10 k	12) CI	*970	10 n
42) CU	730	10 g	18) ES	*980	10 f, z
26) HB	*740	10 d, z	58) DB	990	10 e
43) DK	750	50 d	2) BU	1000	10 a
44) AJ	760	10 e, j	59) CC	1010	10 hm, y
45) JX	770	30	60) DQ	1020	1 f, z
46) ZG	780	10 n	22) FQ	*1020	10 f
47) DC	790	10 d, hm	25) ER	*1030	10 e
48) BW	800	10 f	9) GE	*1030	10 q

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Call	kc	kW
61) AI	1040	5 hm, z
62) CJ	1040	10 g
63) DR	1050	1 n
64) NG	1050	5 f
16) FJ	*1060	10 e
14) CG	*1070	10 n
13) AH	*1070	1 z
65) DZ	1080	1 d
66) JF	1080	10 f, z
67) FM	1090	10 f, z
68) BC	1090	10 d
69) AT	1100	1 d
70) CN	1100	10 d
71) DL	1110	9 c
72) FW	1110	1 d
73) KQ	1120	10 l
74) LO	1120	10 y
75) AC	1130	10 f, j
76) CO	1130	1 g
77) JC	1130	1 f, z
78) TR	1140	10 f
79) DL	1140	1 i
80) EV	1140	1 n
1) GJ	*1150	10 b
81) FI	1150	1 d
82) CK	1160	10 y
83) NH	1160	1 f, z
84) AZ	1160	5 k, y
85) JE	1170	1 f
86) DT	1170	1 z
86a) DP	1170	1 n
87) GK	1180	10 e
88) FX	1180	1 d
89) CV	1190	1 f
90) CT	1190	5 n
91) NB	1190	10 n
92) NF	1200	1 q
93) CD	1200	1 n
94) IJ	1200	1 n
27) BX	*1200	1 f
95) BE	1210	1 n
23) FF	*1210	10 i
96) NM	1220	2.5 n
97) AV	1220	2 e, j
98) KR	1220	10 n
99) FV	1220	1 d
10) FP	*1230	1 n
100) LK	1230	1 n
101) IL	1230	5 z
102) GN	1240	5 d
103) TI	1240	5
5) FG	*1240	5 e, h
8) JA	*1240	1 d
104) KW	1250	10 n
105) AO	1250	1 k, z
106) HZ	1250	1 c
107) HS	1250	1 f
108) ET	1260	1 hm
109) NC	1260	1 g
110) NO	1260	1 l
111) DA	1260	1 h
112) HU	1260	1 n
113) KZ	1270	1 hm
114) TX	1270	1 hm
115) EB	1270	1 n
116) LR	1280	1 n
117) KN	1280	2.5 g
118) AR	1280	5 j
119) EC	1290	1 y
120) TH	1290	1 q
121) LA	1290	1 d
122) KY	1290	1 n
123) CM	1290	1 n
124) BK	1300	2 n
125) NB	1300	1 n
126) LD	1300	1 z
127) AK	1310	2.5 i, z
128) JZ	1310	1 d, y
129) LB	1310	1 f, z
130) ZU	1310	1 f
131) TH	1320	1 n
132) NK	1320	1 n
133) FR	1320	1 e, y
134) HY	1330	1 n
135) FE	1330	5 e

Call	kc	kW
136) GU	1330	1 f, y
137) LB	1340	1 n
138) AD	1340	1 k, z
11) BF	*1340	1 n
7) HA	*1340	1 e
139) EN	1350	1 z
140) FY	1350	1 f
141 DS	1350	1 g
142) HW	1350	1 n
143) FH	1360	1 e
144) GI	1360	1 n
145) NI	1360	1 d
146) KX	1370	1 n
147) BO	1370	1 n
148) BD	1370	1 f
30) EA	*1370	1 f, z
149) NU	1380	1 n
150) LG	1380	1 d
151) EJ	1380	1 e, y
152) KD	1380	1 n
153) TJ	1390	1 n
154) FO	1390	1 z
155) NY	1390	1 f
156) KM	1400	0.25 e
157) AS	1400	1 n
158) ZV	1400	1 e
159) BK	1400	1 e
160) EI	1410	1 hm, z
161) BH	1410	1 d
6) DU	*1410	1 e
162) FS	1410	2 d
163) HM	1420	1 hm
164) GH	1420	1 d
4) KU	*1430	0.25 e
165) AP	1430	1 d
166) EG	1430	1 n
167) BP	1430	1 f, z
168) FL	1440	1 e
169) BZ	1440	1 n
170) NZ	1440	1 n
171) EK	1440	1 hm, z
17) IB	*1440	1 n
172) GM	1440	1 e
173) NL	1450	1 n
174) AL	1460	1 n
175) JW	1460	1 n
176) BA	1460	1 c
177) FZ	1470	1 n
178) NT	1470	1 f
179) IM	1470	1 n
180) BL	1470	1 q
181) FC	1480	1 q
182) AW	1490	1 n
183) BS	1490	1 n
1) EH	*1490	1 b
184) NS	1490	1 f
185) CL	1500	1 d
186) LK	1500	1 c
187) GA	1500	1 l
188) TW	1500	1 n
189) ZH	1500	1 n
190) HX 10	15	1 i
191) ZA	1510	1 d, hm
192) LK	1520	1 n
193) GX	1520	1 n
194) LI	1520	1 q
195) LS	1520	1 d
196) JB	1530	1 e
197) DN	1530	0.2 e
3) GC	*1530	0.35 e
198) LE	1530	1 f
199) ZF	1540	0.25 e
200) BV	1540	1 h
201) ZI	1550	1 n
202) GY	1550	1 n
203) ZX	1560	0.25 e
204) CP	1560	1 e
1) GP	*1560	1 b
205) HE	1570	1 n
206) FW	1570	1 q
207) AY	1580	1 h
208) AP	1580	1 n
209) LC	1580	1 n
210) LP	1590	1 n
211) ZT	1600	1 n

INSTITUTO NACIONAL DE RADIO Y TV (R. Nacional – Go.) – Addr: Apt. Nac. 1824, Bogota. Te: 435640 – L.P: Dir. Gen: C. Simmonds P. Dir. Tec: W. Puth – D.prgr: 12.00 (Sun 14.00)–05.00.

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RADIO CADENA NACIONAL (RCN) – Addr: Apt. Aéreo 1244, Medellin. Te: 28642 – L.P: Pres: L.A. Villegas M. Dir. Tec: G. Escobar – D.prgr: 11.00–05.00.

CODELAR – Addr: Apt. Aéreo 4392, Cali. Te: 89386 – L.P: Dir. Gen: B. Tobón de la Roche.

RADIO SISTEMA TRICOLOR DE COLOMBIA(RST) – Addr: Apt. Aereo 7766, Bogota – L.P: Mgr: J. Vanegas R.

TRANSONAR – Addr: Ca. 13, No. 875, Bogota. Te: 415072 or Apt. Aéreo 3163, Medellin. Te: 459628 – L.P: Dir. Gen: J. Tobón de la Roche.

UNION RADIO – Addr: Apt. Aéreo 13018, Bogota. Te: 432925 – L.P: Mgr: J. Fernandez G.

CADENON (R. Cadena del Norte) – Addr: Apt. Aéreo 9164, [illegible] Te: 346077 – L.P: Mgr: A. Martinez (Apt. Aéreo 246, Cartagena).

CIRCUITO RADIAL ABC S.A. – Addr: Apt. Aéreo 1771, Nac. 206, Cartagena. Cable: Radial – L.P: Mgr: R. Fuentes L. Dir. Tec: C. [illegible] L. – Prgr: 10.45–05.00 N: 12.10, 17.00, 00.00 – V. by letter.

CORAL-CORPORACION RADIAL COLOMBIANA – Addr: Ca. 2 No. 517, Bogota.

ORGANIZACION INDEPENDIENTE DE LA RADIOFONIA COLOMBIANA (OIR) – Addr: Bogota.

RADIO-ASOCIACION NACIONAL DE RADIODIFUSION – Addr: Av. Jiménez 1128, Oficina 503, Bogota. Te: 423413 – L.P: Pres: J. Naranjo V.

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Short Waves: Abbrev: Cra = Carrera, Ca = Calle.
Escuelas Radiofonicas, Apt. Aéreo 1770, Nac. 3262, Bogota. Cable: Radiofonicas. Te: 420543 – L.P: Dir. Gen: J.J. Salcedo G. Mgr: Sarmiento O. Dir. Tec: P. Sanchez C. Dir. Prgr: F. Gutiérrez R – D.prgr: On 5075-1560kc: 10.20–03.10 (Escuelas Radiofonicas: 11.00–12.00, 20.00–21.00, 22.00–23.00, 00.00–01.00. N: 12.00, 22.20, 01.00, 03.00) – On 5095kc: 10.20–14.00 & 19.00–03.10; On 6075kc: 10.20–03.10 (Escuelas Radiofonicas N: as for 5075/1560kc) – On 590kc (Medellin): 10.30–05.00 – On 810kc (Bogota): 11.30–04.00 (Escuelas Radiofonicas: 13.00–14.00, 20.00–21.00, N: 12.00, 20.00, 23.30, 03.00) – 1150kc (Belencito): 10.45–03.10 (Escuelas Radiofonicas: 11.00–12.00, 20.00–21.00, N: 12.00, 23.20, 03.00) – Ann: "R. Sutatenza Ligada a la Confederación Latinoamericana para la Educación Fundamental Integral, transmite desde Sutatenza, en Boyacá República de Colombia" – V. by QSL-card.
V. by QSL-card or letter – Locations 550kc Medellin, 570kc Bogota, 730kc Cali, 960kc Manizales, 1000kc Barranquilla, Chiquinquira – 4) Bogota – 5) Armenia.
Cra. 43 No. 4796, Medellin – 7) Apt. Aéreo 390, Pasto. Cable: "Radionarino". Te: 1854 – 8) Ca. 5, Cra 2, Buenaventura –
Apt. Aereo 572, Apt. Nac. 47, Bucaramanga. Te: 5406. Telex: 48386 – P: Dir. Gen: P. Sorzano B. Dir. Tec: G. Sorzano J – D.Prgr: N: 12.00, 17.00, 24.00 – English: W 03.30–04.00 – Ann: "Estas son las emisoras de R. Bucaramanga, transmitiendo en sus freq's HJGF onda corta 4845kc, HJGE onda larga 1030kc, y HKSO frequencia modulada 88Mc desde Bucaramanga capital del Departamento de Santander en la República de Colombia" E: "This is R. Bucaramanga transmitting over following freq's...from Bucaramanga, Colombia in So. America" – V. by QSL-card. Re. in Sp, E.
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Cra 7 No. 1135, piso 6, Bogota. Te: 421105 – L.P: Mgr: A. Gaitan Apt. Aéreo 174, Barranquilla – L.P: Mgr: M.A. Blanco – V. by QSL-card.
Apt. Aéreo 9339, Bogota. Te: 411482 – V. by letter – 15) Tunja Apt. Aéreo 244, Manizales. Te: 5549 – L.P: Mgr: I. Escobar U. Dir. Tec: E. Martinez. Dir. Prgr: E. Bermudes R – D.Prgr: N: 12.00, 17.00, 24.00 – Ann: "Transmisora Manizales Colombia Filial de R. Cadena Nacional" – V. by letter. Records accepted.
Florencia – 18) Apt. Aéreo 1972, Cali. Te: 81350. Cable: "Radio-" – L.P: Dir. Gen: B. Tobón de la Roche. Dir. Tec: L. Carlos E. Dir. Prgr: F. Franco G – Ann: "Esta es R. El Sol, 980kc, canal prefijo Todelar de Colombia, R. El Sol de Cali, en dos frequencias para cubrir toda la república" – V. by letter.

19) Cra 5 No. 1876, Bogota. Te: 432925 – L.P: Mgr: G. Uribe Th – V. by letter – 20) Av. Jiménez 540, Bogota. Te: 439813.
21) Apt. Aéreo 1431, Medellin – L.P: Dir. Gen: B. Tobón de la Roche. Dir. Tec: J. Tobón de La Roche – Ann: "Desde el R. Centro Todelar y sus Circuito Nacional de Emisoras transmite La Voz del Rio Grande HJDO 910kc onda larga, en Medellin, Colombia" – V. by letter. Records accepted – F.Pl.: sw 10kW, mw 25kW.
22) Apt. 244, Pereira – L.P: Mgr: J. Mejia D – V. by letter.
23) Apt. Aéreo 89, Pereira – V. by letter – 24) Apt. Aéreo 604, Ibague – V. by QSL-card or letter – 25) Apt. Aéreo 2180, Cali – V. by letter.
26) Apt. Aéreo 375, Pasto – L.P: Mgr: A.J. Meneses – 27) Villavicencio.
28) Apt. Aéreo 3163, Medellin. Te: 459628 – L.P: J. Tobón de la Roche. Dir. Tec: E. Arango – Ann: "Sabe Quien transmite? R. Visión de Medellin una emisora de Sonar, Soc. Nacional de Radiofusión, trabajando para Vd." – V. by letter. Rp. Records accepted.
29) Apt. Aéreo 8467, Nac. 2167, Bogota. Te: 415036 – L.P: Mgr: J. Tobón de la Roche. Dir. Tec: J. Rios – V. by letter. Records accepted – F.Pl: 50kW mw – 30) Apt. Aéreo 535, Popayan – L.P: Mgr: O. Burchardt – V. by letter.
31) Cra 15 No. 13–47, Bogota. Te: 344805. Cable: "Nuevagranada" – L.P: Dir. Gen: L. Betancourt Tolosa – D.Prgr: N: 12.00, 17.30, 23.30, 02.30, 04.45 – Ann: "Transmite Nueva Granada" estaciones HJKL y HJKJ 610kc onda larga y 6160kc onda corta, desde Bogota, Republica de Colombia" – V. by QSLcard. Re. in Sp, E Records accepted. – F.Pl.: 50kw on 610kc – 32) Apt. Aéreo 4392, Cali. Te: 89386 – L.P: Dir. Gen: B. Tobón de la Roche – V. by letter.
Medium Waves:
33) R. Libertad, Barranquilla – 34) R. Tricolor, Cali. Te: 63811. L.P: Mgr: J. A. Vanegas. 24 h – 35) R. Manizales, Apt. Aéreo 67, Manizales. Te: 1395. L.P: Mgr: A. Hoyos A.V. by letter – 36) La Voz de Santa Marta, Santa Marta. L.P: Mgr: J. A. Sanchez – 37) R. Tricolor, Bello, Medellin. 24 h – 38) R. Miramar, Apt. Aéreo 246, Cartagena – 39) La Voz de Colombia, Cra 9 No. 1223, piso 3, Bogota. Te: 422344. L.P: Mgr: J. Munera L – 40) Ecos del Combeima, Ibague – 41) Emisoras Unidas, Apt. Aéreo 154, Nac. 324 Barranquilla. Te: 16490. Cable: "Emisunidas". 10.00–05.00 – 42) R. Tricolor, Apt. Aéreo 7766, Bogota. Te: 457073. L.P: Mgr: J. Vanegas R. 24 h – 43) La Voz de Antioquia, Maracaibo 4680, Medellin. Te: 421660. L.P: Mgr: H. Restrepo – 44) La Voz de Barranquilla, Barranquilla – 45) Emisora Monserrate, Cra 8 No. 1733 piso 3, Bogota – 46) R. El Pais, Cali – 47) Ecos de la Montaña, Cra 53 No. 5242, Medellin – 48) Emis. Atalaya, Bucaramanga – 49) La Voz del Rio Cauca, Cra. 1 No. 1839, Cali. Te: 72740 – 50) Ondas del Caribe, Santa Marta – 51) Emis. Nuevo Mundo, Apt. Aéreo 9291, Bogota. Te: 436800 – 52) Voces de Occidente, Cra. 14 No. 231, Buga. L.P: Mgr: R. Azcarate – 53) La Voz de los Comuneros, Bucaramanga – 54) R. Abacoa, S. Andres Isla – 55) Emis. Fuentes, Apt. Aéreo 1771, Nac. 206, Cartagena. Cable: "Emifuentes". Te: 13004. 10.00–05.00 –
56) R. Eco, Apt. Aéreo 4535, Cali – 57) La Voz del Café, Cra 1465, Pereira. Te: 6898 – 58) La Voz de Medellin, Apt. Aéreo 1244, Medellin. Te: 28642 – 59) Emis. Mil Veinte, Cra 13 No. 875, piso 2, Bogota. Te: 424336. L.P: Mgr: F. Gomez A – 60) Emis. Claridad, Apt. Aéreo 2094, Medellin – 61) R. Kalamary, Cra. 39 No. 4145, Barranquilla. L.P: Mgr: E. Ariza – 62) R. Melodia, Apt. Aéreo 7766, Bogota. Te: 457073. 12.00–05.00.
63) La Voz del Triunfo, Cra 51, No. 5131, Medellin. L.P: L.E. Ramirez – 64) R. Palmira, Palmira. L.P: Mgr: O. Burckhardt – 65) R. Reloj, Cra 53, No. 4680, Medellin – 66) R. Musical, Apt. Aéreo 1972, Cali – 67) La Voz de Armenia, Apt. Aéreo 617, Armenia – 68) La Voz de Cucuta, Av. 5 No. 842 piso 6, Cucuta. Te: 2035 – 69) R. Reloj, Cra 42 No. 2346, Barranquilla – 70) R. Reloj, Cra 19 No. 848, Bogota. Te: 428369 – 71) Pontif. Bolivariana, Apt. Aéreo 1178, Medellin – 72) R. Reloj, Cra 1 No. 1839, Cali – 73) R. Tunja, Tunja – 74) Ondas del Valle, Cra 5 No. 1223 piso 3, Cartago – 75) Emis. Riomar, Cra 32 No. 4219, Barranquilla – 76) Emis. Sur America, Apt. Aéreo 7766, Bogota. 10.00–05.00 – 77) R. Cartago, Cra 4 No. 1062, Cartago – 78) R. Girardot, Cra 8 No. 1019 piso 3, Girardot – 79) R. Cristal, Medellin 80) La Voz del Valle, Cali – 81) Pregones del Quindio, Edif. Banco Cafetero, piso 5, Armenia. Te: 1200 – 82) El Mundo en Bogota, Cra 7 No. 1714, Bogota. Te: 429022. L.P: Mgr: A. Castaño C – 83) Ondas del Rio, Magangue – 84) La Voz del Sinu, Apt. Aéreo 148, Monteria. Te: 8219. Cable: "Emisinu". 10.00–05.00 – 85) Emos. Villa Cespedes, Tulua – 86) R. Nutibara, Edif. A. Angel, Medellin. Te: 14675. L.P: Mgr: J. Garcia Lobo – 86a) R. Colosal, Neiva – 87) R. Santander, Apt. Aéreo 1100, Bucaramanga. L.P: Mgr: Fco. Bueno – 88) La Voz del Ruiz, Cra 22 No. 2337, Manizales. Te: 2423 – 89) R. Cordillera, Cra 9 No. 1333 piso 3, Bogota. Te: 341743 – 90) La Voz de la Costa, Barranquilla – 91) R. Sindamanoy, Pasto – 92) La Sultana del Valle, Cali – 93) R. Nueva Epoca, Fusagasuga – 94) R. Colibri, Itagui, Medellin – 95) R. Internacional, Cucuta – 96) Emis. Cultural Bolivar, Ipiales – 97) R. Cordobesa, Monteria – 98) R. Juventud, Ca. 12 No. 517, Bogota. Te: 422254. L.P: Dir: A. Monroy G. – 99) La Voz del Litoral, Ca. 72 No. 4363, Barranquilla. Te: 41844 – 100) R. Calidad, Cali – 101) La Voz de las Americas, Cra 51, No. 5140, Medellin – 102) R. Barrancabermeja, Barrancabermeja – 103) R. Bandera, Girar-

dot – 104) R. Modelo, Cra 13 No. 1281, oficina 201, Bogota, Te: 436478 – 105) R. Vigia, Apt. Aéreo 154, Nac. 426, Barranquilla, Te: 15261, 24 h – 106) Emis. Mariana, Pasto – 107) R. Tiempo, Apt. Aéreo 944, Cucuta, Te: 4296.
108) R. Bolivar, Av. 8 No. 10110, Cali – 109) Ondas del Nevado, Ibague, Te: 34830 – 110) R. Duitama, Duitama – 111) Emis. Siglo XX, Cra 51 No. 5963, Medellin – 112) R. Morgan, S. Andres Isla – 113) Onda Libre, Pereira – 114) R. Compas, Giron – 115) La Voz de Cienaga, Cienaga – 116) R. Pasto, Pasto – 117) R. Metropolitana, Apt. Aéreo 7766, Bogota, Te: 457073, 24 h – 118) La Voz de Cartagena, Apt. Aéreo 246, Cartagena. 119) R. Libertador, Cra 3 No. 18-0, Cali, L.P: Mgr: R. Angulo – 120) R. Ritmos, Medellin – 121) R. Villavicencio, Villavicencio, Te: 2238, V. by letter. Reported using 4875kc – 122) Ondas del Puerto, Cra 14 No. 1119, Girardot – 123) R. Sur, Pitalito – 124) R. Valledupar, Valledupar – 125) Transmisora Gira, Bucaramanga – 126) R. S. Eugenio, Cra 15 No. 1532, S. Rosa de Cabal – 127) La Voz de la Patria, Apt. Aéreo 231, Nac. 621, Barranquilla, L.P: Dir: C. Vassallo – 128) R. Quince, Ca. 13 No. 875, Bogota, Te: 424336 – 129) R. Catatumbo, Apt. Aéreo 19, Ocaña – 130) La Voz dela Amistad, Pasto – 131) La Voz de la Independencia, Envigado, Medellin – 132) R. Luna, Palmira – 133) Ondas del Huila, Banco Comercio, Neiva – 134) R. Morrosquillo, Sincelejo – 135) La Voz de Pereira, Cra 18 No. 854, Pereira – 136) Ondas del Fonce, San Gil – 137) La Voz de la Sabana, Cra 42 No. 1394 piso 3, Bogota, Te: 470.93 – 138) R. Vigia, Apt. Aéreo 1771, Nac. 206, Cartagena, Te: 13398, Cable: Vigia, 24 h – 139) R. Sideral, Apt. Aéreo 2146, Cali – 140) La Voz de Chaparral, Chaparral – 141) La Voz de la Candelaria, Medellin, Te: 425445, 10.00–05.00 – 142) Ecos del Rio, Puerto Boyaca – 143) La Voz de Anserma, Anserma – 144) Emis. Jose Galan, Socorro – 145) R. Sabanas, Sincelejo – 146) R. Mundial, Cra 7 No. 1135 piso 5, Bogota, Te: 418295 – 147) R. Piloto, Barranquilla – 148) R. Guaimaral, Cucuta – 149) R. S. Barbara, Santa Barbara – 150) La Voz de la Dorada, Cra 3, No. 1125, La Dorada, Te: 7171 – 151) Armonias del Palmar, Cra. 29 No. 3290, Palmira, Te: 3344 – 152) Armonias del Sur, Neiva – 153) La Voz de Cerete, Cerete – 154) R. Luz, Apt. Aéreo 284, Manizales – 155) R. Pipaton, Barrancabermeja – 156) Emis. Mariana, Cra 7 No. 610, Bogota, Te: 462712 – 157) Emis. Variedades, Cra 35 No. 35106, Barranquilla – 158) R. Las Lajas, Ipiales – 159) La Voz de la Gran Colombia, Villa Rosario, Cucuta – 160) Emis. Guadalajara, Cra 5 No. 853, Buga – 161) R. Magdalena, Apt. Aéreo 706, Santa Marta, Te: 330 – 162) Ondas del Guali, Honda, Te: 1256 – 163) La Voz de Calarca, Calarca – 164) R. del Comercio, Cra 36 No. 2150, Bucaramanga, Te: 72641 – 165) R. Bahia, Cartagena – 166) La Voz de Belalcazar, Cra 5 No. 581, Popayan – 167) R. Pamplona, Pamplona – 168) Ondas de Ibaque, Edif. Raad, Ibague, L.P: Mgr: L. E. Martinez R – 169) Ondas de Riohacha, Riohacha – 170) R. Sinfonia, Itagui, Medellin – 171) R. Tulua, Cra 26 y 27, Tulua – 172) R. Segamoso, Sogamoso – 173) R. Sintonia, Villamaria CDS – 174) R. Sincelejo, Sincelejo – 175) R. Alegria, Cra 5 No. 1465, Bogota, Te: 342225 – 176) La Voz de Pamplona, Pamplona – 177) La Voz del Espinal, Espinal – 178) La Voz del Paraiso, Cerrito V – 179) R. Armonia, Medellin – 180) Ondas de la Cienaga Grande, Cienaga – 181) R. Centinela, Cra 8, Edif. Algira, Pereira – 182) La Voz de Monteria, Monteria – 183) Antena en Colores, Bogota – 184) R. Guatapuri, Valledupar – 185) R. Garzon, Garzon – 186) R. Calima, Darien – 187) R. Boyaca, Apt. Nacional 96, Tunja, Te: 3832 – 188) R. Sumapaz, Cra 7 No. 535, Fusagasuga, Te: 2000 – 189) La Voz Katia, Envigado Medellin – 190) La Voz Panamericana, Floridablanca 5 – 191) R. Estrella, Armenia – 192) R. Minuto, Barranquilla – 193) La Voz de Lorica, Lorica – 194) La Voz de Chapinero, Bogota – 195) R. Popayan, Cra 12 No. 427, Popayan, Te: 2738 – 196) R. Sevilla, Cra 50, Ca. 49 y 50, Sevilla – 197) Liceo Departamental, Sonson – 198) R. Armero, Armero – 199) Emis. Mariana, Manizales – 200) R. Canoa, Turbaco – 201) R. Fantasia, Ca 12 No. 517, Bogota, Te: 429435 – 202) R. Magangue, Magangue – 203) R. Copacabana, Copacabana – 204) R. Parroquial, Nemocon – 205) Brisas del Magdalena, Barrancabermeja – 206) R. Sensación, Manizales – 207) Voz de la Cordialidad, Galapa, Barranquilja – 208) Emis. Femenina, Cra 7 No. 1137, Bogota, Te: 432523 – 209) La Voz del Banco, El Banco – 210) Armonias Norte Vallecaucanas, Caicedonia – 211) R. Ciudad Milagro, Armenia.

ECUADOR

L.T: GMT–5 h – Pr.L: Spanish, Quechua.

INSPECCION DE RADIO, Ministerio de Publicas, Direccion Tecnica – ADDR: Benalcazar 698, Quito. Cable: Radionacional. Te: 11019 – L.P: Dir: A. Zabala.

ASOCIACION ECUATORIANA DE RADIODIFUSORAS ADDR: Apt. 289, Quito. Cable: AER. Te: 10669 – L.P: Pres: G. Vergara Jimenez.

STATIONS: Short Waves: Call: HC---. *) inactive

	Call	kc	m	kW	Name and h of tr.
1)	RO1	2485	120.7	0.2	R. Otavalo: 12.00–18.00, 23.00–03.00
2)	LP3	3215	93.30	0.25	La Voz de el Oro, Pasaje: 12.00–14.00, 20.00–23.00, 00.00–05.00
3)	JC1	3240	92.59	0.2	R. Atuntaqui: 16.00–03.30
4)	LM3	3245	92.45	0.2	La Voz de Pasaje: 12.00–13.00, 20.00–23.00, 01.00–04.00
5)	MZ6	3265	91.87	0.2	La Voz del Rio Chimbo: 11.00–05.00
6)	AH3	3270	91.75	0.3	R. El Trebol, Zaruma: 10.00–03.00
7)	VU2	3275	91.60	0.2	La Voz de Urdaneta, Ricaurte: 10.00–07.00
8)	DR4	3355	89.42	0.2	R. Miramar, Bahia: 23.00–03.00
9)	4HE	3390	88.50		La Voz de Esmeraldas: 10.00–13.00 16.00–20.00, 23.00–06.00
10)	SG4	3505	85.59	1	La Voz del Valle, Portoviejo: 11.00–13.00, 15.00–04.00
11)	NL2	3510	85.47	0.2	La Voz del Campesino, Naranjal
12)	KD5	3515	85.35	0.2	R. Centro de Gualaceo: 23.00–03.00
13)	YC4	3520	85.23	0.2	R. Escuelas Radiales, Lita: 23.00–03
14)	OT1	3545	84.63	0.2	R. Zaracay, Sto. Domingo Cds: 11.00–14.00, 23.00–05.00
15)	HG2	3570	81.24	0.35	R. Central, Vinces: 23.00–05.00
16)	HA2	3610	83.13	0.25	Ondas Quevedañas, Quevedo: 23.00–03.00
17)	GS6	3615	86.00	0.4	R. Pillaro: 10.00–13.00, 22.00–03.00
18)	OS4	3630	82.64	0.25	La Voz del Carrizal, Calceta: 11.30–04.00
19)	MR1	3640	82.41	0.5	R. Cayambe: 11.00–13.00, 23.00–04.0
20)	JT1	3680	81.48	0.3	R. Tulcan: 12.00–17.00, 22.00–05.00
21)	IE1	3695	80.95	0.5	R. Cotacachi: 23.00–03.00
22)	GB4	3720	80.65	0.35	R. Nac. Espejo, Esmeraldas: 23.00–03.00
23)	HW2	3725	80.54	0.2	R. Rey, Quevedo: 15.00–19.00, 21.00–04.00
24)	JR6	3745	79.65	0.2	La Voz del Colegio Mera, Ambato: 17.30–19.30, 00.00–02.00
25)	BH6	3755	79.90	0.4	R. Latacunga: 15.00–19.30, 20.30–04.0
26)	WN1	3835	78.20	0.35	La Voz del Triunfo, Sto. Domingo Cds: 23.00–03.00
27)	DY4	3945	76.05	0.25	R. Iris, Esmeraldas: 11.00–14.00, 22.00–06.00
28)	PZ1	3950	79.95	0.3	R. Rumichaca, Tulcan: 11.30–15.15, 16.45–04.00
29)	JH1	3965	75.67	0.3	R. Turismo, Otavalo: 23.00–03.00
30)	SN6	3975	75.47	0.6	R. Sira, Ambato: 12.00–23.15, 01.00–04.30
31)	OI4	3980	75.38	0.4	La Voz de Chone: 11.30–05.00
32)	ER5	3985	75.38	1	Escuelas Radiofonicas Populares, Riobamba: 10.00–13.00, 16.00–19.00, 20.00–03.00
33)	JA5	3990	75.19	0.5	La Voz del Rio Tarqui, Cuenca: 11.00–04.00
34)	AO5	*4000	75.00	0.3	La Voz de Tomebamba, Cuenca
35)	BK2	4750	63.96	0.25	R. El Mundo, Guayaquil: 13.00–19.30, 21.45–04.00
36)	LJ6	4755	63.10	0.2	La Voz de Bolivar, Guaranda: 00.00–03.30
37)	2AK	4765	62.95	2	R.Dif. del Ecuador, Guayaquil: 10.45–05.00
38)	MX4	4770	62.89	0.4	R. Cenit, Portoviejo: 11.00–13.00, 15.00–04.00
39)	EH3	4775	62.84	0.2	R. El Progreso, Loja: 11.00–15.00, 17.00–20.00, 24.00–03.00
40)	LC1	4780	62.76	1	R. Atahualpa, Quito: 10.45–04.35
41)	AU2	4790	62.63	0.25	R. Reloj, Guayaquil: 11.00–05.00
42)	SV5	4800	62.50	0.25	R. Amazonas, Cuenca: 11.00–20.00, 23.00–04.00
43)	LS3	4810	62.37	0.2	R. Coro Santa Cecilia, Loja: 23.00–03.00
44)	FA4	4815	62.31	0.3	La Voz de Manabi, Portoviejo: 10.30–04.00
45)	JS1	4830	62.10	0.5	Ondas del Angel, El Angel: 15.00–19.00, 21.30–03.30
46)	AP4	4835	62.05		La Voz del Valle, Portoviejo: 11.00–13.00, 15.00–04.00
47)	RM3	4845	61.92	0.38	R. Cultural Machala: 11.00–19.00, 00.00–05.00
48)	CV3	4850	61.86	0.25	Ondas del Zamora, Loja: 23.00–03.00
49)	MA1	4855	61.79	0.35	R. Amazonas, Quito
50)	JC3	4860	61.73	0.25	R. 18 de Noviembre, Loja: 23.00–03.0
51)	CD1	4865	61.66	1	R. Luz de America, Quito: 11.00–14.30 17.00–20.00, 22.00–04.00
52)	GM7	4870	61.60	0.3	R. Rio Amazonas, Macuma: 23.00–03.00
53)	WE1	4880	61.48		R. Nac. Espejo, Quito: 24 h.
54)	VS6	4904	61.18	0.42	La Voz de Saquisili: 23.00–03.00
55)	MJ1	4910	61.10	0.3	Emis. Gran Colombia, Quito: 11.00–06.00

TV INDUSTRIAL: Addr: Juiz de Fora, MG. Station: chA10.
TV ALTEROSA: Addr: Belo Horizonte, MG. Station: chA2.
TV ANHANGUERA: Addr: Goiânia, Goiás, Station: chA11.
TV COROADOS: Addr: Londrina, Paraná. Station: chA3.
TV ERECHIM: Addr: Erechim, RGS. Station: chA4.

Projected stations:
TV Mayrink Vega, Rio de Janeiro, chA2 – TV Globo, Rua Irineu Marinho 35, Rio de Janeiro, chA4 – TV Nacional, Brasília, chA2 TV Farroupilha, Galeria Rosario 22, Porto Alegre, chA5. – TV Bandeirantes, São Paulo, chA13 – TV Gazeta, São Paulo, chA11 TV Brasil Central, Goiânia, chA13 – TV Campos, Campos, chA8 TV Guaiba, Porto Alegre, chA2 – TV Santos Difusora, Santos –TV Volta Redonda, Volta Redonda, chA8 – TV Feira de Santana, chA3.

Ampex Videotape: TV Alvorada (Brasília), TV Gaucha(Porto Alegre), ch2 (Recife), Rio, TV Cont, TV Rio (Rio de Janeiro), ch7, ch9, ch13, TV Excelsior, TV Paulista (São Paulo).
The Marconi Company, Ltd, G.B: TV tr's: Jornal de Comercio (Recife) 1×18, 1×9kW, R. Bandeirantes S. A. (São Paulo) 2×5, 1×5kW– Ant: Jornal de Comercio – Studio equip: Jornal de Comercio, R. Bandeirantes, S.A – OBV: Jornal de Comercio.
Pye T.V.T. GB: Tr, ant, studio equip to TV Gaucha, Porto Alegre.

CHILE

UNIVERSIDAD CATOLICA (Non-comm.) – Addr: Casilla 114D, Santiago. Tel: 397709 – L.P: Dir. Gen: E. Tironi Arce. Dir. Tec: P. Carabal – Station: ch A13 10kW H. Repeater st. (ch A8) in Valparaiso. D.Prgr: 22.00–04.00, Mon 01.00–03.30.

UNIVERSIDAD DE CHILE (Educ): Addr: Alameda, 1058 Santiago – L.P: Dir: H. Soto. Dir. Tec: H. Barra.
Station: ch A9 3kW V – D.Prgr: 01.45–03.00.

COLOMBIA

INSTITUTO NACIONAL DE RADIO Y TELEVISION (Go.) Finds Gov. and adv. (40% of prgr's non-comm.) – Addr: Apt. Nacional 1824, Bogota. Tel: 435640 – L.P: Dir. Gen: C. Simmonds. P. Dir. Tec: W. Puth – Stations: Bogota chA10 1/0.25kW/A7 10/2kW – Manizales chA11 1/0.25kW – Las Jurisdicciones chA6 10/2kW – El Carmen chA9 1/0.25kW – Monteria chA7 1/0.25kW – S. Marta chA2 10/2kW – Medellin chA8 0.25kW – Tunja chA10 0.4kW – Madrono chA9 0.4kW – Belencito chA7 5kW.
D.Prgr's: 13.15–16.00(Educational), 21.00–04.30(Comm). Prgr's are originated at Bogota, all other st's are repeaters.
Under Construction: Bogota (2nd Prgr.) chA9 1/0.25kW, Medellin chA3 10/2kW, Cali chA11 10/2kW, Munchique (Popayan) chA7 1/0.25kW, Galeras (Pasto) chA10 1/0.25kW, Neiva chA11 1/0.25kW, Quibdo chA13 & Cucuta chA7 0.25kW.

ECUADOR

LA VENTANA DE LOS ANDES (Priv, non-comm, cult.)
Addr: Casilla 691, Quito – L.P: Dir: R. B. Clark – Station: HCJB-TV chA4 8/3kW H – D.Prgr: D exc. Mon 23.30–03.00

PRIMERA TELEVISORA EDUCATORIANA (Comm): Addr: P.O. Box 3875, Guayaquil – L.P: Mgr: J. Rosenbaum – Station: chA4 2kW H – D.Prgr: 22.30–03.30.

PERU

CULTURAL
MINISTRY OF EDUCATION (Go.): Addr: Ministerio de Educacion Publica, Direccion de Cultura, Lima. Tel: 75737 – L.P: Dir. Gen: S. Garrido M. Dir. Tec: A. E. Mousalve – Station: OAD-TV chA7 0.4/0.05kW H.

COMMERCIAL
TELEVISORA AMERICA: Addr: Montero Rosas, Lima. Tel: 42419 – L.P: Mgr: N. Gonzales V. Dir. Tec: D. Capella – Stations: 1) chA4 6kW, 2) Piura chA2 8kW, 3) Chiclayo chA4 8kW, 4) Trujillo chA4 8kW – Relay st's: 1) Huacho ch6, Ica ch6, Ancon ch6, 2) Talara ch6.

TELEVISORA PANAMERICANA: Addr: Av. Arequipa 1110, Lima. Tel: 34240 – L.P: Mgr: G. Delgado P. Dir. Tec: M. Flores – Stations: 1) chA13 2/4kW, 2) Trujillo ch7 0.58kW, 3) Piura chA7 0.58kW, 4) Chimbote chA9 0.3/0.75kW, 5) Chiclayo chA9.

TELEVISORA VICTORIA: Addr: Av. Tacna 543, Lima. Tel: 3-5945 – L.P: Mgr: J. E. Cavero – Stations: 1) chA2 30kW, 2) Huancayo chA3, 3) chA6 (Iquitos), 4) Cuzco chA6.

TELEVISORA EXELSIOR: Addr: Av. Manco Capac, Lima – L.P: Mgr: A. Belmont – Station: chA11.

TELEVISORA EL SOL: Addr: Av. Uruguay 355, Lima. Tel: 35490 – L.P: Dir. Gen: A. Pereyra. Gen. Mgr: N. Gonzalez V – Station: chA9 5/10kW. Relay st's: Huacho chA7. Ica chA11 – D. Prgr: 23.30(Sun 23.00)–05.00.

TELEVISORA SUR PERUANA: Addr: Cas. 514, Arequipa. Tel: 3690 – L.P: Mgr: G. Quintanilla. Dir. Tec: E. Tchuschke – Stations: 1) chA2 0.25/0.5kW, Cuzco chA4 – D.Prgr: 18.00–04.30 – Planned st's: Piura chA7, Tacna chA2, Trujillo chA7.

TELEVISORA CONTINENTAL: Addr: M. de Orberoga 338, Arequipa – Station: chA6 8kW – D.Prgr: 20.00–05.00.

Ampex Videotape, USA: R. America TV, Lima.

URUGUAY

SAETA (Sociedad Anonima de Emisoras de Television y Anexos) (Comm.) – Addr: Tacuarembo 1234, Montevideo. Cable: Saeta. Tel: 4-4034 – L.P: Pres: R. Fontaina. Vice Pres: J. E. De Feo. Gen. Mgr: R. Fontaina Jr. Dir. Tec: A. Galimberti. Sales Mgr: M. Fontaina. Film Buyer: E. Antonio – Station: chA10 2.5kW H – D.Prgr: 17.00–03.00.

SODRE (Servicio Oficial de Difusión Radio Electrica): Addr: Bulevard Artigas, Colorado, Montevideo – L.P: See radio – Station: chA5 5/2.5kW – D.Prgr: 21.30–03.00 – Projected St's: chA6 32.5kW, chA12 100kW.

TELEVISORA LARRANAGA S.A. (Comm.): Addr: Enriqueta Compte y Rique 1276, Montevideo. Te: 25856 – L.P: Gen. Mgr: H. Scheck – Station: CXA12-TV chA12 40/20kW – D.Prgr: 12.00–03.00.

MONTE CARLO TV (Comm.): Addr: Av. 18 de Julio 1855, Montevideo. Cable: Montecarlotv. Te: 402146 – L.P: Dir. Gen: H. Romay Salvo. Dir. Tec: J. L. Goyret. Dir. Prgr: J. N. Mullins – Station: chA4 24/12kW H – D.Prgr: 11.00–04.00 – F.PI: 100kW.

VENEZUELA

Ref: 625 – Ch: A – Pol: H.

TELEVISORA NACIONAL (Go.) – Addr: Apt. 3979, Caracas. Te: 545436 – L.P: Dir. TV: Dr. A. Pazani P. Dir. Tec: M. A. Burgos. Station: YVKA-TV chA5 37.5/18.6kW – D.Prgr: 21.30–04.30.

VENEVISION S.A. (Comm.) – Addr: Apt. 6674, Caracas. Te: 722741 – L.P: Dir. Tec: M. Sapkowski – Station: Carabobo chA9 84/42kW – D.Prgr: 22.30–04.30.

R. CARACAS TV (Comm.) – Addr: Apt. 2057, Caracas. Te: 418971 – L.P: Dir. Gen: A. Espina. Dir. Tec: J. Marcano – Stations: YVKS-TV: Barquisimeto chA3 20/10kW, Carabobo chA7 12.8/6.4kW, Caracas chA2 62.6/31.3kW, Curimagua chA10 330/165kW, Coro chA10 330/165kW, Valencia-Maracay chA7 13/6.5kW, La Guaira chA7 10.5kW, Maracaibo chA2 600/300kW, Barquisimeto chA2 – D.Prgr: 12.30–05.00.

ONDAS DEL LAGO TELEVISION (Comm. – Addr: Apt. 261, Maracaibo – Station: chA13 12/6kW.

R. VALENCIA TV (Comm.) – Addr: Valencia – Station: chA3 4/2kW – D.Prgr: 22.30–04.30.

TELEINVERSIONES C.A. – Addr: Apt. de Correos 9349, Caracas, L.P: Techn. Dir: M. Sapowski. Maintenance Eng: J. Cervera – Stations: Valencia chA6 3/1kW, Pichacho chA13 50/10kW, Caracas chA13 50/10kW. Prgr's are originated in Valencia where studios are located, and repeated in Pichacho & Caracas.

COLOR TELEVISION, Caracas – Station: YVRS-TV chA8.

PARA TODOS LECTORES HABLANDO ESPANOL

A fin de emplear el WRTH sin dificultades ofrecemos a todos nuestros lectores, que hablan el castellano, un vocabulario inglés-español que contiene todas palabras y frases que se utilizan por lo general en todos resumens y tablas en el manual. Este vocabulario capacitará a todas personas con un poquito o sin conocimiento ninguno al idioma inglés para entender y emplear el WRTH sin difficultades. Si quiere un ejemplar, libre de gastos, sírvase escribir a

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Chile

3.7. Terrestrial Communication Distribution Networks

The telecommunication system of Chile, although one of the best in South America, is barely adequate to meet the essential needs of the public and the government. The overall system is extensive, but is composed of a number of unintegrated, competing networks. Telecommunication facilities are concentrated in the larger cities, with many outlying regions having little or no facilities at all.

a. Voice: The domestic inter-city telephone system is composed primarily of a north-south trunk line extending from Arica to Puerto Montt via Iquique, Antofagasta, Copiapo, La Serena, Los Andes, and Santiago. East-west trunks extend from Santiago to Valparaiso and from Santiago to Concepcion. The system is made of submarine cable, open wire line (of 3 to 12 channel capacity) and VHF radio relay (72 and 84 channel capacity). H.f. radio is used to link the trunk with Coihaique, Punta Arenas and other towns in the southern region and other remote areas of the country. There are 235,000 telephones in operation, of which over 70% are concentrated in Santiago and Valparaiso in large automatic exchanges. International voice circuits are available to Argentina and La Paz, Bolivia by land lines and to New York, Bogota, Buenos Aires, Havana, La Paz, Lima, Quito and Rio de Janeiro by h.f. radio.

b. Record and Data: Domestic telegraph service is available throughout most of the country over the same facilities used for voice transmissions. Several additional spur lines and h.f. radio circuits make telegraph service available somewhat more extensively throughout Chile than telephone, but the service is slower and less efficient. International telegraph service is available to the same points as voice service, with additional circuits to Hamburg, London, Madrid, Paris and Montevideo. Teleprinter service is available from Santiago to seven other of the main cities in Chile, and also to Argentina, Brazil and Colombia. Limited domestic and international facsimile service is also available.

c. Television: At the present time there are no wide band transmission telecommunication services available in Chile.

All Chilean telecommunications are administered by the Ministry of the Interior through its subordinate divisions, the General Directorate of Electrical Services and the Telecommunication Commission. The government operates the state telegraph network, but all systems providing domestic and international public services, including radio and television broadcasting, are owned and operated by private companies. There is a trend, however, towards eventual nationalization of all phases of telecommunications in Chile.

Chile - continued

3.8. Broadcast Capabilities Within Chile

Radio broadcasting is moderately developed, with approximately 114 stations operating on medium wave in more than 50 cities. Sixteen of these stations are high power (between 10 and 100 kilowatts), while the remainder are mainly 1 kw or less. The greatest concentration of stations is in Santiago (29), Valparaiso (8) and Antofagasta and Concepcion with 6 each. The following is a list of cities and towns in Chile with medium wave broadcasting stations, and the number of stations in each town.

Ancud (1)
Angol (1)
Antofagasta (6)
Arica (1)
Calama (2)
Cauquenas (1)
Chanaral (1)
Chillan (2)
Chiloe (1)
Claudio (1)
Concepcion (6)
Copiapo (1)
Coquimbo (1)
Coyhaique (1)
Curico (1)
Gandarillas (1)
Illapel (1)
Iquique (3)
La Serena (1)
La Union (1)
Limache (1)
Linares (1)
Los Andes (1)
Lota (1)
Molina (1)
Navarro (1)
Osorno (1)
Ovalle (1)
Parral (1)
Puerto Ausen (1)
Puerto Montt (2)
Puerto Varas (1)
Punta Arenas (3)
Putaendo (1)
Quillota (1)
Rancagua (4)
San Antonio (1)
San Carlos (1)
San Felipe (1)
San Fernando (1)
San Javier (1)
Santiago (29)
Talca (2)
Talcahuano (1)
Temuco (2)
Tocopillo (2)
Traiguen (1)
Valdivia (4)
Vallenar (1)
Valparaiso (8)
Vina Del Mar (2)
Victoria (1)

Chile - continued

In addition, about two-dozen short wave broadcast stations, most of them operating in conjunction with medium wave stations, provide coverage to rural and remote areas of Chile.

About two-dozen VHF-FM broadcasting stations are in operation, primarily in Santiago and the larger cities of the country.

See attachment 1 for additional information concerning radio broadcasting stations in Chile. This information is taken from the 1965 edition of the World Radio-TV Handbook.

At the present time, there are estimated to be between 1.5 and 2 million radios in operation in Chile, for a population of 8.6 million people.

b. Television: The development of television in Chile has been relatively slow. Three non-commercial, University stations are in operation; two in Santiago (channels 9 and 13) and one in Valparaiso (channel 8). The three stations presently in operation use U.S. technical standards, but must be modified for 50 cycle operation in Santiago. There are approximately 40,000 television receivers in use in Chile at the present time.

Attachment 2, taken from the 1965 edition of the World Radio-TV Handbook, contains additional information concerning television broadcasting in Chile.

A ten-year government development plan, implemented recently, includes improvements in telegraph services and urban and rural local telephone services and a long-distance network for communications and the broadcasting media. The first stage of this plan calls for installing two 300-channel radio relay systems, one between Santiago and La Serena and the other between Antofagasta and Arica.

São José do Rio Preto, SP – 256) R. Arárica, Rua Conceição 166, São Paulo, SP – 257) R. Tamoio, Fortaleza, CE – 258) Soc. R. Imbiara de Araxá, Araxá, MG – 259) R. Triunfo, Port Alegre, RS – 260) R. Vera Cruz, Rua Buenos Aires 168, Rio, GB – 261) R. Cl. de Teresina, Teresina, PI – 262) R. Cl. de Tupá, Tupã, SP – 263) R. Rural, Manaus, AM – 264) R. Cl. de Santos, Santos, SP – 265) R. Caiçara, Campina Grande, PB – 266) Campos Dif, Campos, RJ – 267) R. Coroados, Curitibanos, SC – 268) R. Iracema de Fortaleza, Pôrto Al. Linares, Sobral, CE. Te: 477. Cable: "Radiracema" – L.P: Dir. Gen: I. M. Soares. Dir. Tec: S. Freitas – D.Prgr: 09.00-02.00 – V. by letter – 269) R. Cl. de Rio Claro, Rio Claro, SP – 270) R. Emiss. Convenção do Itu, Itu, SP – 271) R. Soc. Muriaé, Muriaé, MG – 272) R. Espinhares de Patos, Patos, PB – 273) R. Cl. Epitacio, Pres. Epitacio, SP – 274) R. Progresso, Novo Hamburgo, RS – 275) R. Araripe, Crato, CE – 276) Soc. Emiss. Continental, Campos, RJ – 277) R. Dif. A Voz de Bage, Bage, RS – 278) Soc. R. Novo Horizonte, Novo Horizonte, SP – 279) R. Nordeste, Nova Cruz, RN – 280) R. Cultura do Nordeste, Caruaru, PE – 281) R. Cultura de Santo Amaro, Santo Amaro, BA – 282) R. Jornal de Maringa, Maringa, PR.

Brown Boveri, Switzerland, delivered 100kW sw-tr. (R. Tupi).
Telefunken A.G, Germany, delivered 50kW sw-tr. (R. Nacional. Rio de Janeiro).

CHILE

L.T: GMT–4 h – Pr.L: Spanish.

ASOCIACION DE RADIODIFUSORAS DE CHILE (ARCHI)
ADDR: Cas. 10476, Santiago de Chile. Cable: Archi. Te: 34509 – L.P: Pres: R. Vergara Santa Cruz. Mgr: J. Menadier Carrasco.
STATIONS: All st's comm. exc. 10), 59), 87) (Cultural) – S.W: Call letters CE are used for all zones – M.W: Call letters CA, CB, CC and CD indicate: A = No. Zone, B = Central Zone, C = So. Zone and D = Antartic Zone. The figures indicate the frequency in kc minus one cipher, f. inst. CB82 = Central Zone 820kc.

St's not associated with ARCHI: 13), 32), 33), 35), 50), 73), 91), 99), 108).

Short Wave: * = inactive.

	Call	kc	m	kc	Name	h of tr.
1)	CE597	5975	50.21	1	Emis. Presidente Balmaceda:	10.00–05.00
2)	CE600	6000	50.00		R. El Carbon, Lota	
3)	CE601	6010	49.92	1	R. Norte, Antofagasta	10.50–04.30
4)	CE602	6020	49.83	1	Diego Portales, Santiago	11.00–05.00
5)	CE604	6040	49.67	0.25	R. Libertad, Antofagasta	11.00–04.00
6)	CE607	6070	49.42	5	Soc. Nac. de Mineria	11.00–05.30
7)	CE610	6100	49.18	1	R. Calama	11.00–04.00
8)	CE611	6110	49.10	5	Soc.Nac.de Agricultura	11.00–05.00
9)		*6130	48.94	1	R. El Morro, Arica	
10)	CE613	6135	48.90	10	R. Universidad de Concepción:	12.00–04.00
11)	CE615	*6150	48.78	5	La Voz de Chile, Valparaiso	
12)	CE619	6190	48.47	10	Corp. Chilena Broade.	11.00–04.00
12)	CE950	9500	31.58	1	Corp. Chilena Broade.	11.00–04.00
13)	CE955	9550	31.41	1	R. Valentin Letelier, Valparaiso Mon-Fri. 16.30–18.00, 23.00 03.00; Sat/Sun 20.00–03.00	
1)	CE960	9600	31.25	10	R. Pres. Balmacèda, Santiago	10.00–05.00
14)	CE965	9650	31.09	1	R. Yungay, Santiago	11.30–06.30
11)	CE970	9700	30.93	10	La Voz de Chile, Santiago	10.50–04.30
15)	CE1174	11740	25.55	5	R. Nuevo Mundo, Santiago	11.00–04.30
8)	CE1180	11800	25.42	1	Soc. Nac. de Agricult.	11.00–05.00
16)	CE1185	11850	25.32	2.5	R. Cruz del Sur, Santiago	11.00–04.00
11)	CE1190	11900	25.21	5	La Voz de Chile, Valparaiso	10.50–04.30
6)	CE1196	11960	25.08	5	Soc. Nac. de Mineria	11.00–05.30
6)	CE1511	*15115	19.85	5	Soc. Nac. de Mineria	
12)	CE1515	15148	19.80	1	Corp. Chilena Broade.	11.00–04.00

Your voice is heard all over the world . . . when you place your sales messages in the WRTH . . . because the reader of the WRTH holds your markets in the palm of his hand . . . For estimation of readership write for full particulars to

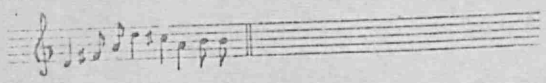
World Radio TV Handbook Co. Ltd.
Sundvej 6, Hellerup, Denmark.

Medium Waves: * = Short Wave.

	Call	kc	kW		Call	kc	kW		Call	kc	kW
17)	CB54	540	1	46)	CC96	960		74)	CD134	1340	0.15
8)	CB57	*570	15	47)	CD96	960	3	75)	CA135	1350	0.25
4)	CB59	590	50	7)	CA97	*970	1	76)	CC135	1350	1
18)	CC59	590	1	48)	CD97	970		76a)	CD135	1350	
19)	CA59	590		14)	CB101	*1010	1	77)	CD136	1360	2.5
20)	CB62	620	2	49)	CD101	1010	1	78)	CB136	1360	0.5
21)	CA63	630	0.25	13)	CB103	1030	1	79)	CD137	1370	1
22)	CB63	630	1	50)	CD103	1030	10	16)	CB138	*1380	2.5
23)	CD63	630	1	51)	CA103	1030		80)	CC140	1400	
24)	CA64	640	0.5	6)	CB106	*1060	100	81)	CD140	1400	
25)	CC64	640	1	52)	CA108	1080	1	82)	CA141	1410	
26)	CB66	660	50	4)	CC108	1080	1	83)	CB141	1410	1
27)	CC67	670		53)	CA109	1090	0.25	84)	CC141	1410	1
6)	CB68	680	1	55)	CD109	1090		85)	CA142	1420	
28)	CC68	680	10	56)	CB111	1110	1	86)	CA142	1420	
29)	CB69	690	10	57)	CD111	1110	1.25	87)	CB143	1430	0.25
30)	CD69	690	1.2	12)	CB114	*1140	50	88)	CC143	1430	0.1
31)	CA70	700	0.25	58)	CC116	1160	1.5	89)	CC144	1440	1
11)	CB73	*730	10	4)	CB118	*1180	50	90)	CC145	1450	
11)	CB76	*760	75	59)	CB120	1200	1	91)	CD145	1450	2.5
32)	CB78	780	1	60)	CA120	1200		92)	CB146	1460	0.1
33)	CA82	820	0.5	61)	CA121	1210	0.25	93)	CD146	1460	0.25
34)	CB82	820	1	8)	CD121	1210	10	94)	CA147	1470	0.1
35)	CD82	820	1	62)	CB124	1240	0.25	95)	CB147	1470	0.25
36)	CB84	840	1	63)	CB125	1250	1	96)	CC147	1470	0.25
37)	CC84	840	0.8	64)	CC125	1250	1	97)	CC148	1480	0.25
38)	CD84	840	1	9)	CA126	*1260	10	98)	CB149	1490	
39)	CB89	890	1	65)	CB126	1260	1	99)	CB150	1500	0.5
40)	CC89	890		3)	CB127	*1270	1	100)	CC151	1510	
41)	CD89	890	1	66)	CC127	1270	0.25	101)	CA152	1520	0.5
10)	CC89	*890	1	67)	CD127	1270	1	102)	CC152	1520	0.25
5)	CA90	*900	1	1)	CB130	*1300	10	103)	CB153	1530	0.25
8)	CB90	*900	1	68)	CB132	1320	1	104)	CB154	1540	0.25
42)	CC90	900	0.1	69)	CD132	1320	1	105)	CC155	1550	
43)	CD90	900		70)	CA132	1320		106)	CD155	1550	
15)	CB93	930	20	71)	CB133	1330	1	107)	CB156	1560	1
44)	CA96	960	0.3	72)	CC133	1330	0.15	2)	CC157	*1570	
45)	CB96	960	10	73)	CB134	1340	1	108)	CB160	1600	

Short Waves:

1) Cas. 13650, Santiago. Te: 88720. Cable: Prebal – L.P: Dir. Gen: J. A. de Wetzig. St. Mgr: R. Deformes R – D.Prgr: N: 10.00, 11.05, 17.15, 01.30, 04.40 + short N. every h on the h – Int-Sig: Gong with notes from "Los Copihues Rojos".



V. by QSL-card. Records accepted – F.Pl: CB130 50kW.
2) Cas. 66, Lota. Te: 63 – L.P: N. Mosciatti.
3) Cas. 556, Antofagasta. Te: 383 – L.P: J. Cvitanic – D.Prgr: N: 11.30, 12.15, 17.00, 17.15, 00.15, 02.00 + short N. every h.
4) CB118/CE602: Cas. 13962, Santiago. Te: Santiago 68279. CC108: 4) CB118/CE602: Cas. 13962, Santiago. Te: Santiago 68279. CB59: Cas. 98V, Valparaiso. CC108: Cas. 21-D, Talca – L.P: Dir. Gen: R. Tarud S. Dir. Tec: A. Hasbun A – D.Prgr: N: 11.30, 12.00, 13.00, 14.00, 15.00, 16.00, 19.00, 20.00, 21.00, 22.00, 23.00, 04.57.
5) Cas. 457, Antofagasta. L.P: A. Cajiao – D.Prgr: N: 12.00, 17.30, 01.00, 02.30.
6) CB106: Cas. 2626, Santiago. Cable: Radiomineria. Te: 381341. CB68: Cas. 337, Vina del Mar – L.P: CB106: Dir. Gen: O. Ruiz, B. Suárez. Dir. Prgr: R. Rojas R. Dir. Tec: R. Fuentes A. CB68: Mgr: L. Muñoz – D.Prgr: N: 10.00, 11.00, 12.00, 16.45, 17.30, 01.00, 01.45, 02.30 – Ann: "Santiago de Chile, R. Soc. Nac. de Mineria" – Int-Sig: Gong – V. by QSL-card. Re. in E or Sp.
7) Cas. 1, Calama. Te: 10 – L.P: Dir: P. Vergara Keller. Dir. Tec: S. Wierckinsky – D.Prgr: N: 11.02, 12.00, 16.45, 17.30, 00.15, 02.30 – Ann: "Transmite CA97, CE610 en 49 metros, R. Calama de Calama, República de Chile" – V. by letter. Records accepted.
8) CB57: Cas. 40-D, Santiago. Te: 64660. CB90: Cas. 90, Valparaiso. Te: 6891. CD121: Cas. 327, Los Angeles. Te: 517. L.P: CB57: Dir: F. Echeverria M – D.Prgr: N: 11.30, 13.00, 15.00, 16.00, 17.00, 19.00, 21.00, 23.00, 00.00, 01.00, 03.00, 04.00 – V. by QSL-card.
9) Cas. 463, Arica – L.P: Dir: C. Nieto G – D.Prgr: 11.00–06.00. V. by letter.
10) Cas. 2337, Concepción. Te: 23207 – L.P: Mgr: F. Dussuel. Dir. Tec: O. Sa. Martin – D.Prgr: N: 12.15, 17.15, 01.30. Wrp: 01.30. L.L: French 14.30, 23.30 – Ann: "Transmite R. Universidad de Concepción CC68 en Onda Larga, CE613 en Onda Corta en la Banda de 49 metros y con su equipo de Frequencia Modulada en 95.1 megaciclos, desde la Ciudad Universitaria, Concepción, Chile – V. by QSL-card and letter. Re. in E, Sp – Pub: Prgr.schedule on request.

1) CB76/CE970: Cas. 13130, Santiago. CB73/CE1190: Cas. 37V, Valparaiso. Cable: Vitalradio. AD: 15 min. per h – L.P: CB76: Exec. Pres: C. A. Vial E. CB73: Gen. Mgr: R. Reyes B. Dep. Gen. Mgr: V. Tschenko G. Dir. Tec: R. Renard S – D.Prgr: N: CB76/CE970: 11.30, 12.15, 13.00, 16.00, 16.45, 17.15, 18.00, 19.00, 19.20, 20.00, 21.00, 22.00, 23.00, 00.15, 02.00; CB73/CE1190: 11.00, 11.30, 12.00, 13.00, 14.00, 15.00, 16.00, 16.45, 17.15, 18.00, 19.00, 20.00, 21.00, 22.00, 22.30, 00.00, 02.00, 03.00, 04.00 – Ann: "Emisoras La Voz de Chile. La Cooperativa". All st's simultaneously: "Transmite La Cadena Radial, La Voz de Chile, por sus estaciones R..La Cooperativa" – Int-Sic: Gong with central theme of "Pomp and Circumstance" – V. by QSL-card and letter. Records accepted.

2) Cas. 244V, Santiago – L.P: Dir: S. Fernandez – D.Prgr: N: Every h on the h – Ann: "Transmite CB114, R. Corporación, Santiago de Chile, R. Corporación en el mejor lugar, su hogar".

3) Escuela de Derecho Universidad de Chile, Box 211V, Valparaiso – L.P: Dir: R. Allu – Ann: "Esta es R. Valentin Letelier, de la Escuela de Derecho de Valparaiso, de la Universidad de Chile, transmitiendo en Onda Larga CB103, en 1030kc, en Onda Corta CE965, en 9550kc, en Frequencia Modulada CE104.3 en 104.3Mc por segundo" – V. by QSL-card or letter. Re. in Sp or E.

4) Cas. 3041, Santiago – Ann: "CB101 y CE766 Estaciones de R. Yungay de la Corporación de Radiodifusion, Santiago de Chile" – Int-Sic: First movement of the song "Donde el Azul de la Noche encuentra el Ove del Dia" – V. by letter.

5) Cas. 9255, Santiago. Cable: R. Nuevo Mundo. Te: 382392 – L.P: Dir. Gen: J. Raggio – D.Prgr: N: 11.30, 12.30, 13.00, 14.00, 15.00, 16.00, 18.00, 19.00, 20.00, 21.00, 22.00, 23.00, 01.00, 03.00 – Ann: "Estas son Las Emisoras Nuevo Mundo de Santiago de Chile que transmiten por CB93, CE1174 estacion de Onda Corta en la banda de 25 metros y su equipo de FM en 93Mc" – V. by QSL-card and letter. Re. in Sp, E.

6) Plaza Bulnes 47, Santiago – L.P: Mgr: Claudio Poblete – D.Prgr: N: 12.10, 17.45, 01.45, 04.45 – FM: 95.3Mc – V. All re. to be sent to Sr. V. Hugo Olguin D, Departamento de Relaciones Internacionales, and will be answered by QSL-card or letter – F.Pl: 50kW mw-tr.

Medium Waves:

7) R. Ignacio Serrano, Ugalde 615, Claudio.
8) R. Condor, Ca. 486, Concepción. D.Prgr: 11.00–04.00.
9) R. Mineria, Hotel Turismo, Antofagasta – L.P: Dir: A. Lieux.
10) R. La Reina, Cas. 244V, Santiago. L.P: Dir: M. Lavin.
11) R. Esmeralda, Cas. 209, Iquique. Te: 572.
12) R. Pres. Prieto, Cas. 37V, Valparaiso.
13) R. Sur, Cas. 60-D, Valdivia. D.Prgr: 11.00–04.00.
14) R. Norte Verde, Cas. 252, Ovalle. L.P: Dir: F. Morales.
15) R. El Sur, Cas. 482, Concepción. L.P: Dir: J. Valenzuela.
16) R. Chilena, Cas. 10277, Santiago. L.P: Dir: E. Menchaca.
17) R. El Libertador, Rubio 259, Rancagua.
18) R. Lautaro, Cas. 214, Talca. L.P: E. Tarud.
19) R. Santiago, Cas. 10195, Santiago – L.P: Dir. Gen: R. Vergara. Dir. Tec: P. del Campo. D.Prgr: N: 11.30, 17.00, 00.45, 01.30. English 02.30–03.00. Ann: "CB69 y CE97.1 R. Santiago, en Santiago de Chile".
20) R. La Frontera, Cas. 516, Temuco – 31) R. Coya, Maria Elena, Antofagasta, or Cas. 13260, M. Elena.
21) R. Caupolican, Cas. 506, Valparaiso – 33) R. del Salitre, Cas. 7-D, Iquique.
22) R. Del Pacifico, Cas. 3591, Santiago – L.P: Dir: R. Vivado & J. Quinteros. D.Prgr: 24 h – 35) R. Concordia, Cas. 119, La Union.
23) R. Recreo, Cas. 596, Viña del Mar. L.P: Mgr: J. Gonzales. Dir. Asst: J. C. Tribuzio. D.Prgr: 12.00–04.00.
24) R. Almirante Latorre, Cas. 358, Talcahuano. L.P: Dir: A. Delj.
25) R. Sago, Cas. 35-O, Osorno. Cable: Radiosago. L.P: Dir: Rosario Luna. D.Prgr: 11.30–04.00.
26) R. Bulnes, Cas. 1555, Santiago. L.P: Dir: C. Briceño.
27) R. Interamericana, Cas. 97, Concepción. L.P: Dir: M. Fonseca.

PARA TODOS LECTORES HABLANDO ESPAÑOL

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28) R. Polar, Cas. 13-D, Punta Arenas. L.P: Dir: P. Torreso. D.Prgr: 11.30–04.00. V. by letter.
29) R. El Roble, Cas. 37, Parral. L.P: Dir: J. Rogazy.
30) R. Vicente Perez Rosales, San Felipe 80, Puerto Montt.
31) R. Riquelme, Cas. 92, Coquimbo – 45) R. José Miguel Carrera, Tenderini 115, piso 9, Santiago – 46) R. Condell, Yungay 10, Curico.
32) R. Camilo Henriquez, Cas. 28-A, Valdivia.
33) R. Payne, Cas. 97, Puerto Natales. L.P: J. Navarro.
34) R. Llanquihue, Cas. 356, Puerto Montt. D.Prgr: 11.00–04.00.
35) R. Cautin, Cas. 40-D, Temuco. L.P: Dir: M. Fernández M.
36) R. La Portada, Cas. 410, Antofagasta. L.P: Sra. Raymunde Prieta.
37) R. La Serena, Cas. 118, La Serena – 53) R. Toco, Cas. 808, Tocopillo.
38) see no. 100) – 55) R. Chiloé, Chiloé. L.P: Dir: F. Mihovilovic.
39) R. Viña del Mar, Cas. 534, Viña del Mar.
40) R. Austral, Cas. 40-D, Punta Arenas. L.P: Dir: J. Navarro.
41) R. Simon Bolivar, Cas. 318, Concepción. L.P: Dir: A. Jaén.
42) R. Universidad Tecnica del Estado, Avda. Ecuador 3469, Santiago. Te: 92981. L.P: Dir: M. T. Temenias. Dir. Tec: J. Arenas K. D.Prgr: 17.00–04.00. N: 17.30, 02.00.
43) R. El Litoral, Cas. 2001, Tocopilla. L.P: Dir: Antonio Arce.
44) R. Atacama, Cas. 57, Copiapo. Te: 171.
45) R. Valparaiso, Cas. 1096, Valparaiso. L.P: Dir: J. O'Shee.
46) R. Andres Bello, Mac Iver 142, Santiago – L.P: Mgr: J. Morris.
47) R. Talca, Cas. 450, Talca – 65) R. Nacional, Cas. 9987, Santiago.
48) Nueva R. Ñuble, Cas. 267, Chillan. L.P: Dir: H. Vaccaro.
49) R. Patagonia Chilena, Cas. 53, Coyhaique.
50) R. Porteña, Cas. 887, Valparaiso.
51) R. Baquedaño, Cas. 758, Valdivia. L.P: Gen. Mgr: C. Cockbaine.
52) R. Calama, Cas. 1, Calama. L.P: Dir: P. Vergara.
53) R. Prat, Cas. 10210, Santiago. L.P: Dir: P. Valenzuela. D.Prgr: 11.00–05.40. Ann: "Esta es CB97 todo el dia informando".
54) R. Discusion, Cas. 14-D, Chillan. L.P: Dir: A. Lagos.
55) R. Cervantes, Cas. 4650, Santiago. L.P: Dir: G. Holtehuer.
56) R. Malleco, Cas. 204, Victoria. L.P: Dir: G. Servanti.
57) R. Pampa, P. de Valdivia – 76) R. Minerva, Cas. 339, Rancagua.
58) R. General Marchant, Puerto Ausén. L.P: Dir: D. Martinez.
59) La Voz del Sur, Cas. 53, Punta Arenas. D.Prgr: 11.30–04.00 – V. by letter – 78) R. Panamericana, Alameda 924, Santiago.
60) R. Eleuterio Ramirez, Ramirez 652, Osorno.
61) R. Renaico, Urriola 85, Renaico. L.P: Dir: F. Gandarillas.
62) R. Pudeto, Edif. Yuri, Ancud. L.P: Dir: José Leal.
63) R. Antofagasta, Cas. 439, Antofagasta. L.P: Dir: A. Garcia.
64) R. Chacaburo, Cas. 370, Quillota – 84) R. Araucania, Cas. 462, Concepción. L.P: Dir: R. Arjona – 85) R. Chañaral, Comercio 53, Chañaral. L.P: Dir: Hoguer Garrao – 86) R. Alonso de Ercilla, Cas. 369, Ilapel. L.P: H. Pinochet.
65) Univ. Tecnica Santa Maria, Cas. 110-V, Valparaiso. L.P: Dir: C. Cerutti. Dir. Tec: G. Feik. D.Prgr: 01.00–02.30.
66) R. Independencia, Cas. 132, Molina. L.P: Dir: J. Aravena C. D.Prgr: 11.00–06.00. V. by QSL-card.
67) R. El Cobre, Cas. 125, Rancagua. L.P: Dir: Julio Romero.
68) R. Central, Cas. 202, San Carlos. L.P: Dir: Victor Busto.
69) R. Turismo, Puerto Varas – 92) R. Magallanes, Cas. 13940, Santiago – 93) R. Arauco, Cas. 6, Angol. L.P: Dir: J. Abasolo.
70) R. Estrella del Norte, Cas. 13, Vallenar. L.P: Dir: L. Morales.
71) R. Trasandina, Cas. 307, Los Andes – 96) R. Maule, Cas. 196, Cauquenas – 97) R. Manuel Rodriguez, Cas. 147, San Fernando – 98) R. Limache, Cas. 92, Limache – 99) R. Sudamerica, Cas. 1346, Santiago.
72) R. Rancagua, Cas. 21, Rancagua. L.P: Dir: J. Romero.
73) R. Almirante Lynch, Vivar 489, Iquique. L.P: Dir: L. Roldán.
74) R. Soberania, Cas. 11-D, Linares. L.P: Dir: R. Abasolo.
75) R. Aroncagua, Cas. 100, San Felipe. L.P: Dir: R. Grez Gonzáles.
76) R. Chronos, Plaza Bulnes 79, Santiago.
77) R. Centenario, Cas. 18, San Javier. L.P: Dir: Mario Gaete.
78) R. Regional, Cas. 293, Traiguen. L.P: Dir: Hugo Cuadra.
79) R. Sargento Aldea, Cas. 38, San Antonio. L.P: Dir: R. Filippi.
80) R. Provincial, Cas. 73, Putaendo.

COLOMBIA

L.T: GMT – 5 h – Pr.L: Spanish.
STATIONS: a) Go. st's – b) Cultural – c) Cultural or non-comm, private – d) to m) Comm. networks – n) Comm. st's – y) & z) Professional Association.
Hours of tr: 12.00–05.00 exc. where indicated.
Short waves: Call HJ---. *=inactive.

	Call	kc	m	kW	Name & h of tr.
1)	GW	3250	92.31	10	Accion Cult. Popular, Bogota b)
2)	AB	3290	91.18	25	Inst. Nac. de Radio y TV, Bogota a)
3)	GI	4755	63.09	2.5	Reina de Colombia, Chiquinquira c)
4)	KW	4775	62.84	1	La Voz de Maria, Bogota c)
5)	FU	4795	62.57	1	La Voz del Comercio, Armenia e)
6)	AU	4805	62.43	0.5	Universidad de Antioquia, Medellin c)
7)	HC	4825	62.18	1	R. Nariño, Pasto: 10.45–05.00 e)
8)	AM	4835	62.05	1	R. Buenaventura n)
9)	GF	4845	61.92	1	R. Bucaramanga: 11.00–04.00 q)

TV INDUSTRIAL: Addr: Juiz de Fora, MG. Station: chA10.

TV ALTEROSA: Addr: Belo Horizonte, MG. Station: chA2.

TV ANHANGUERA: Addr: Goiânia, Goiás. Station: chA11.

TV COROADOS: Addr: Londrina, Paraná. Station: chA3.

TV ERECHIM: Addr: Erechim, RGS. Station: chA4.

Projected stations:
TV Mayrink Vega, Rio de Janeiro, chA2 – TV Globo, Rua Ireneu Marinho 35, Rio de Janeiro, chA4 – TV Nacional, Brasilia, chA2 – TV Farroupilha, Galeria Rosario 22, Porto Alegre, chA5. – TV Bandeirantes, São Paulo, chA13 – TV Gazeta, São Paulo, chA11 – TV Brasil Central, Goiânia, chA13 – TV Campos, Campos, chA8 – TV Guaiba, Porto Alegre, chA2 – TV Santos Difusora, Santos -TV Volta Redonda, Volta Redonda, chA8 – TV Feira de Santana, chA3.

Ampex Videotape: TV Alvorada (Brasilia), TV Gaucha(Porto Alegre), ch2 (Recife), Rio, TV Cont, TV Rio (Rio de Janeiro), ch7, ch9, ch13, TV Excelsior, TV Paulista (São Paulo).
The Marconi Company, Ltd, G.B: TV tr's: Jornal de Comercio (Recife) 1×18, 1×9kW, R. Bandeirantes S. A. (São Paulo) 2×5, 1×5kW– Ant: Jornal de Comercio – Studio equip: Jornal de Comercio, R. Bandeirantes, S.A – OBV: Jornal de Comercio.
Pye T.V.T, GB: Tr, ant, studio equip to TV Gaucha, Porto Alegre.

CHILE

UNIVERSIDAD CATOLICA (Non-comm.) – Addr: Casilla 114D, Santiago. Te: 397709 – L.P: Dir. Gen: E. Tironi Arce. Dir. Tec: P. Carabal – Station: ch A13 10kW H. Repeater st. (ch A8) in Valparaiso. D.Prgr: 22.00–04.00, Mon 01.00–03.30.

UNIVERSIDAD DE CHILE (Educ): Addr: Alameda, 1058 Santiago – L.P: Dir: H. Soto. Dir. Tec: H. Barra.
Station: ch A9 3kW V – D.Prgr: 01.45–03.00.

COLOMBIA

INSTITUTO NACIONAL DE RADIO Y TELEVISION (Go.) Fr By Go. and adv. (40% of prgr's non-comm.) – Addr: Apt. Nacional 1824, Bogota. Te: 435640 – L.P: Dir. Gen: C. Simmonds. P. Dir. Tec: W. Puth – Stations: Bogota chA10 1/0.25kW/A7 10/2kW – Manizales chA11 1/0.25kW – Las Jurisdicciones chA6 10/2kW – El Carmen chA9 1/0.25kW – Monteria chA7 1/0.25kW – S. Marta chA2 10/2kW – Medellin chA8 0.25kW – Tunja chA10 0.4kW – Madrono chA9 0.4kW – Belencito chA7 5kW.
D.Prgr's: 13.15–16.00(Educational), 21.00–04.30(Comm). Prgr's are originated at Bogota, all other st's are repeaters.
Under Construction: Bogota (2nd Prgr.) chA9 1/0.25kW, Medellin chA3 10/2kW, Cali chA11 10/2kW, Munchique (Popayan) chA7 1/0.25kW, Galeras (Pasto) chA10 1/0.25kW, Neiva chA11 1/0.25kW, Quibdo chA13 & Cucutá chA7 0.25kW.

ECUADOR

LA VENTANA DE LOS ANDES (Priv, non-comm, cult.) Addr: Casilla 691, Quito – L.P: Dir: R. B. Clark – Station: HCJB TV chA4 8/3kW H – D.Prgr: D exc. Mon 23.30–03.00

PRIMERA TELEVISORA EDUCATORIANA (Comm): Addr: P.O. Box 3875, Guayaquil – L.P: Mgr: J. Rosenbaum – Station: chA4 2kW H – D.Prgr: 22.30–03.30.

PERU

CULTURAL
MINISTRY OF EDUCATION (Go.): Addr: Ministerio de Educacion Publica, Direccion de Cultura, Lima. Te: 75737 – L.P: Dir. Gen: R. Garrido M. Dir. Tec: A. E. Mousalvo – Station: OAD-TV chA7 0.1/0.05kW H.

COMMERCIAL
TELEVISORA AMERICA: Addr: Montero Rosas, Lima. Te: 42919 – L.P: Mgr: N. Gonzales V. Dir. Tec: D. Capella – Stations: 1) chA4 6kW, 2) Piura chA2 8kW, 3) Chiclayo chA4 8kW, 4) Trujillo chA4 8kW – Relay st's: 1) Huacho ch6, Ica ch6, Ancon ch6, 2) Talara ch6.

TELEVISORA PANAMERICANA: Addr: Av. Arequipa 1110, Lima. Te: 34240 – L.P: Mgr: G. Delgado P. Dir. Tec: M. Flores – Stations: 1) chA13 2/4kW, 2) Trujillo ch7 0.58kW, 3) Piura chA7 0.58kW, 4) Chimbote chA9 0.3/0.75kW, 5) Chiclayo chA9.

TELEVISORA VICTORIA: Addr: Av. Tacna 543, Lima. Te: 3-5943 – L.P: Mgr: J. E. Cavero – Stations: 1) chA2 30kW, 2) Huancayo chA3, 3) chA6 (Iquitos), 4) Cuzco chA6.

TELEVISORA EXELSIOR: Addr: Av. Manco Capac, Lima – L.P: Mgr: A. Belmont – Station: chA11.

TELEVISORA EL SOL: Addr: Av. Uruguay 355, Lima. Te: 35300 – L.P: Dir. Gen: A. Pereyra. Gen. Mgr: N. Gonzalez V – Station: chA7 5/10kW. Relay st's: Huacho chA7, Ica chA11 – D. Prgr: 24 30Sun. 23.00–05.00.

TELEVISORA SUR PERUANA: Addr: Cas. 514, Arequipa. Te: 3650 – L.P: Mgr: G. Quintanilla. Dir. Tec: E. Tchuschke – Stations: 1) chA2 0.25/0.5kW, Cuzco chA4 – D.Prgr: 18.00–04.30 – Planned st's: Piura chA7, Tacna chA2, Trujillo chA7.

TELEVISORA CONTINENTAL: Addr: M. de Orberoga 338, Arequipa – Station: chA6 8kW – D.Prgr: 20.00–05.00.

Ampex Videotape, USA: R, America TV, Lima.

URUGUAY

SAETA (Sociedad Anonima de Emisoras de Television y Anexos) (Comm.) – Addr: Tacuarembo 1234, Montevideo. Cable: Saeta. Te: 4-4011 – L.P: Pres: R. Fontaina. Vice Pres: J. E. De Feo. Gen. Mgr: R. Fontaina Jr. Dir. Tec: A. Galimberti. Sales Mgr: M. Fontaina. Film Buyer: E. Antonio – Station: chA10 2.5kW H – D.Prgr: 17.00–03.00.

SODRE (Servicio Oficial de Difusión Radio Electrica): Addr: Bulevard Artigas, Colorado, Montevideo – L.P: See radio – Station: chA5 5/2.5kW – D.Prgr: 21.30–03.00 – Projected St's: chA6 32.5kW, chA12 100kW.

TELEVISORA LARRANAGA S.A. (Comm.): Addr: Enriqueta Compte y Rique 1276, Montevideo. Te: 25856 – L.P: Gen. Mgr: H. Scheck – Station: CXA12-TV chA12 40/20kW – D.Prgr: 12.00–03.00.

MONTE CARLO TV (Comm.): Addr: Av. 18 de Julio 1855, Montevideo, Cable: Montecarlotv. Te: 402146 – L.P: Dir. Gen: H. Romay Salvo. Dir. Tec: J. L. Goyret. Dir. Prgr: J. N. Mullins – Station: chA4 24/12kW H – D.Prgr: 11.00–04.00 – F.Pl: 100kW.

VENEZUELA

Def: 625 – Ch: A – Pol: H.

TELEVISORA NACIONAL (Go.) – Addr: Apt. 3979, Caracas. Te: 545436 – L.P: Dir. TV: Dr. A. Pazani P. Dir. Tec: M. A. Burgos. Station: YVKA-TV chA5 37,5/18,6kW – D.Prgr: 21.30–04.30.

VENEVISION S.A. (Comm.) – Addr: Apt. 6674, Caracas. Te: 722741 – L.P: Dir. Tec: M. Sapkowski – Station: Carabobo chA9 84/42kW – D.Prgr: 22.30–04.30.

R. CARACAS TV (Comm.) – Addr: Apt. 2057, Caracas. Te: 418971 – L.P: Dir. Gen: A. Espina. Dir. Tec: J. Marcano – Stations: YVKS-TV: Barquisimeto chA3 20/10kW, Carabobo chA7 12.8/6.4kW, Caracas chA2 62.6/31.3kW, Curimagua chA10 330/165kW, Coro chA10 330/165kW, Valencia-Maracay chA7 13/6.5kW, La Guaira chA7 10/5kW, Maracaibo chA2 600/300kW, Barquisimeto chA2 – D.Prgr: 12.30–05.00.

ONDAS DEL LAGO TELEVISION (Comm. – Addr: Apt. 261, Maracaibo – Station: chA13 12/6kW.

R. VALENCIA TV (Comm.) – Addr: Valencia – Station: chA3 4/2kW – D.Prgr: 22.30–04.30.

TELEINVERSIONES C.A. – Addr: Apt. de Correos 9349, Caracas. L.P: Techn. Dir: M. Sapowski. Maintenance Eng: J. Cervera – Stations: Valencia chA6 3/1kW, Pichacho chA13 50/10kW, Caracas chA13 50/10kW. Prgr's are originated in Valencia where studios are located, and repeated in Pichacho & Caracas.

COLOR TELEVISION, Caracas – Station: YVRS-TV chA8.

PARA TODOS LECTORES HABLANDO ESPAÑOL

A fin de emplear el WRTH sin dificultades ofrecemos a todos nuestros lectores, que hablan el castellano, un vocabulario inglés-español que contiene todas palabras y frases que se utilizan por lo general en todos resumens y tablas en el manual. Este vocabulario capacitará a todas personas con un poquito o sin conocimiento ninguno al idioma inglés para entender y emplear el WRTH sin difficultades. Si quiere un ejemplar, libre de gastos, sírvase escribir a

WORLD RADIO TV HANDBOOK CO., LTD
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APPENDIX I.

Educational Potential of the Synchronous Communications Satellite and Summary of Status of Television in Africa and Latin America

Draft working paper prepared by ComSat Corporation staff member.

November 1965

THE EDUCATIONAL POTENTIAL OF THE SYNCHRONOUS COMMUNICATIONS SATELLITE

Because of foreign policy considerations, it has been apparent for some months that the Corporation may be asked to extend satellite services to individuals or groups of developing countries before the time period when such service would otherwise be considered commercially desirable. Extension of normal services to such countries would not necessarily present novel problems, except insofar as users owning no interest in the joint verture might participate for the first time.

However, the interest of the developing countries may be focused primarily on the educational potential of communications satellites. This new focus suggests it may be timely now to examine some of the possible ramifications of providing service to the developing countries.

Since it is being assumed that it may become necessary to provide satellite service before it would otherwise be considered commercially desirable to institute it, it cannot be expected that direct broadcasting satellites will be available

for the time period when service would initially be required. Consequently, from an economic point of view, it would appear advantageous to provide as great a variety of services as possible for whichever developing countries would be involved in the educational service. This suggests the desirability of a continuation of the present practice of establishing large earth stations capable of serving a variety of needs throughout a wide geographical area. International commercial telephony and telegraphy, embassy and other U. S. official communications could all be handled in addition to whatever educational uses should be deemed of greatest interest to the governments of the developing countries concerned. By serving a broad range of interests, it can be expected that help in financing certain internal improvements in the developing countries directly involved would be easier to obtain, and also that, from a cost point of view, the break-even point would be more quickly attainable. A specific analysis of various aspects of satellite service to developing areas follows.

The need. The need for service to an area must be sharply differentiated from the present economic feasibility of such service. The latter can be judged somewhat from earth station viability studies being conducted by the International Development Division. The "need for service" must depend on a determination of what factors are allowed to define the "need." This immediately raises the question of whether the developing countries have any needs which can be best met by instituting satellite services.

To examine the question of need, it is necessary to look at specifics. Taking the African continent as an example, it can be said that the problems impeding speedy development are basically two: (1) the very low average per capita income in most African countries and, (2) the high illiteracy rate among African populations. While census statistics on illiteracy are sparse, some figures are available. The 1961 census in Senegal indicated an illiteracy rate of 94.4% among its non-white population. The 1956 census in Sudan showed a 95.6% illiteracy rate. In North Africa the situation was relatively better,

but nonetheless hardly good. Censuses taken in 1960 indicated an illiteracy rate of 86.2% in Morocco, 84.2% in Tunisia, and 73.7% in the U.A.R.

To the extent that the factors impeding development can be remedied to some extent by education, the mass media, and particularly television, have an important role to play. The teaching of improved agricultural methods and training in necessary health measures, the teaching of reading, writing, and when necessary, foreign language skills necessary to achieve literacy in a language common to the inhabitants of a particular area are all skills which television is uniquely suited to teach, particularly in areas where, as here, the number of trained teachers is insufficient for conventional teaching methods to be adequate.

If education is the most basic requirement of the developing countries in Africa today, and television represents the best medium for remedying this lack over as short a time period as possible, it would appear worthwhile for the Corporation to study in depth the role which it could best play in meeting this need.

Earlier work on the potential value of communications satellites to transmit educational and current events television has focused on their potential in an intercontinental system. Conclusions have been rather pessimistic due to high estimates of the costs involved (based to a considerable extent on the number of recievers that would need to be supplied)* and other problems such as significant time variations, language difficulties, frequency allocation problems, and incompatibility of line standardization systems in use. Such pessimism does not really seem warranted.

A beginning could be made experimenting in the potential of this field next year after the HS 303A's are launched. Present estimates of the excess channel capacity over the NASA requirements are now estimated at 90. Slow-scan Television could be used to transmit programs using at most 60 of the 90 voice channels expected to be available. It is evident that were

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*Leland L. Johnson. Communications Satellites and Underdeveloped Countries. RM 2985-NASA, The Rand Corporation, Santa Monica, California.

experimentation to begin next year with the 303A, transportable earth stations would have to be used to receive programs in Africa or Latin America. In choosing countries for experimentation, it would be advisable initially to select an area where the problems to be encountered would be few. The attached charts show the countries where television service is now available, the line standard in use, and the density of receivers among populations in Latin America and Africa. It shows that all states in Central and South America with the exception of Paraguay and Bolivia now have television and that , with two exceptions (Argentina and Venezuela), these countries all have the same line standardization as the United States. Since time difference is minimal between the U. S. and the other American republics, transmission could be made in off time periods within both areas. In addition, a number of these countries already have experience at the national level in the use of educational television. In short, Latin America represents a natural for experimentation for such a program. At the same time, it would not be advisable

to exclude the African continent completely from such an experiment. Examination of the line standardization chart shows that the best potential area here appears to be West Africa. With the exception of Upper Volta, all countries having television in this area employ CCIR 625 line standardization. Conversion from the U.S. 525 system could be accomplished by locating one conversion unit by each transportable earth station. (The costs here are in the neighborhood of $50,000 per conversion unit and while it is difficult to estimate the cost of the transportable earth station figures in the vicinity of $1,500,000 are often mentioned.) The language problem in this area should not be too great, since English or French are widely understood and one or the other serves as a lingua franca in these countries. The time difference of course is great here, but transmission from the U.S. during evening hours would reach the West Coast of Africa the following morning, local time, presumably not a bad time from the point of view of the receivers. While costs of such experimental use would have to be examined, it would obviously be cheaper to begin educational services as a marginal use of

an existing program rather than in other, more dramatic, ways.

Choice of actual countries and cities to be served in these continents would depend on the internal distribution patterns available and the interests of the governments concerned. (Assumption: most TV stations are government owned or controlled in these areas.)

While the program planned for the HS 303A next year would allow the possibliity of some tv use to Africa and Latin America, a developed educational television system clearly would need greater capacity than Comsat's present launch program for next year would allow. Should a developed system be needed for educational purposes in advance of the development of the global system, the need could presumably be implemented through the Interim Committee in the same way that NASA's Apollo needs were recently met. Such a program might well have a favorable spill-over effect, making excess voice channels available for official communications or commercial telephony or telegraph use in the developing areas.

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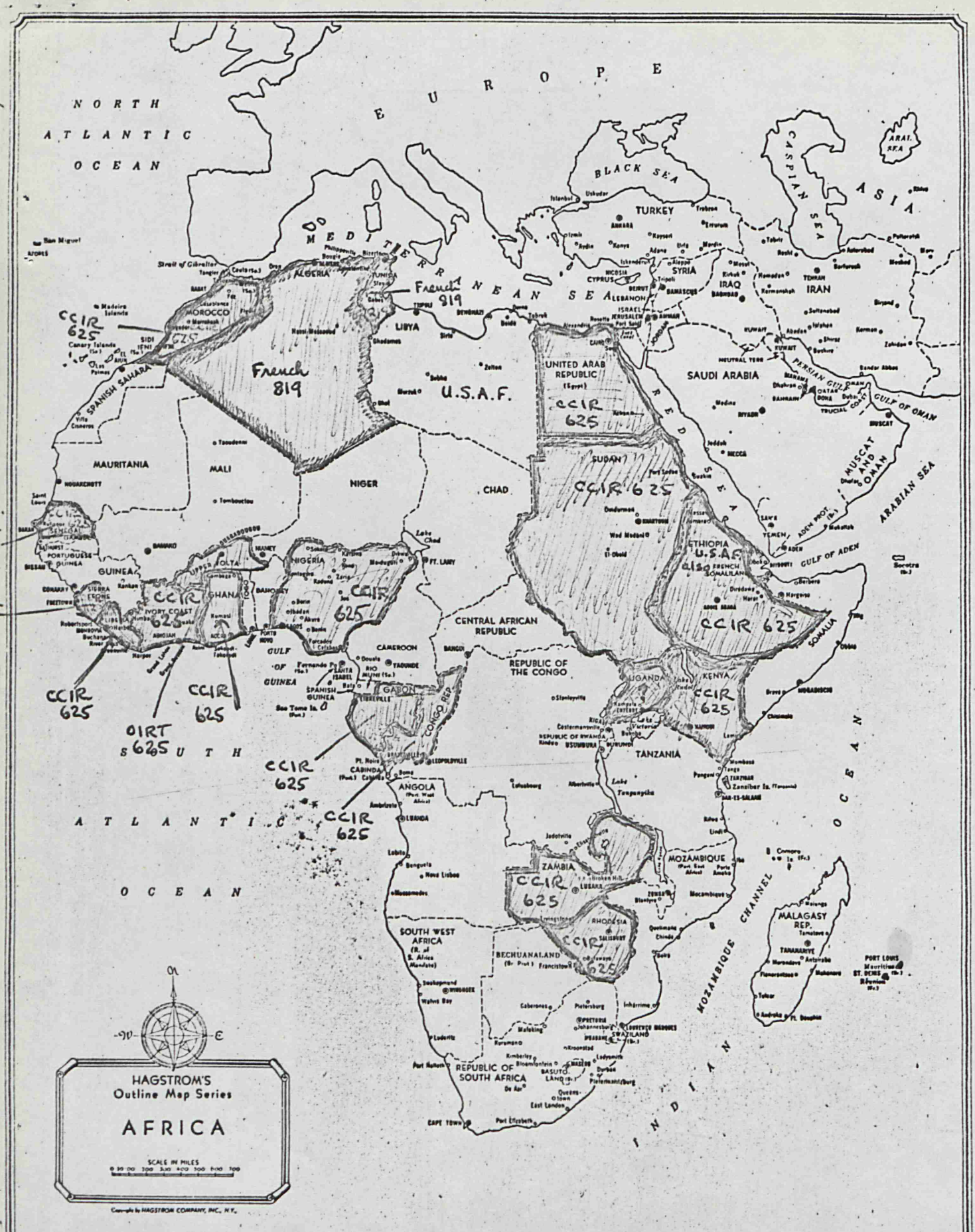
NORTH ATLANTIC OCEAN
EUROPE
MEDITERRANEAN SEA
BLACK SEA
CASPIAN SEA
ASIA
ARAB. SEA
TURKEY
SYRIA
IRAQ
IRAN
LEBANON
CYPRUS
ISRAEL
JORDAN
KUWAIT
SAUDI ARABIA
PERSIAN GULF
GULF OF OMAN
MUSCAT AND OMAN
ARABIAN SEA
RED SEA
GULF OF ADEN
SOMALIA
ETHIOPIA
U.S.A.F.
SUDAN
UNITED ARAB REPUBLIC (Egypt)
LIBYA
ALGERIA
MOROCCO
SPANISH SAHARA
MAURITANIA
MALI
NIGER
CHAD
NIGERIA
GUINEA
PORTUGUESE GUINEA
SENEGAL
GAMBIA
UPPER VOLTA
GHANA
IVORY COAST
CENTRAL AFRICAN REPUBLIC
CAMEROON
REPUBLIC OF THE CONGO
GABON
CONGO REP.
SPANISH GUINEA
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ZAMBIA
RHODESIA
MOZAMBIQUE
SOUTH WEST AFRICA
BECHUANALAND
REPUBLIC OF SOUTH AFRICA
BASUTOLAND
SWAZILAND
MALAGASY REP.
MOZAMBIQUE CHANNEL
INDIAN OCEAN
ATLANTIC OCEAN
French 819
French 819
U.S.A.F.
U.S.A.F.
CCIR 625
CCIR 625
CCIR 625

AFRICAN TV COUNTRIES

Algeria.....1 TV set per 116 people

United Arab Republic.....1 TV set per 119+ people

Zambia.....1 TV set per 358+ people

Liberia.....1 TV set per 515 people

Morocco.....1 TV set per 633+ people

Kenya.....1 TV set per 1,040 people

Sudan.....1 TV set per 1,283+ people

Gabon.....1 TV set per 1,520 people

Congo (Brazzaville).....1 TV set per 2,100 people

Tunisia.....1 TV set per 2,247 people

Sierra Leone.....1 TV set per 3,650 people

Ivory Coast.....1 TV set per 3,665 people

Nigeria.....1 TV set per 3,708 people

Upper Volta.....1 TV set per 18,600 people

* = signatory COUNTRY	1963 POPULATION	(end of 1964) TV SETS	TYPE	(PL. = planned) CITIES (OP=operating)
*ALGERIA	11,600,000	100,000 in use	French 819-line standards	Algiers (OP) Chrea (OP) Constantine (OP) Oran (OP) Tessala (OP) Tizi-Ouzou (OP)
*TUNISIA	4,494,000	2,000 sets in use	French 819-line standards. Programs are picked up from Italy.	TUNIS I (PL.) TUNIS II (PL) SFAX I (PL) SFAX II (PL) (Radiodiffusion Television Tunisienne (Govt.), Tunis.)
*LIBYA	1,504,000			
*UNITED ARAB REPUBLIC	27,963,000	250,000 sets in use	CCIR 625-line standards	ALEXANDRIA I (OP) ALEXANDRIA II (OP) ALMINIA (OP) ASWAN (OP) BOSHE (OP) CAIROI (OP) CAIRO II (OP) CAIRO III (OP) EDFU (OP) EL RAYAYNA (OP) ISMAILIA (OP) KENA (OP) KOMOMBO (OP) LUXOR (OP) MAGHAGHA (OP) MALLAWI (OP) MANSOURA (OP) PORT SAID (OP) QUASSASSIN (OP) SUEZ (OP) TANTA (OP) (United Arab Republic Broadcasting Corp. (Govt,commercial) TV Bldg.,Cairo, Egypt)

POPULATION STATISTICS ARE FROM:
UN STATISTICAL YEARBOOK 1964

TV STATISTICS ARE FROM:
1965 Edition of TELEVISION FACTBOOK
(RCA)

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
*SUDAN	12,831,000	10,000 in use	CCIR 625-line standards	OMDURMAN (OP) (Sudan Television Service, (Govt., commercial), Omdurman, Sudan) WAD MEDANI area (PL): new station at: ATBARAH or PORT SUDAN.
*ETHIOPIA	21,800,000	....	CCIR 625-line standards	ADDIS ABABA (OP) (Television Ethiopia, (Govt), Ministry of Information, Addis Ababa. Started 1964)
CHAD	2,800,000			
NIGER	3,117,000			
MALI	4,394,000			
MAURITANIA	780,000			
MOROCCO	12,665,000	20,000 in use	CCIR 625-line standards	CASABLANCA (OP) M. ZERHOUN (OP) MARRAKECH (OP) RABAT (OP) (Radiodiffusion Television Marociane (Govt, non-commercial Rabat, Morocco)
SENEGAL	3,360,000	....	CCIR 625-line standards	DAKAR (PL) : to be Govt. outlet.
GAMBIA	315,000			
GUINEA	3,360,000			
PORTUGUESE GUINEA	524,000			

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
SIERRA LEONE	2,190,000	600 in use	CCIR 625-line standards	FREETOWN (Aberdeen Hill) (OP) (Sierra Leone Television, (Commercial), Freetown, Sierra Leone).
LIBERIA	1,030,000	2,000 in use	CCIR 625-line standards	MONROVIA--ELTV, (OP): Liberian Broadcasting Corp., (govt, commercial), Monrovia, Liberia
IVORY COAST	3,665,000	1,000 in use	CCIR 625-line standards	ABIDJAN (OP) (La Television Ivoirienne, (Govt., commercial), Abidjan, Ivory Coast).
UPPER VOLTA	4,650,000 (African)	250 in use	OIRT 625-line standards	OUAGADOUGOU (OP) non- (Volta Vision, (govt., commrcl) Ouagadougou, Upper Volta).
GHANA	7,340,000	...	CCIR 625-line standards	ADJANKOTE (OP) KISSI (OP) JAMASI (OP) TAMALE (PL) (Ghana Television, Accra, Ghana, Govt, n-commercial).
TOGO	1,565,000			
DAHOMEY	2,250,000 (African)			
NIGERIA	55,620,000	15,000 in use	CCIR 625-line standards	Broadcasting Company of Nigeria LTD., (BCNN), Kaduna, Nigeria, Commercial. Eastern Nigeria Television (ENTV) Enugu, Nigeria, Govt, Commercial Nigerian Television Service (NTS) Victoria Island, Lagos, Nigeria, Govt, commercial.

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
NIGERIA (con't)				Western Nigeria Radiovision Services Ltd. (WNTV) Ibadan, Nigeria, Govt., Commercial. ABA -(ENTV) (OP) ENUGU - (ENTV) (OP) IBADAN - (NTS) (OP) IBADAN - (WNTV) (OP) KADUNA - (BCNN) (OP) KANO - (BCNN) (OP) LAGOS - (Abafon,WNTV) (OP) LAGOS - (NTS) (OP) ZARIA - (BCNN) (OP)
CAMEROON	4,560,000			
CENTRAL AFRICAN REPUBLIC	1,300,000 (African)			
GABON	456,000	300 in use	CCIR 625-line standards	LIBREVILLE (OP) (Radiodiffusion Television Gabonaise, Govt, educational)
CONGO REPUBLIC (Brazzaville + Leopoldville)	15,847,000	400 in use	CCIR 625-line standards	BRAZZAVILLE (OP) (Radiodiffusion-Television Congolese, Govt., commercial)
UGANDA	7,190,000			
KENYA	8,847,000	8,500 in use	CCIR 635-line standards	NAIROBI (OP) KISUMU (Timboroa) (OP) (Voice of Kenya, govt., commercial).
SOMALIA	2,300,000			

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (PL=planned) (OP=operating)
TANZANIA	10,123,000			
RWANDA	2,850,000			
ANGOLA (Port.)	5,012,000			
ZAMBIA	3,500,000	9,750 in use	CCIR 625-line standards	KITWE (OP) LUSAKA (PL) BROKEN HILL (PL) (Zambia Television Ltd., Kitwe, Zambia, Commercial).
MALAWI	3,753,000			
MOZAMBIQUE (Portuguese)	6,789,000			
RHODESIA (Southern, UK)	4,010,000	38,700 in use	CCIR 625-line standards	Rhodesia Broadcasting Corp. (Govt) owns and operates all stations. RTV-Rhodesian Television Ltd. in Salisbury, Southern Rhodesia, is program contractor in charge of daily programming. SALISBURY--RTV (OP) BULAWAYO--RTV (OP)
BECHUANALAND (UK)	540,000			
BURUNDI	2,650,000			
SOUTH WEST AFRICA	554,000			
*R. OF SOUTH AFRICA	17,057,000			
SWAZILAND (UK)	283,000			



TELEVISION IN LATIN AMERICA

FIRST NATIONAL CITY BANK
FOREIGN INFORMATION SERVICE

LATIN AMERICAN TV COUNTRIES

VENEZUELA	1 TV set per 9+ people
*ARGENTINA	1 TV set per 13+ people
CUBA	1 TV set per 14+ people
URUGUAY	1 TV set per 14+ people
PANAMA excluding Canal Zone	1 TV set per 24+ people
MEXICO	1 TV set per 29+ people
*BRAZIL	1 TV set per 33+ people
COSTA RICA	1 TV set per 38+ people
*COLOMBIA	1 TV set per 50+ people
PERU	1 TV set per 63+ people
GUATEMALA	1 TV set per 81+ people
EL SALVADOR	1 TV set per 90+ people
DOMINICAN REPUBLIC	1 TV set per 95+ people
NICARAGUA	1 TV set per 154+ people
*CHILE	1 TV set per 164+ people
HONDURAS	1 TV set per 311+ people
ECUADOR	1 TV set per 590+ people
HAITI	1 TV set per 1,270+ people

(end of 1964)

LATIN AMERICA

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (PL=planned) (OP=operating)
MEXICO	38,416,000	1,300,000	525-line standards	All OP. All stations commercial except where noted. CHIHUAHUA--XERA-TV COLIMA--XHCC-TV ENSENADA--XHS-TV GUADALAJARA--XEHL-TV GUADALAJARA--XEWO-TV GUADALAJARA--XHG-TV HERMOSILLO--XEWH-TV JUAREZ--XEJ-TV JUAREZ--XEPM-TV LAREDO--XEFE-TV MERIDA--XHY-TV MEXICALI--XHBC-TV MEXICO CITY--XEIP-TV MEXICO CITY--XEQ-TV MEXICO CITY --XEW-TV MEXICO CITY--XEX-TV MEXICO CITY--XHGC-TV MEXICO CITY--XHTV MONTERREY--XEFB-TV MONTERREY--XET-TV MONTERREY--XHX-TV NOGALES--XHFA-TV TIJUANA--XETV TIJUANA--XEWT-TV TORREON--XELN-TV VERACRUZ--XHFM-TV
GUATEMALA	4,095,000	50,000	525-line standards	GUATEMALA CITY: TG-BOL-TV, commercial TGW-TV, govt, commercial TG-AB-TV, commercial ALL OPERATING
BRITISH HONDURAS	100,000	.....	.....	.....

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
HONDURAS	2,024,000	6,500	525-line standards	TEGUCIGALPA--HRTG-TV (Commercial, OP) SIGUATEPEQUE--HRSU-TV (Repeats Ch. 5, Teguicigalpa,OP) SAN PEDRO SULA--HRTA-TV (Repeats Ch.5, Tegucigalpa,OP)
EL SALVADOR	2,721,000	30,000	525-line standards	Teleradio Centroamericana (TELECENTRO), San Salvador, Commercial: SAN SALVADOR, OP: YSEB-TV (OP) YSDR-TV (OP) YSU-TV (OP) SAN SALVADOR,PL: YSY-TV (PL)
NICARAGUA	1,541,000	10,000	525-line standards	Television de Nicaragua SA. Managua, Nicaragua,Commercl MANAGUA-YNSA-TV (OP) Ch.6 MANAGUA--YNSA-TV (OP)Ch.8
COSTA RICA	1,344,000	35,000	525-line standards	SAN JOSE (OP): TI-TVCR, Televisora Costa Rica, Commercial, affiliated with Central American TV Network, San Jose, Costa Rica. SAN JOSE (OP): TI-TT, Radio Television Tic-Tac, Commercial. Ch.9 SAN JOSE (PL): TI-TT, a Channel 4 to repeat Channel 9.

* = Signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
PANAMA (excluding Canal Zone)	1,177,000	48,000 (excluding Canal Zone)	525-line standards	PANAMA--RPC-TV, Corporacion Panamena de Radiodifusion, Commercial, Ch. 4 (OP) PANAMA--RPC-TV, Ch. 12, repeats Ch. 4 (OP) PANAMA--TV-2, Televisora Nacional S.A. Commercial, (OP) PANAMA--Ch. 7, to repeat Ch. 4 (PL) PANAMA--Ch. 6, to repeat Ch. 2 (PL) DAVID--Ch.10 (PL)
CUBA	7,203,000	500,000	525-line standards	All stations commercial. All of list are operating. Havana stations CMAB-TV and CMBF-TV are operated as one network by the govt. and are feeding their former satellites the same programs. CMQ-TV is operated as a second network and also feeds its former satellites with govt. programs. Commercil operations of all stations have been taken over by the govt. HAVANA--CMAB-TV: Television Revolucion; Also operates 6 satellites and plans 7th. HAVANA--CMBF-TV: Cadena Nacional, S.A. Ch.4; also operates 6 satellite HAVANA--CMQ-TV: Circuito,

* = signatory

COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (OP=operating) (PL=planned)
CUBA CONTINUED			HAVANA, CMQ-TV con't	CMQ, Ch.6, operates 7-station network.
				HAVANA--CMTV, Ch.10.
				HAVANA--CMBA-TV: Radio Universal, S.A., Ch. 7.
				HAVANA--CMBJ-TV: TV de la Libertad, Ch. 12.
				CAMAGUEY--CMJL-TV: Circuit CMQ, Ch. 6.
				CAMAGUEY--CMFE-TV: Telemundo, Ch.9, Satelite of CMAB-TV, Havana.
				CAMAGUEY--CMJ-TV: CMBF-TV Cadena Nacional, Ch.4, Satellite of CMBF-TV, Havana.
				CAMAGUEY--CMFG-TV: Television Camaguey, S.A. Ch. 11.
				CIEGO DE AVILA--CMFD-TV, Circuito CMQ, Ch.7.
				HOLGUIN--CMKJ-TV: Circuito CMQ, Ch. 3.
				HOLDGUIN--CMLD-TV, CMBF-TV Cadena Nacional, Ch. 8, Satellite of CAB-TV, Havana.
				JATIBONICA--CMFF-TV: Telemundo, Ch. 12.

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
CUBA CONTINUED				MATANZAS--CMG-TV, CMBF Cadena Nacional, Ch. 13; satellite of CMAB-TV, Havana. MATANZAS--CMGQ-TV, Circuito CMQ, Ch. 9; satellite of CMBF-TV, Havana. MATANZAS--CMGH-TV, Telemundo, Ch. 11, satellite of CMAB-TV, Havana. SANTA CLARA--CMH-TV, CMBF-TV, Cadena Nacional, Ch. 3; satellite of CMBF-TV, Havana. SANTA CLARA--CMHQ-TV, Circuito CMQ, Ch.5. SANTA CLARA--CMRA-TV, Telemundo, Ch. 8; satellite of CMAB-TV, Havana. SANTIAGO DE CUBA--CMKU-TV, Circuito CMQ, Ch.2. SANTIAGO DE CUBA--CMLC-TV, Telemundo, Ch. 7; satellite of CMAB-TV, Havana. SANTIAGO DE CUBA--CMLB-TV, Cadena Nacionale, Ch.5; Satellite of CMBF-TV, Havana. VICTORIA DE LAS TUNAS--CMLQ-TV, Circuito CMQ, Ch. 70. VICTORIA DE LAS TUNAS--Ch. 73.

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
HAITI	4,448,000	3,500	525-line standards	PORT-AU-PRINCE (OP): 4VMR-TV, Telehaiti S.A. Commercial, Ch.5.
DOMINICAN REPUBLIC	3,334,000	35,000	525-line standards	SANTA DOMINGO--HIN-TV, Rahintel TV, commercial, Ch. 7, (OP). SANTA DOMINGO--HISD-TV, Radio Santa Domingo TV, Govt, commercial, Ch.4 (OP) LA CUMBRE--Radio Santo Domingo TV, Govt. , Commercial, Ch.9, (OP). SANTO CERRO--Radio Santo Domingo TV, Govt., Commercial, Ch.2, (OP).
*COLOMBIA	15,098,000	300,000	525-line standards	Televisora Nacional: (Govt., commercial), Bogota; All stations use HJRN-TV. ALTO MAGDALENA, Ch.7 (OP). BOGOTA, Ch. 9 (OP). BOYACA, Ch. 7 (OP). BUCARAMANGA, Ch. 10 (OP). CALI, Ch. 7, (OP). CALI, Ch. 10, (satellite) (OP). MADRONO, Ch.9 (OP). MANIZALES, Ch. 11 (OP). MANJUI, Ch. 7 (Experimental (OP). MEDELLIN, Ch.8 (OP). PAZ DEL RIO, Ch. 7 (satellite) (OP). EL QUINDIO, Ch. 9 (OP).

* = signatory

COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
*COLOMBIA CONTINUED				SANTA MARTA, Ch. 7 (OP). TUNJA, Ch. 10 (OP) VALLE DEL CAUCA, Ch. 7 (satellite) (OP). EL CARMEN DE BOLIVAR, Ch. 10 (PL). GALERAS, Ch. 2, (PL). LAS JURIDICTIONES, Ch. 5 (PL). MONTERIA, Ch. 7 (PL). NEIVA, Ch. 9 (PL). PASTO, Ch. 2 (PL). POPAYAN, Ch. 11 (PL). PURACE, Ch. 11 (PL). KUIBO, Ch. 13 (PL). C.QUEMADO, Ch. 4 (PL).
VENEZUELA	8,144,000 (Indian jungle ihabitants: 31,800 (1961))	850,000	CCIR 625-line standards, U.S. channeling	Televisora Nacional, Govt., Non-commercial, Caracas. Venevision , Commercial, Corporacion Venezolana de Television S. A., La Colino. Teletrece, commercial, subsidiary of Venevision Radio Caracas Television, Commercial, Corporacion Radiofonica Venezolana C.A., Caracas. Radio Valencia Television, Commercial, Valencia. BARQUISIMETO: Radio Caracas Television, Ch. 3, repeats YVKS-TV, Caracas (OP).

* = signatory

COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (OP=operating) (PL=planned)
VENEZUELA CONTINUED				CARABOBO: Radio Caracas Television, Ch. 7, repeats YVKS-TV, Caracas (OP).
				CARACAS: Proventel, Ch.8, (OP).
				CARACAS: Ch. 11, Amable Espina, owner, (OP).
				CARACAS: YVKA-TV, Televisora Nacional, Ch. 5 (OP).
				CARACAS: YVKS-TV, Radio Caracas Television, Ch. 2, (OP).
				CARACAS: YULV-TV, Venevision, Ch. 4, (OP).
				CORO, Falcon: Radio Caracas Television, Ch. 10, repeats YVKS-TV, Caracas (OP).
				LA GUAIRA: Radio Caracas Television, Ch. 7, repeats YVKS-TV, Caracas, (OP).
				MARACAIBO: Radio Caracas Television, Ch. 2, repeats YVKS-TV, Caracas, (OP).
				MARACAIBO: YVMB-TV, Teletrece, Ch. 13 (OP).
				ORIENTE (Barcelona, Pto. La Cruz, Margarita): Radio Caracas Television, Ch. 3, repeats YVKS-TV, Caracas (OP).

* = signatory

COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (PL=planned (OP=operating)
VENEZUELA CONTINUED				
				PUERTO CABELLO: Radio Caracas Television, Ch. 10, repeats YVKS-TV, Caracas (OP).
				TACHIRA: Radio Caracas Television, Ch. 7, repeats YVKS-TV, Caracas, (OP).
				VALENCIA: YULD-TV, Radio Valencia Television, Ch. 3, (OP).
				VALENCIA: Teletrece, Ch. 13, (OP).
				VALENCIA: Venevision, Ch. 11, repeats YVKS-TV, Caracas (OP).
				VALENCIA-MARACAY: Radio Caracas Television, Ch. 7, repeats YVKS-TV, Caracas (OP).
				EL TIGRE (Anzoategui): Radio Caracas Televis'n Ch. 10, repeats YVKS-TV, Caracas (OP).
				TRUJILLO: Radio Caracas Television, Ch. 7, repeats YVKS-TV Caracas, (OP).
BRITISH GUIANA	611,000	.....	.....	.....

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL=planned) CITIES (OP=operating)
SURINAM (Neth)	320,000 (Indian & Negro pop. =38,000 in '62)	.....	.....	.....
FRENCH GUIANA	35,000	.....	.....	.....
*BRAZIL	76,409,000 (Indian jungle inhabitants (1956) =150,000)	2,300,000	525-line standards	

Brazil

(525-line standards)

Sets in use: 2,300,000

All (6 P)

All stations commercial except Govt.-owned outlets.

BAURU—TV Bauru, Ch. 2. ERP 3 kw. Started 1960.

BELEM—TV Marajoara, Ch. 4. (Chateaubriand group) ERP 5 kw. Started 1960.

BELO HORIZONTE—TV Itacolomi, Ch. 2. (Chateaubriand group) ERP 15 kw. Started 1955.

BELO HORIZONTE—TV Alteroza, Ch. 4. (Chateaubriand group) ERP 30 kw. Started 1961.

BELO HORIZONTE—TV Belo Horizonte, Ch. 12. (J. B. Amaral group) ERP 5 kw. Started 1962.

BRASILIA—TV Nacional (govt.), Emprenza Incorporado ao Patrimonio Nacional, Brasilia, D.F. Ch. 2. ERP 2 kw. Started April 1960.

BRASILIA—TV Brasilia, Ch. 5. (Chateaubriand group) ERP 10 kw. Started April 1960.

BRASILIA—TV Alvorada, Ch. 9. (J. B. Amaral group) ERP 5 kw. Started April 1960.

CAMPINA GRANDE—Ch. 9. (Chateaubriand group)

CAMPINAS—TV Excelsior (M. W. Simonsen group--see Ch. 9, Sao Paulo). Ch. 10. ERP 20 kw. Started Jan. 1964.

CURITIBA—TV Parana, Ch. 6. (Chateaubriand group) ERP 4 kw. Started 1960.

CURITIBA—TV Paranaense, Ch. 12. ERP 10 kw. Started June 1959.

FORTALEZA—TV Ceara, Ch. 2. (Chateaubriand group) ERP 3 kw. Started 1960.

GOIANIA—TV Anhuanguera, Ch. 2. ERP 10 kw.

GUARATINGUETA—TV Guaratingueta, Ch. 12. (J. B. Amaral group) ERP 5 kw. Started 1961.

836-b

SAO PAULO—TV Cultura, Ch. 2. (Chateaubriand group) ERP 15 kw. Started 1960.

SAO PAULO—TV Tupi Difusora, Ch. 4. (Chateaubriand group) ERP 30 kw. Started Sept. 1950. (Directional satellites on Ch. 16, 23 & 31)

SAO PAULO—TV Paulista, Ch. 5. (Victor Costa) ERP 30 kw. Started March 1952. (Directional satellites on Ch. 19, 28 & 29)

SAO PAULO—TV Record, Ch. 7. (J. B. Amaral group) ERP 30 kw. Started Sept. 1953. (Directional satellites on Ch. 17, 22 & 25)

SAO PAULO—TV Excelsior, Rua Nestor Pestana 196, Sao Paulo (M. W. Simonsen group). Ch. 9. ERP 60 kw.; 20 low-power satellites. TV tape recording facilities. Started July 1960. Rate card available from ABC International Television, New York. Personnel: Alberto Saad, gen. mgr.; Edson Leite, film buyer; Alberto Maluf, chief engineer.

SAO PAULO—TV Bandeirantes, Ch, 13. ERP 120 kw. Started April 1963.

UBERLANDIA—Ch. 10. ERP 10 kw. Started 1964.

VITORIA--Ch. 4. (Chateaubriand group) Started 1960.

Under construction & planned;

BELO HORIZONTE—TV Vila Rica. Ch. 7. ERP 60 kw.

CAMPOS--TV Campos, Ch. 8. Under construction.

NOVA FRIBURGO—TV Nova Friburgo, Ch. 3. Under construction.

PORTO ALEGRE—TV Gualba, Ch. 2.

PORTO ALEGRE—TV Princesa, Ch. 10.

RIO DE JANEIRO—TV Diario Carioca, Ch. 11.

SAO PAULO—TV Gazeta, Ch. 11.

SANTOS--TV Santos Difusora.

VOLTA REDONDA—TV Volta Redonda, Ch. 8. Under construction.

JUIZ DE FORA—TV Juiz de Fora, Ch. 5. (J. B. Amaral group) ERP 5 kw. Started 1960.

JUIZ DE FORA—TV Mariano Procopio. (Chateaubriand group) ERP 10 kw. Started 1960.

LAFAIETE--TV Lafaiete, Ch. 6. (J. B. Amaral group) ERP 5 kw. Started 1960.

LONDRINA--TV Coroados, Ch. 3. (Chateaubriand group) ERP 5 kw. Started 1960.

PORTO ALEGRE—TV Piratini, Ch. 5. (Chateaubriand group) ERP 25 kw. Started Dec. 1959.

PORTO ALEGRE-RIO GRANDE DO SUL—TV Gaucha, Caixa Postal 1164, Porto Alegre. Ch. 12. ERP 40 kw. TV tape recording facilities. Started Dec. 1962. Personnel: Mauricio Sobrinho, gen. mgr.; Edson Leite, film buyer; Alberto Maluf, chief engineer.

RECIFE--TV Jornal do Comercio, Ch. 2. ERP 200 kw. Started 1960.

RECIFE--TV Pernambuco, Ch. 6. ERP 25 kw. Started 1960.

RESENDE--TV Itatiaia, Ch. 27.

RIBEIRAO PRETO--TV Tupi Difusora, Ch. 3. (Chateaubriand group) ERP 5 kw. Started 1960.

RIO DE JANEIRO—TV Excelsior, Av. Venezuela 43, Rio de Janeiro (M. W. Simonsen group). Ch. 2. ERP 100 kw. TV tape recording facilities. Started Sept. 1963. Personnel: Felicio Maluhy, gen. mgr.; Edson Leite, film buyer; Alberto Maluf, chief engineer.

RIO DE JANEIRO—TV Globo, Rua Irineu Marintio 35. Ch. 4. Abdon Torres, dir. of programs.

RIO DE JANEIRO—TV Tupi, Ch. 6. (Chateaubriand group) ERP 300 kw. Started Jan. 1951. (Directional satellite on Ch. 33).

RIO DE JANEIRO—TV Continental, Ch. 9. ERP 25 kw. Started June 1959.

RIO DE JANEIRO—TV Rio, Ch. 13. (J. B. Amaral group) ERP 25 kw. Started March 1955. Walter Clark Bueno, dir. of commercials.

RIO GRANDE DO SUL—See Porto Alegre.

SALVADOR—TV Itapoa, Ch. 5. (Chateaubriand group) ERP 10 kw. Started 1960.

SANTOS—TV Excelsior (M. W. Simonsen group—see Ch. 9, Sao Paulo). Ch. 9. ERP 1 kw. Satellite of Ch. 9, Sao Paulo.

SAO LUIZ DO MARANHAO—Ch. 4. ERP 6 kw. Started 1963. Luiz Bacelar, owner.

* = signatory

COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (OP=operating, PL=planned)
ECUADOR	4,726,000 (thought over-estimated)	8,000	525-line standards	GUAYAQUIL--HCPTVE, Prima Television Ecuatoriana, commercial, (OP). QUITO--HCJB-TV: La Ventana de los Andes, non-Commercial, World Radio Missionary Fellowship, Quito, (OP).
PERU	11,045,000	175,000	525-line standards	

Peru

(525-line standards)

OPERating!

Sets in use: 175,000

AREQUIPA—Televisora sur Peruana S.A. (Commercial), P.O. Box 514, Arequipa. Tel. 3090. Ch. 2. Transmitter 500 watts. Started Aug. 1959.

AREQUIPA—Radio Continental TV (Commercial), M. de Orbegora 338, Arequipa. Ch. 6. Transmitter 8 kw.

CHICLAYO—Ch. 4. Transmitter 8 kw. R. Mendoza, mgr.

CHIMBOTE—Televisora Panamericana (Commercial). See main station in Lima. Ch. 9.

CUZCO—Televisora sur Peruana S.A. (Commercial). See main station in Arequipa. Ch. 4.

HUACHO—Televisora America (Commercial). See main station in Lima. Ch. 6.

HUACHO—Televisora El Sol (Commercial). See main station in Lima. Ch. 7.

ICA—Televisora El Sol (Commercial). See main station in Lima. Ch. 11.

IQUITOS—Televisora Victoria (Commercial). See main station in Lima. Ch. 6.

LIMA—OAD-TV. Ministry of Education (Govt., educational-cultural, non-commercial), Ministerio de Educacion Publica. Direccion de Cultura, Lima. Tel. 75737. Ch. 7. Transmitter 100 watts, ERP 150 watts. Started Jan. 1958. Personnel: R. Garrido M., director general; A. E. Mousalve, dir. of engineering.

LIMA—OAX4U-TV. Televisora America (Commercial), Montero Rosas, Lima. Tel. 38305. Ch. 4. Transmitter 3 kw, ERP 6 kw. Started Dec. 1958. Personnel: N. Gonzalez, gen. mgr.; D. Capella, tech. director.

LIMA—OBX4X-TV. Televisora El Sol (Commercial), Av. Uruguay 355, Lima, Tel. 35945. Ch. 9. Transmitter 10 kw. Started July 1959. Personnel: A. Pereyra, director general; N. Gonzalez V., gen. mgr.

LIMA—OAX4D-TV. Televisora Panamericana (Commercial), Ave. Arequipa 1110, Lima. Tel. 34240. Ch. 13. Transmitter 50 watts, ERP 4 kw. Personnel: G. Delgado Parker, gen. mgr.; M. Florez, tech. director.

LIMA—OAX4X-TV. Televisora Victoria (Commercial), Av. Tacna 543, Lima. Tel. 35945. Ch. 2. Transmitter 30 kw. J. E. Cavero, gen. mgr.

LIMA—Televisora Excelsior (Commercial), Ave. Manco Capac, Lima. Ch. 11. Started March 1963. A. Belmont, gen. mgr.

TRUJILLO—Televisora Panamericana (Commercial). See main station in Lima. Ch. 7.

Planned:

PIURA—Televisora sur Peruana S.A. Ch. 7.

TACNA—Televisora sur Peruana S.A. Ch. 2.

TRUJILLO—Televisora sur Peruana S.A. Ch. 7.

* = signatory

COUNTRY	1963 POPULATION	TV SETS	TYPE	CITIES (OP=operating, PL=planned)
BOLIVIA	3,596,000		525-line standards	LA PAZ--Television Bolivians, S. A., commercial, (PL).
*CHILE	8,217,000	50,000	525-line standards	SANTIAGO-TV 13: Universidad Catolica, commerc'l, Catholic University of Chile, Santiago, (OP). SANTIAGO-University of Chile, commercial, Ch.9, (OP). VALPARAISO-Catholic University, Ch.8, repeats Ch.13 Santiago (OP).
*ARGENTINA	21,719,000 (Thought over-estimated)	1,600,000	CCIR 625-line standards, U.S. Channeling	

Argentina
(CCIR 625-line standards, U.S. channeling)
Sets in use: 1,600,000
All stations commercial

BUENOS AIRES—LS82-TV, Comision Administradora de Emisora Comerciales (Govt.), Av. Leandro N. Alem 735, Capital Federal. Transmitter: Av. 9 de Julio 1925. Ch. 7 (V-175.25, A-179.25) transmitter 5 kw, ERP 43 kw. TV tape recording facilities. Low-powered repeaters in Rosario, Santa Fe & Chivilcoy. Started Nov. 1951. Personnel: Francisco Petrone, director general; Angel Grandamarina, commercial director; Alejandro R. Spataro, technical director.

BUENOS AIRES—LS83-TV, Compania Argentina de Television CA-DE-TE S.A., Castex 3345, Capital Federal. Transmitter plant: Av. 9 de Julio 1925. Ch. 9 (V-187.25, A-191.75), transmitter 1 kw, ERP 35 kw. TV tape recording facilities. Started June 1961. Personnel: Alejandro Romay, director general; Javier Diaz, commercial manager; Domingo Perez, technical director.

BUENOS AIRES—LS84-TV, Teleonce Dicon S.A., Pavon 2444, Capital Federal. Transmitter plant: Av. Leandro N. Alem 719. Ch. 11 (V-199.25, A-203.75), transmitter 10 kw, ERP 120 kw. TV tape recording facilities. Started July 1961. Personnel: Pedro Simonsini, director general; Juan C. Sanchez, manager; Carlos A. Fernandez, technical manager.

BUENOS AIRES—LS85-TV, Rio de la Plata TV S.A., Cochabamba 1153, Capital Federal. Transmitter plant: Av. Leandro N. Alem 719. Ch. 13 (V-211.25, A-215.75), transmitter 10 kw, ERP 116 kw. TV tape recording facilities. Started Oct. 1960. Personnel: Alfredo Chopitea, pres.; Alberto R. Constantini, general manager; Jorge Alcaraz, sales manager; Francisco Gavilanes, technical manager.

CHIVILCOY—Ch. 6 (V-83.25, A-87.75). ERP 400 watts. Repeats LS82-TV, Buenos Aires.

CORDOBA—LV80-TV, Universidad Nacional de Cordoba, Rivera Indarte 170, Cordoba. Transmitter plant: Rivera Indarte & Av. Colon. Ch. 10 (V-193.25, A-197.75), transmitter 100 watts, ERP 350 watts. TV tape recording facilities. Educational & commercial. Started March 1962. Personnel: Dr. Jorge Orgaz, Rector of the University of Cordoba; Eduardo Posse, controller; Hector Blesio, technical director.

CORDOBA—LV81-TV, Telecor S.A., Fader 111, Cerro de las Rosas. Ch. 12 (V-205.25, A-209.75), transmitter 500 watts, ERP 2 kw. TV tape recording facilities. Started April 1960. Personnel: Jorge Smith, general manager; Marcos Pena, sales manager; Alberto Munoz, technical manager.

MAR DEL PLATA—LU86-TV, Difusora Marplatense S.A., Avenida Pedro Luro 2907, Mar del Plata. Ch. 8 (V-181.25, A-185.75), transmitter 500 watts, ERP 3 kw. TV tape recording facilities. Started Dec. 1960. Personnel: Leon Hecker, director general; Oscar Vina, general manager; Ricardo Casanova, operations mgr.

MENDOZA—LV89-TV, Difusora Mendoza S.A., Garibaldi 7, Mendoza. Ch. 7 (V-175.25, A-179.75), transmitter 2 kw, ERP 15 kw. TV tape recording facilities. Started Feb. 1961. Personnel: Ing. Salvador Castro, director general; Arturo Anguita, sales manager; Ing. Hugo Bortolamedi, technical manager.

ROSARIO—Ch. 8 (V-181.25, A-185.75). ERP 400 watts. Repeats LS82-TV, Buenos Aires.

SAN JUAN—LV82-TV, Rivadavia 22 Este, San Juan. Ch. 8 (V-181.25, A-185.75). ERP 2 kw. Jorge Enrique Estornell, director general.

SAN MIGUEL DE TUCUMAN—LW83-TV, Ch. 10 (V-193.25, A-197.75).

SAN RAFAEL—LV84-TV. Ch. 6 (V-83.25, A-87.75).

SANTA FE—Ch. 7 (V-175.25, A-179.25). ERP 400 watts. Repeats LS82-TV, Buenos Aires.

Under construction:

BAHIA BLANCA—LU81-TV. Ch. 7 (V-175.25, A-179.75).

BAHIA BLANCA—LU80-TV. Ch. 9 (V-187.25, A-191.75).

COMODORO RIVADAVIA—LU83-TV. Ch. 9 (V-187.25, A-191.75).

CORRIENTES—LT80-TV. Ch. 13 (V-211.25, A-215.75).

LA PLATA—LS86-TV. Ch. 2 (V-55.25, A-59.75).

MAR DEL PLATA—LU82-TV. Ch. 10 (V-193.25, A-197.75).

MENDOZA—LV83-TV. Ch. 9 (V-187.25, A-191.75).

NEUQUEN—LU84-TV. Ch. 7 (V-175.25, A-179.75).

RESISTENCIA—LT81-TV. Ch. 9 (V-187.25, A-191.75).

ROSARIO-SANTA FE—LT-83-TV. Ch. 3 (V-61.25, A-65.75).

ROSARIO-SANTA FE—LT84-TV. Ch. 5 (V-77.25, A-81.75).

SALTA—LW82-TV. Ch. 11 (V-199.25, A-203.75).

SAN SALVADOR DE JUJUY—LW80-TV, Radio Vision Jujuy S.A., Necochea 237, San Salvador de Jujuy. Ch. 7 (V-175.25, A-179.75).

SANTA FE—LT82-TV. Ch. 13 (V-211.25, A-215.75).

SANTIAGO DEL ESTERO—LW81-TV. Ch. 7 (V-175.25, A-179.75).

* = signatory COUNTRY	1963 POPULATION	TV SETS	TYPE	(PL= planned) CITIES (OP= operating)
PARAGUAY	1,903,000 (thought over-estimated)			ASUNCION--Television Cerro Cora (PL).
URUGUAY	2,556,000	175,000	525-line standards	

Uruguay
(525-line standards)
Sets in use: 175,000

MONTEVIDEO—SAETA, Sociedad Anonima de Emisoras de Television y Anexos (Commercial), Tacuarembo 1234, Montevideo. Tel. 4-4034 & 4-6674. Ch. 10 (V-193, A-197). Transmitter 2.5 kw, ERP 94 kw. TV tape recording facilities. Started Dec. 1956. Personnel: Raul Fontaina, pres.; Juan Enrique De Feo, v.p.; Raul Fontaina Jr., gen. mgr.; Eduardo Antonio, sales manager; Alfonso Galimberti, chief engineer.

MONTEVIDEO—Montecarlo Television (Commercial), 18 de Julio 1855, Montevideo. Tel. 40 21 46. Ch. 4. Transmitter 2.5 kw, ERP 22 kw. Started April 1961. Personnel: Hugo Romay, gen. mgr.; Jorge Mullins, sales manager; Jose Goyret, chief engineer.

MONTEVIDEO—Larranaga S.A. (Commercial), Enriqueta Compte y Riquet 1276, Montevideo. Tel. 2 58 56. Ch. 12. Transmitter 3 kw, ERP 40 kw. Started April 1962. Personnel: Horacio Schek, gen. mgr.; Ruben Rodriguez, commercial manager; Mario Giampietro, chief engineer.

MONTEVIDEO—SODRE, Servicio Oficial de Difusion Radioelectrica (Govt., non-commercial). Ch. 5. Transmitter 5 kw, ERP 32.5 kw. Started April 1963.

ALL (OP)

U.S. Contribution

ICSC/T-9-12E W/11/65
November 2, 1965

APPENDIX J

NOTE ON THE ECONOMIC VIABILITY OF EARTH STATIONS WITH *SMALLER APERTURE ANTENNAS

*(than 85 foot)

Prepared by ComSat Corporation

November 1965

Precision in determining the relative costs of earth stations equipped with antennas of different apertures is not possible; this because the cost of even nominally similar earth stations is grossly dependent upon location and upon other factors. From such evidence as is already available, it would appear that the cost of nominally similar earth stations may vary over a range of two or three to one.

However, in spite of imprecision, it is believed that some useful impressions can be gained by making comparative studies and, as a contribution to these, an examination has been made of the annual half-circuit charges that might be necessary to cover space segment charges and earth station charges in respect of earth stations having different circuit requirements and equipped with different sizes of antennas.

The selected example used in the study reported upon here has the following characteristics:

1. Synchronous orbit satellite having the performance described in the current specification for such items for use in the so-called "initial global system."

2. Annual space segment half-circuit basic charge ranging from $2,000 to $50,000.

3. Earth stations equipped with a single antenna and duplicate transmitting and receiving equipment.

4. Earth stations having the following characteristics:

Type	Antenna Size	Receive Noise Temperature
A	85'	50° K
B	42'	100° K
C	30'	150° K

5. Earth stations having the following capital costs:

A	$5.0 M
B	1.5 M
C	1.25 M

These are considered to be representative of the cost of such stations, A being a fixed installation and B & C trailer-mounted transportable installations. It is thought to be reasonable to assume trailer-mounted installations for stations type B & C for they are likely to be considered for use only by countries having but modest circuit requirements and, probably, having to obtain the equipment from abroad.

6. Annual charges on earth stations:

A	$1.9 M
B	0.57 M
C	0.475 M

These annual charges are based upon 10-year depreciation, 12% return on capital and 20% of capital cost per annum for operation and maintenance.

In determining the relative efficiency of use of the space segment by stations type A, B and C, it has been assumed that aperture efficiency is constant and that satellite power requirements are, therefore, a function of the G/T ratio. Now $G/T = FD^2/T$ and the ratio for stations types A, B and C is, respectively, F 144.7, F 17.65 and F 6. Taking station type A as a norm, stations of type B and C require, respectively, approximately and per circuit, 8 and 24 times as much satellite capacity.

Calculations have been made to determine the cost of service in terms of annual charge for a half-circuit in the space segment and the annual per-circuit charge for the use of an earth station for various circuit requirements and for stations type A, B and C. The results are shown in Figure 1, the cross-over curves defining the areas in which it would be cheapest to use stations of each of types A, B and C. For example, if a station required ten circuits and the basic annual space segment half-circuit charge

was $10,000 then a station type B would be most economical even though the actual space segment half-circuit charge would be eight times $10,000.

In case there may be grounds for penalizing the smaller capacity earth stations less severely than would be required solely on the basis of employment of the space sector, the calculations have been repeated with the penalty ratio halved. i.e., 1:4:12 and the results are given in Figure 2.

As a further exercise, calculations have been made to determine the total half-circuit cost per annum, i.e., the minimum cost that the owner of an earth station would need to recover, for a range of circuit demand, space segment charge and type of earth station. The results of this calculation, which included use of the 1:8:24 penalty ratio, is shown in Figure 3. If the penalty ratio is reduced to 1:4:12, the results are as shown in Figure 4.

The diagrams illustrate clearly the relatively high per-circuit cost if requirements are but small even if earth station costs are reduced by the expedient of going to small size and if it were found possible to favor the smaller user by advantageous charges for use of the space segment.

It must be stressed that the results of the study are illustrative only and must not be taken as having any global validity. In the first place, and as mentioned earlier, the earth station capital and annual costs are illustrative only and could range widely with location. In the second place, no account has been taken of variation of circuit requirements with time.

It is believed that, in practice, selection of optimum earth station size for any given location will need to be based on individual study, the factors to be taken into account being estimated circuit requirements over a number of years, capital costs, operating and maintenance costs, level of basic space segment charge and any reduction in space segment penalty factor that may be offered.

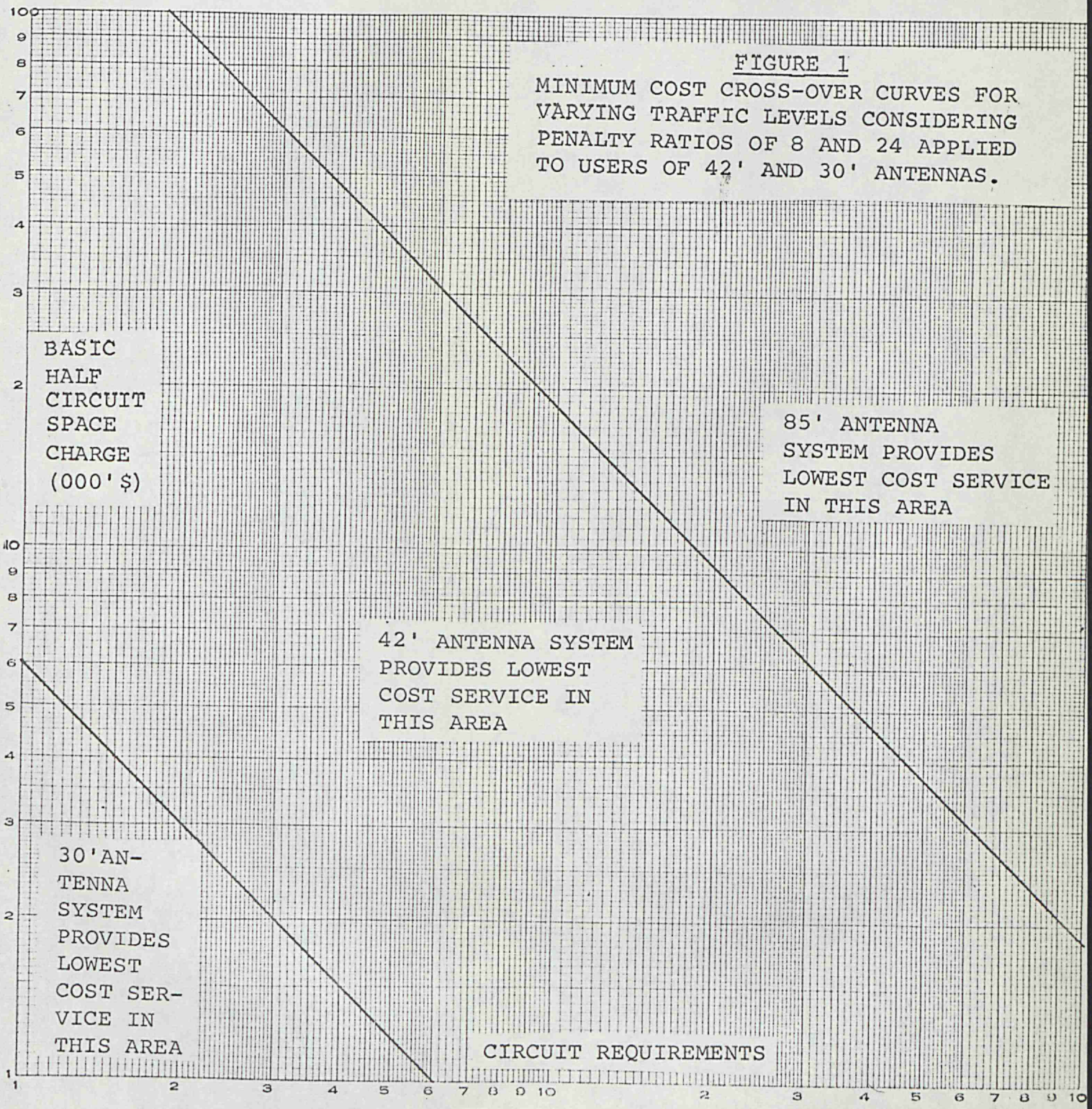
FIGURE 1
MINIMUM COST CROSS-OVER CURVES FOR VARYING TRAFFIC LEVELS CONSIDERING PENALTY RATIOS OF 8 AND 24 APPLIED TO USERS OF 42' AND 30' ANTENNAS.
BASIC HALF CIRCUIT SPACE CHARGE (000'$)
85' ANTENNA SYSTEM PROVIDES LOWEST COST SERVICE IN THIS AREA
42' ANTENNA SYSTEM PROVIDES LOWEST COST SERVICE IN THIS AREA
30'AN-TENNA SYSTEM PROVIDES LOWEST COST SER-VICE IN THIS AREA
CIRCUIT REQUIREMENTS
100
9
8
7
6
5
4
3
2
10
9
8
7
6
5
4
3
2
1
1
2
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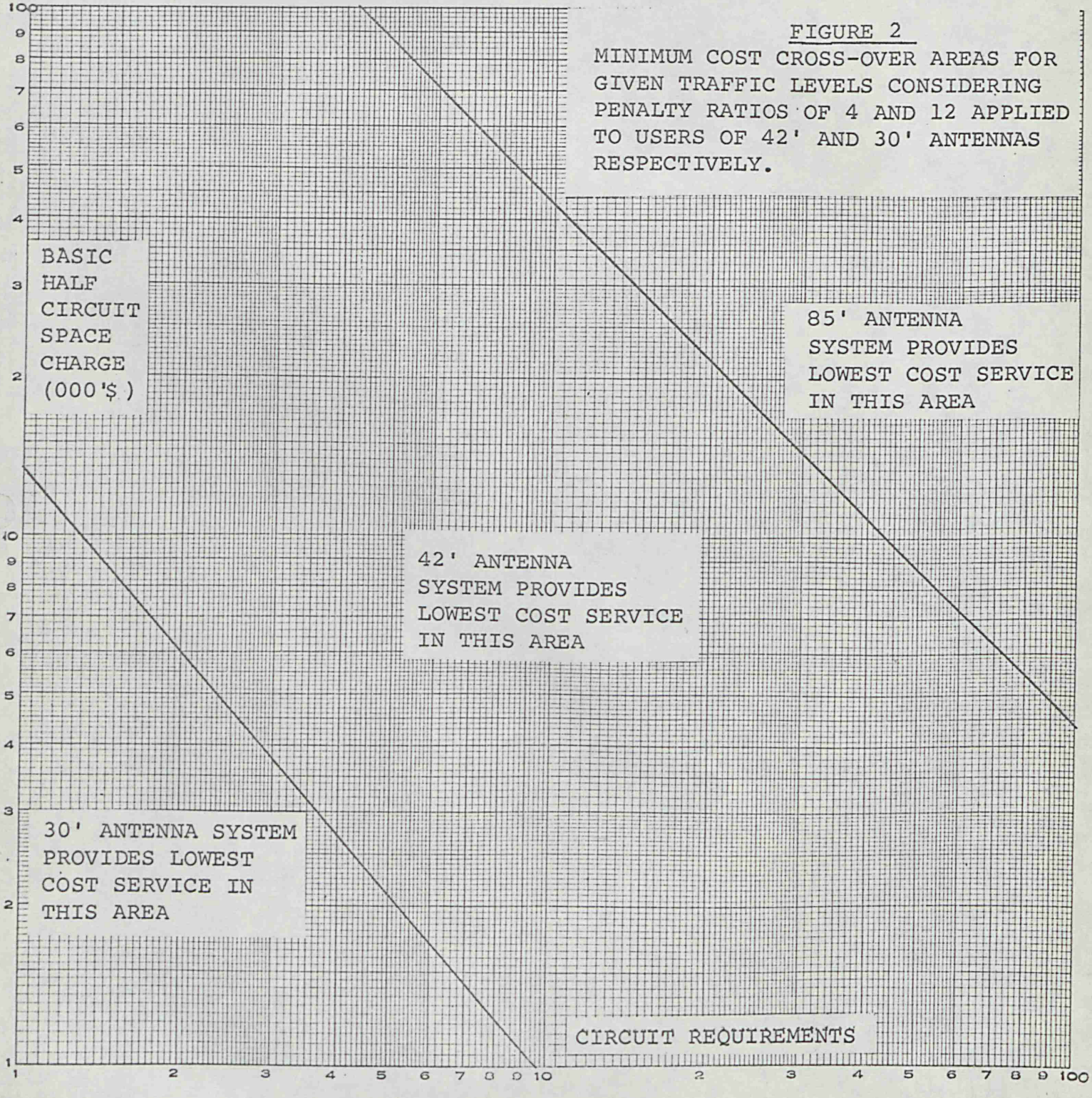
LOGARITHMIC
2 CYCLES X 2 CYCLES

FIGURE 2

MINIMUM COST CROSS-OVER AREAS FOR GIVEN TRAFFIC LEVELS CONSIDERING PENALTY RATIOS OF 4 AND 12 APPLIED TO USERS OF 42' AND 30' ANTENNAS RESPECTIVELY.



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2 CYCLES X 2 CYCLES

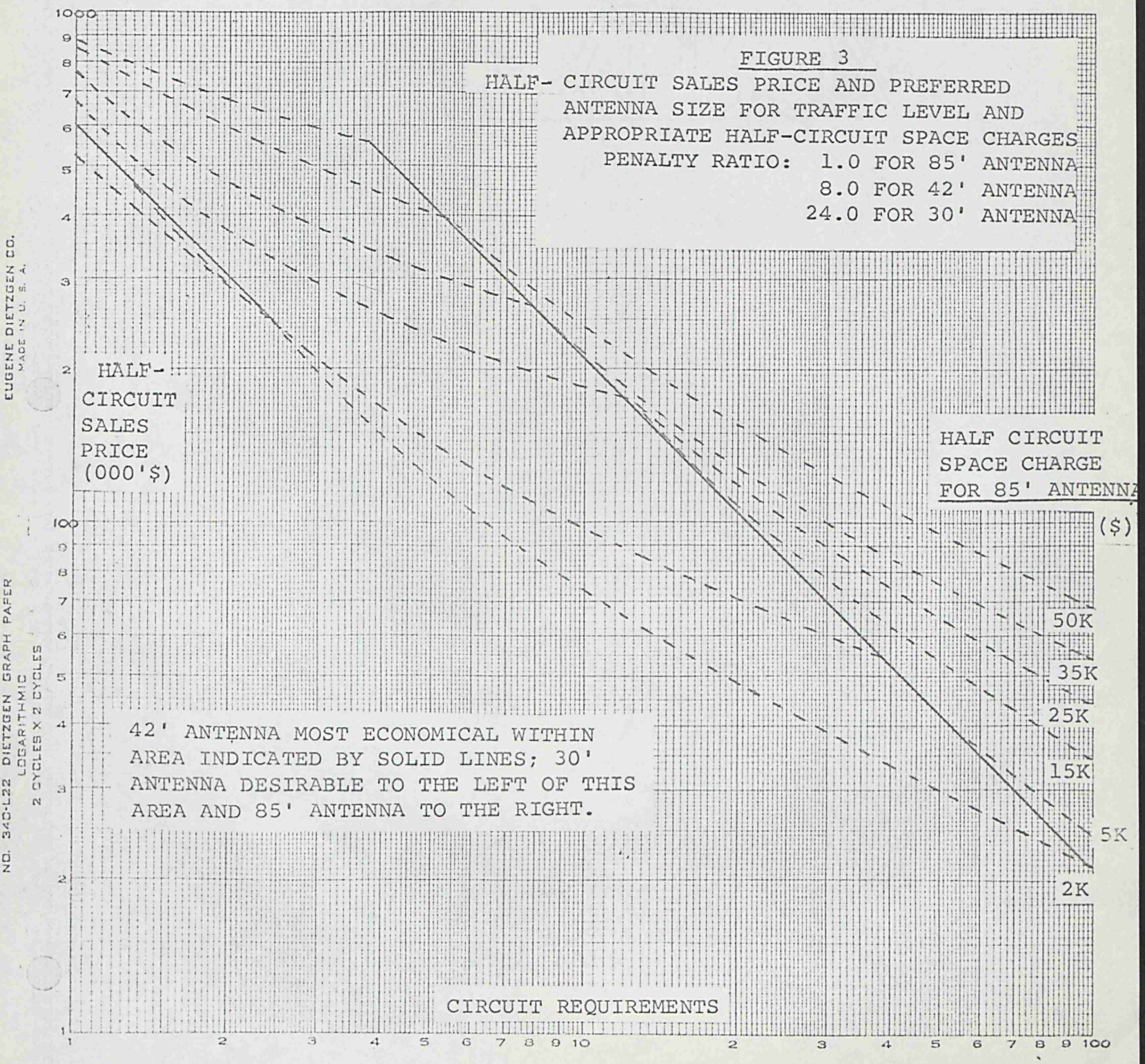

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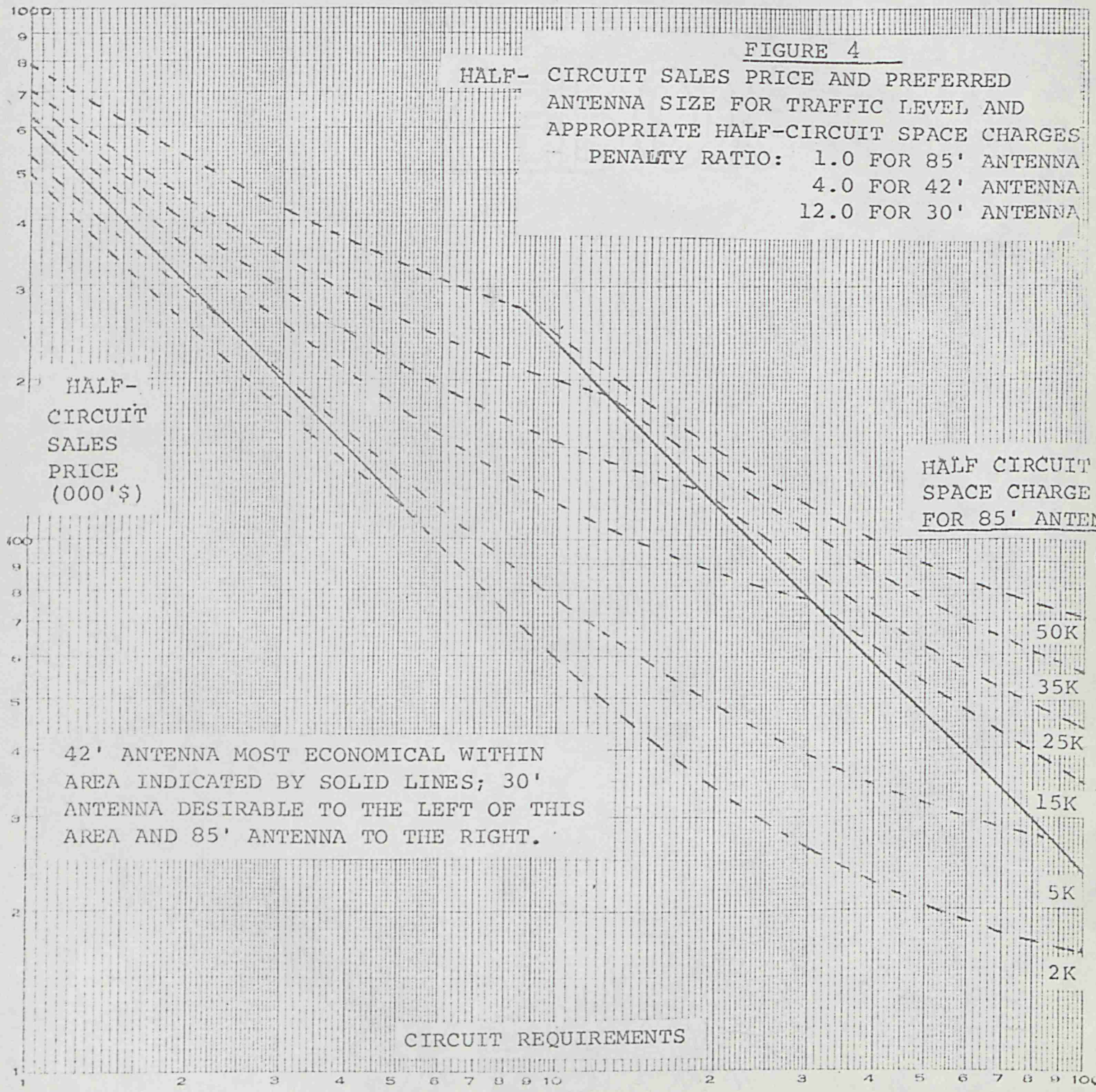
FIGURE 4

HALF-CIRCUIT SALES PRICE AND PREFERRED ANTENNA SIZE FOR TRAFFIC LEVEL AND APPROPRIATE HALF-CIRCUIT SPACE CHARGES

PENALTY RATIO: 1.0 FOR 85' ANTENNA
4.0 FOR 42' ANTENNA
12.0 FOR 30' ANTENNA



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LOGARITHMIC
2 CYCLES X 2 CYCLES

~~SECRET~~ COPY FOR MR. J. D. O'CONNELL

MEMORANDUM

THE WHITE HOUSE

WASHINGTON

December 22, 1965

MEMORANDUM FOR:

Members, White House Working Group on Communications Satellite Service for Less-Developed Countries.

The attached memorandum responds to the need indicated during the meeting of our working group on December 3, 1965 for background information relative to several technical and planning questions. It is hoped that this material will assist in your consideration of the subject of interest to the working group.

If during your consideration you develop more specific information needs, I will appreciate your communicating with Mr. Fred W. Morris, Jr., Associate Director of Telecommunications Management, who will be available to assist you (telephone: Code 128 x21194).

In accordance with the instructions of Chairman Leonard Marks, the attached material should not be released for other than the use of the working group activity. The material should not be released to non-Executive Branch or contract personnel without the concurrence of Chairman Marks.

DECLASSIFIED
E.O. 13526, Sec. 3.3h
By MW, NARA, Date 11/29/12

J. D. O'Connell
Special Assistant to the President
for Telecommunications
and
Director of Telecommunications Management

Attachments

When the attachments are removed this transmittal letter becomes ~~CONFIDENTIAL~~.

~~SECRET~~

Members of White House Working Group on Communications Satellite Service for Less-Developed Countries

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Special Assistant to the President
The White House

SECRET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF TELECOMMUNICATIONS MANAGEMENT
WASHINGTON, D.C. 20504

OFFICE OF THE DIRECTOR

DECLASSIFIED
E.O. 13526, Sec. 3.3h
By mw, NARA, Date 11/29/12

December 22, 1965

MEMORANDUM FOR THE RECORD:

Subject: White House Task Force on Communications Satellite Service for Less Developed Countries.

This memorandum addresses the need for information responding to Questions A, B, C, and D of the Agenda of the First Meeting of the White House Task Force on Communications Satellite Service for Less Developed Countries as recorded in the Minutes of the meeting of December 3, 1965, Mr. Leonard H. Marks, Chairman.

In order that definitive information could be developed for selected less-developed countries, the State Department (Mr. William Jorden, Deputy Assistant Secretary of State) informally advised the Office of the Director of Telecommunications Management/Special Assistant to the President for Telecommunications on December 10, 1965 that the following countries were recommended -- from a U. S. National interest and political standpoint -- for consideration:

Africa

First Priority: Nigeria
Second Priority: Ethiopia
Third Priority: A combination of Kenya, Uganda, and Tanzania (who are currently served by a common PTT).

South America

First Priority: Colombia
Second Priority: Chile

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Far East

First Priority: Thailand
Second Priority: Korea
Third Priority: Vietnam
Fourth Priority: Philippines

South Asia and Near East

Without Priority: India
Pakistan
Turkey or Iran

Background information responding to the Agenda Questions has been assembled with the participation of the staffs of the Communications Satellite Corporation, NASA, USIA, and DOD. The following paragraphs address the specific Agenda Questions and make reference to appendices hereto.

An interesting finding has developed with reference to the twelve countries selected for consideration. The preliminary study by the State Department demonstrates the economic and political wisdom of stimulating active participation of these countries in the INTELSAT communications satellite system. Furthermore, INTELSAT communications satellite space segment capacity can be available for conventional voice-record-data communications, as well as television relay and television distribution on a global basis more rapidly than earth stations can be emplaced. Assuming that a program were undertaken immediately to establish earth stations in the twelve selected countries by 1967, studies show that two of the stations could be financially viable from the outset and that only seven might remain in a deficit position by 1972. Even under assumptions which do not take account of the full potential of traffic which might be generated in the U. S. National interest, and applying today's charges for the use of the satellite for the entire period, the total amount of deficit for all stations through 1972 would total approximately $29 million. Significantly, $22 million of this would consist of the amortization on a $37 million capital investment (15 year) and (6%) interest. The remainder would be in the nature of an operating deficit. A reasonable projection of increased U. S. use and greater commercial volume (as a result of reduced rates) would reduce the deficit very substantially.

Responses to the Agenda Questions are as follows:

"A. Technical questions:

1. Availability of channels through --

Apollo
COMSAT (i.e. COMSAT - INTELSAT)
Department of Defense - Philco
New NASA experimental satellites."

1.1 Apollo and COMSAT communication satellites are one and the same. NCS-NASA Apollo Program communications service is being accomplished through International Communications Satellite Consortium (INTELSAT) satellites, United States Government, COMSAT Corporation and foreign-owned earth stations. The INTELSAT satellites being launched to provide the initial Apollo service will have additional capacity to serve other customers with television and multi-channel voice-record-data communications.

1.2 COMSAT-INTELSAT communication satellite space segment location and capacity availability -- current, contractually committed, planned and projected (as based on current demand projections) and extensions which are feasible and desirable are discussed in Appendix A, Tab 1. It is shown that space segment capacity can be established to meet television relay and/or distribution requirements as well as those of conventional voice-record-data communications on a global basis more rapidly than earth stations can be constructed. However, the satellites now planned will not provide for direct radio or television transmission (broadcast) to unmodified home receivers. The INTELSAT satellites to be launched in 1966 (HS 303A) will have capacity to handle a total of 240 two-way voice channels or, alternately, a full time television (Early Bird quality) channel (one way) and 130 two-way voice channels when working into 85-foot antenna earth stations. The NCS-Apollo Program service will require approximately 75 of these channels in the satellite located over the Pacific and approximately 140 of these channels in the satellite located over the Atlantic. Other alternatives and additional satellites are available for early service.

The important conclusion is that space segment capacity is not a problem for foreseeable requirements.

1.3 DOD -- IDCSP (Philco) and ADCSP satellites. DOD satellite developments are geared to unique and vital national security requirements where commercial service cannot appropriately be made available. The frequencies used and the orbital configuration of the military communication satellites are not compatible with those of the global commercial system. The earth stations to operate with the defense communication satellites are defense owned and operated and are not compatible with cooperative operation by less-developed countries. Technical developments, as well as policy considerations, make it difficult and inappropriate to consider the use of DOD satellites to meet the interests of the White House Task Force. (See Appendix B for copy of U. S. National Policy statement dated September 1965).

1.4 NASA Experimental Satellites. A limited number of experimental satellites will be launched during the period of 1966-68 in connection with the NASA Application Technology Satellite Program. These satellites are required for experimental and demonstration uses. The space positioning of the satellites, their uses and other factors establish mission conflicts and render difficult their commitment to operational or commercial use competitive with the global commercial system (INTELSAT) available in the same time period or earlier. (See Appendix C for the rationale presented in Memoranda to the President from J. D. O'Connell dated September 21, 1965 and November 17, 1965).

"2. Extent to which above will provide telephone, telegraph communications and broadcasting."

As noted above, the INTELSAT communications satellite capacity existent and committed will provide for conventional voice-record-data communications as well as television relay and/or distribution. Broadcast service cannot be provided in the time period under consideration (next 24 months). See Appendix D for discussion of broadcast satellites.

"3. Compatibility or incompatibility of ground stations with USSR or other foreign satellites."

Earth stations designed to operate with the USSR MOLNIA satellites are not compatible with the INTELSAT satellites due to the different operating frequencies and orbital characteristics of the satellites. The MOLNIA, as now existent and projected, is an approximate 12-hour inclined orbiting satellite system requiring full tracking earth stations operating in the 900 mc frequency region. The current and committed INTELSAT satellites (for the period at least until 1968) are synchronous and operate in the 4 and 6 kmc frequency region. It is possible to provide for a common design (i.e., operation in the 900 mc, 4 kmc and 6 kmc regions with full tracking capability). However, dual capability earth stations would be more costly and sophisticated. A station capable of full tracking can, of course, work with the synchronous satellites (see Appendix A, Tab 2 for a discussion of this subject).

"4. Reliability of service available from communications satellites (feasibility of jamming or creating interference)."

The INTELSAT space segment and earth stations are projected for commercial service of high quality and reliability. In fact, the requirement for the NCS-NASA Apollo communications satellite service is for 99.8% time reliability. However, defense against intentional interference is not inherent in the design. The DOD-IDCSP and ADCSP designs are for high reliability and operation in high security modes in the face of intentional interference. (See Appendix A, Tab 3, for a discussion of this subject).

"5. Recommended location for ground stations in Latin America, Africa, Asia and coverage derived."

State Department advice indicates the selection of twelve less-developed countries (or locales) for consideration. See listing, page 1 of this memorandum.

"6. Present plans for ground stations in above areas."

Earth stations to operate with the INTELSAT satellites are already in the planning stage for three of twelve less-developed countries under consideration. These are Nigeria, Pakistan, and India. While this material was in preparation, discussions with Ethiopia have resulted in a commitment by the Emperor, on an urgent basis, to

explore the early establishment of an earth station in Ethiopia. (See Appendix E for details of the communications satellite earth station location and capacity availability, current, committed, planned and projected (based upon current demand projections) and extensions which are considered desirable and feasible via INTELSAT. Appendix F presents a general financial assessment study for the selected less-developed countries under consideration. Earth stations established in these countries would serve as gateways for global traffic to and from the countries. Service within the countries would be dependent upon distribution networks or other means of dissemination (for example, in the case of television, video recordings could be made for transport or transmission to remote and multiple locations for re-transmission and/or conventional broadcast.

"7. Feasibility of direct transmission (cost and timing)."

There is no space communications system that can be available within 18 to 24 months capable of direct radio or television transmission to unmodified home receivers; such a system does not appear feasible before the 1970's. Appendix D, Tab 1, presents a discussion of the subject as prepared by NASA. Appendix D, Tab 2, includes notes on International and National Radio Regulations affecting broadcasting from satellites as prepared by ODTM, Executive Office of the President.

"B. Need for service and proposed uses:

1. Present and anticipated communications requirements (telephone, telegraph, etc.) and broadcasting (AM, FM, TV from U. S. or other sources with proposed system."

Present and anticipated communications satellite requirements for voice-record-data service is presented in Appendix E, Tabs 1 and 2. Appendix G comments on the demand for television transmission via satellite and current INTELSAT system capability planning to meet the demand. This study does not include the major requirement which could develop in support of a major U. S. effort to provide educational and informational service to less-developed countries, nor does the study include U. S. traffic which could be handled via satellite in support of U. S. national security interests with one or more of the less-developed countries under consideration (e.g. (1) U. S. Government traffic through an Ethiopian terminal to connect with the U. S. —DOD communications facilities at Asmara, Ethiopia or (2) U. S. Government traffic through a

Thailand terminal to serve SEATO and U. S. Southeast Asia commitments). A statement of present and anticipated communications requirements for broadcasting via satellite from the U. S. is not known to be existent nor is there a plan for the programming of such broadcasting.

"2. Same for sources within particular countries (i.e., use of satellite for internal communications within Brazil) and within the continent (Mexico to Argentina)."

Intra-country and intra-continental communications service needs and projections are included in Appendix E in a limited way. Mexico, Argentina, and Brazil (as identified in the agenda question) are not countries selected for current consideration. Appendix E includes some data for these countries. Detailed consideration is being given in a current NASA-AID contractual study to the matter of internal communications traffic requirements within Brazil. Results are to be reported by the contractor by the end of 1966. The Inter-American Development Bank is also undertaking a study of the feasibility of assisting in providing communications by satellite for the South American continent. It is to be noted that Brazil is proceeding with site selection for an earth station which the Brazilian Government has stated is to be operational in 1967.

"3. Status of television development in Africa, Asia and Latin America (including transmission, microwave relay and other related facilities)."

An evaluation of the terrestrial telecommunications and broadcasting capabilities -- including television, microwave relay and related facilities -- in Nigeria, Ethiopia, Korea, Thailand, Colombia, and Chile is detailed in Appendix H. Similar evaluations for the remaining less-developed countries under consideration are in preparation and will be distributed as soon as available to be added to Appendix H. Appendix I discusses the educational potential of synchronous communications satellites and provides a summary of the status of television in Latin America and Africa. Reference is made to the book, World Communications -- Press, Radio, Television, Film, published by UNESCO (1964) for a complete detailing of the status of these media throughout the world.

"C. Cost of ground stations and domestic installations necessary to complete communications requirements."

Earth station costs are largely dependent upon size and the degree of sophistication (full tracking, channel derivation, etc.). Optimum choice of size from an economic standpoint can only be derived when details of traffic requirements are determined and trade-off analysis is made against cost of space segment capacity. For planning purposes, an 85 foot antenna earth station (less land, site surveying and site preparation) can be considered to require an investment of $3 million. If the same facility is constructed without transmit capability, the cost would be reduced by $250,000. A 42 foot antenna transportable will cost $1.5 million. Appendix J furnishes notes on the economic viability of earth stations with small (less than 85 foot) aperture antennas. Appendix K presents a discussion of four alternative economic television receive-only earth stations costing from approximately $300,000 to $800,000 in limited quantity and capable of working with the earlier satellites. Appendix A, Tab 4, presents a discussion of the cost of earth stations and points out that $150,000 is an approximate cost for small earth stations (30 foot antenna) capable of serving as economic television receive-only terminals from the global satellites now being planned for 1968.

Additional study of this subject and the cost of terrestrial communications distribution networks will be necessary and can be undertaken when more definite communication service requirements are defined for selected countries.

In addition to earth station costs, there must be added the cost of the space segment channel capacity. INTELSAT rates, effective January 1966, are $20,000 per year per half circuit full time when utilizing 85 foot antennas. (i.e., $40,000 per year for voice channel between 85 foot antennas).

The occasional use space segment rate for a television channel relay (or distribution) (Early Bird quality) effective January 1966 is $1,150 per hour. While no space segment rate is established for a full time television channel, considered estimates for planning purposes suggest $2.5 million per year. It is noted that this service would permit the simultaneous reception of television by all adequate design antennas within view of the satellite to which the transmission is directed. For example, reception would be possible throughout Latin America and Africa from the INTELSAT Atlantic satellite being launched in 1966 to include service for the Apollo program.

"D. Personnel training required to operate facilities."

A staff paper prepared by NASA discussing ground terminal equipment, staffing, and training requirements for communications satellite terminals is included as Appendix L.

Fred W. Morris

Fred W. Morris, Jr.
Associate Director

Appendices:
(12 listed)

Listing of Appendices

Appendix A: INTELSAT Space Segment Status and Planning.
Compatibility of Earth Stations for INTELSAT and MOLNIA Communications Satellites.
Reliability of Communication Satellite Service.
Cost Planning for Earth Stations.

Appendix B: U. S. National Policy Statement re Communications Satellites.

Appendix C: Memoranda to the President re Communications Satellites.

Appendix D: Broadcast Satellites.

Appendix E: Communications Satellite Earth Station Planning for Communications via INTELSAT.

Appendix F: General Financial Assessment Study on Selected Developing Nations.

Appendix G: Television Transmission Demand.

Appendix H: Evaluation of Terrestrial Telecommunications and Broadcasting Capabilities in Nigeria, Ethiopia, Korea, Thailand, Colombia, and Chile.

Appendix I: Educational Potential of the Synchronous Communications Satellite and Summary of Status of Television in Africa and Latin America.

Appendix J: Notes on the Economic Viability of Earth Stations with Smaller than 85 foot Antennas.

Appendix K: Television Receive Only Earth Stations for Communications Satellites.

Appendix L: Ground Station Equipment, Staffing, and Training Requirements for Communications Satellite Terminals.

APPENDIX K

Television Receive Only Earth Stations for Communications Satellites

Note: The Earth Stations discussed are for early availability and capable of working with the Fall 1966 (HS-303A) satellites.

Prepared by Page Communications Engineers, Inc.

December 1965

PAGE COMMUNICATIONS SATELLITE

EARTH STATIONS

Summary of Prices

The prices of Page Communications Engineers, Inc., Communications Satellite Earth Stations are shown on the attached sheet. These costs reflect an earth station installed and tested at a customer's facility (assumed for reference purposes to be in the Washington, D. C. area). The cost does not include the land, power, or electronic equipment building (air conditioned) which are assumed to be supplied by the customer. To adjust these prices for various overseas locations, it is only necessary to add freight, travel and per diem.

In determining the factors affecting the choice of the exact Earth Station configuration most economical for a particular application one must compare the total Satellite costs and the total Earth Station costs. Where the total earth stations are great in number it may be more economical to utilize all three transponders of the satellite simultaneously in order to reduce the earth station requirements. However, if the number of earth stations are few, it would be more economical to reduce the number of active transponders dedicated to a specific service and increase power of the earth station by using individually or together larger antennas and/or masers.

For this reason we offer the four (4) basic configurations that follow with a few additional options within the four basic configurations.

MODEL CODES

Example

PCE	-	4	-	C	-	ST	-	3
Page Communications Engineers	-	42 foot		Convention		Satellite Terminal		for TV only

PCE - 4 S - ST - 3	42 foot supplied	-	TV Only
PCE - 2 S - ST - 3	25 foot supplied	-	TV Only
PCE - 2 S - ST - 2	25 foot supplied	-	TV Only or Multiple Voice Channels
PCE - 4 C - ST - 3	42 foot conventional	-	TV Only

MODEL	CAPABILITY	SATELLITE MODE OF OPERATION	PRICE EACH		PRICE FOR ADD'L MASERS
PCE-4C-ST-3	TV receive only, using a 42-ft. Casshorn, a conventional mount and a simplified servo, feed and redundant electronics with threshold extender and parametric amplifier.	2 Transponders in TV Service 1 Transponders in Alternate Service 1 Transponder spare	Single 4 Units 10 Units	$790,000 720,000 670,000	$100,000 80,000 80,000
PCE-2S-ST-2	TV receive only or multiple two-way voice channels using a 25-ft. Casshorn, a simplified mount, feed and servo and non-redundant electronics with threshold extender and parametric amplifier.	3 Transponders in Service 1 Transponder spare	20 Units	475,000	40,000
PCE-2S-ST-3	TV receive only using a 25-ft. Casshorn simplified mount, servo and feed and non-redundant electronics with threshold extender and parametric amplifier.	3 Transponders in Service 1 Transponder spare	20 Units	320,000	40,000
PCE-4S-ST-3	TV receive only, using a 42-ft. Casshorn, a simplified mount feed and servo and non-redundant electronics with threshold extender and parametric amplifier.	2 Transponders in TV Service 1 Transponder in Alternate Service 1 Transponder spare	20 Units	545,000	40,000

THE PAGE COMMUNICATIONS SATELLITE EARTH STATION FOR TELEVISION RECEPTION MODEL PCE-4C-ST-3

Prior to the advent of communications satellites such as Echo and Syncom 2 and 3, Page Communications Engineers, Inc., directed its engineering effort toward the design of a family of Earth Stations.

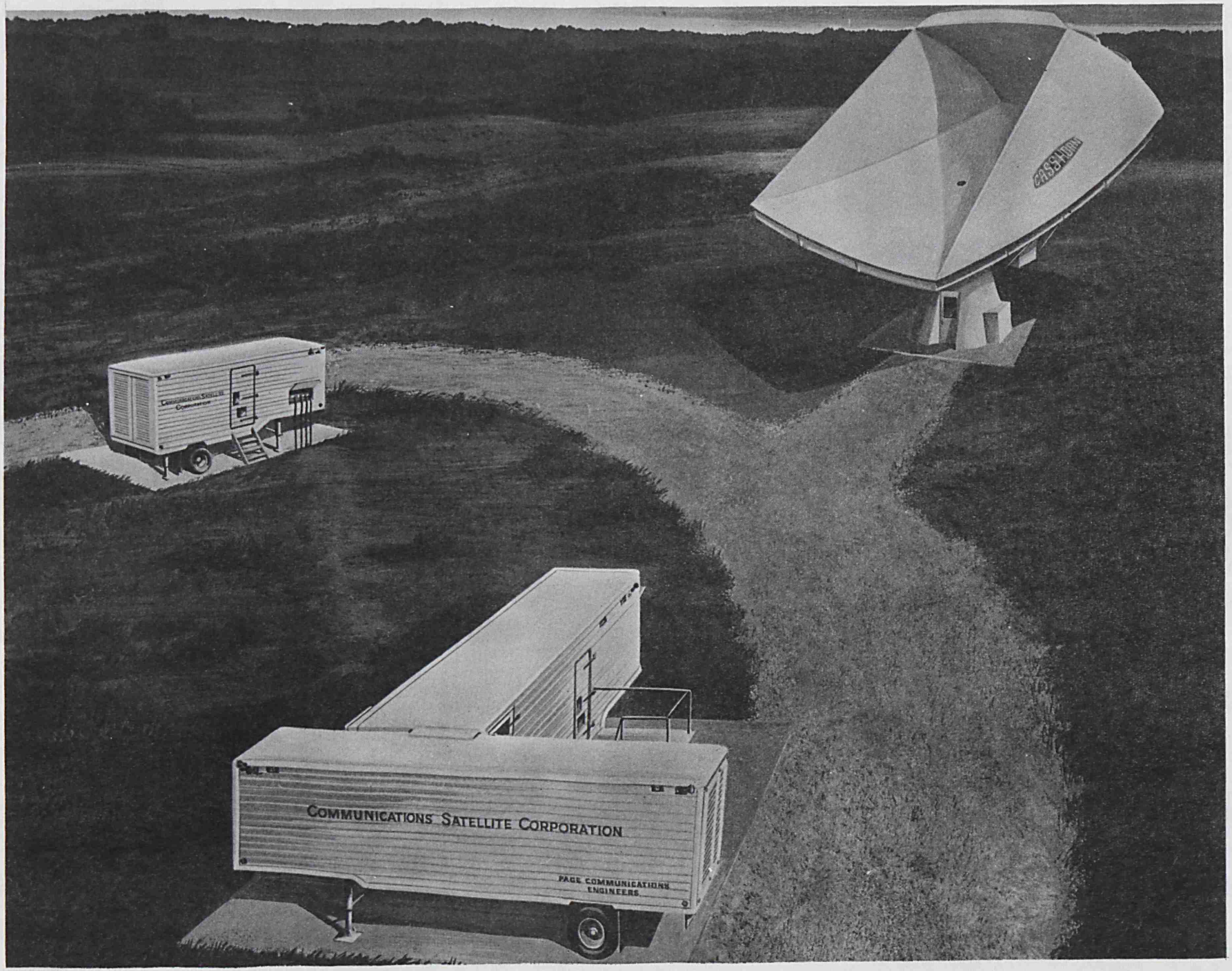
This engineering effort resulted in a prototype station which was ready for operation when the Early Bird satellite was put into service.

The first operational configuration, now being built for the Comsat Corporation and shown in the attached photograph, will provide vital world-wide communications for the NASA Apollo Program. This earth station provides 14 voice/data channels as well as the necessary order wire and telemetry channels to direct the Apollo mission support requirements. Expansion to 100 channels is possible when the entire HS-303A satellite capability is used. It also provides highly accurate tracking services for satellite orbit injection and subsequent control.

During the design program of the prototype earth station, television tests were conducted with Early Bird using essentially the same basic equipment as is being supplied for voice operations in the Apollo earth stations, with minor modifications.

This experimental work and the Comsat/Apollo program have optimized a second operational configuration of Earth Stations for Television Reception only.

Since this earth station is intended for television reception only with HS-303A type satellites, it has been greatly simplified. The design and simplification program removed all of the unnecessary voice communications channeling equipment, removed the transmitting RF equipment, and simplified the feed inasmuch as there is no longer a need for the high power handling requirements.



Transportable Communications Satellite Earth Terminal Designed, Built, and Tested
by Page Communications Engineers

While this earth station employs the same mount and 42-foot antenna as that being provided to the Comsat Corporation, the servo and drive system has been simplified considerably. The hydraulic drive system has been deleted because the severe dynamic range requirements dictated by orbit injection missions no longer exist. A simple, reliable electric drive has been substituted.

Automatic steering of the antenna is provided to insure that the satellite remains in the antenna beam pattern. This is displayed at the operating console where the antenna controls are located.

In attempting to arrive at an economical solution employing current state-of-the-art hardware, various satellite configurations and earth terminal configurations presently available have been analyzed. The technical characteristics of the Hughes Satellite being produced under contract with the Comsat Corporation and designated HS-303A along with a simplified version of the Page Comsat terminal offers several system configurations with attractive performance characteristics and costs. The most attractive configurations are shown in Table I. Superior television performance can, of course, be obtained by using all three transponders with one spare transponder and a 16-mc bandwidth. (The various bandwidth alternates are, of course, available with each configuration.) The "B" system configuration, while resulting in a slightly more expensive ground terminal, would permit a single satellite to furnish either three separate television broadcast programs simultaneously (still providing one spare transponder) or alternately reduce satellite costs by virtue of providing other communication services through the use of the other available two transponders. Detailed tradeoff studies must await the final determination of the method of providing the overall service.

TABLE I

The performance service is based on an 85-foot transmitting ground station at the originating terminal.

SYSTEM	SERVICE	CONFIGURATION
A	Excellent quality black and white television or color	2 transponders, 1 transponder in use for other services, and 1 spare. +4.3 db margin with threshold extension and cooled parametric amplifier.
B	Excellent quality black and white television or color	1 transponder, 2 transponders in use for other service, 1 transponder spare, +5.0 db margin with threshold extension and maser.

The technical performance which is provided by the Page earth station for the classes of television reception with HS-303A satellites is summarized in Table II, below:

TABLE II

MARGIN TO THRESHOLD, (DB)

Equipment:	Bandwidth:		
	16 mcs	10 mcs	6 mcs
1 Transponder			
Conventional discriminator, paramp	-5.7	-3.7	-1.5
5 db Extension, paramp	-0.7	+1.3	+3.5
5 db Extension, maser	+3.3	+5.3	+7.5
2 Transponders			
Conventional discriminator, paramp	-2.7	-0.7	+1.5
5 db Extension, paramp	+2.3	+4.3	+5.5
5 db Extension, maser	+6.3	+8.3	+10.5

TABLE II (continued)

3 Transponders

Conventional discriminator, paramp	-0.9	+1.1	+3.5
5 db Extension, paramp	+4.1	+6.1	+8.5
5 db Extension, maser	+8.1	+10.1	+12.3

The significant feature of the Page earth station which permits the superior performance quoted is the 42-foot Casshorn antenna. This is an identical antenna to that being provided to the Comsat Corporation for the Apollo network ground stations. Its high gain of 52.55 db, system figure of merit of 33.1 db with the paramp and extremely low antenna spillover temperature of 5° Kelvin, permits achievement of this outstanding performance which otherwise would require the use of a parabolic antenna of about 60-feet diameter.

The feed provided is very much simplified over that provided to Comsat Corporation by deletion of the tracking components as well as the high transmitter power handling requirement and the associated RF plumbing.

The low noise dual front ends are either a cooled maser for System B or a cooled parametric amplifier for System A. In both cases, we propose a front end which has been proven in actual operation. The cooled parametric amplifier is the same helium gas cooled front end which Page now has in production for use in the Comsat Corporation earth stations for multichannel voice communications. The complete electronic receiving chain from the parametric amplifier, including dual cryogenic units, to video output is furnished in duplicate to provide high operational reliability.

Appropriate video and sound receiving and demodulation equipment, monitor facilities and test equipment is included to provide a high quality, reliable earth station.

THE PAGE COMMUNICATIONS SATELLITE EARTH STATION FOR TELEVISION RECEPTION MODEL PCE-4S-ST-3

The Page Model PCE-4S-ST-3 earth station is essentially the same as the 42-foot Casshorn equipped station described in our literature on the Model PCE-4C-ST-3.

Our design and experimental experience has led to the configuration of this version of the station with simplicity and economy as our objective. Without sacrificing any operational capability, we have evolved a station design which is much simpler and yet provides high quality reliable service.

Since this earth station is intended for television reception only with HS-303A type satellites, it has been greatly simplified. The design and simplification program removed all of the unnecessary voice communications channeling equipment, removed the transmitting RF equipment, the complex antenna mount, and simplified the feed inasmuch as there is no longer a need for the high power handling requirements.

The complex multi-purpose antenna mount, servo and drive has been replaced by a simple limited motion mount and drive sufficient to accommodate the small fluctuations in position expected of the HS-303A satellites. The electric drive system employed insures that the antenna remains pointed at the satellite.

In attempting to arrive at an economical solution employing current state-of-the-art hardware, various satellite configurations and earth terminal configurations presently available have been analyzed. The technical characteristics of the Hughes satellite being produced under contract with the Comsat Corporation and designated HS-303A along with a simplified version of the Page Comsat terminal offers several system configurations

with attractive performance characteristics and costs. The most attractive configurations are shown in Table I. Superior television performance can, of course, be obtained by using all three transponders with one spare transponder and a 16-mc bandwidth. (The various bandwidth alternates are, of course, available with each configuration.) The "B" system configuration, while resulting in a slightly more expensive ground terminal, would permit a single satellite to furnish either three separate television broadcast programs simultaneously (still providing one spare transponder) or alternately reduce satellite costs by virtue of providing other communication services through the use of the other available two transponders. Detailed tradeoff studies must await the final determination of the method of providing the overall service.

TABLE I

The performance service is based on an 85-foot transmitting ground station at the originating terminal.

SYSTEM	SERVICE	CONFIGURATION
A	Excellent quality black and white television or color	2 transponders, 1 transponder in use for other services, and 1 spare. +4.3 db margin with threshold extension and cooled parametric amplifier.
B	Excellent quality black and white television or color	1 transponder, 2 transponders in use for other service, 1 transponder spare, +5.0 db margin with threshold extension and maser.

The technical performance which is provided by the Page earth station for the classes of television reception with HS-303A satellites is summarized in Table II, below:

TABLE II

MARGIN TO THRESHOLD, (DB)

Equipment:	Bandwidth: 16 mcs	10 mcs	6 mcs
1 Transponder			
Conventional discriminator, paramp	-5.7	-3.7	-1.5
5 db Extension, paramp	-0.7	+1.3	+3.5
5 db Extension, maser	+3.3	+5.3	+7.5
2 Transponders			
Conventional discriminator, paramp	-2.7	-0.7	+1.5
5 db Extension, paramp	+2.3	+4.3	+5.5
5 db Extension, maser	+6.3	+8.3	+10.5
3 Transponders			
Conventional discriminator, paramp	-0.9	+1.1	+3.5
5 db Extension, paramp	+4.1	+6.1	+8.5
5 db Extension, maser	+8.1	+10.1	+12.3

The significant feature of the Page earth station which permits the superior performance quoted is the 42-foot Casshorn antenna. This is an identical antenna to that being provided to the Comsat Corporation for the Apollo network ground stations. Its high gain of 52.55 db, system figure of merit of 33.1 db with the paramp and extremely low antenna spillover temperature of 5° Kelvin, permits achievement of this outstanding performance which otherwise would require the use of a parabolic antenna of about 60-feet diameter.

The feed provided is identical to that which was proven in use with the original Page earth station and is very much simpler than the one being provided for the Apollo earth stations due to the fact that the high power

handling requirements have been deleted. The low noise front end is a helium cooled parametric amplifier and is the same cooled front end which Page now has in production for use in the Comsat Corporation earth stations for multi-channel voice communications. The complete electronic receiving chain from the parametric amplifier, including the cryogenic unit, to the video output is designed to provide high operational reliability. Provision for installing a redundant receiving chain has been made if this is desired.

Appropriate video and sound receiving and demodulation equipment, monitor facilities and test equipment is included to provide a high quality, reliable earth station.

THE PAGE COMMUNICATIONS SATELLITE EARTH STATION MODEL PCE-2S-ST-2

The Model PCE-2S-ST-2 earth station is designed for either high quality television reception only or low capacity multiple voice channel operation with HS-303A type satellites.

When these satellites are launched into synchronous equatorial orbit late in 1966, this station may be employed for voice or television service anywhere in the Atlantic and Pacific areas of coverage of the satellites.

The HS-303A satellites are equipped with four transponders. It is planned that the satellites will be operated in the following modes:

TABLE 1

	Mode of Operation	Satellite Equipment
A.	Three simultaneous multichannel voice links 6 to 24 channels capacity each.	One transponder used for each link and one transponder spare.
B.	Two simultaneous links, one television and one 6 to 24 channel voice.	Two transponders for television, one transponder for voice service and one transponder spare.
C.	One television link or up to 100 channels of voice service	Three transponders used with one transponder spare.

The Model PCE-2S-ST-2 is a small earth station designed to provide television reception only or low capacity voice service in an economical package.

While this station is limited to synchronous satellite applications and is currently limited to either one television channel reception or small numbers of two way voice channels by the characteristics of the HS-303A satellites, its small size and high quality performance is exceptional.

The equipment selected for use in this earth station is identical to that being provided for the Comsat Corporation transportable earth station with the exception of the antenna system. The 25-foot Casshorn which has been proven in TV experiments with the Early Bird satellite is used with a simplified mount.

The complexity involved in completely redundant electronics equipment packages has been eliminated in favor of economy while still maintaining professional performance and reliability. All unnecessary electronics such as complex tracking feeds, telemetry and command subsystems, expensive servo drive equipment and other equipment peculiar to the Comsat Apollo program have been deleted from this station.

The service to be provided by this station based on the use of the planned 85-foot transmitting ground stations at the originating terminal is shown in Table 2 below.

TABLE 2

	Type of Service	Satellite Configuration
A.	Excellent quality 10 mcs black and white television or color receive only	Three transponders in use and one transponder spare. +3.0 db margin with threshold extension and cooled parametric amplifier.
B.	Six to twelve two-way voice channels	One transponder used for this service, two transponders used for other services and one transponder spare.

The performance achieved with this earth station is shown in Table 3 below.

TABLE 3

Television (3 transponders)

Margin to Threshold (db)

Equipment	Bandwidth	
	10 mcs	6 mcs
Conventional discriminator, paramp	-2.0	+0.4
5 db extension, paramp	+3.0	+5.4
5 db extension, maser	+7.0	+9.2

Two Way Voice (1 transponder)

Transmit power	5 KW
Antenna gain (4Gcs)	48.5 db
Received signal level	-163 dbm
System noise temperature	85°Kelvin
Parametric amplifier	30°Kelvin
Number of voice channels	6
Margin to threshold	2 db
FMFB improvement	7 db

The significant feature of this earth station which permits this high performance is the 25-foot Casshorn antenna. This is an identical antenna to that used on the Page prototype earth station and employed for the television tests which were conducted with the Early Bird satellite.

The feed provided is also identical to that which was proven in use with the Page prototype earth station and is very much simpler than the one being provided for the Apollo earth stations.

The front end provided is the same helium gas cooled parametric amplifier with a noise temperature of 30°K that is in production for use in the Comsat Corporation earth stations. The complete electronic receiving chain from the parametric amplifier, including the cryogenic cooling unit, up to the voice and video output has been designed for exceptionally high operating reliability. We have made provision for installing a redundant receiving system if desired.

Appropriate voice and video receiving and demodulating equipment including the FMFB receiver, monitor facilities and test equipment is included to provide a high quality, reliable earth station.

The voice modulation equipment employed is identical to that which is now in production for the Comsat Corporation earth stations. The 5 kw power amplifier is the same PA that has been proven on the Page prototype earth station.

THE PAGE COMMUNICATIONS SATELLITE EARTH STATION FOR TELEVISION RECEPTION MODEL PCE-2S-ST-3

The Page Communications Engineers, Inc., Satellite Earth Station Model PCE-2S-ST-3 is designed for high quality television reception only from HS-303A type satellites using a 25-foot Casshorn antenna with limited tracking facility for use with synchronous satellites.

These satellites are currently being produced by the Hughes Aircraft Company for the Comsat Corporation and they will be launched into synchronous equatorial orbit late in 1966.

It is planned that two satellites will be positioned over the Atlantic and two over the Pacific. This will result in the capability of providing six simultaneous links in the Atlantic region and six in the Pacific since three operational transponders are available for use at any one time on each of the satellites. However, in order to make use of the 25-foot Casshorn and still provide television signal, the output of the three transponders in the satellite must be combined for retransmittal to the earth stations. The satellite, therefore, would be fully committed to this service with one transponder spare during the periods of time when this television service is desired. Any number of earth stations of this type would be able to receive the television signal simultaneously.

While this station is limited to use with only synchronous satellites and is currently restricted to one TV channel capacity due to the characteristics of HS-303A, it nevertheless is unique in its simplicity and performance at an attractive cost.

The performance expected, based on the use of the planned 85-foot transmitting ground stations at the originating terminal, is shown in Table 1 below.

TABLE 1

Type of Service	Satellite Configuration
Excellent quality 10 mcs black and white television or color.	Three transponders in use and one transponder spare. +3.0 db margin with threshold extension and cooled parametric amplifier.

The television performance achieved with this station for various receiving configurations is shown in Table 2 below.

TABLE 2

Margin To Threshold, (DB)

3 Transponders

Equipment	Bandwidth	
	10 MCS	6 MCS
Conventional discriminator, paramp	-2.0	+0.4
5 db Extension, paramp	+3.0	+5.4
5 db extension, maser	+7.0	+9.2

The significant feature of the Page Earth Station which permits the superior performance quoted is the 25-foot Casshorn antenna. This is an

identical antenna to that used on the original Page earth station and employed for the television tests which were conducted with the Early Bird satellite.

The feed provided is also identical to that which was proven in use with the original Page earth station and is very much simpler than the one being provided for the Apollo earth stations due to the fact the high power handling requirements have been deleted.

Appropriate video and sound receiving and demodulation equipment, monitor facilities and test equipment is included to provide a high quality, reliable earth station.

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APPENDIX L

Ground Terminal Equipment, Staffing and Training Requirements for Communications Satellite Terminals

Prepared by National Aeronautics & Space Administration

December 1965

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

December 17, 1965

STAFF PAPER

Ground Terminal Equipment, Staffing, and Training Requirements for Communication Satellite Terminals

The communications satellite ground terminal contemplated herein is a self-contained ground system necessary for the transmission, reception, data handling and control functions in conjunction with the spacecraft and located as required for preservation of a low noise environment. The major subsystems comprising the ground terminal are as follows:

1. Antenna, servo and control systems.
2. Receiver and transmitter.
3. Communications control and modulation equipment.
4. Spacecraft data handling and control equipment.
5. Power generation.

Personnel Requirements

A ground terminal station operating 24 hours/day, 7 days/week for a synchronous communication satellite and utilizing an 85-foot diameter antenna requires a complement of approximately 49 technical and logistic personnel. These break down as follows:

Engineers	4
Technicians	40
Administrative	2
Logistics	3
	49

Attached is an organization chart for a typical ground terminal station. It is assumed that cross-training and cross-utilization will be used to the maximum extent possible. This chart shows a basic management, administrative and support structure plus four operating shifts of eight technicians each. The basic management, administrative and support personnel are "on-call" during shift work when required. The eight-hour gap (4 X 40 = 160 hours) could be handled as overtime, or an additional shift of eight people would be required. One of the eight senior technicians acts as shift supervisor. Should a receive-only capability be considered, a decrease of one technician per operating shift could be realized. In addition, this implies a less than 24 hour coverage requirement and could directly decrease the number of operating shifts depending on type and availability of programmatic material.

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Technical Qualifications

The Station Manager should be a Senior Engineer--minimum requirement is a B.S. in the electronics/communications field, with eight or more years of progressive experience including managerial and supervisory experience. The Assistant Station Manager and/or Operations Manager should have similar experience and qualifications.

The System Engineer should have a minimum of a B.S. in the electronics field, plus additional graduate work, and ten years of progressive experience working with highly technical and complex systems.

The Facility Engineer should have a broad background in general and mechanical engineering; a degree is desired in a related field but not absolutely required.

The Senior Electronic Technicians should have an equivalent of a 2-year technical school training program, plus 3 to 5 years experience in work which is above the average technician's level.

The Senior Mechanical and Electrical Technicians should have some specialized training in the power generation and transmission, lighting, air conditioning, motors, etc. fields plus 8 to 10 years experience.

The administrative and logistic personnel require minimum training in their related fields.

Training Requirements

In those countries where the basic technical capability now exists, it is envisioned that the following nominal specialized training periods would be required:

Engineers	:	12 months--this would include 3 months of classroom lectures plus laboratory work on the ground terminal equipment, with the rest composed of on-the-job training at the ground terminal.
Electronic Technicians	:	These people are of key importance to the successful operation of the terminal. Six months of training is required; three months of classroom lectures and equipment laboratory, and three months on-the-job training. These technicians would be trained on all subsystems

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rather than specialized on one subsystem. It is envisioned that the shift operators would also be qualified to perform preventive as well as corrective maintenance. The training material would be primarily manuals on theory of operations, maintenance instruction, and details of drawings and specifications.

Mechanical and Electrical Technicians : 4 months of specialized training on equipment installed at the station.

Administrative and Logistic Personnel : One to two weeks on-the-job training.

In those countries where the basic technical competence does not exist, a somewhat longer training program would be required. Each country may present different problems and each would have to be solved independently.

Estimates of countries' ability to provide technical personnel to maintain and operate the ground terminal equipment

It is felt that the following countries have the basic technical capability and should be able to handle the ground terminal equipment after completing training listed in Item 3. This estimate is based on information that these countries possess a telecommunication system that has achieved a reasonable level of performance.

1. Argentina
2. Brazil
3. Chile
4. Colombia
5. Mexico
6. Peru
7. Venezuela
8. Philippines
9. Taiwan

In other nations of interest, technical personnel could be expected to maintain and operate ground terminal equipment satisfactorily if initially provided with trained U.S. leadership in the key technical areas.

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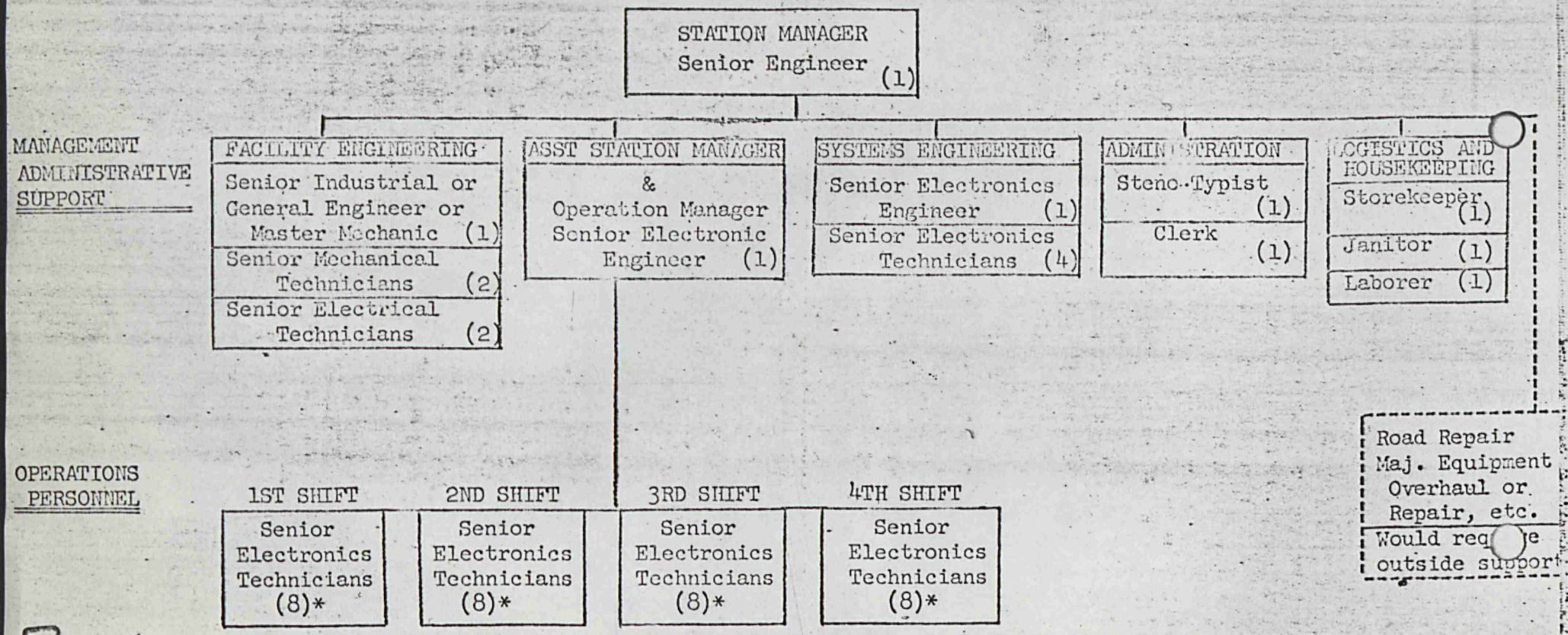
85-FOOT ANTENNA 24 HOURS/DAY, 7 DAYS/WEEK OPERATION



* Output interface-unique equipment may require one additional man per shift. It is assumed this equipment and additional man would be provided by the user.

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ISOO 2013-005
By MW, NARA, Date 1/28/14

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Mr. J. D. O'Connell DATE: December 13, 1965

FROM : Fred W. Morris, Jr.

SUBJECT: Work Plan for Marks Committee Assignments

Tab A attached, includes annotation of the assignments which you agreed to undertake and to supply a paper on or before December 18 responding to questions A, B, and C (except A. 7). Also included, is a notation of the organizations that are being drawn upon to assist us in this assignment.

Tab B is a draft outline of the entire study designed to meet the Marks assignments in an organized fashion. The annotations indicate the assignments and due dates and the sub-assignments necessary for us to complete our efforts.

ComSat, as of last Friday, was proceeding to organize and respond to the sub-assignments conveyed in my letter to Mr. McCormack December 8.

In a conversation with General Grant, it was agreed that DOD would proceed with preparation of material for selected items for the assignment as noted.

Mr. Ed Martin of USIA has agreed to prepare the material for submission to us by COB December 15 responding to selected items of the assignment.

Mr. Jorden, Department of State, provided a tentative listing of the selection of less-developed countries as reported in my memorandum for the record of December 10. This listing has been passed on to ComSat, DOD, and USIA.

Gil Carter, USIA, indicates that material we need responding to your assignment B.2 (i.e. internal communications in Brazil, etc.) will be forthcoming only via the recently contracted study with results expected next year.

I have yet to contact NASA for a statement concerning their thinking as to item A.1 where the possible availability of channels "through new NASA experimental satellites" is concerned. It is also necessary I proceed to get a more definitive statement from CIA and/or DIA concerning Molnia and intelligence re USSR and foreign satellites and earth stations.

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The assignment due to the Marks Committee by December 18 is supposed to include responses to questions suggesting that there are "proposed uses" and a "proposed system." I am unaware of any definitive proposals being available. This will limit our responsiveness to the Marks assignments.

At this date it appears uncertain as to the degree to which you will be able to meet your assignment due date with Mr. Marks as the sub-assignments may well be delayed in getting back to us. Even if fully satisfied, the sub-assignments results will have to be amalgamated into a report and reproduced for distribution to the full Committee. I suggest that when Mr. Marks returns from his current overseas travels, expected Wednesday, December 15, that you ask for a "stay of execution."

Fred W. Morris, Jr.

A

~~CONFIDENTIAL~~

December 3, 1965

AGENDA FOR TASK FORCE ON COMMUNICATIONS SATELLITE GROUND STATIONS

Question: Will national interests be served by encouraging and assisting less-developed countries in Latin America, Africa and Asia to establish ground stations for communications satellite reception and/or transmission?

✓ A. Technical questions:

JDOC 12/18 1. Availability of channels through -

Apollo
COMSAT } COMSAT
Department of Defense - Philco DOD
New NASA experimental satellites NASA

JDOC 12/18 2. Extent to which above will provide for telephone, telegraph communications and broadcasting.

JDOC 12/18 3. Compatibility or incompatibility of ground stations with USSR or other foreign satellites. COMSAT, CIA & DIA

JDOC 12/18 4. Reliability of service available from communications satellites (feasibility of jamming or creating interference). COMSAT

JDOC 12/18 5. Recommended location for ground stations in Latin America, Africa, Asia and coverage derived. COMSAT & DEPT. STATE

JDOC 12/18 6. Present plans for ground stations in above areas. COMSAT

NASA 7. Feasibility of direct transmission (cost and timing).

✓ B. Need for service and proposed uses: ?

JDOC 12/18 1. Present and anticipated communication requirements (telephone, telegraph, etc.) and broadcasting (AM, FM, TV) from U.S. or other sources compatible with proposed system. USIA & DOD

? ?

TAB A

JDOC 12/18 2. Same for sources within particular countries (i.e., use of satellite for internal communications within Brazil) and within the continent (Mexico to Argentina). AID-NASA

JDOC 12/18 3. Status of television development in Africa, Asia and Latin America (including transmission, microwave relay and other related facilities). USIA + DOD

C. Cost of ground stations and domestic installations necessary to complete communications requirements -

JDOC 12/18 1. Receiving stations only -- mobile or fixed COMSAT

JDOC 12/18 2. Receiving and transmitting ground stations (this estimate should be for equipment and installation costs as compared to land and building.) COMSAT

D. Personnel training required to operate facilities -

NASA + DOD 1. Present availability of trained technicians

NASA + DOD 2. Time required to train new technicians

Fact Comm. 1/10 E. Arguments for and against proposal to assist less-developed countries to erect facilities described.

Leonard H. Marks

~~CONFIDENTIAL~~

MINUTES OF FIRST MEETING OF WORKING GROUP ON COMMUNICATIONS SATELLITE GROUND STATIONS

White House, December 3, 1965, 2:00pm

The meeting was called to order by Douglass Cater who described the general purpose of the working group. He introduced Leonard H. Marks as the Chairman.

Mr. Marks distributed a proposed Agenda which was discussed in detail and revised. A copy of the revised Agenda is attached.

It was agreed that James O'Connell would supply a paper on or before December 18 responding to Questions A, B and C, except for A. 7 which is to be furnished by NASA.

Department of Defense and NASA will provide the information raised by Question D.

In addition, AID will furnish a report on the status of projects for television reception in less-developed countries in Latin America, Asia and Africa.

Each member of the Working Group will, prior to January 10, 1966, submit his conclusions and arguments specified in Question E. A list of those who participated is attached. Personnel responsible for reports shall submit five copies to the Chairman and one copy to each of those shown on the attached list.

The next meeting of the Committee will be held on Monday, January 17, 1966, at 2:00pm, at the offices of the Chairman, 1750 Pennsylvania Avenue, N.W., room 700.

Leonard H. Marks 12/3/65

~~CONFIDENTIAL~~

B

CONFIDENTIAL

FWMorris:dc
12/13/65

DRAFT OUTLINE

Study of Communications Satellite
Service for Less-Developed Countries

ASSIGNMENT

SUB-ASSIGNMENT FOR ASSIST TO JDOC

1. INTRODUCTION

1.1 The Question: Will U. S. national interests be served by encouraging and assisting less-developed countries in Latin America, Africa, and Asia in the early establishment of earth stations for communications satellite service?

1/10 1.2 Planning and Analysis Approach.

2. U. S. NATIONAL INTERESTS

1/10 2.1 Analysis of U. S. Foreign Policy Objectives.

1/10 2.2 The Role of Telecommunications in Supporting U. S. Foreign Policy Objectives.

1/10 2.3 Evaluation of the Risks Associated with Foreign Domination in Satellite Communications for Developing Nations.

1/10 2.4 The Interests of Traditional Allies of the U. S.

3. TECHNICAL CONSIDERATIONS

JDOC 12/18 (3.1) Communication Satellite Space Segment Location and Capacity Availability -- Current, Committed, Planned and Projected* and Extensions Which are Feasible and Desirable via:

COMSAT a. INTELSAT
DOD b. Department of Defense -- IDCSP and ADCSP
NASA c. Experimental Satellites

JDOC 12/18 (3.2) Communications Satellite Earth Station Location and Capacity Availability -- Current, Committed, Planned and Projected* and Extensions Which are Feasible and Desirable via:

COMSAT a. INTELSAT
DOD b. Department of Defense -- IDCSP and ADCSP
NASA c. Experimental Satellites

* As based on current demand projections.

TAB B

CONFIDENTIAL

JDOC 12/18 — 3.3 — CIA & DIA — Status of Soviet and Other Foreign Communication Satellite System Programs -- Satellite Characteristics and Capacity.

JDOC 12/18 — 3.4 — COMSAT — Degree of Compatibility of INTELSAT Earth Stations for Transmission to and Reception from Soviet and Other Foreign Communications Satellites.

JDOC 12/18 — 3.5 — COMSAT — Reliability of Communications Satellite Service (considering intentional interference).

JDOC 12/18 — 3.6 — COMSAT — Location of Communication Satellite Earth Stations in Selected Less-Developed Countries of Latin America, Africa, and Asia -- Projected Investment Requirements, Operating Expense and Revenue.

JDOC 12/18 — 3.7 — Terrestrial Communication Distribution Networks Within Selected Less-Developed Countries of Latin America, Africa, and Asia -- Current, Committed, Planned, Projected and Extensions Which are Feasible and Desirable for:

USIA & DOD

a. Voice
b. Record and Data
c. Television

JDOC 12/18 — 3.8 — USIA & DOD — Broadcast Capabilities To and Within Selected Less-Developed Countries of Latin America, Africa and Asia -- Current, Committed, Planned, Projected and Extensions Which are Feasible and Desirable for:

a. Voice
b. Television

JDOC 12/18 — 3.9 — COMSAT — Cost of Communications Satellite Earth Stations -- Receive Only vs. Receive and Transmit Capability.

DOD & NASA — 3.10 — Personnel Training Requirements for Maintenance and Operation of Communications Satellite Earth Stations, Terrestrial Communications Distribution Networks, and Broadcast Facilities.

NASA — 3.11 — Feasibility, Cost and Timing of Direct Broadcast Transmission to include Less Developed Countries:

a. Voice Only
b. Multilanguage plus Educational Television

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4. DISCUSSION

FULL COMMITTEE 1/10

4.1 Arguments For and Against U. S. Action Encouraging Early Establishment of Earth Stations for Communications Satellite Service, Terrestrial Communications Distribution Networks and/or Broadcast Capabilities for Selected Less-Developed Countries in Latin America, Africa and Asia.

5. CONCLUSIONS AND RECOMMENDATIONS

FULL COMMITTEE 1/10

CONFIDENTIAL

CONFIDENTIAL

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF TELECOMMUNICATIONS MANAGEMENT
WASHINGTON, D.C. 20504

OFFICE OF THE DIRECTOR

December 8, 1965

Mr. James McCormack
Chief Executive Officer
Communications Satellite Corporation
1900 L Street, N. W.
Washington, D. C.

Dear Mr. McCormack:

Since Mr. O'Connell is on the West Coast this week, I am writing to you because of the urgency of the subject matter.

The President has asked that a White House Working Group be convened to study the question of encouraging the early establishment of communications satellite service for less-developed countries in Latin America, Africa, and Asia. The Working Group met for the first time last Friday under the chairmanship of Mr. Leonard Marks. A copy of the minutes of this meeting and the White House memorandum convening the Working Group are attached for your information. The subject and the attached papers should be considered as "White House - Privileged" information.

We are certain that you will find the subject to be of considerable interest. Mr. O'Connell hopes that it will be possible for the Communications Satellite Corporation staff to assist in the preparation of working papers and recommendations incident to the subject study. He requests that you establish a point of contact within the Corporation to work with our office and to bring together inputs from the Technical, Operational, and International Divisions of the Communications Satellite Corporation. We have had an informal discussion of the subject with Messrs. Johnson and Istvan of your staff.

You will note in reviewing the attached minutes that the timing requirements for the study are extremely short and that Mr. O'Connell has agreed to supply substantial information on or before December 18th

This material contains information affecting the national defense of the United States within the meaning of the espionage laws, Title 18, U.S.C., Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

DECLASSIFIED
E.O. 13526, Sec. 3.3h
By mw, NARA, Date 11/29/12

CONFIDENTIAL

responding to several questions being considered by the Working Group. Our draft outline of the study (copy attached) suggests several topics that can be most appropriately and adequately addressed by your staff, drawing upon the extensive background of information already developed by ComSat. It is suggested that these include items 3.1a, 3.2a, 3.4, 3.5, 3.6, and 3.9 in the draft outline as well as cooperation in the preparation of other items.

Of particular significance will be consideration of material such as was presented to the Department of State by your Director of International Development with reference to possible U. S. action to encourage early establishment of an earth station facility to serve U. S. and commercial communications requirements in Southeast Asia (ComSat Letter - Edward Istvan to C. Hoyt Price - Department of State, dated November 23, 1965 - Confidential).

In order to adequately address the President's interest, it is important that we consider not only the communications satellite space segment and earth station capabilities now existent and planned but those capabilities which could be or should be established in the U. S. national interest. We believe this can serve as a real opportunity to push forward the objectives of the Communications Satellite Act of 1962 and the early establishment of the Global Commercial Communications Satellite System.

I will be pleased to meet with you or your designee at the earliest possible time in order to proceed in this matter.

Sincerely,

Fred W. Morris

Fred W. Morris, Jr.
Associate Director

Encls. (3)

~~CONFIDENTIAL~~

MINUTES OF FIRST MEETING OF WORKING GROUP ON COMMUNICATIONS SATELLITE GROUND STATIONS

White House, December 3, 1965, 2:00pm

The meeting was called to order by Douglass Cater who described the general purpose of the working group. He introduced Leonard H. Marks as the Chairman.

Mr. Marks distributed a proposed Agenda which was discussed in detail and revised. A copy of the revised Agenda is attached.

It was agreed that James O'Connell would supply a paper on or before December 18 responding to Questions A, B and C, except for A. 7 which is to be furnished by NASA.

Department of Defense and NASA will provide the information raised by Question D.

In addition, AID will furnish a report on the status of projects for television reception in less-developed countries in Latin America, Asia and Africa.

Each member of the Working Group will, prior to January 10, 1966, submit his conclusions and arguments specified in Question E. A list of those who participated is attached. Personnel responsible for reports shall submit five copies to the Chairman and one copy to each of those shown on the attached list.

The next meeting of the Committee will be held on Monday, January 17, 1966, at 2:00pm, at the offices of the Chairman, 1750 Pennsylvania Avenue, N.W., room 700.

Leonard H. Marks 12/3/65

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

December 3, 1965

AGENDA FOR TASK FORCE ON COMMUNICATIONS SATELLITE GROUND STATIONS

Question: Will national interests be served by encouraging and assisting less-developed countries in Latin America, Africa and Asia to establish ground stations for communications satellite reception and/or transmission?

✓ A. Technical questions:

1. Availability of channels through -

   Apollo

   COMSAT

   Department of Defense - Philco

   New NASA experimental satellites

2. Extent to which above will provide for telephone, telegraph communications and broadcasting.

3. Compatibility or incompatibility of ground stations with USSR or other foreign satellites.

4. Reliability of service available from communications satellites (feasibility of jamming or creating interference).

5. Recommended location for ground stations in Latin America, Africa, Asia and coverage derived.

6. Present plans for ground stations in above areas.

NASA 7. Feasibility of direct transmission (cost and timing).

✓ B. Need for service and proposed uses:

1. Present and anticipated communication requirements (telephone, telegraph, etc.) and broadcasting (AM, FM, TV) from U.S. or other sources compatible with proposed system.

2. Same for sources within particular countries (i.e., use of satellite for internal communications within Brazil) and within the continent (Mexico to Argentina).

3. Status of television development in Africa, Asia and Latin America (including transmission, microwave relay and other related facilities).

C. Cost of ground stations and domestic installations necessary to complete communications requirements -

1. Receiving stations only -- mobile or fixed

2. Receiving and transmitting ground stations (this estimate should be for equipment and installation costs as compared to land and building.)

D. Personnel training required to operate facilities -

DOD
NASA

1. Present availability of trained technicians

2. Time required to train new technicians

E. Arguments for and against proposal to assist less-developed countries to erect facilities described.

Leonard H. Marks

~~CONFIDENTIAL~~

Those present at the first meeting of the communications satellite system working group:

Leonard H. Marks, Chairman
Director
U.S. Information Agency
1750 Pennsylvania Avenue, N.W.

General Harold W. Grant
Director Telecommunications Policy
OSD, Room 4210
Building 12
Navy Service Center

John C. Broger
Director
Armed Forces Information and Education
OSD, Room 3D253
The Pentagon

Henry Rowen
Assistant Director
Bureau of the Budget
Executive Office Building

Dr. Donald Steinniger
Science and Technology
Executive Office Building

Dr. Donald Hornig
Director
Science and Technology
Executive Office Building

Dr. Robert C. Semans
Associate Administrator
NASA
400 Maryland Avenue, S.W.

Earl D. Hilburn
Deputy Associate Administrator
NASA
400 Maryland Avenue, S.W.

W. G. Carter
Assistant Administrator
Private Enterprise, Room 2493
AID

William Jorden
Deputy Assistant Secretary
Room 6804A
Department of State

James D. O'Connell
Director
Telecommunications Management, OEP
Executive Office Building

Fred Morris (Alternate to James O'Connell)
Executive Office Building

Dr. Edward Welsh
Executive Secretary
National Aeronautics and Space Council
Executive Office Building

Douglass Cater
The White House

MEMORANDUM

WH PRIVILEGED

THE WHITE HOUSE

WASHINGTON

November 29, 1965

TO: Secretary Dean Rusk
Secretary Robert McNamara
Director Leonard Marks
Director Donald Hornig
Director Charles Schultze
Administrator James Webb
Administrator David Bell
Director James D. O'Connell ✓

The President has requested me to call together an informal working group to study the feasibility and need of a communications satellite system and connecting earth stations capable of serving informational and educational purposes in the developing nations. The group will be expected to make recommendations to the President and the Secretary of State.

The President has designated Director Marks to serve as chairman and requests each participating agency to designate a ranking representative to serve on the group. I will act as White House representative.

Please inform my office as soon as possible of your selection. The first meeting of the group will take place at the White House on Thursday, December second at 11 a. m.

Douglass Cater
Special Assistant
to the President

CONFIDENTIAL

FWMorris:dc
12/8/65

DRAFT OUTLINE

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2.1 Analysis of U. S. Foreign Policy Objectives.

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3.1 Communication Satellite Space Segment Location and Capacity Availability -- Current, Committed, Planned and Projected* and Extensions Which are Feasible and Desirable via:

a. INTELSAT
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3.2 Communications Satellite Earth Station Location and Capacity Availability -- Current, Committed, Planned and Projected* and Extensions Which are Feasible and Desirable via:

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* As based on current demand projections.

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3.3 Status of Soviet and Other Foreign Communication Satellite System Programs -- Satellite Characteristics and Capacity.

3.4 Degree of Compatibility of INTELSAT Earth Stations for Transmission to and Reception from Soviet and Other Foreign Communications Satellites.

3.5 Reliability of Communications Satellite Service (considering intentional interference).

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3.8 Broadcast Capabilities To and Within Selected Less-Developed Countries of Latin America, Africa and Asia -- Current, Committed, Planned, Projected and Extensions Which are Feasible and Desirable for:

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3.9 Cost of Communications Satellite Earth Stations -- Receive Only vs. Receive and Transmit Capability.

3.10 Personnel Training Requirements for Maintenance and Operation of Communications Satellite Earth Stations, Terrestrial Communications Distribution Networks, and Broadcast Facilities.

4. DISCUSSION

4.1 Arguments For and Against U. S. Action Encouraging Early Establishment of Earth Stations for Communications Satellite Service, Terrestrial Communications Distribution Networks and/or Broadcast Capabilities for Selected Less-Developed Countries in Latin America, Africa and Asia.

5. CONCLUSIONS AND RECOMMENDATIONS

December 7, 1965

Memoran dum for Mr. M orris:

Mr. O'Connell called while you were away. He has been in deep conversations with General Blake and others on the west coast concerning the studies of the Leonard Marks Committee. As a result of these discussions, a concept and philosophy has crystallized in Mr. O'Connell's mind which he feels it is important that we work into our paper for the Marks Committee. The concept is as follows:

"The most serious bottleneck and impediment to the development of international telecommunications traffic is the lack of ground distribution facilities in almost every nation of the world other than the United States. If we are to reap the benefits of communications satellite technology and create a world of peace and security, of economic growth and international cooperation then we must break this bottleneck. We must find a way to encourage a dynamic development of the internal communications facilities of the nations of the world.

In Europe the technology is available. What is needed here is some way of effectively fostering the type of growth we have enjoyed in the United States.

In the developing nations we must provide the technology and, if necessary, the funds to encourage the rapid development of internal communications of those nations which show any promise of participating in the communications satellite Consortium."

Mr. O'Connell feels that the developing nations have a good understanding of the relationship of a telecommunications base to the development of natural resources, trade, industry within the country. He further feels that we must take advantage of this current opportunity to push this program.

H. R. Johnson

Copy to Mr. Morris

~~CONFIDENTIAL~~

MINUTES OF FIRST MEETING OF WORKING GROUP ON
COMMUNICATIONS SATELLITE GROUND STATIONS

White House, December 3, 1965, 2:00pm

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DECLASSIFIED
E.O. 13526, Sec. 3.3h
By MW, NARA, Date 11/29/12

Leonard H. Marks 12/3/65

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

December 3, 1965

AGENDA FOR TASK FORCE ON COMMUNICATIONS SATELLITE GROUND STATIONS

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E. Arguments for and against proposal to assist less-developed countries to erect facilities described.

Leonard H. Marks

EXECUTIVE OFFICE OF
THE PRESIDENT

1965 DEC 6 PM 3 36

OFFICE OF EMERGENCY
PLANNING-MAIL ROOM
WASHINGTON 25, D.C.

MEMORANDUM

THE WHITE HOUSE

WASHINGTON

November 29, 1965

TO: Secretary Dean Rusk
Secretary Robert McNamara
Director Leonard Marks
Director Donald Hornig
Director Charles Schultze
Administrator James Webb
Administrator David Bell
Director James D. O'Connell

The President has requested me to call together an informal working group to study the feasibility and need of a communications satellite system and connecting earth stations capable of serving informational and educational purposes in the developing nations. The group will be expected to make recommendations to the President and the Secretary of State.

The President has designated Director Marks to serve as chairman and requests each participating agency to designate a ranking representative to serve on the group. I will act as White House representative.

Please inform my office as soon as possible of your selection. The first meeting of the group will take place at the White House on Thursday, December second at 11 a. m.

Douglass Cater
Special Assistant
to the President

~~CONFIDENTIAL~~

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Leonard H. Marks, Chairman
Director
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1750 Pennsylvania Avenue, N.W.

General Harold W. Grant
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OSD, Room 4210
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Assistant Director
Bureau of the Budget
Executive Office Building

Dr. Donald Steinniger
Science and Technology
Executive Office Building

Dr. Donald Hornig
Director
Science and Technology
Executive Office Building

Dr. Robert C. Semans
Associate Administrator
NASA
400 Maryland Avenue, S.W.

Earl D. Hilburn
Deputy Associate Administrator
NASA
400 Maryland Avenue, S.W.

W. G. Carter
Assistant Administrator
Private Enterprise, Room 2493
AID

William Jorden
Deputy Assistant Secretary
Room 6804A
Department of State

James D. O'Connell
Director
Telecommunications Management, OEP
Executive Office Building

Fred Morris (Alternate to James O'Connell)
Executive Office Building

Dr. Edward Welsh
Executive Secretary
National Aeronautics and Space Council
Executive Office Building

Douglass Cater
The White House