APPENDIX A

Tab 1 - INTELSAT Space Segment Status and Planning

Tab 2 - Compatibility of Earth Stations for INTELSAT and MOLNIA Communications Satellites

Tab 3- Reliability of Communications Satellite Service

Tab 4- Cost Planning for Earth Stations

Prepared by ComSat Corporation December 1965

TECHNICAL CONSIDERATIONS

This section discusses some of the technical aspects of the questions contained in the outline received from General O'Connell's office. The items are discussed in the order in which they appear in the outline under technical considerations.

3.1.a Space Segment, INTELSAT

1. Current

The available space segment capacity at present is, of course, the Early Bird satellite which has a capacity of 240 two-way telephone circuits between Andover, Maine and Europe. A second flight model of the Early Bird satellite has completed testing and is available for replacement if required.

2. Committed

If and when the Early Bird satellite fails, it will be replaced by a satellite of at least equal capacity. The exact replacement will depend upon the point in time at which a replacement is needed.

Also committed at present are the two satellites to be used in support of the Apollo program and other commercial uses including Hawaii to the mainland. One will be located at approximately 6° West longitude and the other at approximately 176° East longitude. These will be supported initially by the addition of a 42-foot transportable earth terminal located at the Andover

station, and the 85-foot terminals being constructed at Brewster Flat and Hawaii. The additional stations in Australia, Ascension and Canary Islands are being supplied by Australia, United Kingdom and Spain respectively in close cooperation with the Corporation. The Apollo ship stations are being provided by the government. The Brewster Flat and Hawaii stations will commence operation initially with 42-foot transportable terminals which will subsequently serve as back-up antennas to the 85-foot terminals when they become available. There are 4 satellites of this configuration on order, and the Corporation has the option to buy up to 15 additional satellites of this type within 6 months from the date of the contract (May, 1966).

3. Planned

The Corporation plans to undertake the development of a larger satellite to be used with the first global commercial system in early 1968. The proposals for this satellite design have been received, evaluated, and the Corporation in conjunction with the Interim Committee is proceeding with negotiations for the development.

4. Projected

The Corporation plans to launch these global satellites beginning in early 1968 (see figure 1), one in the Atlantic area to replace the Early Bird replacement and the other in the Pacific to replace the satellite to be launched in 1966 for the

Hawaii to Brewster service and for service to the Apollo program. The satellite freed by this replacement in the Pacific would be moved to provide coverage over the Indian Ocean. In this manner a global coverage will be available in early 1968 to meet the expected traffic load for that time period. The satellite in the Atlantic (6^{o} West longitude) will be replaced when necessary, estimated as mid-1969. From that point forward satellites will be launched as required to replace failures until mid-1972 when a third satellite will be added to the Atlantic area. This satellite would be located at approximately 50^{o} West longitude in order to handle increased traffic. In addition to this global satellite development the Corporation plans to undertake a preliminary design study of 4 months duration for a larger satellite called a multi-purpose satellite. This satellite would have the capability of combining several functions; namely, communications to aircraft and ships, the television distribution service, and, of course telephony. The study will determine what flexibility is possible in the mixing of these various services within a given satellite whose size will be determined primarily by the limitations of launch vehicles generally of the Atlas Agena category. This approach of a multi-purpose satellite is felt to be an economic solution to the longer range requirements presented by the several diverse services discussed

above.

5. Extensions

The above planning has been based primarily upon a traffic matrix which has been discussed with and agreed upon by the various member countries of the Interim Committee. The aeronautical, maritime and television distribution services have not been included in this traffic matrix. The Corporation has nevertheless been considering the feasibility of providing such services and has recommended to the Committee that this proposed 4-month study of the multi-purpose satellite be undertaken as the next step in developing a suitable plan to accommodate these other services. This larger satellite would, in the normal course of events, be made available in the early 1970 period. However, in discussing what extensions of this basic planning are feasible and perhaps desirable, one must recognize that it is entirely possible to provide the aeronautical, maritime and television distribution services at an earlier date.

The aeronautical services have recently received considerable interest from the airline operators and the FAA. In preparing some planning material it has become clear that an interim service could be made available which would provide some 2 voice channels through the satellite for commercial aircraft over the North Atlantic. While the other areas of the world could, of course, be serviced at the same time, it is highly probable

that the North Atlantic routes will be the first to require the service. This service could be provided with a modification of the 303-A satellite (used for combined commercial and Apollo support services) by changing the electronics and antennas to work at aeronautical frequencies. It is this particular modification which could be made available by mid-1967 should the requirements for such a service materialize.

The television distribution service could be provided before 1970 by launching additional global satellites in 1968. A preliminary study indicates that 3 global satellites launched on an Atlas Agena should provide the same number of television channels as one large satellite completely dedicated to this television service. Thus it would be possible within the framework of designs being projected to make available the television distribution service into economically sized ground terminals by mid-1968 should the demand for such service materialize.

The requirement for service to developing countries in 1967 would require additional launches beyond those presently committed during this time period. The capacity to provide a television channel to the several stated countries can best be met during this time period by launching additional satellites of the 303-A (type). These additional satellites, one

in the Atlantic and one in the Pacific, would require additional ground antennas in the United States as well as in the developing countries. These satellites could be of the same design as the planned 1966 launchings and would permit a full-time television (Early Bird quality) channel (one-way) as well as 130 two-way telephone circuits. Should there be a requirement for capacity beyond this, it can be achieved with an antenna design change which would be available for launching early in 1967. This despun antenna design would permit a considerable increase in capacity for the same launch cost and would provide the capacity for two television programs (Early Bird quality) plus 430 two-way telephone circuits simultaneously. While this increase in capacity is feasible, the desirability for undertaking such a development is related to the more specific requirement for full-time television channels directly from the United States to other countries.

The solution of the television distribution problem in an economic manner will provide the technology for bringing television directly to many users whose needs will support a low-cost earth terminal. In particular, the use of such television for educational purposes is certainly feasible in the 1968 time period. Whether this be used by established institutions in this country or as a means of developing the internal distribution system of

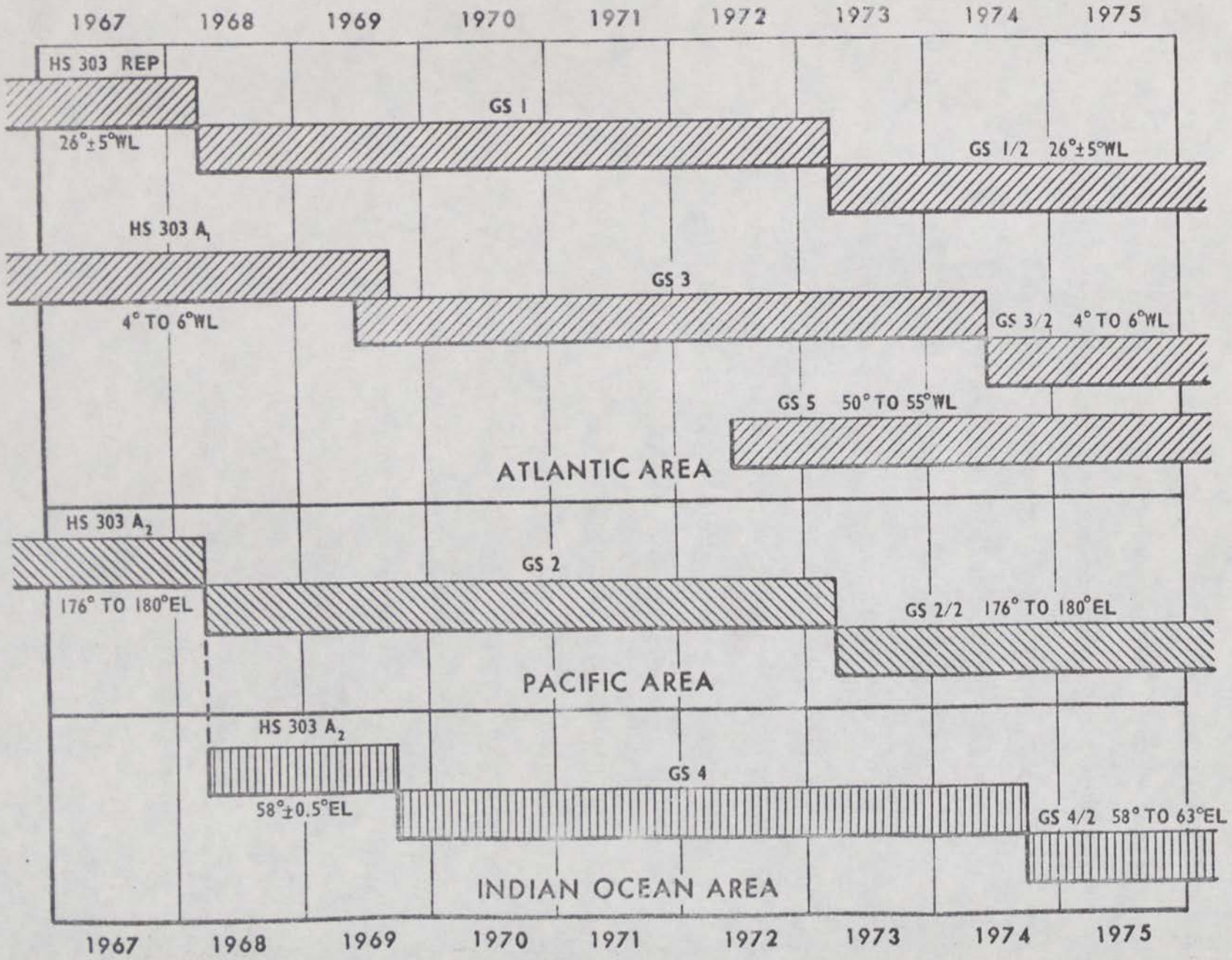
less advanced countries, the technology will be available and there only remains to have a clear statement of requirements to further assess the desirability of the planning for such services. The proposed global satellite will be capable of 4 television channels into 30-foot terminals over an area the size of the United States. This will permit the establishment of a distribution system early in 1968.

3.2.a Extensions

To the extent that additional satellites beyond these already committed for commercial services including Apollo support may be made available for 1967, other earth terminals will be required in the United States. There is no question of feasibility involved, and the desirability simply awaits the further definition of specific requirements.

In the area of terminals suitable for such services as television distribution, further work must be accomplished in the area of simple low cost earth terminals of the 30-foot diameter class. The feasibility of such developments is being examined, and further studies will be necessary within Comsat and by contracts with qualified contractors in order to assess the limits which might be achieved in providing suitable terminals at a cost sufficiently low to encourage wide-spread use.

FIG. 1 - SATELLITE POSITIONS IN TIME AND LONGITUDE



3.4 Compatibility

The earliest satellites planned for INTELSAT use do not incorporate a de-spun or oriented antenna beam to focus the power. The Molyna satellite has a stabilized beam and could therefore provide service to smaller, less expensive ground terminals. If such terminals were to be installed, they would not be efficient as against the INTELSAT satellites until a de-spun antenna is made available. Even after the de-spun antenna is available (presently planned early 1968) the space segment cost for working against small terminals is proportionately larger. For instance, in the Apollo service, the 30-foot ship terminals require approximately 16 times the space segment cost per channel compared to the 85-foot terminals. Where a single terminal is involved, the cost trade-off considerations between space and ground dictate the larger antenna use even for a few channels. Therefore, it is important to have the larger terminal installed from the beginning in order to insure compatibility with the INTELSAT service, in the long term economic sense.

For a television distribution system where a significant number of ground terminals are involved within one country, this cost trade-off favors the use of a less expensive terminal, of

the 30-foot diameter category and, of course, the higher powered satellite.

Thus, within the context of starting with an 85-foot steerable antenna for INTELSAT use, the compatibility with Molnya can later be achieved by adding suitable equipment to operate at the different frequencies (900 megacycles instead of the 6000 - 4000 band used by INTELSAT). This conversion cost is usually a small fraction of initial terminal cost, perhaps some $300,000 to $500,000 for an operating capability in contrast to an experimental capability which could be achieved at even lower cost.

If a distribution system within a country is the objective, the higher powered satellites should be made available initially along with the smaller stations. If this were done, the Molyna satellites could efficiently work such stations after suitable adaptations to frequencies peculiar to Molnya.

3.5 Reliability of Communications Satellite Service

The general reliability of the space segment and of the earth terminals being projected for commercial service is of the highest quality. Satellites of 5-year lifetime with switchable redundant elements are being confidentially projected, and there is little additional to say about the general operational

reliability of such links. However, the linear transponders best suited for the high degree of multiple access mandatory in the global commercial system and the types of modulation efficient of satellite capacity are generally more susceptible to intentional interference. In the commercial environment unintentional interference is carefully controlled and intentional interference is never considered to be a problem. The ability to deal with intentional interference is related to the signal strength of the transmitter relative to the jamming source, the type of modulation used and the design of the transponder.

The linear transponder operation depends upon controlling the relative and total power of all signals illuminating the satellite. Interference disrupts this balance and can cause suppression of signals. Switching to spread spectrum digital modulation techniques will permit operation at reduced capacity even with the linear transponder. Non-linear (hard-limiter) transponders are usually preferred for dealing with a wide variety of jamming signals.

Interference in the form of signals which can actuate the satellite position or attitude control system is also possible. The control systems projected for commercial satellites have no protection against such interference.

In contradistinction to interference it would be possible for an unauthorized user to use a low-powered, spread-spectrum signal and transmit through the satellite to his own benefit without noticeably interfering with normal operations. Thus by providing suitable inexpensive detection and modulation equipment to established ground stations, a foreign country could to some degree exploit the INTELSAT system for its own purpose.

The need for a high degree of flexible multiple access and efficient modulation generally dictates a satellite transponder design which is highly susceptible to various forms of intentional interference. In any case, the satellite design which continues to have some utility when being jammed consists of a hard-limiter transponder. Even with such a satellite, however, operation during jamming is limited to a few voice channels. To achieve even that, one must go to digital transmission with special modulation and detection techniques. For a system specifically designed to work under jamming, the same modulation and detection techniques can provide a rather significant capability when operating in the clear. For instance, a satellite similar in design to the proposed global satellite, if provided with a hard-limiter transponder, could transmit approximately 4 megabits per second of data using the spread-spectrum-multiple-access techniques. The same satellite, however, if equipped with a linear transponder

can provide some 1200 two-way telephone circuits when operated in a commercial environment. This basic difference in the design of the transponder is the key element in determining the ability of the system to function when jammed.

3.9 Cost of Earth Stations

The 42-foot antenna transportable earth stations being procured for support of the Apollo program will cost approximately $1.5-million apiece. If the 42-foot antenna is replaced by an 85-foot antenna, the installation will cost approximately $3-million. If the station is made more permanent, and buildings, roads and other facilities are included, the cost can range between this $3-million and approximately $6-million depending on the location and desired elaborateness of facilities and support. If the station is equipped to receive only and no transmitters are included, it would be possible to save approximately $250,000 of the basic $3-million cost. These costs are for fully steerable antennas.

For the smaller stations representative of an economic solution to the distribution service (30-foot) diameter and receiving only, significant reduction in cost is possible. Costs ranging from $100,000 to $150,000 are estimated for such units in limited production quantities.

APPENDIX D
Broadcast Satellites

Tab 1 - NASA Discussion

Tab 2 - International and National Radio Regulations Affecting Broadcasting from Satellites

Prepared by National Aeronautics & Space Administration

December 1965

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UNITED STATES GOVERNMENT

OFFICIAL USE ONLY

Memorandum

TO : AAD/Deputy Associate Administrator

DATE: December 17, 1965

FROM : ST, Director, Communications & Navigation Programs

SUBJECT: Broadcast Satellites for Marks' Task Force

BROADCAST SATELLITES

The purpose of this paper is to discuss the technical possibilities for providing radio and television services via satellites to both conventional home receivers and specially designed receivers which might be used for specific information distribution systems, and then comment on the technical feasibility of such satellites, considering timing and costs.

Before discussing the various possibilities of broadcast satellites it must be stated that it is not possible to realize any of the following satellites within the 18 to 24 month period that the task group is considering. A reasonable developmental program and current resources and commitments do not permit developments of satellites of the described size and complexity in this time scale.

Definitions

By direct broadcast, we mean that an earth station transmitter would transmit program material to a satellite, which would amplify the received signal and retransmit it direct to individual home radio or television receivers.

Satellites from which the program material is received by more elaborate receiving equipment than the current commercially available home receivers are called distribution satellites.

To complete the definitions, the current communications satellites - which require reception by very complex ground equipments from which program material must be subsequently delivered to the consumer via wire or rebroadcast by conventional local broadcast stations - are called point-to-point communication satellites.

Television

In discussing the various broadcasting possibilities, television is discussed first because it is what most people think about.

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A direct broadcast satellite will have to radiate a great deal of power so that the signals it retransmits to home receivers will be strong enough to be picked up by simple antennas or at least no more than listeners are now generally accustomed to use with their home TV receivers.

There have been a great range of estimates of the kind of power such a service requires. Basically there are two reasons for the wide variation. The acceptability of a television picture containing various levels of noise or interference or distortion is a highly subjective quantity. The quality of picture required of a particular service, in addition to being a subjective consideration, is truly a variable. It is common practice, however, to characterize quality of reception in terms of classes or grades of service: Grade 1 - excellent; Grade 2 - fine; Grade 3 - passable, and so on. Since there are wide differences in signal to noise required among the various grades, the amount of power which would be needed for providing a direct broadcast service is dependent on the picture quality desired by the consumer.

The second reason for the wide range of estimates of power and satellite size required for television broadcasting related to the degree to which one departs from the conventional receiver and increases the costs of the receiver installation. The degree of technical difficulty of the space segment is largely dependent on the character and sophistication of ground equipment used for receiving transmissions from a broadcast satellite. In view of the recent tremendous technological progress in receiver components, it became desirable that these advances be considered in any deliberations on space telecasting. NASA has contracted for a comparative analysis of the cost of various combinations of ground receiving equipment. The results of this effort should be available in February or March, 1966 and should provide an input to the kind of information needed to permit optimum spacecraft size-to-ground receiver tradeoffs to be made for each particular application and grades of service.

Direct satellite television broadcasting to conventional TV receivers equipped with indoor antennas is beyond the state of the art. Such satellite systems would require very large space power sources considerably beyond the 35-kilowatt capabilities of even the nuclear reactor-turboalternator of the SNAP-8 class, the largest for which the technology is under development. It is unlikely that such a system will be available--under current program levels until the late seventies.

An earlier capability might be possible if conventional home TV receivers are assumed to have directive antennas augmented by preamplifiers. In such an approach, the on-board satellite power requirement can be reduced to about 20 kilowatts, with an area coverage of about 1 million

square miles. No such power sources now exist, but there is work under way on nuclear and even solar power systems in these ranges. This approach would also require the development of large space erectable antennas that could be accurately pointed at the selected receiving area. Some preliminary consideration is being given by both DOD and NASA to antennas of this type. If the necessary power source and antenna development programs are vigorously pursued, this type of direct TV broadcast capability might be possible by the early 1970's.

Probably the earliest capability for effective space TV broadcasting would be based upon the distribution satellite approach. For example, if one would permit the design of a new receiver, making use of frequency modulation techniques instead of amplitude modulation techniques, and permit the use of a special outdoor antenna connected to the receiver - then the following could be done.

- Reduce the size and weight of the spacecraft thereby permitting the use of proven lower cost launch vehicle combinations.
- Reduce the complexity of the spacecraft thereby making possible the use of technology which has either been flight proven or which is already in an advanced state of development.
- Substantially reduce the amount of space power required, and provide higher quality reception.
- Reduce the development time required for establishing an operational capability by as much as a factor of 2.

The technology for such a joint space-ground system is within reach within this decade. For example, one spacecraft design concept would be basically an outgrowth of NASA's current Application Technology Satellites (ATS) which utilizes an expanded cylindrical solar cell array to increase available solar power with minimal weight increase. In May, 1965, Hughes Aircraft submitted a proposal to NASA for such a distribution satellite concept.

The spacecraft weighs the same as current ATS spacecraft - 1550 pounds, and would utilize the same launch vehicle and kick motor to place it into a geostationary orbit, although the required solar cell area required poses a fair structural problem. The required rf power would be obtained by driving each of the sixteen elements of the antenna with a separate traveling wave tube amplifier.

In this approach, all of the major spacecraft subsystems are either identical with or derived from ATS, and no major technological breakthroughs or long-term developments are required for its accomplishment.

With 10 kilowatts of effective radiated power from such a satellite, use of frequency modulation on the down link, and a low noise preamplifier, it is possible to use a 6 foot receiving antenna attached to the receiver.

Another spacecraft design concept which would use the same size ground receiver would utilize a large pointable antenna. This approach minimizes the electronic complexity of the spacecraft considerably, but would entail the development of large aperture antenna techniques for space. The same amount of effective radiated power could be achieved, but using a single 10 watt transmitter amplifier tube instead of the sixteen traveling wave tube amplifiers needed in the first design concept. The tradeoffs in terms of cost and reliability of these plus other approaches must be studied in detail before choices can be made as to which type of spacecraft is optimum.

Radio

In the related field of direct radio broadcast, NASA has been examining the technical aspects of such satellites. Industry was requested by NASA on December 1, 1965 to submit proposals for a study of the feasibility of satellites capable of broadcasting directly to conventional home FM radios and/or shortwave radios.

At the outset, NASA was only giving consideration to a FM broadcast satellite because of the difficulty and vagaries of transmitting through the ionosphere in the HF shortwave band. In March, 1965, USIA asked NASA to consider transmission to shortwave radios. Also, discussion at the March-April, 1965 International Radio Consultative Committee (CCIR) meeting, in Monoco, left the question of frequency sharing in the FM radio broadcast bands unresolved, making it more desirable to consider the shortwave bands. NASA has requested industry to study only the technology requirements and cost factors involved in the conceptual design of an unmanned satellite which would be capable of transmitting aural program material directly to FM radios or shortwave receivers. Although many facets of direct broadcast satellites have already been considered by industry, and to a limited extent by government, a detailed, comprehensive evaluation of the technology requirements have not been accomplished nor have feasibility studies of the various technical approaches been compared and analyzed. It is primarily towards this end that NASA is directing its efforts. The results of the study should be available

about August or September of 1966 and will assist NASA in determining the need for additional technology developments, and in assessing the degree to which broadcast satellites are determined to be state of the art.

Feasibility, Costs and Timing

Since the Task Force guidelines called for consideration of an operational capability in being within 18 to 24 months, it is concluded that direct transmissions from space is not technically feasible for any of the radio and televison satellite approaches previously discussed. This applies specifically to a capability for providing a single channel using a radio frequency which might be cleared for space broadcast purposes. At the Task Force's request, NASA has prepared a chart summarizing its gross estimates of feasibility, costs and timing for various broadcast satellite concepts. The Space Agency cautioned the Task Force to treat these as gross estimates inasmuch as the detailed feasibility studies have not yet been conducted.

Some elaboration on NASA's summary chart attached is required. By feasibility time period is meant, the period of time during which a first demonstration might be accomplished. Using the distribution TV satellite as an example, NASA estimates that it would require a minimum of 3 years* to develop, build flightworthy spacecraft, and demonstrate its feasibility in space. The space costs are gross estimates which include research, development of spacecraft and launch costs for two experimental satellites. Cost estimates for the specialized receivers which could be used with the distribution TV satellite are based on unit costs for large production quantities, and they do not include research and development costs. Thus the cost of developmental receivers and an Earth station which would be needed to carry out initial experiments must be added to the total cost of development. Smaller quantities (100 or less) of receivers might cost anywhere from 2 to 5 times more per unit than shown on the chart. It should be noted that NASA is still in the process of making comparative cost analysis for various kinds of ground receiving equipments in the TV broadcast satellite area and these figures need to be refined as a result of these studies.

In the direct TV broadcast satellite area, the six year spread indicated for the feasibility time period is based largely on two factors: First, the acceptability of a TV picture is a highly subjective quantity, and, in addition, is truly a variable. Secondly, the degree of difficulty of the space segment is largely dependent on the quality of the TV receiver, and whether or not the addition of a fringe area receiving antenna, and possibly a preamplifier stage is permitted. It is noted that for a given frequency and the same grade of service, the satellite

* Assuming an orderly and properly phase procurement.

transmitter power required for direct transmission to a conventional TV receiver equipped with a simple dipole antenna is about 15 times greater than is needed to serve a similar set equipped with a fringe area antenna and a good preamplifier. When powers of the order of kilowatts are involved, a factor of 15 is highly significantly from a space technology viewpoint. Not only does this impact the technical feasibility, but it also has an important bearing on when direct broadcast satellites could become a reality, and how much the space segment will cost.

While it has been concluded that direct transmission from broadcast satellites is not technically feasible within the next 18 to 24 months, many of the technical problems associated with the various kinds or approaches to broadcasting via satellites are being attacked in various parts of the space program. In point-to-point communications satellites, in a period of less than 5 years, the required space technology for operational point-to-point communications satellites was developed. This is clearly evidenced by the Communications Satellite Corporation's Early Bird satellite. Substantial advances have been made in large boosters and in space power sources. NASA's Pegasus satellite clearly demonstrated the technical feasibility of deploying large panels for micrometeorite detection. Similar techniques might be used for deploying the large solar cell arrays required for direct broadcast satellites. While a good deal of technology remains to be demonstrated in space, NASA is optimistic concerning the rate of technological development in most of the required areas and is continually reviewing the need for supplementary efforts to insure the timely availability of the required capability.

Leonard Jaffe

BROADCAST SATELLITE POSSIBILITIES

GROSS ESTIMATES OF FEASIBILITY, COSTS & TIMING

	Feasibility Time Period	Space Costs (Millions-$)	Ground Receiver Costs
DISTRIBUTION TV	1969 - 70	40-50	$3000 - 5000
DIRECT VOICE	1970 - 71	100-150	50 - 100
DIRECT TV	1971 - 77	150-250	125 - 250

NOTE 1: Ground transmitter cost would be in the order of $1,000,000.

NOTE 2: Ground receiving equipment costs assumes large production quantities.

NOTE 3: The costs are those for execution of the flight program to demonstrate the satellites per se and assumes that certain supporting research will be undertaken prior to initiation of the flight program.

OFFICE OF THE DIRECTOR OF TELECOMMUNICATIONS MANAGEMENT
FREQUENCY MANAGEMENT DIRECTORATE

December 1, 1965

2

Notes on International and National Radio Regulations Affecting Broadcasting from Satellites

Radio operations in the United States are regulated by the Federal Communications Commission when conducted by private enterprise and by the Director of Telecommunications Management when conducted by a Government agency. The regulations applied by the FCC and the ODTM conform to the international Radio Regulations. The current Regulations are those of Geneva, 1959, as amended by the Space Radio Conference, Geneva, 1963, which have the force of law in the United States.

Frequency bands are allocated to specific radio services such as amateur, broadcasting, fixed, mobile and space services. There are existing allocations to several space services, including the communication-satellite service, and to the broadcasting (terrestrial as distinct from space broadcasting). However, there are no allocations, national or international, for broadcasting from satellites directly to the public. Radio operations for which there is no allocation may be conducted on condition of causing no harmful interference to operations of other countries which conform to the international Regulations.

The transmission of broadcast programs from an earth station in the space service to another earth station, via communication satellites, for distribution over terrestrial broadcasting systems is in the communication-satellite service and is not considered to be broadcasting per se. Existing allocations provide for such transmission.

Similarly, the transmission of broadcast programs from an earth station to a number of earth stations, via communication satellites, for local distribution could be considered to be in the communication-satellite service and provided for in existing allocations.

The transmission of broadcast programs from an earth station to a satellite for retransmission directly to the public involves the communication-satellite service on the up path and the broadcasting service on the down path. The first of these is provided for in the allocations, the second is not. However, such an operation would result in the loss or nonuse of a satellite to Earth frequency band which is paired with an Earth to satellite frequency band, and would be inefficient use of the radio spectrum.

Geneva 1959 RR 422 provides, "The establishment and use of broadcasting stations (sound broadcasting and television broadcasting stations) on board ships, aircraft or any other floating or airborne objects outside national territories is prohibited." Prohibition against broadcasting from satellites probably was not considered because such broadcasting was not then possible. At the time of the 1963 Space Conference, France and one or two other

countries wanted to amend RR422 to prohibit broadcasting from satellites but yielded in favor of making no provisions for such broadcasting.[1]

The 1963 Space Conference recognized broadcasting from satellites in two ways. RR 84AP defines the Broadcasting-Satellite Service as "A space service in which signals transmitted or re-transmitted by space stations, or transmitted by reflection from objects in orbit around the Earth, are intended for direct reception by the general public." No frequencies were allocated to this service. The Conference adopted Recommendation No. 5A which recommends, "that the C.C.I.R. expedite its studies and make early recommendations on Question 24/1 (IV), Geneva, 1963, in particular, regarding those parts of the question relating to the technical characteristics of the systems to be used, what bands would be technically suitable and whether and under what conditions those bands could be shared between the broadcasting-satellite and terrestrial services."

The 1963 Space Conference adopted a number of constraints (Revision of Article 7 of the Radio Regulations) with respect to the sharing of frequencies between the space and terrestrial services. RR's 4700 and 470P limit the power flux density which a communication-satellite may produce at the Earth's surface, in the frequency bands 3400-4200 and 7250-7750 Mc/s. It is generally agreed that a broadcasting satellite cannot comply with these Regulations and provide a good service to the general public using reasonable cost antennas and receivers.[2]

Satellite broadcasting directly to the general public in the frequency bands now allocated for terrestrial broadcasting would result in mutual harmful interference unless terrestrial broadcasting is moved to allow exclusive use of the frequencies for satellite broadcasting. Such clearance would disrupt existing broadcast systems and allotment plans in many countries, including those in the UHF TV band still lightly used in the United States.

Experiments and operations, including broadcasting satellites, may be conducted under RR115 subject to causing no harmful interference to the operations of another country operating in accord with the Regulations.

The CCIR is studying criteria for space and terrestrial sharing of frequencies, including the limitation on flux density at the surface of the Earth, in preparation for the Plenary to be held at Oslo in June 1966.

Revision of the Table of Frequency Allocations will have to await the convening of a World Administrative Conference. There is no information on when such a conference will be held but such a conference is unlikely before 1968 at the earliest.

The most important question considered by Working Group 4B was that of direct broadcasting from satellites. The following two proposals were considered:

1. The French proposal to amend paragraph 422 of the Radio Regulations to prohibit the establishment and use of sound broadcasting and television broadcasting stations on any space object.

2. The United States proposal that a) the Conference adopt a recommendation urging the CCIR to expedite its studies and recommendations regarding the technical feasibility of broadcasting from satellites, what bands would be technically suitable for such broadcasting, and whether and under what conditions those bands could be shared between broadcasting satellites and non-space services, and that b) pending the allocation of frequency bands for direct broadcasting from satellites, experimental programs for the development of a broadcasting-satellite service be carried on in technically suitable bands now allocated to the broadcasting service on condition that no interference be caused to established broadcasting services operating in such bands.

During the course of the Working Group's consideration of the foregoing, the USSR submitted a proposal to the Group which was essentially the same as that of the United States. The Group therefore combined these two papers and considered them as a single proposal.

A small ad hoc group was then designated to attempt to bridge the gap between the French proposal and the combined US/USSR proposal. This group was composed of representatives of France, US, UK, and USSR. France offered to withdraw its proposal provided the second portion of the US/USSR proposal was withdrawn. It was agreed by the conferees that administrations could conduct experimental broadcasting from space in conformity with the Radio Regulations (paragraph No. 115) without calling specific attention to this fact. Accordingly, it was agreed to delete this provision from the US/USSR proposal. This compromise was adopted unanimously and appears in the Final Acts of the Conference as Recommendation No. 5A.

OFFICE OF THE DIRECTOR OF TELECOMMUNICATIONS MANAGEMENT
FREQUENCY MANAGEMENT DIRECTORATE

CERTAIN INTERNATIONAL RADIO REGULATIONS AFFECTING SPACE RADIOCOMMUNICATION
(Extract from Final Acts of EARC for Space Radiocommunication, Geneva, 1963)

ANNEX 4

Revision of Article 7 of the Radio Regulations

Article 7 of the Radio Regulations shall be amended as follows:

After Section VI, there shall be inserted the following new Sections VII, VIII and IX:

ADD

Section VII. Terrestrial Services sharing Frequency Bands with Space Services between 1 Gc/s and 10 Gc/s

Choice of Sites and Frequencies

ADD **470A** § 18. Sites and frequencies for terrestrial stations, operating in frequency bands shared with equal rights between terrestrial and space services, shall be selected having regard to the relevant recommendations of the C.C.I.R. with respect to geographical separation from earth stations.

Power Limits

ADD **470B** § 19. (1) The maximum effective radiated power of the transmitter and associated antenna, of a station in the fixed or mobile service, shall not exceed + 55 dbW.

ADD **470C** (2) The power delivered by a transmitter to the antenna of a station in the fixed or mobile service shall not exceed + 13 dbW.

ADD **470D** (3) The limits given in 470B and 470C apply in the following frequency bands allocated to reception by space stations in the communication-satellite service, where these are shared with equal rights with the fixed or mobile service:

5800-5850 Mc/s (for the countries mentioned in 390)
5850-5925 Mc/s (Regions 1 and 3)
5925-6425 Mc/s
7900-8100 Mc/s

ADD

Section VIII. Space Services sharing Frequency Bands with Terrestrial Services between 1 Gc/s and 10 Gc/s

Choice of Sites and Frequencies

ADD

470E § 20. Sites and frequencies for earth stations, operating in frequency bands shared with equal rights between terrestrial and space services, shall be selected having regard to the relevant recommendations of the C.C.I.R. with respect to geographical separation from terrestrial stations.

Power Limits

ADD

470F § 21. (1) Earth Stations in the Communication-Satellite Service

ADD

470G (2) The mean effective radiated power transmitted by an earth station in any direction in the horizontal plane [1] shall not exceed + 55 dbW in any 4 kc/s band, except that it may be increased subject to the provisions of 470H or 470I. However, in no case shall it exceed a value of + 65 dbW in any 4 kc/s band.

ADD

470H (3) In any direction where the distance from an earth station to the boundary of the territory of another administration exceeds 400 km, the limit of + 55 dbW in any 4 kc/s band may be increased in that direction by 2 db for each 100 km in excess of 400 km.

ADD

470I (4) The limit of + 55 dbW in any 4 kc/s band may be exceeded by agreement between the administrations concerned or affected.

ADD

470J (5) The limits given in 470G apply in the following frequency bands allocated to transmission by earth stations in the communica-

---

[1] For the purpose of this Regulation, the effective radiated power transmitted in the horizontal plane shall be taken to mean the effective radiated power actually transmitted towards the horizon, reduced by the site-shielding factor that may be applicable. The value of this site-shielding factor shall be determined as indicated in Section 5 of the Annex to Recommendation No. 1A.

tion-satellite service, where these are shared with equal rights with the fixed or mobile service:

4400-4700 Mc/s
5800-5850 Mc/s (for the countries mentioned in 390)
5850-5925 Mc/s (Regions 1 and 3)
5925-6425 Mc/s
7900-8400 Mc/s

Minimum Angle of Elevation

ADD **470K** § 22. (1) Earth Stations in the Communication-Satellite Service

ADD **470L** (2) Earth station antennas shall not be employed for transmission at elevation angles less than 3 degrees, measured from the horizontal plane to the central axis of the main lobe, except when agreed to by the administrations concerned or affected.

ADD **470M** (3) The limit given in 470L applies in the following frequency bands allocated to transmission by earth stations in the communication-satellite service, where these are shared with equal rights with the fixed or mobile service:

4400-4700 Mc/s
5800-5850 Mc/s (for the countries mentioned in 390)
5850-5925 Mc/s (Regions 1 and 3)
5925-6425 Mc/s
7250-7750 Mc/s
7900-8400 Mc/s

Power Flux Density Limits

ADD **470N** § 23. (1) Communication-Satellite Space Stations

ADD **470O** *a)* The total power flux density at the earth's surface, produced by an emission from a communication-satellite space station, or reflected from a passive communica-

tion satellite, where wide-deviation frequency (or phase) modulation is used, shall in no case exceed −130 dbW/m² for all angles of arrival. In addition, such signals shall if necessary be continuously modulated by a suitable waveform, so that the power flux density shall in no case exceed −149 dbW/m² in any 4 kc/s band for all angles of arrival.

ADD **470P** *b)* The power flux density at the earth's surface, produced by an emission from a communication-satellite space station, or reflected from a passive communication satellite, where modulation other than wide-deviation frequency (or phase) modulation is used, shall in no case exceed −152 dbW/m² in any 4 kc/s band for all angles of arrival.

ADD **470Q** *c)* The limits given in **470O** and **470P** apply in the following frequency bands allocated to transmission by space stations in the communication-satellite service, where these are shared with equal rights with the fixed or mobile services:

3400-4200 Mc/s
7250-7750 Mc/s

ADD **470R** (2) Meteorological-Satellite Space Stations [1]

ADD **470S** *a)* The power flux density at the earth's surface, produced by an emission from a meteorological-satellite space station, where wide-deviation frequency (or phase) modulation is used, shall in no case exceed −130 dbW/m² for all angles of arrival. In addition, such signals shall if necessary be continuously modulated by a suitable waveform, so that the power flux density shall in no case exceed −149 dbW/ m² in any 4 kc/s band for all angles of arrival.

[1] In view of the absence of any C.C.I.R. Recommendations relative to sharing between the meteorological-satellite service and other services, power flux density levels applicable to communication-satellite space stations are extended to meteorological-satellite space stations.

ADD 470T *b)* The power flux density at the earth's surface, produced by an emission from a meteorological-satellite space station, where modulation other than wide-deviation frequency (or phase) modulation is used, shall in no case exceed -152 dbW/m^2 in any 4 kc/s band for all angles of arrival.

ADD 470U *c)* The limits given in 470S and 470T apply in the following frequency bands allocated to transmissions by space stations in the meteorological-satellite service, shared with equal rights with the fixed or mobile service :

1660-1670 Mc/s
1690-1700 Mc/s
7200-7250 Mc/s
7300-7750 Mc/s

The limits given in 470S and 470T also apply in the band 1770-1790 Mc/s although the meteorological-satellite service is a secondary service in this band.

ADD

Section IX. Space Services

Cessation of Emissions

ADD 470V § 24. Space stations shall be made capable of ceasing radio emissions by the use of appropriate devices [1] that will ensure definite cessation of emissions.

[1] Battery life, timing devices, ground command, etc.

APPENDIX E

Communications Satellite Earth Station
Planning for Communications via INTELSAT

Prepared by ComSat Corporation

December 1965

PREFACE

The enclosed data is in response to the Question [redacted]

"Communications satellite earth station location and capacity availability, current, committed, planned, projected (based on current demand projections) and extensions which are feasible and desirable via Intelsat."

Note: This data is premised upon the assumption that all stations will be equivalent to a station possessing an 85-foot diameter antenna with 50 per cent aperture efficiency and $50^{o}K$ noise temperature ratings in order to permit television as well as voice, data, and record operations.

COMMUNICATIONS SATELLITE EARTH STATION DATA

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TAB 1

TAB 1

MAJOR TRAFFIC SYSTEMS
AVAILABLE TO SATELLITES IN 1970 AND 1975

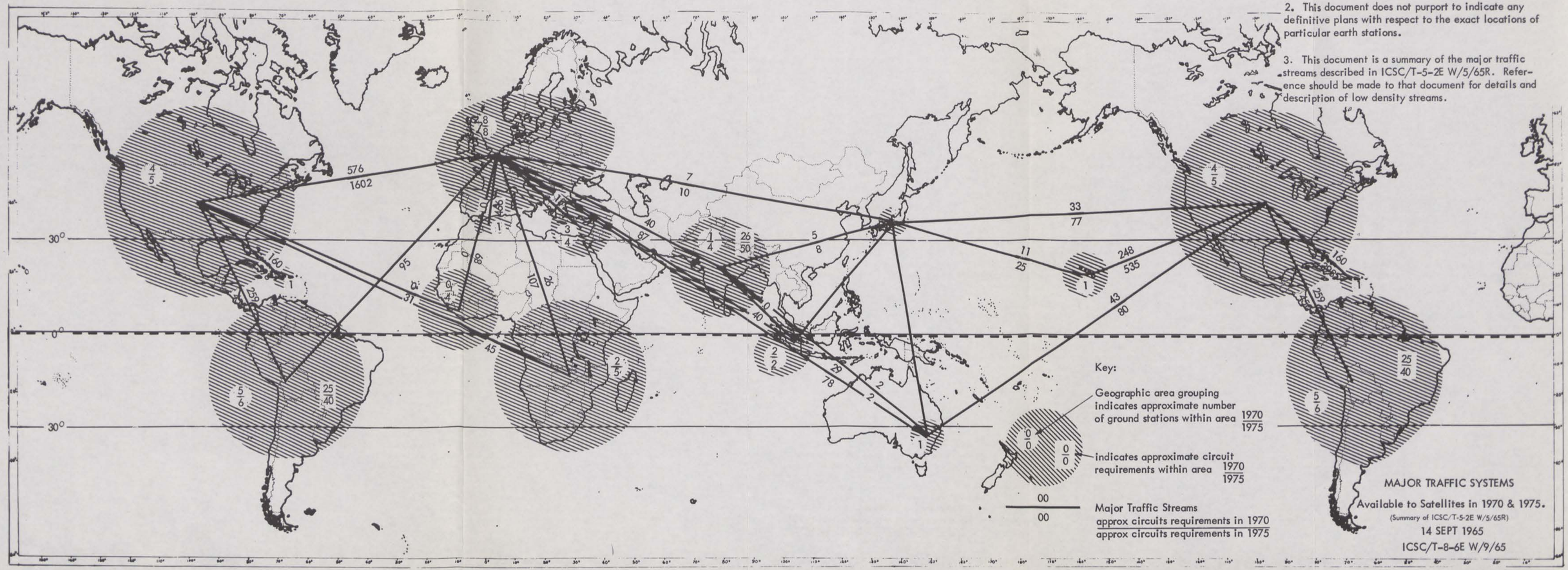
Tab 1 presents pictorially, data used by the International Telecommunications Satellite Consortium for broad planning purposes and it depicts major traffic streams available to satellites in 1970 and 1975 in summary form.

ICSC-13-10E W/10/65

1. This document is for broad planning purposes only; it is intended that it primarily be used for the selection of the Global System satellite design.

2. This document does not purport to indicate any definitive plans with respect to the exact locations of particular earth stations.

3. This document is a summary of the major traffic streams described in ICSC/T-5-2E W/5/65R. Reference should be made to that document for details and description of low density streams.



TAB 2

TAB 2

GLOBAL TRAFFIC AND SYSTEM PLANNING

This data provides a basis for initial planning of a global satellite communications system. It includes the ICSC traffic model and a ground station implementation plan.

TAB 2

GLOBAL TRAFFIC AND SYSTEM PLANNING

A. Introduction

B. Ground Station Implementation Schedule

C. Traffic Available for Satellite Service

D. ICSC Traffic Model

E. Anticipated Cable Capacity

F. Map: Representative Traffic Streams

A

INTRODUCTION

This contribution provides a basis for the initial planning of the global satellite communication system. The I.C.S.C. Traffic Model, reflecting the latest thinking of the "Advisory Subcommittee on Technical Matters", is an extrapolation of the previously agreed upon matrices for 1970 and 1975 (ICSC/1-4-13E W/4/65). The ground station implementation plan is by no means firm but is offered as a basis for discussion within the subcommittee.

Traffic Available for Satellite Service was calculated by subtracting Anticipated Cable Capacity from the requirements of the ICSC Traffic Model. It is hoped that the delegates will better assign existing capacity so that the allocation of available traffic will be more realistic.

No attention has been given to traffic routing other than local distribution from the terminals. Each alternative satellite configuration will suggest several possible routing plans. It was therefore deemed desirable to omit any consideration of routing so that this document will provide a universal basis for the subcommittee's planning efforts.

B

GROUND STATION IMPLEMENTATION SCHEDULE

NORTH AMERICA Country - City	1968	1969	1970	1971	1972	1973	1974	1975
United States - Northeast	x	x	x	x	x	x	x	x
- Southeast	x	x	x	x	x	x	x	x
- Northwest	x	x	x	x	x	x	x	x
- Hawaii	x	x	x	x	x	x	x	x
- Puerto Rico (San Juan)	x	x	x	x	x	x	x	x
Canada - Halifax	x	x	x	x	x	x	x	x
Mexico - Mexico City					x	x	x	x
EUROPE **Country - City**								
France - Pleumeur Bodou	x	x	x	x	x	x	x	x
England - Goonhilly Downs	x	x	x	x	x	x	x	x
Germany - Raisting	x	x	x	x	x	x	x	x
Italy - Fucino	x	x	x	x	x	x	x	x
Spain - Madrid			x	x	x	x	x	x
Sweden - Goteburg			x	x	x	x	x	x
SOUTH AMERICA **Country - City**								
Brazil - Rio DeJaniero	x	x	x	x	x	x	x	x
Argentina - Buenos Aires	x	x	x	x	x	x	x	x
Peru - Lima	x	x	x	x	x	x	x	x
Colombia - Bogota	x	x	x	x	x	x	x	x
Venezuela - Caracas	x	x	x	x	x	x	x	x

GROUND STATION IMPLEMENTATION SCHEDULE (Continued)

SOUTH AMERICA Country - City	1968	1969	1970	1971	1972	1973	1974	1975
Chile - Santiago					x	x	x	x
AFRICA								
Country - City								
Congo - Leopoldville		x	x	x	x	x	x	x
South Africa - Cape Town			x	x	x	x	x	x
Algeria - Algiers				x	x	x	x	x
Nigeria - Lagos					x	x	x	x
Kenya - Nairobi					x	x	x	x
Liberia - Monrovia						x	x	x
Ghana - Accra (Akra)						x	x	x
Ethiopia - Addis Ababa						x	x	x
Mozambique - Lourenco Marques							x	x
Senegal - Dakar					x	x	x	x
MIDDLE EAST								
Country - City								
Turkey - Ankara			x	x	x	x	x	x
Egypt - Cairo			x	x	x	x	x	x
ASIA								
Country - City								
Malaya - Singapore							x	x
Indonesia - Djakarta							x	x
Burma - Rangoon							x	x
India - New Delhi		x	x	x	x	x	x	x
Japan - Tokyo	x	x	x	x	x	x	x	x
E. Pakistan - Dacca				x	x	x	x	x
W. Pakistan - Karachi				x	x	x	x	x

GROUND STATION IMPLEMENTATION SCHEDULE (Continued)

AUSTRALIA

Country - City	1968	1969	1970	1971	1972	1973	1974	1975
Australia - Sydney	x	x	x	x	x	x	x	x
	17	19	24	27	32	35	39	39

TRAFFIC AVAILABLE FOR SATELLITE SERVICE

NORTH - SOUTH AMERICA	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
United States - Brazil				35	37	39	45	51	57	63	70
United States - Argentina				41	46	51	57	63	69	74	80
United States - Peru				26	33	41	47	54	61	68	74
United States - Colombia				26	34	42	50	58	65	73	80
United States - Chile				(20)	(23)	(26)	(29)	31	34	37	40
United States - Venezuela				36	34	43	50	58	66	74	81
C. America - Peru				(4)	(5)	(6)	(7)	8	8	9	9
C. America - Argentina-Chile				(5)	(5)	(6)	(6)	7	7	8	8
C. America - Brazil				(5)	(5)	(5)	(6)	6	7	7	8
Peru - Argentina-Chile				0	0	1	1	2	3	4	5
Peru - Brazil				0	0	0	0	0	0	1	1
Peru - N. So. America				0	1	1	1	2	2	3	3
N. So. America - Argentina-Chile				0	1	1	1	1	1	1	1
N. So. America - Brazil				0	1	1	1	1	1	1	1
Argentina-Chile - Brazil				13	17	21	22	24	26	28	29
West Indies - Argentina-Chile				0	1	1	1	1	1	1	1
West Indies - Brazil				0	0	0	0	0	0	1	1
West Indies - C. America				11	13	15	16	17	18	20	22
United States - C. America				(22)	(34)	(47)	(60)	73	86	100	113
United States - Puerto Rico (West Indies)				61	105	145	189	234	282	329	376

TRAFFIC AVAILABLE FOR SATELLITE SERVICE

ATLANTIC OCEAN	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Canada - England				12	22	33	45	58	74	88	102
Canada - France				2	4	5	7	8	10	12	14
Canada - Germany				4	8	10	14	21	27	31	37
Canada - Italy				1	3	3	4	5	7	8	10
Canada - Spain				(1)	(1)	1	1	1	2	2	3
Canada - Sweden				(1)	(2)	3	4	5	6	8	9
TOTAL Canada - Europe				21	40	55	75	98	126	149	175
United States - England				107	149	186	235	290	348	409	475
United States - France				51	72	84	105	131	154	181	208
United States - Germany				80	113	141	188	242	307	386	477
United States - Italy(Includes Israel)				33	44	50	61	74	87	100	114
United States - Spain				(12)	(17)	26	37	42	50	58	65
United States - Sweden				(19)	(26)	34	43	54	65	77	88
TOTAL United States - Europe	120	180	240	302	421	521	669	833	1011	1211	1427
United States - Dakar, Senegal				(6)	(6)	(7)	(7)	7	8	8	8
United States - Lagos, Nigeria				(5)	(6)	(7)	(7)	7	7	7	7
United States - Monrovia, Liberia				(5)	(6)	(7)	(7)	(7)	7	8	8
United States - Akra, Ghana				(5)	(7)	(7)	(7)	(8)	8	8	8
United States - S. Africa				(4)	(4)	4	6	7	8	9	10
United States - Kenya				(5)	(6)	(6)	(6)	7	7	7	8
United States - Mozambique				(5)	(5)	(6)	(6)	(6)	(7)	7	7
United States - N.E. Africa(Ethiopa)				(7)	(8)	(9)	(9)	(10)	11	12	13
United States - Maghreb				(4)	(4)	(4)	(5)	6	6	7	7
Europe - Argentina				19	21	23	25	31	39	43	46
Europe - Brazil				12	14	16	18	20	22	24	26

TRAFFIC AVAILABLE FOR SATELLITE SERVICE

EUROPE - AFRICA	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Europe - Dakar, Senegal				(12)	(14)	(15)	(16)	17	19	21	22
Europe - Lagos, Nigeria				(12)	(14)	(15)	(16)	18	19	21	22
Europe - Monrovia, Liberia				(12)	(14)	(15)	(16)	(18)	19	21	22
Europe - Akra, Ghana				(12)	(13)	(14)	(17)	(18)	20	20	23
Europe - S. Africa				(16)	(18)	26	33	37	48	52	57
Europe - Kenya				(7)	(8)	(9)	(10)	12	13	14	15
Europe - Mozambique				(7)	(8)	(9)	(10)	(12)	(13)	14	15
Europe - N.E. Africa(Ethiopa)				(13)	(14)	(15)	(16)	(17)	18	19	20
Europe - Maghreb				(0)	(0)	(9)	(80)	169	262	366	466
EUROPE - MIDDLE EAST & ASIA											
Europe - Egypt				(14)	(14)	15	15	16	18	19	20
Europe - Burma				(2)	(2)	(4)	(4)	(6)	(8)	10	12
Europe - Pakistan-W.				(13)	(15)	(18)	20	23	27	30	32
ASIA											
Europe - Australia				6	14	29	37	48	58	68	78
Europe - India				(35)	37	40	25	28	34	39	43
Europe - Japan				17	23	31	32	34	40	42	42
India - Japan				(4)	4	5	5	6	6	7	8
India - Australia				(2)	2	2	2	2	2	2	2
E. Pakistan - W. Pakistan				-	-	-	TV + Voice				
Malaya - India				(12)	(14)	(14)	(18)	(22)	(28)	33	36
Burma - India				(3)	(3)	(4)	(4)	(5)	(7)	8	10
Indonesia - India				-	-	-	-	-	-	4	4

TRAFFIC AVAILABLE FOR SATELLITE SERVICE

PACIFIC OCEAN	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
United States - Japan			(16)	(64)	26	37	49	60	112	84	97	109
United States - Hawaii					97	175	248	320	346	397	470	535
United States - Australia					30	37	43	50	57	65	73	80

Note: Numbers in parenthesis ( ) indicate traffic prior to Ground-Station implementation.

I.C.S.C. TRAFFIC MODEL

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1. British Isles														
2. France														
3. Spain-Portugal														
4. Belg-Holl-Lux.														
5. Germany														
6. Austria-Switz.														
7. Italy														
8. Balkans														
9. Bulg-Hung-Roumania														
10. Poland-Czech.														
11. Scandinavia														
12. Russia-Europe														
13. Russia-Asia														
14. Turk-Jord-Syr-Israel	8	12	15	19	22	26	30	33	37	40	44			
15. Africa-N.E.	4	6	6	9	10	11	12	13	14	15	16			
16. Maghreb-Alg-Mor-Tun.	2	3	4	5	6	7	8	9	10	11	11			
17. Africa, West	4	6	8	11	14	16	18	20	22	24	26			
18. Africa, Central	4	6	8	11	14	17	19	21	23	25	27			
19. Africa, East	6	8	11	13	16	18	21	24	27	30	32			
20. Africa, South	8	9	11	14	16	18	22	25	28	31	35			
21. Iran-Arabia	2	3	4	6	7	8	8	9	10	11	12			
22. Indian Peninsula	18	19	21	23	26	29	33	38	42	48	53			
23. South Asia	3	4	5	7	8	9	10	11	12	13	13			
24. China	1	3	5	7	9	11	12	13	14	14	15			
25. Japan	1	2	4	6	8	9	10	11	12	13	13			
26. Australia-Indon.	15	20	25	30	37	45	53	62	70	79	88			
27. Canada	36	42	50	60	66	78	89	101	115	130	146			
28. United States	160	187	216	247	282	321	364	410	460	515	571			
29. Central America	1	1	2	2	3	3	3	3	3	3	3			
30. West Indies	1	2	3	4	6	7	8	9	10	10	11			
31. Northern So. America	1	1	2	2	3	4	4	4	4	4	4			
32. Boliva-Ecuador-Peru	1	1	1	1	2	2	2	2	3	3	3			
33. Argent-Chile-Uruguay	2	3	4	5	6	7	8	9	9	10	11			
34. Brazil	1	2	3	4	4	5	5	5	6	6	6			
TOTALS														

BRITISH ISLES - ZONE 1

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria-Switz.														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	7		8	8	9	10	11	12	13	15	17	19		
15.	Africa-N.E.	1		1	1	1	1	1	1	1	2	2	2		
16.	Maghreb-Alg-Mor-Tun.	286		304	328	355	389	429	479	538	605	678	754		
17.	Africa, West	17		18	19	20	22	23	26	29	33	36	39		
18.	Africa, Central	6		6	7	7	8	8	9	10	11	12	13		
19.	Africa, East	3		3	3	4	4	4	5	5	6	6	7		
20.	Africa, South							P	P	P	1	1	1		
21.	Iran-Arabia	1		1	1	1	1	1	1	1	2	2	2		
22.	Indian Peninsula	1		1	1	1	1	1	1	1	2	2	2		
23.	South Asia	1		1	1	1	1	1	1	1	2	2	2		
24.	China							P	P	P	P	P	P		
25.	Japan	1		1	2	2	3	3	3	3	4	4	4		
26.	Australia-Indon.							1	1	1	2	2	2		
27.	Canada	3		4	5	6	8	9	10	11	13	14	15		
28.	United States	71		78	87	98	112	126	142	160	177	196	215		
29.	Central America	1		1	1	2	2	2	2	2	3	3	3		
30.	West Indies	3		3	3	4	4	4	5	5	6	6	6		
31.	Northern So. America	1		1	1	1	1	1	1	1	1	1	1		
32.	Boliva-Ecuador-Peru	P		P	P	P	P	P	P	P	P	P	P		
33.	Argent-Chile-Uruguay	2		2	2	2	2	2	2	2	3	3	3		
34.	Brazil	1		1	1	1	1	1	1	1	2	2	2		
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria-Switz.														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.				19	25	31	38	46	55	65	75	86	98	110
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South														
21.	Iran-Arabia														
22.	Indian Peninsula				1	1	1	1	1	1	1	1	1	1	1
23.	South Asia														
24.	China														
25.	Japan				P	P	P	P	P	P	P	P	P	P	P
26.	Australia-Indon.				P	P	P	P	P	P	P	P	P	P	P
27.	Canada				P	P	P	P	P	P	P	P	P	1	1
28.	United States				19	23	27	31	36	41	47	53	59	64	69
29.	Central America				P	P	P	P	P	P	P	P	1	1	1
30.	West Indies				P	P	P	P	P	P	P	P	1	1	1
31.	Northern So. America				P	P	P	P	P	P	P	P	1	1	1
32.	Boliva-Ecuador-Peru				P	P	P	P	P	P	P	P	1	1	1
33.	Argent-Chile-Uruguay				P	P	P	P	P	P	P	P	1	1	1
34.	Brazil				P	P	P	P	P	P	P	P	1	1	1
	TOTALS														

IBERIAN PENINSULA - ZONE 3

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria-Switz.														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	1	1	2	2	3	3	3	4	4	5	5			
15.	Africa-N.E.						P	P	P	1	1	1			
16.	Maghreb-Alg-Mor-Tun.	2	2	2	3	3	3	4	4	5	5	5			
17.	Africa, West	1	1	1	1	1	1	1	1	1	1	1			
18.	Africa, Central	3	5	7	9	12	15	18	21	24	27	29			
19.	Africa, East	P	P	P	P	P	P	P	P	P	P	P			
20.	Africa, South	1	1	1	1	1	1	1	1	1	1	1			
21.	Iran-Arabia	P	P	P	P	P	P	P	P	1	1	1			
22.	Indian Peninsula	1	1	1	1	1	1	1	1	1	1	1			
23.	South Asia	P	P	P	P	P	P	P	P	P	P	P			
24.	China	P	P	P	P	P	P	P	P	P	P	P			
25.	Japan					1	2	2	2	3	3	3			
26.	Australia-Indon.					1	2	2	3	3	3	3			
27.	Canada	3	4	5	6	7	7	8	9	10	11	12			
28.	United States	19	30	40	52	62	74	84	96	107	118	129			
29.	Central America					1	1	1	1	1	1	1			
30.	West Indies	1	1	1	2	2	2	3	3	4	4	4			
31.	Northern So. America						1	1	1	2	2	2			
32.	Boliva-Ecuador-Peru						P	P	P	P	P	P			
33.	Argent-Chile-Uruguay						1	1	1	1	1	1			
34.	Brazil						P	P	P	P	P	P			
	TOTAL														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria-Switz.														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	7		8		9		10	11	12		14	16	18	20	22
15.	Africa-N.E	1		1		1		1	1	1		1	1	2	2	2
16.	Maghreb-Alg-Mor-Tun.	2		2		2		3	3	3		3	4	5	6	7
17.	Africa West	P		P		P		P	P	P		P	P	P	P	P
18.	Africa, Central	1		1		1		1	1	1		1	1	1	1	1
19.	Africa East	P		P		P		P	P	P		P	P	P	P	P
20.	Africa, South	1		1		1		1	1	1		1	1	2	2	2
21.	Iran-Arabia	1		1		1		2	2	2		2	2	2	2	2
22.	Indian Peninsula	2		2		2		3	3	3		4	5	6	7	8
23.	South Asia	P		P		P		P	P	P		P	P	1	1	1
24.	China	P		P		P		P	P	P		P	P	P	P	P
25.	Japan			1		2		3	4	5		5	5	6	6	6
26.	Australia-Indon.								1	2		2	3	3	4	5
27.	Canada	8		10		12		14	16	18		22	27	32	35	39
28.	United States	77		90		105		125	147	175		212	255	310	380	463
29.	Central America									1		1	1	1	1	1
30.	West Indies									1		1	1	1	1	1
31.	Northern So. America									P		P	P	1	1	1
32.	Boliva-Ecuador-Peru									P		P	P	P	P	P
33.	Argent-Chile-Uruguay	1		1		1		1	2	2		2	2	3	3	3
34.	Brazil											1	1	1	1	1
	TOTALS															

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria-Switz.														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	5	6	7	8	9	10	12	14	16	18	20			
15.	Africa-N.E.	1	1	2	2	3	3	3	3	3	3	3			
16.	Maghreb-Alg-Mor-Tun.	3	4	6	8	10	11	14	17	20	23	25			
17.	Africa, West	1	1	1	2	2	2	2	2	2	2	2			
18.	Africa, Central	1	1	1	2	2	2	2	2	3	3	3			
19.	Africa, East	P	P	P	P	P	P	P	P	P	P	P			
20.	Africa, South	p	p	p	p	p	p	p	1	1	2	2			
21.	Iran-Arabia	1	1	1	2	2	2	2	2	2	2	2			
22.	Indian Peninsula	2	2	2	2	2	2	2	2	2	2	2			
23.	South Asia	P	P	P	P	P	P	P	P	P	P	P			
24.	China	P	P	P	P	P	P	P	P	P	P	P			
25.	Japan	1	1	2	2	3	3	3	3	4	4	4			
26.	Australia-Indon.	1	1	1	1	1	1	1	1	2	2	2			
27.	Canada	3	3	4	4	5	5	6	7	8	9	10			
28.	United States	36	40	45	50	55	60	70	80	90	101	112			
29.	Central America	1	1	2	2	3	3	3	3	4	4	4			
30.	West Indies						P	P	P	P	P	P			
31.	Northern So. America	P	P	P	P	P	P	P	P	P	P	P			
32.	Boliva-Ecuador-Peru	P	P	P	P	P	P	P	P	P	P	P			
33.	Argent-Chile-Uruguay	2	2	2	3	3	3	3	3	4	4	4			
34.	Brazil	2	2	2	2	2	2	2	2	3	3	3			
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	3		4	6	7	10	12	14	17	19	22	24		
15.	Africa-N.E.	3		3	3	4	4	4	5	5	6	7	8		
16.	Maghreb-Alg-Mor-Tun.	15		15	16	17	18	22	28	33	43	52	62		
17.	Africa, West							P	P	P	P	P	P		
18.	Africa, Central														
19.	Africa, East							P	P	P	P	P	P		
20.	Africa, South							P	P	P	P	P	P		
21.	Iran-Arabia	P		P	P	P	P	P	P	P	1	1	1		
22.	Indian Peninsula	1		1	1	1	1	1	1	1	1	2	2		
23.	South Asia	P		P	P	P	P	P	P	P	P	P	P		
24.	China	P		P	P	P	P	P	P	P	P	P	P		
25.	Japan	1		1	2	2	3	3	3	3	3	3	3		
26.	Australia-Indon.						1	1	1	1	2	2	2		
27.	Canada	3		3	4	5	6	7	8	9	11	12	13		
28.	United States	38		43	48	54	60	66	73	80	87	94	102		
29.	Central America							1	1	2	2	3	3		
30.	West Indies							P	P	P	1	1	1		
31.	Northern So. America							P	P	1	1	2	2		
32.	Boliva-Ecuador-Peru							P	P	P	1	1	1		
33.	Argent-Chile-Uruguay	4		4	5	6	7	7	9	11	16	18	20		
34.	Brazil	2		2	3	3	4	4	5	6	7	8	9		
	TOTALS														

ITALY - ZONE 7

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	17		19		21		22		23	24	24	24	24	24	24
15.	Africa-N.E.	5		6		8		9		10	11	11	11	11	11	11
16.	Maghreb-Alg-Mor-Tun.	1		1		1		2		2	2	2	2	2	2	2
17.	Africa, West	P		P		P		P		P	P	P	P	1	1	1
18.	Africa, Central	P		P		P		P		P	P	P	P	1	1	1
19.	Africa, East	P		P		P		P		P	P	P	P	1	1	1
20.	Africa, South										1	1	1	1	2	2
21.	Iran-Arabia	P		P		P		P		P	P	P	P	1	1	1
22.	Indian Peninsula	P		P		P		P		P	P	P	P	1	1	1
23.	South Asia	P		P		P		P		P	P	P	P	1	1	1
24.	China										P	P	P	1	1	1
25.	Japan										P	P	P	1	1	1
26.	Australia-Indon.										1	1	1	1	1	1
27.	Canada	1		1		1		2		2	2	2	3	3	3	3
28.	United States	9		11		13		15		17	19	22	25	28	31	35
29.	Central America										P	P	P	1	1	1
30.	West Indies										P	P	P	1	1	1
31.	Northern So. America										P	P	P	1	1	1
32.	Boliva-Ecuador-Peru										P	P	P	1	1	1
33.	Argent-Chile-Uruguay										P	P	P	1	1	1
34.	Brazil										P	P	P	1	1	1
	TOTALS															

BALKANS - ZONE 8

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	3	3	4	5	6	6	7	8	9	10	11			
15.	Africa-N.E.	1	1	1	2	2	2	2	2	2	2	2			
16.	Maghreb-Alg-Mor-Tun.	1	1	1	2	2	2	2	3	3	3	3			
17.	Africa, West	P	P	P	P	P	P	P	1	1	1	1			
18.	Africa, Central	P	P	P	P	P	P	P	P	1	1	1			
19.	Africa, East	P	P	P	P	P	P	P	P	1	1	1			
20.	Africa, South	P	P	P	P	P	P	P	P	1	1	1			
21.	Iran-Arabia	P	P	P	P	P	P	P	P	1	1	1			
22.	Indian Peninsula	P	P	P	P	P	P	P	P	1	1	1			
23.	South Asia	P	P	P	P	P	P	P	P	1	1	1			
24.	China	P	P	P	P	P	P	P	P	1	1	1			
25.	Japan						P	P	P	P	P	P			
26.	Australia-Indon.						P	P	P	P	P	P			
27.	Canada						1	1	1	2	2	2			
28.	United States	4	5	6	7	8	9	9	10	10	11	12			
29.	Central America						P	P	P	1	1	1			
30.	West Indies						P	P	P	1	1	1			
31.	Northern So. America						P	P	P	1	1	1			
32.	Bolivia-Ecuador-Peru						P	P	P	1	1	1			
33.	Argent-Chile-Uruguay						P	P	P	1	1	1			
34.	Brazil						P	P	P	1	1	1			
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	1	1	1	1	1	1	1	1	1	1	2	2	2	
15.	Africa-N.E.	P	P	P	P	P	P	P	P	P	P	1	1	1	
16.	Maghreb-Alg-Mor-Tun.	1	1	1	1	1	1	1	1	1	1	2	2	2	
17.	Africa, West	P	P	P	P	P	P	P	P	P	P	1	1	1	
18.	Africa, Central	P	P	P	P	P	P	P	P	P	P	1	1	1	
19.	Africa, East	P	P	P	P	P	P	P	P	P	P	1	1	1	
20.	Africa, South	P	P	P	P	P	P	P	P	P	P	1	1	1	
21.	Iran-Arabia	P	P	P	P	P	P	P	P	P	P	1	1	1	
22.	Indian Peninsula	1	1	1	1	1	1	1	1	1	1	2	2	2	
23.	South Asia	P	P	P	P	P	P	P	P	P	P	1	1	1	
24.	China	P	P	P	P	P	P	P	P	P	P	1	1	1	
25.	Japan									P	P	P	P	P	P
26.	Australia-Indon.									P	P	P	P	P	P
27.	Canada									1	1	1	1	1	1
28.	United States	3	3	4	5	6	7	8	9	10	11	12			
29.	Central America									P	P	P	1	1	1
30.	West Indies									P	P	P	1	1	1
31.	Northern So. America									P	P	P	1	1	1
32.	Boliva-Ecuador-Peru									P	P	P	1	1	1
33.	Argent-Chile-Uruguay									P	P	P	1	1	1
34.	Brazil									P	P	P	1	1	1
	TOTALS														

POLAND-CZECH. - ZONE 10

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel	1	1	1	1	2	2	2	3	3	3	3			
15.	Africa-N.E.	1	1	1	1	1	1	1	1	1	1	1			
16.	Maghreb-Alg-Mor-Tun.	1	1	1	1	2	2	2	3	3	3	3			
17.	Africa, West	P	P	P	P	P	P	P	P	P	P	P			
18.	Africa, Central	P	P	P	P	P	P	P	P	1	1	1			
19.	Africa, East	P	P	P	P	P	P	P	P	P	P	P			
20.	Africa, South	P	P	P	P	P	P	P	P	1	1	1			
21.	Iran-Arabia	1	1	1	1	1	1	1	1	1	1	1			
22.	Indian Peninsula	P	P	P	P	P	P	P	1	1	2	2			
23.	South Asia	P	P	P	P	P	P	P	P	P	P	P			
24.	China	P	P	P	P	P	P	P	P	P	P	P			
25.	Japan	1	1	1	1	2	2	2	3	3	3	3			
26.	Australia-Indon.						1	1	1	1	1	1			
27.	Canada	3	4	5	6	7	7	8	10	11	12	13			
28.	United States	26	30	35	41	47	55	62	71	80	90	99			
29.	Central America						P	P	P	1	1	1			
30.	West Indies						P	P	P	P	P	P			
31.	Northern So. America						P	P	P	P	P	P			
32.	Boliva-Ecuador-Peru						P	P	P	P	P	P			
33.	Argent-Chile-Uruguay						P	P	P	1	1	1			
34.	Brazil	P	P	P	P	P	P	P	P	P	P	P			
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles														
2.	France														
3.	Spain-Portugal														
4.	Belg-Holl-Lux.														
5.	Germany														
6.	Austria														
7.	Italy														
8.	Balkans														
9.	Bulg-Hung-Roumania														
10.	Poland-Czech.														
11.	Scandinavia														
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.									P	P	P	P	P	P
16.	Maghreb-Alg-Mor-Tun.									P	P	P	P	P	P
17.	Africa, West									P	P	P	P	P	P
18.	Africa, Central									P	P	P	P	P	P
19.	Africa, East									P	P	P	P	P	P
20.	Africa, South									P	P	P	P	P	P
21.	Iran-Arabia									P	P	P	1	1	1
22.	Indian Peninsula	1		1	2	2	3	3	3	4	4	5	5		
23.	South Asia	1		1	1	1	1	1	1	2	2	3	3		
24.	China	5		6	7	8	9	11	13	14	15	16	18		
25.	Japan	2		2	3	3	4	4	4	5	5	6	6		
26.	Australia-Indon.	P		P	P	P	P	P	P	P	P	P	P	P	P
27.	Canada									P	P	P	P	P	P
28.	United States	7		10	14	17	21	24	30	36	42	48	53		
29.	Central America									P	P	P	P	P	P
30.	West Indies	P		P	P	P	P	P	P	P	P	P	P	P	P
31.	Northern So. America									P	P	P	P	P	P
32.	Bolivia-Ecuador-Peru									P	P	P	P	P	P
33.	Argent-Chile-Uruguay	P		P	P	P	P	P	P	P	P	P	P	P	P
34.	Brazil	P		P	P	P	P	P	P	P	P	P	P	P	P
	TOTALS														

RUSSIA - ZONES 12 AND 13

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				8	12	15	19	22	26	30	33	37	40	44
2.	France				7	8	8	9	10	11	12	13	15	17	19
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				1	1	2	2	3	3	3	4	4	5	5
5.	Germany				7	8	9	10	11	12	14	16	18	20	22
6.	Austria				5	6	7	8	9	10	12	14	16	18	20
7.	Italy				3	4	6	7	10	12	14	17	19	22	24
8.	Balkans				17	19	21	22	23	24	24	24	24	24	24
9.	Bulg-Hung-Roumania				3	3	4	5	6	6	7	8	9	10	11
10.	Poland-Czech.				1	1	1	1	1	1	1	1	2	2	2
11.	Scandinavia				1	1	1	1	2	2	2	3	3	3	3
12.	Russia-Europe														
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.				4	6	8	10	12	13	13	13	13	13	13
16.	Maghreb-Alg-Mor-Tun.				P	P	P	P	P	P	P	P	1	1	1
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East									P	P	P	1	1	1
20.	Africa, South									P	P	P	1	1	1
21.	Iran-Arabia				2	2	2	3	3	3	3	3	3	3	3
22.	Indian Peninsula				5	7	9	11	13	15	17	19	21	24	26
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan				1	1	1	1	1	1	1	1	1	1	1
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada									1	1	1	1	1	1
28.	United States				9	11	13	15	17	19	21	23	25	28	31
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				4	6	7	9	10	11	12	13	14	15	16
2.	France				1	1	1	1	1	1	1	1	2	2	2
3.	Spain-Portugal														
4.	Belg-Holl-Lux.									P	p	P	1	1	1
5.	Germany				1	1	1	1	1	1	1	1	2	2	2
6.	Austria				1	1	2	2	3	3	3	3	3	3	3
7.	Italy				3	3	3	4	4	4	5	5	6	7	8
8.	Balkans				5	6	8	9	10	11	11	11	11	11	11
9.	Bulg-Hung-Roumania				1	1	1	2	2	2	2	2	2	2	2
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				1	1	1	1	1	1	1	1	1	1	1
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				4	6	8	10	12	13	13	13	13	13	13
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.				1	1	1	2	2	3	3	3	3	3	3
17.	Africa, West				1	1	1	1	2	2	2	2	2	2	2
18.	Africa, Central									P	P	P	1	1	1
19.	Africa, East					1	2	3	4	5	5	5	5	5	5
20.	Africa, South														
21.	Iran-Arabia				2	2	3	3	4	4	4	4	4	4	4
22.	Indian Peninsula				1	1	1	1	1	1	1	2	2	3	3
23.	South Asia				p	p	p	p	p	p	p	p	1	1	1
24.	China				p	p	p	p	p	p	p	p	1	1	1
25.	Japan				1	1	1	1	1	1	1	1	1	1	1
26.	Australia-Indon.				p	p	p	p	p	p	p	p	1	1	1
27.	Canada				p	p	p	p	p	p	p	p	p	p	p
28.	United States				5	5	6	7	8	9	9	10	11	12	13
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

AFRICA, N.E. - ZONE 15

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				2	3	4	5	6	7	8	9	10	11	11
2.	France				286	304	328	355	389	429	479	538	605	678	754
3.	Spain-Portugal				19	25	31	38	46	55	65	75	86	98	110
4.	Belg-Holl-Lux.				2	2	2	3	3	3	4	4	5	5	5
5.	Germany				2	2	2	3	3	3	3	4	5	6	7
6.	Austria				3	4	6	8	10	11	14	17	20	23	25
7.	Italy				15	15	16	17	18	22	28	33	43	52	62
8.	Balkans				1	1	1	2	2	2	2	2	2	2	2
9.	Bulg-Hung-Roumania				1	1	1	2	2	2	2	3	3	3	3
10.	Poland-Czech.				1	1	1	1	1	1	1	1	2	2	2
11.	Scandinavia				1	1	1	1	2	2	2	3	3	3	3
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				P	P	P	P	P	P	P	P	1	1	1
15.	Africa-N.E.				1	1	1	2	2	3	3	3	3	3	3
16.	Maghreb-Alg-Mor-Tun.														
17.	Africa, West				1	1	1	1	1	1	1	1	2	2	2
18.	Africa, Central									P	P	P	1	1	1
19.	Africa, East														
20.	Africa, South														
21.	Iran-Arabia				P	P	P	P	P	P	P	P	1	1	1
22.	Indian Peninsula														
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan									P	P	P	P	P	P
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				3	3	3	4	4	4	5	6	6	7	7
29.	Central America									P	P	P	1	1	1
30.	West Indies														
31.	Northern So. America									P	P	P	1	1	1
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay									P	P	P	1	1	1
34.	Brazil									P	P	P	1	1	1
	TOTALS														

MAGHREB - ZONE 16

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				4	6	8	11	14	16	18	20	22	24	26
2.	France				17	18	19	20	22	23	26	29	33	36	39
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				1	1	1	1	1	1	1	1	1	1	1
5.	Germany				P	P	P	P	P	P	P	P	P	P	P
6.	Austria				1	1	1	2	2	2	2	2	2	2	2
7.	Italy									P	P	P	P	P	P
8.	Balkans				P	P	P	P	P	P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				P	P	P	P	P	P	P	P	P	P	P
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.				1	1	1	1	2	2	2	2	2	2	2
16.	Maghreb-Alg-Mor-Tun.				1	1	1	1	1	1	1	1	2	2	2
17.	Africa, West														
18.	Africa, Central				P	P	P	P	P	P	P	P	1	1	1
19.	Africa, East									P	P	P	1	1	1
20.	Africa, South									P	P	P	1	1	1
21.	Iran-Arabia									P	P	P	1	1	1
22.	Indian Peninsula									P	P	P	1	1	1
23.	South Asia									P	P	P	1	1	1
24.	China									P	P	P	1	1	1
25.	Japan									P	P	P	P	P	P
26.	Australia-Indon.									P	P	P	1	1	1
27.	Canada									P	P	P	P	P	P
28.	United States				4	7	9	11	13	15	15	16	16	17	17
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

AFRICA, WEST - ZONE 17

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				4	6	8	11	14	17	19	21	23	25	27
2.	France				6	6	7	7	8	8	9	10	11	12	13
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				3	5	7	9	12	15	18	21	24	27	29
5.	Germany				1	1	1	1	1	1	1	1	1	1	1
6.	Austria				1	1	1	2	2	2	2	2	3	3	3
7.	Italy														
8.	Balkans				P	P	P	P	P	P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				P	P	P	P	P	P	P	P	1	1	1
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.									P	P	P	1	1	1
16.	Maghreb-Alg-Mor-Tun.									P	P	P	1	1	1
17.	Africa, West				P	P	P	P	P	P	P	P	1	1	1
18.	Africa, Central														
19.	Africa, East				P	P	P	P	P	P	P	P	1	1	1
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia									P	P	P	P	P	P
22.	Indian Peninsula				P	P	P	P	P	P	P	P	1	1	1
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan									P	P	P	P	P	P
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				3	5	7	9	11	13	13	13	13	14	14
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

AFRICA, CENTRAL - ZONE 18

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				6	8	11	13	16	18	21	24	27	30	32
2.	France				3	3	3	4	4	4	5	5	6	6	7
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				P	P	P	P	P	P	P	P	P	P	P
5.	Germany				P	P	P	P	P	P	P	P	P	P	P
6.	Austria				P	P	P	P	P	P	P	P	P	P	P
7.	Italy									P	P	P	P	P	P
8.	Balkans				P	P	P	P	P	P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				P	P	P	P	P	P	P	P	P	P	P
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel									P	P	P	1	1	1
15.	Africa-N.E.				1	2	3	4	5	5	5	5	5	5	5
16.	Maghreb-Alg-Mor-Tun.														
17.	Africa, West									P	P	P	1	1	1
18.	Africa, Central				P	P	P	P	P	P	P	P	1	1	1
19.	Africa, East														
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia				P	P	P	P	P	P	P	P	1	1	1
22.	Indian Peninsula				1	1	2	2	3	3	4	4	5	5	6
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan									P	P	P	1	1	1
26.	Australia-Indon.				P	P	P	P	P	P	P	P	P	P	P
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				6	8	9	10	11	12	12	13	14	14	15
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

AFRICA, EAST - ZONE 19

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				8	9	11	14	16	18	22	25	28	31	35
2.	France									P	P	P	1	1	1
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				1	1	1	1	1	1	1	1	1	1	1
5.	Germany				1	1	1	1	1	1	1	1	2	2	2
6.	Austria				P	P	P	P	P	P	P	1	1	2	2
7.	Italy									P	P	P	P	P	P
8.	Balkans									1	1	1	1	2	2
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				P	P	P	P	P	P	P	P	1	1	1
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel									P	P	P	1	1	1
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.														
17.	Africa, West									P	P	P	1	1	1
18.	Africa, Central				P	P	P	P	P	P	P	P	1	1	1
19.	Africa, East				P	P	P	P	P	P	P	P	1	1	1
20.	Africa, South														
21.	Iran-Arabia														
22.	Indian Peninsula				P	P	P	P	P	P	P	P	1	1	1
23.	South Asia									P	P	P	1	1	1
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan									1	1	1	2	2	2
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada									P	P	P	P	P	P
28.	United States				4	4	4	4	4	4	6	7	8	9	10
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay				P	P	P	P	P	P	P	P	1	1	1
34.	Brazil				P	P	P	P	P	P	P	P	1	1	1
	TOTALS														

AFRICA, SOUTH - ZONE 20

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				2	3	4	6	7	8	8	9	10	11	12
2.	France				1	1	1	1	1	1	1	1	2	2	2
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				P	P	P	P	P	P	P	P	1	1	1
5.	Germany				1	1	1	2	2	2	2	2	2	2	2
6.	Austria				1	1	1	2	2	2	2	2	2	2	2
7.	Italy				P	P	P	P	P	P	P	P	1	1	1
8.	Balkans				P	P	P	P	P	P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				1	1	1	1	1	1	1	1	1	1	1
12.	Russia-Europe									P	P	P	1	1	1
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				2	2	2	3	3	3	3	3	3	3	3
15.	Africa-N.E.				2	2	3	3	4	4	4	4	4	4	4
16.	Maghreb-Alg-Mor-Tun.				P	P	P	P	P	P	P	P	1	1	1
17.	Africa, West									P	P	P	1	1	1
18.	Africa, Central									P	P	P	P	P	P
19.	Africa, East				P	P	P	P	P	P	P	P	1	1	1
20.	Africa, South														
21.	Iran-Arabia														
22.	Indian Peninsula				9	10	11	13	15	18	21	24	28	31	35
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan									P	P	P	1	1	1
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				4	4	5	6	7	8	8	9	10	11	12
29.	Central America														
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

IRAN-ARABIA - ZONE 21

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				18	19	21	23	26	29	33	38	42	49	53
2.	France				1	1	1	1	1	1	1	1	2	2	2
3.	Spain-Portugal				1	1	1	1	1	1	1	1	1	1	1
4.	Belg-Holl-Lux.				1	1	1	1	1	1	1	1	1	1	1
5.	Germany				2	2	2	3	3	3	4	5	6	7	8
6.	Austria				2	2	2	2	2	2	2	2	2	2	2
7.	Italy				1	1	1	1	1	1	1	1	1	2	2
8.	Balkans				P	P	P	P	P	P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				1	1	1	1	1	1	1	1	2	2	2
11.	Scandinavia				P	P	P	P	P	P	P	1	1	2	2
12.	Russia-Europe				1	1	2	2	3	3	3	4	4	5	5
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				5	7	9	11	13	15	17	19	21	24	26
15.	Africa-N.E.				1	1	1	1	1	1	1	2	2	3	3
16.	Maghreb-Alg-Mor-Tun.														
17.	Africa, West									P	P	P	1	1	1
18.	Africa, Central				P	P	P	P	P	P	P	P	1	1	1
19.	Africa, East				1	1	2	2	3	3	4	4	5	5	6
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia				9	10	11	13	15	18	21	24	28	31	35
22.	Indian Peninsula														
23.	South Asia				4	4	5	6	6	7	9	11	14	16	18
24.	China				2	2	2	2	2	2	2	2	2	3	3
25.	Japan				4	4	4	5	5	5	5	6	6	7	8
26.	Australia-Indon.				P	P	P	P	P	P	P	P	P	P	P
27.	Canada				P	P	P	P	P	P	P	P	1	1	1
28.	United States				5	7	10	12	14	16	19	22	25	28	31
29.	Central America				P	P	P	P	P	P	P	P	1	1	1
30.	West Indies									P	P	P	1	1	1
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay									P	P	P	1	1	1
34.	Brazil									P	P	P	1	1	1
	TOTALS														

INDIAN PENINSULA - ZONE 22

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				3	4	5	7	8	9	10	11	12	13	13
2.	France				1	1	1	1	1	1	1	1	2	2	2
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				P	P	P	P	P	P	P	P	P	P	P
5.	Germany				P	P	P	P	P	P	P	P	1	1	1
6.	Austria				P	P	P	P	P	P	P	P	PP	P	P
7.	Italy				P	P	P	P	P	P	P	P	P	P	P
8.	Balkans				P	P	P	P	P	P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				P	P	P	P	P	P	P	P	P	P	P
12.	Russia-Europe				1	1	1	1	1	1	1	2	2	3	3
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.				P	P	P	P	P	P	P	P	1	1	1
16.	Maghreb-Alg-Mor-Tun.														
17.	Africa, West									P	P	P	1	1	1
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South									P	P	P	1	1	1
21.	Iran-Arabia														
22.	Indian Peninsula				4	4	5	6	6	7	9	11	14	16	18
23.	South Asia														
24.	China				4	7	12	16	18	21	23	25	26	28	29
25.	Japan				2	7	13	18	22	25	29	32	35	38	41
26.	Australia-Indon.				1	1	1	1	1	2	2	3	3	4	4
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				17	19	21	24	27	30	32	34	37	40	43
29.	Central America				P	P	P	P	P	P	P	P	1	1	1
30.	West Indies														
31.	Northern So. America														
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay														
34.	Brazil														
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				1	3	5	7	9	11	12	13	14	14	15
2.	France									P	P	P	P	P	P
3.	Spain-Portugal														
4.	Belg-Holl-Lux.				P	P	P	P	P	P	P	P	P	P	P
5.	Germany				P	P	P	P	P	P	P	P	P	P	P
6.	Austria				P	P	P	P	P	P	P	P	P	P	P
7.	Italy				P	P	P	P	P	P	P	P	P	P	P
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania				P	P	P	P	P	P	P	P	1	1	1
10.	Poland-Czech.				P	P	P	P	P	P	P	P	1	1	1
11.	Scandinavia				P	P	P	P	P	P	P	P	P	P	P
12.	Russia-Europe				5	6	7	8	9	11	13	14	15	16	18
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				P	P	P	P	P	P	P	P	1	1	1
15.	Africa-N.E.				P	P	P	P	P	P	P	P	1	1	1
16.	Maghreb-Alg-Mor-Tun.				P	P	P	P	P	P	P	P	1	1	1
17.	Africa West									P	P	P	1	1	1
18.	Africa, Central				P	P	P	P	P	P	P	P	1	1	1
19.	Africa, East				P	P	P	P	P	P	P	P	1	1	1
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia				P	P	P	P	P	P	P	P	1	1	1
22.	Indian Peninsula				2	2	2	2	2	2	2	2	2	3	3
23.	South Asia				4	7	12	16	18	21	23	25	26	28	29
24.	China														
25.	Japan				7	17	26	34	41	48	54	60	66	72	77
26.	Australia-Indon.				3	3	4	4	5	5	5	6	6	7	7
27.	Canada				1	1	1	1	1	1	1	1	1	1	1
28.	United States				10	11	12	14	16	18	19	21	23	25	27
29.	Central America				P	P	P	P	P	P	P	P	1	1	1
30.	West Indies									P	P	P	1	1	1
31.	Northern So. America										P	P	P	1	1
32.	Boliva-Ecuador-Peru										P	P	P	1	1
33.	Argent-Chile-Uruguay				P	P	P	P	P	P	P	P	P	1	1	1
34.	Brazil				P	P	P	P	P	P	P	P	P	1	1	1
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				1	2	4	6	8	9	10	11	12	13	13
2.	France				1	1	2	2	3	3	3	3	4	4	4
3.	Spain-Portugal				P	P	P	P	P	P	P	P	P	P	P
4.	Belg-Holl-Lux.								1	2	2	2	3	3	3
5.	Germany					1	2	3	4	5	5	5	6	6	6
6.	Austria				1	1	2	2	3	3	3	3	4	4	4
7.	Italy				1	1	2	2	3	3	3	3	3	3	3
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	P	P	P
10.	Poland-Czech.									P	P	P	P	P	P
11.	Scandinavia				1	1	1	1	2	2	2	3	3	3	3
12.	Russia-Europe				2	2	3	3	4	4	4	5	5	6	6
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				1	1	1	1	1	1	1	1	1	1	1
15.	Africa-N.E.				1	1	1	1	1	1	1	1	1	1	1
16.	Maghreb-Alg-Mor-Tun.									P	P	P	P	P	P
17.	Africa, West									P	P	P	P	P	P
18.	Africa, Central									P	P	P	P	P	P
19.	Africa, East									P	P	P	1	1	1
20.	Africa, South									1	1	1	2	2	2
21.	Iran-Arabia									P	P	P	1	1	1
22.	Indian Peninsula				4	4	4	5	5	5	5	6	6	7	8
23.	South Asia				2	7	13	18	22	25	29	32	35	38	41
24.	China				7	17	26	34	41	48	54	60	66	72	77
25.	Japan														
26.	Australia-Indon.				3	4	5	6	8	9	10	12	13	15	16
27.	Canada				1	2	3	4	5	5	5	6	6	7	7
28.	United States				45	54	63	73	83	94	105	116	128	140	152
29.	Central America				2	2	2	2	2	2	2	2	2	2	2
30.	West Indies									P	P	P	P	P	P
31.	Northern So. America				P	P	P	P	P	P	P	P	P	P	P
32.	Boliva-Ecuador-Peru				1	1	1	1	1	1	1	1	1	1	1
33.	Argent-Chile-Uruguay				1	1	1	1	1	1	1	1	2	2	2
34.	Brazil				1	1	1	1	1	1	1	1	2	2	2
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				15	20	25	30	37	45	53	62	70	79	88
2.	France									1	1	1	2	2	2
3.	Spain-Portugal				P	P	P	P	P	P	P	P	P	P	P
4.	Belg-Holl-Lux.								1	2	2	3	3	3	3
5.	Germany								1	2	2	3	3	4	5
6.	Austria				1	1	1	1	1	1	1	1	2	2	2
7.	Italy								1	1	1	1	2	2	2
8.	Balkans									1	1	1	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	P	P	P
10.	Poland-Czech.									P	P	P	P	P	P
11.	Scandinavia									1	1	1	1	1	1
12.	Russia-Europe				P	P	P	P	P	P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel				P	P	P	P	P	P	P	P	1	1	1
15.	Africa-N.E.				P	P	P	P	P	P	P	P	1	1	1
16.	Maghreb-Alg-Mor-Tun.				P	P	P	P	P	P	P	P	1	1	1
17.	Africa, West									P	P	P	1	1	1
18.	Africa, Central				P	P	P	P	P	P	P	P	1	1	1
19.	Africa, East				P	P	P	P	P	P	P	P	P	P	P
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia				P	P	P	P	P	P	P	P	1	1	1
22.	Indian Peninsula				P	P	P	P	P	P	P	P	P	P	P
23.	South Asia				1	1	1	1	1	2	2	3	3	4	4
24.	China				3	3	4	4	5	5	5	6	6	7	7
25.	Japan				3	4	5	6	8	9	10	12	13	15	16
26.	Australia-Indon.														
27.	Canada				4	4	5	5	6	7	7	8	9	10	11
28.	United States				28	34	41	47	54	60	67	73	80	87	93
29.	Central America				1	1	2	2	3	3	3	3	3	3	3
30.	West Indies									P	P	P	1	1	1
31.	Northern So. America				P	P	P	P	P	P	P	P	1	1	1
32.	Boliva-Ecuador-Peru				P	P	P	P	P	P	P	P	1	1	1
33.	Argent-Chile-Uruguay				P	P	P	P	P	P	P	P	1	1	1
34.	Brazil				P	P	P	P	P	P	P	P	P	P	P
	TOTALS														

AUSTRALIA-INDON. - ZONE 26

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles	36	42	50	60	66	78	89	101	115	130	146			
2.	France	3	4	5	6	8	9	10	11	13	14	15			
3.	Spain-Portugal	P	P	P	P	P	P	P	P	P	1	1			
4.	Belg-Holl-Lux.	3	4	5	6	7	7	8	9	10	11	12			
5.	Germany	8	10	12	14	16	18	22	27	32	35	39			
6.	Austria	3	3	4	4	5	5	6	7	8	9	10			
7.	Italy	3	3	4	5	6	7	8	9	11	12	13			
8.	Balkans	1	1	1	2	2	2	2	3	3	3	3			
9.	Bulg-Hung-Roumania						1	1	1	2	2	2			
10.	Poland-Czech.						1	1	1	1	1	1			
11.	Scandinavia	3	4	5	6	7	7	8	10	11	12	13			
12.	Russia-Europe						P	P	P	P	P	P			
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel						1	1	1	1	1	1			
15.	Africa-N.E.	P	P	P	P	P	P	P	P	P	P	P			
16.	Maghreb-Alg-Mor-Tun.	P	P	P	P	P	P	P	P	P	P	P			
17.	Africa, West						P	P	P	P	P	P			
18.	Africa, Central	P	P	P	P	P	P	P	P	P	P	P			
19.	Africa, East	P	P	P	P	P	P	P	P	P	P	P			
20.	Africa, South						P	P	P	P	P	P			
21.	Iran-Arabia	P	P	P	P	P	P	P	P	P	P	P			
22.	Indian Peninsula	P	P	P	P	P	P	P	P	1	1	1			
23.	South Asia	P	P	P	P	P	P	P	P	P	P	P			
24.	China	1	1	1	1	1	1	1	1	1	1	1			
25.	Japan	1	2	3	4	5	5	5	6	6	7	7			
26.	Australia-Indon.	4	4	5	5	6	7	7	8	9	10	11			
27.	Canada														
28.	United States														
29.	Central America	3	4	5	6	7	7	8	9	10	11	12			
30.	West Indies	6	6	7	7	8	8	9	10	11	12	13			
31.	Northern So. America	P	P	P	P	P	P	P	P	P	P	P			
32.	Boliva-E uador-Peru	P	P	P	P	P	P	P	P	P	P	P			
33.	Argent-Chile-Uruguay	P	P	P	P	P	P	P	P	1	1	1			
34.	Brazil	P	P	P	P	P	P	P	P	P	P	P			
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				160	187	216	247	282	321	364	410	460	515	571
2.	France				71	78	87	98	112	126	142	160	177	196	215
3.	Spain-Portugal				19	23	27	31	36	41	47	53	59	64	69
4.	Belg-Holl-Lux.				19	30	40	52	62	74	84	96	107	118	129
5.	Germany				77	90	105	125	147	175	212	255	310	380	463
6.	Austria-Switz.				36	40	45	50	55	60	70	80	90	101	112
7.	Italy				38	43	48	54	60	66	73	80	87	94	102
8.	Balkans				9	11	13	15	17	19	22	25	28	31	35
9.	Bulg-Hung-Roumania				4	5	6	7	8	9	9	10	10	11	12
10.	Poland-Czech.				3	3	4	5	6	7	8	9	10	11	12
11.	Scandinavia				26	30	35	41	47	55	62	71	80	90	99
12.	Russia-Europe														
13.	Russia-Asia				7	10	14	17	21	24	30	36	42	48	53
14.	Turk-Jord-Syr-Isr.				9	11	13	15	17	19	21	23	25	28	31
15.	Africa-N.E.				5	5	6	7	8	9	9	10	11	12	13
16.	Maghreb-Alg-Mor-Tun.				3	3	3	4	4	4	5	6	6	7	7
17.	Africe, West				4	7	9	11	13	15	15	16	16	17	17
18.	Africa, Central				3	5	7	9	11	13	13	13	13	14	14
19.	Africa, East				6	8	9	10	11	12	12	13	14	14	15
20.	Africa, South				4	4	4	4	4	4	6	7	8	9	10
21.	Iran-Arabia				4	4	5	6	7	8	8	9	10	11	12
22.	Indian Peninsula				5	7	10	12	14	16	19	22	25	28	31
23.	South Asia				17	19	21	24	27	30	32	34	37	40	43
24.	China				10	11	12	14	16	18	19	21	23	25	27
25.	Japan				45	54	63	73	83	94	105	116	128	140	152
26.	Australia-Indon.				28	34	41	47	54	60	67	73	80	87	93
27.	Canada														
28.	United States														
29.	Central America				52	64	77	90	102	115	128	141	154	168	181
30.	West Indies				241	270	300	328	372	412	456	501	549	596	643
31.	Northern South Am.				43	60	76	92	108	125	140	156	171	187	201
32.	Bolivia-Edua-Peru				16	21	28	34	41	49	55	62	69	76	82
33.	Argen-Chile-Urag.				38	46	53	61	69	77	86	94	103	111	120
34.	Brazil				26	29	32	35	37	39	45	51	57	63	70
35.	Hawaii				100	~~140~~	~~200~~	260	324	382	446	509	560	633	698
	TOTAL					179	237								

UNITED STATES - ZONE 28

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				1	1	2	2	3	3	3	3	3	3	3
2.	France				1	1	1	2	2	2	2	2	3	3	3
3.	Spain-Portugal				P	P	P	P	P	P	P	P	1	1	1
4.	Belg-Holl-Lux.								1	1	1	1	1	1	1
5.	Germany									1	1	1	1	1	1
6.	Austria-Switz.				1	1	2	2	3	3	3	3	4	4	4
7.	Italy									1	1	2	2	3	3
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	1	1	1
10.	Poland-Czech.									P	P	P	1	1	1
11.	Scandinavia									P	P	P	1	1	1
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.									P	P	P	1	1	1
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South														
21.	Iran-Arabia														
22.	Indian Peninsula				P	P	P	P	P	P	P	P	1	1	1
23.	South Asia				P	P	P	P	P	P	P	P	1	1	1
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan				2	2	2	2	2	2	2	2	2	2	2
26.	Australia-Indon.				1	1	2	2	3	3	3	3	3	3	3
27.	Canada				3	4	5	6	7	7	8	9	10	11	12
28.	United States				52	64	77	90	102	115	128	141	154	168	181
29.	Central America														
30.	West Indies				2	5	8	11	13	15	16	17	18	20	22
31.	Northern So. America				4	4	5	5	6	6	7	7	8	9	10
32.	Bolivia-Ecuador-Peru				2	2	3	4	5	6	7	8	8	9	9
33.	Argent-Chile-Uruguay				3	4	4	5	5	6	6	7	7	8	8
34.	Brazil				4	4	4	5	5	5	6	6	7	7	8
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				1	2	3	4	6	7	8	9	10	10	11
2.	France				3	3	3	4	4	4	5	5	6	6	6
3.	Spain-Portugal				P	P	P	P	P	P	P	1	1	1	1
4.	Belg-Holl-Lux.				1	1	1	2	2	2	3	3	4	4	4
5.	Germany									1	1	1	1	1	1
6.	Austria-Switz.									P	P	P	P	P	P
7.	Italy									P	P	P	1	1	1
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	1	1	1
10.	Poland-Czech.									P	P	P	1	1	1
11.	Scandinavia									P	P	P	P	P	P
12.	Russia-Europe				P	P	P	P	P	P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.														
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South														
21.	Iran-Arabia														
22.	Indian Peninsula									P	P	P	1	1	1
23.	South Asia														
24.	China									P	P	P	1	1	1
25.	Japan									P	P	P	P	P	P
26.	Australia-Indon.									P	P	P	1	1	1
27.	Canada				6	6	7	7	8	8	9	10	11	12	13
28.	United States				241	270	300	328	372	412	456	501	549	596	643
29.	Central America				2	5	8	11	13	15	16	17	18	20	22
30.	West Indies														
31.	Northern So. America				1	5	9	13	17	20	23	26	29	32	36
32.	Boliva-Ecuador-Peru													P	P
33.	Argent-Chile-Uruguay				P	P	P	P	1	1	1	1	1	1	1
34.	Brazil				P	P	P	P	P	P	P	P	1	1	1
	TOTALS														

WEST INDIES - ZONE 30

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				1	1	2	2	3	4	4	4	4	4	4
2.	France				1	1	1	1	1	1	1	1	1	1	1
3.	Spain-Portugal				P	P	P	P	P	P	P	P	1	1	1
4.	Belg-Holl-Lux.									1	1	1	2	2	2
5.	Germany									P	P	P	1	1	1
6.	Austria-Switz.				P	P	P	P	P	P	P	P	P	P	P
7.	Italy									P	P	1	1	2	2
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	1	1	1
10.	Poland-Czech.									P	P	P	1	1	1
11.	Scandinavia									P	P	P	P	P	P
12.	Russia-Europe									P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.									P	P	P	1	1	1
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South														
21.	Iran-Arabia														
22.	Indian Peninsula														
23.	South Asia														
24.	China										P	P	P	1	1
25.	Japan				P	P	P	P	P	P	P	P	P	P	P
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				43	60	76	92	108	125	140	156	171	187	201
29.	Central America				4	4	5	5	6	6	7	7	8	9	10
30.	West Indies				1	5	9	13	17	20	23	26	29	32	36
31.	Northern So. America														
32.	Boliva-Ecuador-Peru				P	P	P	P	1	1	1	2	2	3	3
33.	Argent-Chile-Uruguay				P	P	P	P	1	1	1	1	1	1	1
34.	Brazil				P	P	P	P	1	1	1	1	1	1	1
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles	1	1	1	1	2	2	2	2	3	3	3			
2.	France	P	P	P	P	P	P	P	P	P	P	P			
3.	Spain-Portugal	P	P	P	P	P	P	P	P	P	P	1			
4.	Belg-Holl-Lux.						P	P	P	P	P	P			
5.	Germany						P	P	P	P	P	P			
6.	Austria-Switz.	P	P	P	P	P	P	P	P	P	P	P			
7.	Italy						P	P	P	1	1	1			
8.	Balkans						P	P	P	1	1	1			
9.	Bulg-Hung-Roumania						P	P	P	1	1	1			
10.	Poland-Czech.						P	P	P	P	P	P			
11.	Scandinavia						P	P	P	P	P	P			
12.	Russia-Europe									P	P	P			
13.	Russia-Asia										P	P			
14.	Turk-Jord-Syr-Israel										P	P			
15.	Africa-N.E.										P	P			
16.	Maghreb-Alg-Mor-Tun.										P	P			
17.	Africa, West										P	P			
18.	Africa, Central										P	P			
19.	Africa, East										P	P			
20.	Africa, South										P	P			
21.	Iran-Arabia										P	P			
22.	Indian Peninsula										P	P			
23.	South Asia										P	P			
24.	China										P	P			
25.	Japan	1	1	1	1	1	1	1	1	1	1	1			
26.	Australia-Indon.	P	P	P	P	P	P	P	P	P	P	P			
27.	Canada	P	P	P	P	P	P	P	P	P	P	P			
28.	United States	16	21	28	34	41	49	55	62	69	76	82			
29.	Central America	2	2	3	4	5	6	7	7	8	9	9			
30.	West Indies														
31.	Northern So. America	P	P	P	P	1	1	1	2	2	3	3			
32.	Boliva-Ecuador-Peru														
33.	Argent-Chile-Uruguay						1	1	2	3	4	5			
34.	Brazil							P	P	P	1	1			
	TOTALS														

I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				2	3	4	5	6	7	8	9	9	10	11
2.	France				2	2	2	2	2	2	2	2	3	3	3
3.	Spain-Portugal				P	P	P	P	P	P	P	1	1	1	1
4.	Belg-Holl-Lux.									1	1	1	1	1	1
5.	Germany				1	1	1	1	2	2	2	2	3	3	3
6.	Austria-Switz.				2	2	2	3	3	3	3	3	4	4	4
7.	Italy				4	4	5	6	7	7	9	11	16	18	20
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	1	1	1
10.	Poland-Czech.									P	P	P	1	1	1
11.	Scandinavia									P	P	P	1	1	1
12.	Russia-Europe				P	P	P	P	P	P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.									P	P	P	1	1	1
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia														
22.	Indian Peninsula									P	P	P	1	1	1
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan				1	1	1	1	1	1	1	1	2	2	2
26.	Australia-Indon.				P	P	P	P	P	P	P	P	1	1	1
27.	Canada				P	P	P	P	P	P	P	P	1	1	1
28.	United States				38	46	53	61	69	77	86	94	103	111	120
29.	Central America				3	4	4	5	5	6	6	7	7	8	8
30.	West Indies				P	P	P	P	1	1	1	1	1	1	1
31.	Northern So. America				P	P	P	P	1	1	1	1	1	1	1
32.	Boliva-Ecuador-Peru									1	1	2	3	4	5
33.	Argent-Chile-Uruguay														
34.	Brazil				1	5	9	13	17	21	22	24	26	28	29
	TOTALS														

ARGEN-CHILE-URU - ZONE 33

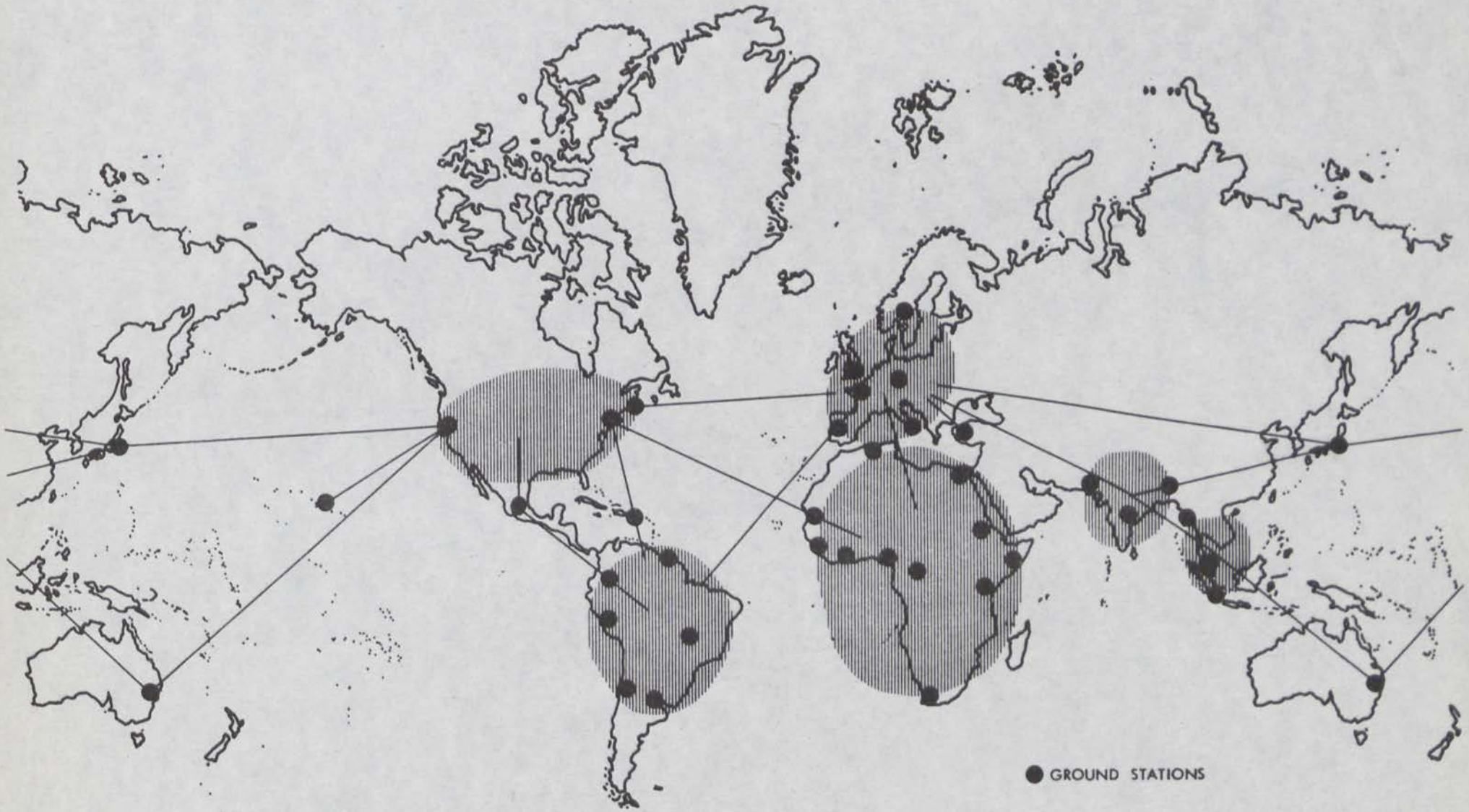
I.C.S.C. TRAFFIC MODEL

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1.	British Isles				1	2	3	4	4	5	5	5	6	6	6
2.	France				1	1	1	1	1	1	1	1	2	2	2
3.	Spain-Portugal				P	P	P	P	P	P	P	P	1	1	1
4.	Belg-Holl-Lux.									P	P	P	P	P	P
5.	Germany									1	1	1	1	1	1
6.	Austria-Switz.				2	2	2	2	2	2	2	2	3	3	3
7.	Italy				2	2	3	3	4	4	5	6	7	8	9
8.	Balkans									P	P	P	1	1	1
9.	Bulg-Hung-Roumania									P	P	P	1	1	1
10.	Poland-Czech.									P	P	P	1	1	1
11.	Scandinavia									P	P	P	P	P	P
12.	Russia-Europe				P	P	P	P	P	P	P	P	P	P	P
13.	Russia-Asia														
14.	Turk-Jord-Syr-Israel														
15.	Africa-N.E.														
16.	Maghreb-Alg-Mor-Tun.									P	P	P	1	1	1
17.	Africa, West														
18.	Africa, Central														
19.	Africa, East														
20.	Africa, South				P	P	P	P	P	P	P	P	1	1	1
21.	Iran-Arabia														
22.	Indian Peninsula									P	P	P	1	1	1
23.	South Asia														
24.	China				P	P	P	P	P	P	P	P	1	1	1
25.	Japan				1	1	1	1	1	1	1	1	2	2	2
26.	Australia-Indon.				P	P	P	P	P	P	P	P	P	P	P
27.	Canada				P	P	P	P	P	P	P	P	P	P	P
28.	United States				26	29	32	35	37	39	45	51	57	63	70
29.	Central America				4	4	4	5	5	5	6	6	7	7	8
30.	West Indies				P	P	P	P	P	P	P	P	1	1	1
31.	Northern So. America				P	P	P	P	1	1	1	1	1	1	1
32.	Boliva-Eduador-Peru										P	P	P	1	1
33.	Argent-Chile-Uruguay				1	5	9	13	17	21	22	24	26	28	29
34.	Brazil														
	TOTALS														

ANTICIPATED CABLE CAPACITY

PATH	CHANNELS
United States - Europe	475
Canada - Europe	80
United States - Northern South America	40
United States - West Indies*	267
United States - Central America	68
United States - Hawaii	163
United States - Japan	50
United States - Australia	17
Canada - Australia	7
Europe - Australia	25
Europe - Near East	80
Europe - Maghreb	528

* Included United States - Puerto Rico path consisting of an estimated 163 channels.



Representative Traffic Streams

TAB 3

TAB 3

EARTH STATION STATUS

A. Earth Stations Already Operational

B. Earth Stations Committed and under Construction

C. Earth Stations Formally Notified as Planned

A

TAB 3

EARTH STATION STATUS

A. Currently Operational

1. North America

   a. Andover, Maine

      85-foot equivalent capacity in operation. Circuits in continuous use on Early Bird.

2. Europe

   a. Goonhilly Downs, United Kingdom

      85-foot equivalent capacity. Circuits in continuous use on Early Bird.

   b. Pleumeur-Bodou, France

      85-foot equivalent capacity in operation. Circuits in continuous use on Early Bird.

   c. Raisting, Germany

      85-foot equivalent capacity in operation. Circuits in continuous use on Early Bird.

   d. Fucino, Italy

      Rated at about a 42-foot equivalent capacity (24 voice channels). Station is capable of transmitting television only. No television reception capacity. Weekend European traffic is current mode of use on Early Bird. In process of changing to 85-foot equivalent capacity by 1968.

B

B. Earth Stations Committed

1. North America

a. Brewster Flat, Washington

(1) 42-foot equivalent station; operational September, 1966

(2) 85-foot equivalent station; operational January, 1967

b. Mill Village, Nova Scotia, Canada

(1) 85-foot equivalent capacity. Operational Spring, 1966.

2. Hawaii

a. Puamalu, Hawaii

(1) 42-foot equivalent station; operational September, 1966

(2) 85-foot equivalent station; operational January, 1967

3. Japan

a. Ibakari, Japan

(1) 70-foot equivalent (20 meters) station now operational

(2) 77-foot equivalent (22 meters) station is planned to be operational in October, 1966

B. Earth Stations Committed (continued)

4. Australia

a. Carnarvon, Australia

(1) 42-foot equivalent station is programmed to be operational by September, 1966, by Australia

5. Canary Islands

a. Gran Canarias Island

(1) 42-foot equivalent station is programmed to be operational in September, 1966, by Spain

6. Ascension Island

a. 42-foot equivalent station is programmed to be operational in September, 1966, by the United Kingdom

7. Spain

a. Vicinity of Madrid

(1) 85-foot equivalent station is programmed to be operational in 1967.

C. Earth Stations Planned (Formal advice of intent received)

1. Europe

a. Sweden

It is expected that a station in Sweden, also serving Norway and Denmark, will become operational after 1969.

b. Switzerland

Switzerland has indicated by letter that it is programming a station to be operational in 1971.

c. Belgium

Belgium has indicated by letter that a station is programmed to be operational in 1970.

2. Africa

a. Nigeria

Nigeria acceded to the Interim Agreements, obtaining membership in Intelsat on December 8, 1965. The Nigerian Senate has approved funds for construction of an earth station in 1967. This is planned to be a regional station for the contiguous area.

3. Middle East

a. Israel

Israel has expressed intentions of constructing an earth station for operation in 1968.

C. Earth Stations Planned

3. Middle East (continued)

b. Kuwait

Kuwait has expressed its intention to construct an earth station. It could be operational by 1968. It would be viable and would serve as a regional station for Lebanon, Syria, Iraq, and Saudi Arabia and Jordan.

4. Pacific-Asia

a. West Pakistan

This country has stated informally that an earth station will be operational in 1968. Traffic forecasts indicate viability would not occur before 1972. An East Pakistan station would not be viable on a projected traffic basis, but will appear about 1970, due to Pakistan's internal need and expressed intent.

b. India

Site selection completed for station near Poona, India. India states the station could be accelerated to be completed in late 1967, if satellite visibility is afforded. If no satellite visibility is available, this station would become operational in 1968.

5. Oceania

a. Australia

In the vicinity of Sydney, an 85-foot equivalent station is now being considered for use in 1968 with synchronous satellite for North American traffic.

In the vicinity of Perth, an 85-foot equivalent station about 1970 concurrent with national microwave project completion.

C. Earth Stations Planned (continued)

6. Latin America

a. Brazil

Site selection program now underway with Comsat technical personnel now in Brazil to assist. Brazil states this station will be operational in 1967.

b. Argentina

Argentina has expressed an intention to construct an earth station in 1967. A recent request has been received for assistance in site selection. Traffic forecasts indicate that an earth station in Argentina would be economically viable.

7. North America

a. Southeast U.S. station. The Southeast U.S. station is required to augment the Northeast station and to accommodate the additional needs posed by additional stations in Europe-Spain; Africa-Nigeria; Latin America-Argentina; Brazil; in the 1967 time frame.

b. The Puerto Rico station is required to accommodate the growth in traffic envisioned past the cable capacity now existent and to provide a Puerto Rico-U.S.; Europe, Africa, and Latin America telecommunications capability.

TAB 4

TAB 4

PROJECTED EARTH STATION DATA

The projections of earth stations made herein are based upon unofficial advice from various sources, then tempered by an economic assessment based upon available data along the forecast traffic streams available for satellite communications.

TAB 4

PROJECTED EARTH STATION DATA

1. North America

   a. Southwest U.S. station

      Traffic and ground station growth in the Pacific will require that a station augment the Northwest station. It is forecast that this need will occur during the 1969-1970 time frame.

   b. Mexico

      The 1968 Olympics may prove to be the catalyst necessary to bring a Mexican station into being at this time. There have been no expressions by Mexico to accede to the Interim Agreements or to program for an earth station.

2. Europe

   a. Yugoslavia

      Yugoslavia has expressed interest in Intelsat membership. There are to date no expressions by Yugoslavia on accession or when an earth station would become operational.

   b. Netherlands

      In view of the use of synchronous satellites, this country is investigating a station which would be operational in late 1968.

3. Middle East

   a. Turkey

      Turkey has made no expressions concerning accession or construction of an earth station. Based upon forecast traffic, a station would be viable in 1968, especially if guaranteed revenue or other long term loan assistance would be available and if traffic from Iran would be handled. Iran has recently stated they have no intention of constructing a satellite earth station in view of adequate communications link to Turkey through CENTO microwave.

4. Africa

a. Ethiopia

Ethiopia, now a member of Intelsat, has expressed an interest in owning and operating an earth station. With assistance, an Ethiopian station could appear under these conditions in late 1967. Ethiopia is now exploring means to finance a station.

b. Kenya

Kenya has made a recent expression of interest in an earth station and accession to Intelsat, if the governments of Tanzania and Uganda would also accede. With assistance, such a regional station could appear in 1967.

c. Algeria

A regional station serving Tunisia as well could be viable by 1970. Announcement by Spain of its early construction of an earth terminal, with a request for 24 channels, may affect appearance of this African station.

d. Senegal

A regional earth station in Senegal serving Liberia, Sierre Leone, French Guinea, Mali, Gambi, and Mauritania could be economically viable. None of these countries have acceded to Intelsat. Such a station could not be forecast prior to 1968.

e. Congo

A regional station serving both Congos, Chad, Cameroon, Central African Republic, Gabon, and Angola could be economically viable. Such a station could be operational in 1968. No expression concerning accession to Intelsat by these countries has been received.

f. South Africa

A South African station would be viable and is forecast to become operational in 1968.

4. Africa (continued)

g. United Arab Republic

Twelve of the thirteen countries of the Arab League are now members of Intelsat. Agreement within the Arab League has just been reached in regard to a member to represent these countries in the Interim Committee. The UAR is expected to be designated as providing the alternate member to the Interim Committee.

The Arab League Council has met to consider the question of earth stations to serve the member Arab League nations. Informal information has been received that the Arab League Council has firmly concluded that two earth stations, and possibly three, should be established to serve the member Arab League nations. This information indicates that one of these stations is firmly planned to be constructed in Kuwait and that the second station will be located either in the UAR or in the Maghreb area, with a possibility that each of these locations will be provided with a station. Establishment of a regional earth station in the UAR to serve Egypt, Libya, and the Sudan is indicated as being most probable.

5. Pacific-Asia

a. Thailand

Thailand has not made any expression towards accession or for planning of an earth station. Such a station could serve as a regional station for Malaysia, Burma, and other countries of that region. A positive interest has been expressed by Malaysia and Burma. This station could appear in 1967 if long-term loan or guaranteed revenue assistance were granted.

5. Pacific-Asia (continued)

b. Saigon, Viet Nam

Viet Nam has made no expression towards accession to Intelsat or for construction of an earth station. Analysis shows that an earth terminal would not be viable in the foreseeable future, based on Viet Nam needs alone. It could be served by a regional station located in Thailand.

c. Philippines

The Philippines have expressed positive interest, and have stated that they would accede to Intelsat following their national elections. A station in the Philippines would be viable. Asistance on a long-term loan or from a guaranteed circuit basis could make this station appear in 1967; otherwise it is forecast not to emerge before 1968. Several of the long distance carriers operating in the Philippines are vying for the right to own and operate the station.

d. Indonesia

Indonesia has expressed an interest in the television aspects of satellites. Based on an informal governmental expression, it may be expected that an earth station will appear about 1969.

e. Korea

Korea has made no expression of intent to accede to Intelsat agreements or to construct an earth station. However, based on information recently obtained from Korean officials, Korea is interested in means of international communications other than through Japan. Based upon present traffic information, a Korean ground station would not be viable in the foreseeable future. A long-term loan and guaranteed circuit revenues appear to be required for this station to appear in an early time frame.

5. Pacific-Asia (continued)

f. Taiwan

There has been no expression by China that they intend to construct an earth station. Information has been received that a World Bank loan request for 1968-1972 contains a line item for an earth station. Based on traffic forecasts and cable construction plans, a Chinese station is not considered to be a viable proposition. It is not reasonable to forecast such a station before 1970.

6. Oceania

a. New Zealand

There has been a good deal of interest by New Zealand for construction of an earth station, but the traffic projections do not support the establishment of such a station before 1970.

7. Latin America

a. Colombia

There has been a great deal of interest on the part of Colombia in an earth station. Technical assistance in site selection was provided by Comsat in November, 1965. Assistance in the form of a long-term loan could materially enhance this station's emergence in 1967.

b. Chile

Chile has expressed a great deal of interest in constructing an earth station. However, this project would probably not become operational prior to 1968. Their plans may vary based on earlier satellite availability. Assistance in the form of a long-term loan could assure this emergence. Traffic forecasts indicate such a station would be viable.

7. Latin America

c. Venezuela

In November 1965, Venezuela formally requested and received advice of its allotment for a quota. No further word has been received of their intentions to accede to Intelsat. Traffic information indicates such a station would be economically viable. A regional effort with Colombia could be feasible; however, discussions of such a possibility have not taken place.

d. Peru

In November, 1965, Peru formally requested and received advice of its allotment for a quota. No further word has been received from Peru concerning its plans to accede to Intelsat. It is known that Peru has received technical proposals for construction of an earth station. Traffic forecasts indicate that such a station would be economically viable.

e. Central American countries

There have been discussions concerning a regional station being constructed to serve several Central American countries. There have been no formally expressed intentions by any Central American country either to accede or to construct such a station; however, several countries have evidenced increasing interest during the past few months.

AREAS AND THE COUNTRIES IN WHICH EARTH STATIONS
ARE EXPECTED TO BE CONSTRUCTED

AREA	COUNTRIES
North America	United States, Canada
Central America	Mexico
West Indies	Puerto Rico
South America	Colombia, Venezuela, Peru, Chile, Brazil, Argentina
Europe	England, France, Germany, Italy, Belgium, Spain Sweden, Switzerland, Russia, Yugoslavia
Africa	Algeria, Senegal, United Arab Republic, Nigeria, Congo, South Africa, Kenya,* Ethiopia
Middle East	Turkey, Israel, Kuwait
Asia	India, East Pakistan, West Pakistan, Thailand
Oceania	Australia, New Zealand, Indonesia
Far East	Japan, Korea, Philippines
Hawaii	Hawaii

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*Note: the following countries can be considered as practicable alternatives:

Yugoslavia/Romania
Kenya/Tanzania

Earth Station Implementation

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
North America											
U.S. - North East	x	x	x	x	x	x	x	x	x	x	x
North West		x	x	x	x	x	x	x	x	x	x
South East				x	x	x	x	x	x	x	x
Hawaii		x	x	x	x	x	x	x	x	x	x
Puerto Rico				x	x	x	x	x	x	x	x
Canada		x	x	x	x	x	x	x	x	x	x
Mexico				x	x	x	x	x	x	x	x
Europe											
England	x	x	x	x	x	x	x	x	x	x	x
France	x	x	x	x	x	x	x	x	x	x	x
Germany	x	x	x	x	x	x	x	x	x	x	x
Italy				x	x	x	x	x	x	x	x
Spain			x	x	x	x	x	x	x	x	x
Sweden					x	x	x	x	x	x	x
Switzerland							x	x	x	x	x
Belgium						x	x	x	x	x	x
Russia-Moscow-Vladivostok						x	x	x	x	x	x
Roumania						x	x	x	x	x	x

Note: "x" indicates the earth station is operational.

Tab 4 Earth Station Projected Implementation Schedule

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
South America											
Colombia				x	x	x	x	x	x	x	x
Venezuela						x	x	x	x	x	x
Peru			x	x	x	x	x	x	x	x	x
Brazil			x	x	x	x	x	x	x	x	x
Argentina			x	x	x	x	x	x	x	x	x
Chile			x	x	x	x	x	x	x	x	x
Middle East											
Kuwait				x	x	x	x	x	x	x	x
Israel				x	x	x	x	x	x	x	x
Turkey				x	x	x	x	x	x	x	x
Asia											
W. Pakistan				x	x	x	x	x	x	x	x
E. Pakistan						x	x	x	x	x	x
India			x	x	x	x	x	x	x	x	x
Thailand			x	x	x	x	x	x	x	x	x
Indonesia					x	x	x	x	x	x	x
Japan		x	x	x	x	x	x	x	x	x	x
Philippines				x	x	x	x	x	x	x	x
China (Taiwan)						x	x	x	x	x	x
Oceania											
Australia			x	x	x	x	x	x	x	x	x
New Zealand						x	x	x	x	x	x

Note: "x" indicates the earth station is operational.

Tab 4 Earth Station Projected Implementation Schedule

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
South America											
Colombia				x	x	x	x	x	x	x	x
Venezuela						x	x	x	x	x	x
Peru			x	x	x	x	x	x	x	x	x
Brazil			x	x	x	x	x	x	x	x	x
Argentina			x	x	x	x	x	x	x	x	x
Chile			x	x	x	x	x	x	x	x	x
Middle East											
Kuwait				x	x	x	x	x	x	x	x
Israel				x	x	x	x	x	x	x	x
Turkey				x	x	x	x	x	x	x	x
Asia											
W. Pakistan				x	x	x	x	x	x	x	x
E. Pakistan						x	x	x	x	x	x
India			x	x	x	x	x	x	x	x	x
Thailand			x	x	x	x	x	x	x	x	x
Indonesia					x	x	x	x	x	x	x
Japan		x	x	x	x	x	x	x	x	x	x
Philippines				x	x	x	x	x	x	x	x
China (Taiwan)						x	x	x	x	x	x
Oceania											
Australia			x	x	x	x	x	x	x	x	x
New Zealand						x	x	x	x	x	x

Note: "x" indicates the earth station is operational.

Tab 4 Earth Station Projected Implementation Schedule

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
South America											
Colombia				x	x	x	x	x	x	x	x
Venezuela						x	x	x	x	x	x
Peru			x	x	x	x	x	x	x	x	x
Brazil			x	x	x	x	x	x	x	x	x
Argentina			x	x	x	x	x	x	x	x	x
Chile			x	x	x	x	x	x	x	x	x
Middle East											
Kuwait				x	x	x	x	x	x	x	x
Israel				x	x	x	x	x	x	x	x
Turkey				x	x	x	x	x	x	x	x
Asia											
W. Pakistan				x	x	x	x	x	x	x	x
E. Pakistan						x	x	x	x	x	x
India			x	x	x	x	x	x	x	x	x
Thailand			x	x	x	x	x	x	x	x	x
Indonesia					x	x	x	x	x	x	x
Japan		x	x	x	x	x	x	x	x	x	x
Philippines				x	x	x	x	x	x	x	x
China (Taiwan)						x	x	x	x	x	x
Oceania											
Australia			x	x	x	x	x	x	x	x	x
New Zealand						x	x	x	x	x	x

Note: "x" indicates the earth station is operational.

Tab 4 Earth Station Projected Implementation Schedule

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
South America											
Colombia				x	x	x	x	x	x	x	x
Venezuela						x	x	x	x	x	x
Peru			x	x	x	x	x	x	x	x	x
Brazil			x	x	x	x	x	x	x	x	x
Argentina			x	x	x	x	x	x	x	x	x
Chile			x	x	x	x	x	x	x	x	x
Middle East											
Kuwait				x	x	x	x	x	x	x	x
Israel				x	x	x	x	x	x	x	x
Turkey				x	x	x	x	x	x	x	x
Asia											
W. Pakistan				x	x	x	x	x	x	x	x
E. Pakistan						x	x	x	x	x	x
India			x	x	x	x	x	x	x	x	x
Thailand			x	x	x	x	x	x	x	x	x
Indonesia					x	x	x	x	x	x	x
Japan		x	x	x	x	x	x	x	x	x	x
Philippines				x	x	x	x	x	x	x	x
China (Taiwan)						x	x	x	x	x	x
Oceania											
Australia			x	x	x	x	x	x	x	x	x
New Zealand						x	x	x	x	x	x

Note: "x" indicates the earth station is operational.

Tab 4 Earth Station Projected Implementation Schedule

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Africa											
Ethiopia			x	x	x	x	x	x	x	x	x
United Arab Rep.				x	x	x	x	x	x	x	x
Nigeria			x	x	x	x	x	x	x	x	x
Senegal				x	x	x	x	x	x	x	x
Congo				x	x	x	x	x	x	x	x
South Africa				x	x	x	x	x	x	x	x
Tanzania						x	x	x	x	x	x
Algeria						x	x	x	x	x	x
TOTAL		8	18	32	34	44	45	45	45	45	45

Note: "x" indicates the earth station is operational.

Tab 4 Earth Station Projected Implementation Schedule

TAB 4
PROJECTED EARTH STATION DATA

EARTH STATIONS SERVING AS A REGIONAL COMMUNICATION CENTER

Regional Earth Station	Countries Served
Colombia	Ecuador
Argentina	Uruguay
Mexico	All of Central America
Puerto Rico	All of the Caribbean
Algeria	Tunisia
United Arab Republic	Libya, Sudan
Senegal	Mauritania, Gambia, Guinea, Sierre Leone, Mali, Liberia
Nigeria	Niger, Ivory Coast, Togo, Dahomey, Upper Volta
Congo	Central African Republic, Gabon, Angola, Cameroon, Chad, Congo
Kenya	Tanzania, Mozambique, Zambia, Rwanda, Burundi, Uganda
South Africa	Southwest Africa, Rhodesia
Turkey	Iran
Kuwait	Iraq, Lebanon, Jordan, Saudi Arabia
Thailand	Burma, Malaysia, Viet Nam

TAB 5

TAB 5

EXTENSIONS WHICH APPEAR FEASIBLE AND DESIRABLE

Extensions which are feasible and desirable under the concepts presented, as they pertain to earth stations, are in part treated under projections for each country, where a possible direct U.S. interest or benefit could be derived. These are couched in a reference to circuit revenue guarantee or as need for long-term loan assistance. These would make a station possible and in a position to take advantage of the presently committed or feasible additions to the space segment.

TAB 5

EXTENSIONS WHICH APPEAR FEASIBLE AND DESIRABLE

1. Africa

   a. Ethiopia

      This country, long a member of Intelsat, has expressed the strong desire to own and operate a satellite communications earth station. Coincident with the announcement of satellite availability to its area to serve the NASCOM program, Ethiopia has actively sought a means of financial assistance to construct an earth station. It has even approached Comsat for assistance. It would be desirable to assist Ethiopia in a financial manner in order to get an earth station into operational status in 1967. The U.S. interests involved in telecommunications to and from this area would accrue direct benefit from such a ground station's existence. A method of assistance whereby the U.S. could have direct representation in the operation of this station should be pursued. Direct assistance and aid appear to be the only basis on which such a station would appear in the immediate time frame, and it is desirable from the U.S. view that it should. Left to pure commercial need alone, this station would probably not be constructed until the post-1970 time frame.

   b. Nigeria

      This country acceded to the Interim Agreements on December 8, 1965. The action of the Nigerian Senate in approving funds for construction of an earth station--reportedly $5 million, adequate to construct a single 85-foot antenna equivalent station--appears to assure the Nigerian intent to own and operate a satellite communications earth station. It may well serve the U.S. interests in assisting the underdeveloped nations to encourage Nigeria through offer of such financial assistance as they may require to definitely assure the consummation of this desire.

2. Pacific-Asia

a. Thailand

This country has expressed interest in satellite communications but has taken no positive external action to accede to the Interim Agreements and become a partner in Intelsat. From a pure commercial point of view, a regional station located in Thailand appears to offer the necessary revenue area to bring the station into a viable state, after initial operating years. Definite action will be required to have Thailand take positive action to seek Intelsat status if this station is to appear in time to take advantage of the system committed to support NASCOM. Otherwise, this station would probably not appear before the fully global system of Intelsat was available, post-1968 time frame.

(1) Possible advantages of a regional ground station for Southeast Asia located in Thailand are briefly:

(a) Based on Malaysia's expression of interest in such a joint venture and their recent inquiry for additional information on Intelsat and Malaysian desire for a means of international communications not requiring egress through Singapore, Malaysia will participate in such a regional station.

(b) Extensions to permit Burma and the Republic of Viet Nam to also participate and Laos, in time, would aid in bolstering the unity of this contiguous area. Cambodia, in time, could also be served when deemed propitiate.

2. Pacific-Asia

a. Thailand (continued)

(1) (c) Regional communications deficits of SEATO would be bolstered, particularly when a ground station in the Philippines becomes operational, which would permit direct intra-regional communications from Thailand.

(d) U.S. needs for telecommunications to Southeast Asia could be satisfied through this regional station without fanfare and through normal international communications agencies while concurrently aiding this region in a commercial venture.

b. Korea

This country has recently obtained information concerning satellite system plans and Intelsat. Korea, in an economic expansion mode, is seeking reliable international communications, particularly one that does not require access through a neighboring major country. Analysis shows that Korean traffic alone, in pure commercial vein, would not make a satellite ground station economically advantageous for some time in the future. Such a decision becomes political in nature. With U.S. interests deeply involved in Korea, establishment of an earth station could bolster Korean image among the nations of the world (Intelsat members) and concurrently permit the U.S. interests therein to be served without fanfare or other U.S. monuments for attack on imperialistic grounds in a political sense. It will require assistance and assurances to bring Korea into Intelsat and to initiate action to have an earth station in a meaningful time frame. This could occur in 1967 if actions are commenced now; otherwise a Korean station probably would not occur before the global system time frame.

3. South America

a. Colombia

This country has expressed intense desire to own and operate an earth station and has long been a partner in Intelsat. During November, 1965, Comsat provided Colombia with site survey technical assistance. They are well along in the series of events necessary to obtain a ground station. Financial means determination is the next step. The U.S. could bolster its interests in Latin America by assisting Colombia find this financial means. This station could appear in time to take advantage of the additional space segment committed for September, 1966.

4. General

In the series of advances that will be made in the space segment, such as increases in capacity, increased power, full global service, and multipurpose satellites with high power affording full global coverage, there are many other countries that should receive our attention to assist them realize the benefits of U.S. technology. During the later time frame, the immense advantage of small, low-cost earth stations, which provide voice, record, and full video presentations should be fully exploited. Each country could then fully develop their own internal communication needs as well as participate in regional and global operations of the voice, record, and video capabilities the large multipurpose satellite would offer. The U.S. could then insure that its message was received by all participating countries of the world.

4. General (Continued)

a. In order to yield equivalent telecommunications capability, small aperture earth stations require the allotment of substantially greater amounts of satellite power than that required by the large aperture stations of the 85-foot diameter aperture type. The use of small aperture earth terminals with the space segment capability that could exist beginning in 1967 is feasible, provided appropriate charges are paid for the increased satellite power used.

APPENDIX F

General Financial Assessment Study
on
Selected Developing Nations

Prepared by ComSat Corporation

December 1965

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GENERAL FINANCIAL ASSESSMENT STUDY

ON

SELECTED DEVELOPING NATIONS

COMMUNICATIONS SATELLITE CORPORATION
OPERATIONS ANALYSIS DEPARTMENT
15 December 1965

Prepared By: Paul E. Torrington

Approved By: Carl W. Johnson

GENERAL FINANCIAL ASSESSMENT STUDY
ON
SELECTED DEVELOPING NATIONS

Table of Contents

15 December 1965

GENERAL FINANCIAL ASSESSMENT STUDY ON SELECTED DEVELOPING NATIONS.

1. INTRODUCTION

1.1 SCOPE

The purpose of this study is to develop a financial assessment of several selected developing nations and to determine the estimated support required to make participation in INTELSAT economically viable for the developing nation. The nations selected for the financial assessment study are:

Africa
- Nigeria
- Ethiopia
- Kenya

South America
- Colombia
- Chile

South Asia & Near East
- India
- Pakistan
- Turkey

Far East
- Thailand
- Korea
- Viet Nam
- Philippines

1.2 ASSUMPTIONS

In the process of developing the financial assessment for each country's active participation in INTELSAT via an earth station, it became necessary to make certain assumptions which will affect the outcome of the analysis and the interpretation of the results. These assumptions are enumerated herein to facilitate evaluating the implications of the study conclusions, and to simplify revaluating the conclusions, whenever there is a change in the basic assumptions.

a. Traffic

The traffic projections used in this analysis include only commercial telephone traffic. A growth factor of 15% annually was applied to the latest available annual message volume in order to determine total telephone messages throughout the study period. Telephone messages were assumed to average six minutes per message.

Record carrier, private line (both industrial and government) wide-band data and television requirements were not included in the basic financial assessments.

b. Space Segment Charge

The space segment charge ($20,000 per half circuit per year) is based on existing 1966 conditions and it is reasonable to assume that these charges will be reduced before 1972 which is another factor that would tend to reduce the indicated deficits.

c. Earth Stations

Each earth station is considered to be equipped with a single 85' diameter steerable antenna with a 50% aperture efficiency and 50° K noise temperature, and associated van mounted equipment. This type of station will be available and in operation in 1967. Earth station investment does not include land, site survey, and site preparation.

d. Antenna Derating Factors

Earth stations equipped with antennas smaller than the standard 85' antenna, 50% aperture efficiency, and 50°K temperature are subject to increased per channel costs for operation. The present derating factors relating antenna size and cost are:

85' Antenna -- 1
42' Antenna -- 6.5
30' Antenna --27.5

For example, one voice channel serviced through an earth station with a 30' antenna would cost 27.5 times as much as through an 85' antenna. These derating factors are based on equivalent power calculations.

e. Early Capability

An early system capability with operation in 1967 was considered in developing the financial assessments. This capability was predicated on the present state of the technical art and that it would be necessary and desirable to attain a global capability as soon as possible.

f. Earth Station - Interface Interconnection

The interconnection between the earth station and the nearest terrestrial network interface can be effected by a one hop microwave link.

1.3 CONCLUSIONS

A review of the study results leads to the following conclusions concerning the economic viability of the earth stations and to consideration of several imponderable factors which influence the economic viability. The problems raised by these factors must be resolved on a case-by-case basis.

a. Several countries have already expressed their interest in building an earth station to operate with INTELSAT, and are currently proceeding with their earth station planning. These countries are:

Nigeria
Pakistan
India

Reference: Communications Satellite Earth Station Data Table 3, Section B.

The other countries considered in this analysis have not officially expressed an interest in participating in INTELSAT.

Reference: Communications Satellite Earth Station Data, Table 4, Section 4.

b. The United States can implement additional circuits above and beyond the normal requirements for commercial service to help offset the deficit incurred by each earth station. Implementation of extra circuits via an earth station might reduce the regular revenues by siphoning off some of the regular traffic into the extra circuits. This condition could be avoided by permitting only special types of U.S. Government traffic to be served by the extra circuits.

c. When implementing extra circuits via an earth station additional costs are incurred for the space segment, terrestrial distribution networks, and earth station at the other end of satellite link. The total costs for an extra circuit can be as high as 500% of the earth station per circuit costs.

d. Television programs of regional interest can be received in a "Television Distribution Mode" by more than one earth station and distributed locally. Since the space segment charge is based on satellite power used, it costs no more for the program to be received by several earth stations simultaneously than by one station. The relative cost of the space segment is therefore less when used in the "Television Distribution Mode."

e. Special television conversion equipment may be needed at the television receive terminals for converting the transmitted television signals into a form compatible with local television standards. Areas having no existing local television standards might be encouraged to accept the 525 line, 30 frame U.S. standard on the basis of economics and availability of equipment. Thus a firm economic tie with American industry can be effected.

f. Overbuild of the terrestrial network may be required to provide simultaneous television and voice service to the nearest transit center.

1.4 SUMMARY OF FINANCIAL ASSESSMENTS

The following table summarizes the total investment, amortization, interest, and deficit applicable to the twelve countries studied. Amortization, interest, and deficit are listed annually. For those countries running into deficit operations, the average annual deficit is approximately $5.0 million for all countries.

Of the twelve countries considered in these studies, two (India and Chile) have a surplus from the first year of operation in 1967. By the end of the study period, five countries are operating with revenues exceeding expenses.

The details supporting this summary table may be found in Appendix A. Section 2 summarizes for each country, pertinent information relative to the economic viability of their active participation in INTELSAT via operating an earth station.

SUMMARY OF FINANCIAL ASSESSMENTS
OF 12 COUNTRIES UNDER STUDY
(Dollars in Millions)

	1966	1967	1968	1969	1970	1971	1972	TOTAL
1. Earth Station Investment	$37.2							$37.20
2. Amortization	$	1.58	1.68	1.78	1.89	1.99	2.12	$11.04
3. Interest	$	2.23	2.14	2.04	1.93	1.82	1.69	$11.85
4. Deficit	$	5.37	5.31	4.99	4.66	4.47	4.05	$28.85
5. No. of Countries Incurring Deficit	$	10	10	9	8	8	7	

2. FINANCIAL ASSESSMENT FOR INDIVIDUAL COUNTRIES

The financial assessment for each of the developing nations considered in this study is summarized in this section. The detail analytic work sheet for each developing country are presented in Appendix A: Financial Assessment & Traffic Exhibits.

2.1 AFRICAN COUNTRIES

2.1.1 Nigeria -- For the study period 1966-1972 Nigeria would accumulate a deficit of $2.878 million. This deficit would be greater if Nigeria were not acting as a regional center. About half of Nigeria's traffic would be with other African countries, 47% with Europe and only 4% with the United States. If the traffic to Europe and North America were to slightly increase due to improving economic conditions then the resulting increase in revenues would tend to offset expenses to the extent that Nigeria might become self supporting by 1975.

2.1.2 Ethiopia -- For the study period 1966-1972, Ethiopia would accumulate a deficit of $2.443 million. Approximately half of Ethiopia's traffic would be with other African countries, 12% with the United States and 30% with Europe. At the end of the study period, revenues would be approaching expenses and Ethiopia might become self-supporting by 1975.

2.1.3 Kenya - For the study period 1966-1972 Kenya would accumulate a deficit of $5.520 million. Over half of Kenya's traffic would be with the United Kingdom and approximately 18% with the United States. By the end of the study period expenses would still exceed revenues by over $1 million annually so it appears that Kenya would not become self-supporting for sometime in the future.

2.2 SOUTH AMERICAN COUNTRIES

2.2.1 Colombia -- For the study period 1966-1972, Colombia would accumulate a deficit of $3.319 million. Approximately 75% of Colombia's traffic would be with the United States. If the space segment charge per circuit would be reduced sometime around 1970, Colombia would then become self-supporting before 1975.

2.2.2 Chile - For the study period 1966-1972, Chile would accumulate an excess of $1.940 million. Revenues would exceed expenses by the end of 1969. Approximately 85% of Chile's traffic would be with North America and Europe, which results in a high revenue per call.

2.3 FAR EAST AND SOUTH EAST ASIAN COUNTRIES

2.3.1 Thailand - For the study period Thailand would accumulate a deficit of $4.304 million. This deficit would be greater if

Thailand were not acting as a regional center for Burma and Malaya. Approximately 75% of Thailand's traffic would be with the surrounding area with only 8% to the United States. Thus, the revenue per call would be low. It appears that Thailand would not become self-supporting for sometime in the future.

2.3.2 Korea - For the study period Korea would accumulate a deficit of $3.923 million. Approximately 55% of Korean traffic would be with Japan, and 25% with the United States. Thus, the revenue per call would be low. It appears that Korea would not become self-supporting for sometime in the future.

2.3.3 Viet Nam - For the study period 1966-1972 Viet Nam would accumulate a deficit of $4.765 million. Approximately 38% of Viet Nam's traffic would be with the United States and the rest with the surrounding area. It would seem more economical if economics were the only consideration to service Viet Nam traffic through an earth station in Thailand. If this were not done, then Viet Nam would not become self-supporting for sometime in the future.

2.3.4 Philippines - For the study period 1966-1972 the Philippines would accumulate an excess of $.922 million. Approximately 60% of the Philippines traffic would be with the United States. The estimated revenues would exceed estimated expenses in 1970.

2.4 SOUTH ASIAN AND NEAR EAST COUNTRIES

2.4.1 India - For the study period 1966-1972 India would accumulate an excess of $4.152 million. Approximately 61% of their traffic would be with Europe and 24% with the United States. Estimated revenues would exceed estimated expenses at the end of the first year of operation, 1967.

2.4.2 Pakistan - For the study period 1966-1972, Pakistan would accumulate a deficit of $1.170 million. Approximately 45% of its traffic would be with Europe and 20% with the United States. Estimated revenues would exceed estimated expenses in 1972. No account was made of West Pakistan to East Pakistan traffic needs, in this study only international traffic was considered.

2.4.3 Turkey - For the study period 1966-1972, Turkey would accumulate an excess of $1.243 million. Approximately 70% of its traffic would be with Europe and 20% with the United States. Estimated revenues would exceed estimated expenses in 1968.

APPENDIX A: FINANCIAL ASSESSMENT AND ESTIMATED REVENUES ANALYSES.

GENERAL FINANCIAL ASSESSMENT *

NIGERIA - REGIONAL CENTER

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$	3.000							$ 3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		.100							.100
TOTALS	$	3.100							$ 3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of Total Investment)	$		.465	.465	.465	.465	.465	.465	$ 2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$ 1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$ 4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			14	17	20	23	26	29	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense	$		.280	.340	.400	.460	.520	.580	$ 2.580
TOTAL EXPENSES	$		1.063	1.123	1.183	1.243	1.303	1.363	$ 7.278
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		.425	.516	.607	.823	.936	1.093	$ 4.400
ANNUAL DEFICIT	$		.638	.607	.576	.420	.367	.270	$2.878
ANNUAL SURPLUS	$		--	--	--	--	--	--	---

* All dollars in millions.

Table A.1 General Financial Assessment - Nigeria

NIGERIA

Regional Center

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	63,000	76,500	90,000	102,900	117,000	136,500
Average Revenue per Call *	$15.50	15.50	15.50	18.00	18.00	18.00
Annual Revenue (Gross Millions)	$ .977	1.186	1.395	1.852	2.106	2.457
Nigeria Earth Station Share (½ of Gross Millions)	$ .488	.593	.697	.926	1.053	1.229
Revenues Allocated to Distribution Facilities ($1.00 per message)	$ .063	.077	.090	.103	.117	.136
Revenues Allocated to Satellite Facilities	$ .425	.516	.607	.823	.936	1.093

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* $8.00 for first 3 minutes; $2.50 per minute for each additional minute.

$8.00 is a weighted figure based on:

$15.00 to U.S.	= 4%
$ 8.40 to England	= 23%
$12.00 to Europe	= 24%
$ 6.00 to Intra Africa	= 49%

Table A.2 Estimated Annual Revenues - Nigeria

GENERAL FINANCIAL ASSESSMENT*

ETHIOPIA

EARTH STATION INVESTMENT	1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$ 3.000							$ 3.000
Land (Including Improvements)								
Microwave Facilities (1 Link)	.100							.100
TOTALS	$ 3.100							$ 3.100
EARTH STATION EXPENSES								
Annual Operating Expense (15% of total Investment)	$	.465	.465	.465	.465	.465	.465	$ 2.790
Loan Repayment (6% 15 Years)	$	.318	.318	.318	.318	.318	.318	$ 1.908
TOTALS	$	.783	.783	.783	.783	.783	.783	$ 4.698
SPACE SEGMENT EXPENSES								
Estimated Circuits		9	11	13	14	15	16	
Space Segment Charge per Term. Circuit	$	.020	.020	.020	.020	.020	.020	
Space Segment Expense		.180	.220	.260	.280	.300	.320	$ 1.560
TOTAL EXPENSES	$	.963	1.003	1.043	1.063	1.083	1..03	$ 6.258
REVENUES ALLOCATED TO SATELLITE FACILITIES	$	.308	.442	.545	.785	.840	.895	$ 3.815
ANNUAL DEFICIT	$	.655	.561	.498	.278	.243	.208	$ 2.443
ANNUAL SURPLUS		--	--	--	--	--	--	----

* All dollars in millions.

Table ..... General Financial Assessment - Ethiopia

ETHIOPIA

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	38,400	55,200	68,100	98,100	105,000	111,900
Average Revenue per Call *	$ 18.00	18.00	18.00	18.00	18.00	18.00
Annual Revenue (Gross in Millions)	$ .691	.994	1.226	1.766	1.890	2.014
Ethiopia's Share (½ of Gross)	$ .346	.497	.613	.883	.945	1.007
Revenues Allocated to Distribution Facilities	$ .038	.055	.068	.098	.105	.112
Revenues Allocated to Satellite Facilities	$ .308	.442	.545	.785	.840	.895

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* $ 9.00 for first 3 minutes; $ 3.00 per minute for each additional minute.

$ 9.00 is a weighted figure based on:

$ 15.00 to U.S.	= 12%
$ 8.40 to England	= 14%
$ 12.00 to Europe	= 16%
$ 6.00 to Intra Africa	= 58%

Table A.4 Estimated Annual Revenues - Ethiopia

GENERAL FINANCIAL ASSESSMENT *

KENYA

EARTH STATION INVESTMENT	1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$3.000							$3.000
Land (Including Improvements)								
Microwave Facilities (1 Link)	.100							.100
TOTALS	$3.100							$3.100
EARTH STATION EXPENSES								
Annual Operating Expense (15% of total Investment)		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$	.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$	.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES								
Estimated Circuits		8	12	17	27	29	31	
Space Segment Charge per Term. Circuit	$	.020	.020	.020	.020	.020	.020	$2.480
Space Segment Expense	$	.160	.240	.340	.540	.580	.620	
TOTAL EXPENSES	$	.943	1.023	1.123	1.323	1.363	1.403	$7.178
REVENUES ALLOCATED TO SATELLITE FACILITIES	$	.189	.218	.251	.288	.332	.380	$1.658
ANNUAL DEFICIT	$	.754	.805	.872	1.035	1.031	1.023	$5.520
ANNUAL SURPLUS	--	--	--	--	---	--	--	---

* All dollars in millions.

Table A.5 General Financial Assessment -Kenya

KENYA

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	23,700	27,200	31,300	36,000	41,400	47,600
Average Revenue per Call *	$18.00	18.00	18.00	18.00	18.00	$18.00
Annual Revenue (Gross in Millions)	$ .427	.490	.563	.648	.745	$ .857
Kenya's Share (½ of Gross)	$ .213	.245	.282	.324	.373	$ .428
Revenues Allocated to Distribution Facilities ($1.00 per message)	$ .024	.027	.031	.036	.041	$ .048
Revenues Allocated to Satellite Facilities	$ .189	.218	.251	.288	.332	$ .380

---

* $9.00 for first 3 minutes; $3.00 per minute for each additional minute.

$9.00 is a weighted figure based on:

$15.00 to U.S.	=	18%
$ 6.00 to rest of Africa	=	11%
$ 8.40 to England	=	53%
$ 6.00 to India	=	14%
$12.00 to rest of Europe	=	4%

Table A.6 Estimated Annual Revenues - Kenya

GENERAL FINANCIAL ASSESSMENT *

COLOMBIA

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$	3.000							$3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		.100							.100
TOTALS	$	3.100							$3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of Total Investment)	$		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			40	54	64	72	85	92	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense			.800	1.080	1.280	1.440	1.700	1.840	$8.140
TOTAL EXPENSES	$		1.583	1.863	2.063	2.223	2.483	2.623	$12.838
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		1.069	1.233	1.430	1.656	1.908	2.223	$ 9.519
ANNUAL DEFICIT	$		.514	.630	.633	.567	.575	.400	$ 3.319
ANNUAL SURPLUS	$	--	--	--	--	--	--	--	---

* All dollars in millions.

Table A-7 General Financial Assessment - Colombia

COLOMBIA

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	178,200	205,500	238,500	276,000	318,000	370,500
Average Revenue per Call *	$ 14.00	14.00	14.00	14.00	14.00	14.00
Annual Revenue (Gross in Millions)	$ 2.495	2.877	3.339	3.864	4.452	5.187
Colombia's Share (½ of Gross)	$ 1.247	1.439	1.669	1.932	2.226	2.594
Revenues Allocated to Distribution Facilities	$ .178	.206	.239	.276	.318	.371
Revenues Allocated to Satellite Facilities	$ 1.069	1.233	1.430	1.656	1.908	2.223

---

* $ 8.00 for first 3 minutes; $ 2.00 per minute for each additional minute.

$ 8.00 is a weighted figure based on:

$ 9.00 to U.S.	= 75%
$ 8.40 to England	= 2%
$ 6.00 to Latin America	= 23%

Table A.8 Estimated Annual Revenues - Colombia

GENERAL FINANCIAL ASSESSMENT*

CHILE

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment		$3.000							$3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		$ .100							$ .100
TOTALS		$3.100							$3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of total Investment)	$		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			10	25	27	31	36	39	--
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	--
Space Segment Expense	$		.200	.500	.540	.620	.720	.780	$3.360
TOTAL EXPENSES	$		.983	1.283	1.323	1.403	1.503	1.563	$8.058
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		1.109	1.276	1.610	1.806	2.001	2.196	$9.998
ANNUAL DEFICIT	$		--	.007	--	--	--	--	$ .007
ANNUAL SURPLUS	$		.126	--	.287	.403	.498	.633	$1.947

* All dollars in millions.

Table A.9 General Financial Assessment - Chile

CHILE

-Estimated Revenues-

		1967	1968	1969	1970	1971	1972
Number of Calls per Year		96,500	111,000	140,000	157,000	174,000	191,000
Average Revenue per Call *	$	25.00	25.00	25.00	25.00	25.00	25.00
Annual Revenue (Gross in Millions)	$	2.412	2.775	3.500	3.925	4.350	4.774
Chile's Share (½ of Gross)	$	1.206	1.387	1.750	1.963	2.175	2.387
Revenues Allocated to Distribution Facilities ($1.00 per message)	$	.097	.111	.140	.157	.174	.191
Revenues Allocated to Satellite Facilities	$	1.109	1.276	1.610	1.806	2.001	2.196

---

* $13.00 for first 3 minutes; $4.00 per minute for each additional minute.

$13.00 is a weighted figure based on:

$15.00 to U.S.	=	65%
$ 6.00 to S. America	=	15%
$15.00 to Europe	=	20%

Table A.10 Estimated Annual Revenues - Chile

GENERAL FINANCIAL ASSESSMENT*

THAILAND - REGIONAL CENTER

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$	3.000							$3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		.100							.100
TOTALS	$	3.100							$3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of Total Investment)	$		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6%, 15 years)	$		.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			10	12	14	18	23	29	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense	$		.200	.240	.280	.360	.460	.580	$2.120
TOTAL EXPENSES	$		.983	1.023	1.063	1.143	1.243	1.363	$6.818
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		.275	.330	.384	.424	.487	.614	$2.514
ANNUAL DEFICIT	$		.708	.693	.679	.719	.756	.749	$4.304
ANNUAL SURPLUS	$		--	--	--	--	--	--	--

* All dollars in millions.

Table A.11 General Financial Assessment - Thailand

THAILAND
(Burma, Malaya, Thailand)

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	50,100	60,000	69,900	77,100	88,700	111,600
Average Revenue per Call *	$ 13.00	13.00	13.00	13.00	13.00	13.00
Annual Revenue (Gross in Millions)	$ .651	.780	.909	1.002	1.153	1.451
Thailand's Share (½ of Gross)	$ .325	.390	.454	.501	.576	.726
Revenues Allocated to Distribution Facilities	$ .050	.060	.070	.077	.089	.112
Revenues Allocated to Satellite Facilities	$ .275	.330	.384	.424	.487	.614

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* $ 7.00 for first 3 minutes; $ 2.00 per minute for each additional minute.

$ 7.00 is a weighted figure based on:

$ 12.00 to U.S.	= 8%
$ 6.00 to S.E. Asia	= 75%
$ 8.00 to Japan	= 17%

Table A.12 - Estimated Annual Revenues - Thailand

GENERAL FINANCIAL ASSESSMENT *

FOR KOREA

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$	3.000							$ 3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		.100							.100
TOTALS	$	3.100							$ 3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of Total Investment)			.465	.465	.465	.465	.465	.465	$ 2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$ 1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$ 4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			17	19	21	24	27	30	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense			.340	.380	.420	.480	.540	.600	$ 2.760
TOTAL EXPENSES	$		1.123	1.163	1.203	1.263	1.323	1.383	$ 7.458
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		.407	.464	.534	.611	.709	.810	$ 3.535
ANNUAL DEFICIT	$		.716	.699	.669	.652	.614	.573	$3.923
ANNUAL SURPLUS	$		--	--	--	--	--	--	----

* All dollars in millions.

Table A.13 General Financial Assessment - Korea

KOREA

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	77,400	88,500	101,700	116,400	135,000	154,500
Average Revenue per Call *	$ 12.50	12.50	12.50	12.50	12.50	12.50
Annual Revenue (Gross in Millions)	$ .968	1.106	1.271	1.455	1.688	1.931
Korea's Share (½ of Gross)	$ .484	.553	.636	.727	.844	.965
Revenues Allocated to Distribution Facilities $1.00/message	$ .077	.089	.102	.116	.135	.155
Revenues Allocated to Satellite Facilities	$ .407	.464	.534	.611	.709	.810

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* $6.50 for first 3 minutes; $2.00 per minute for each additional minute.

$6.50 is a weighted figure based on:

$12.00 to U.S. = 25%
$ 6.00 to S.E. Asia = 20%
$ 4.00 to Japan = 55%

Table A.14 - Estimated Annual Revenues - Korea

GENERAL FINANCIAL ASSESSMENT*

VIET NAM

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment		$3.000							$3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		.100							.100
TOTALS		$3.100							$3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of total Investment)	$		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			4	8	10	12	14	16	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense	$		.080	.160	.200	.240	.280	.320	$1.280
TOTAL EXPENSES	$		.863	.943	.983	1.023	1.063	1.103	$5.978
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		.138	.160	.182	.210	.243	.280	$1.213
ANNUAL DEFICIT	$		.725	.783	.801	.813	.820	.823	$4.765
ANNUAL SURPLUS	$		--	--	--	--	--	--	----

* All dollars in millions.

Table A.15 General Financial Assessment - Viet Nam

VIET NAM

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per year	23,000	26,500	30,500	35,100	40,400	46,500
Average Revenue per Call *	$14.00	14.00	14.00	14.00	14.00	14.00
Annual Revenue (Gross in Millions)	$ .322	.371	.427	.491	.566	.651
Viet Nam's share (½ of Gross)	$ .161	.186	.213	.245	.283	.326
Revenue Allocated to Distribution Facilities ($1.00 per message)	$ .023	.026	.031	.035	.040	.046
Revenues Allocated to Satellite Facilities	$ .138	.160	.182	.210	.243	.280

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* $8.00 for first 3 minutes; $2.00 per minute for each additional minute.

$8.00 is a weighted figure based on:
$12.00 to U.S. = 38%
$ 6.00 to S.E. Asia = 62%

Table A.16 - Estimated Annual Revenues- Viet Nam

GENERAL FINANCIAL ASSESSMENT*

PHILIPPINES

EARTH STATION INVESTMENT	1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$3.000							$3.000
Land (Including Improvements)								
Microwave Facilities (1 Link)	$ .100							$ .100
TOTALS	$3.100							$3.100
EARTH STATION EXPENSES								
Annual Operating Expense (15% of Total Investment)	$	.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$	.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$	.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES								
Estimated Circuits		16	22	28	35	44	52	
Space Segment Charge per Term. Circuit	$	.020	.020	.020	.020	.020	.020	$3.940
Space Segment Expense	$	.320	.440	.560	.700	.880	1.040	
TOTAL EXPENSES	$ .318	1.103	1.223	1.343	1.483	1.663	1.823	$8.638
REVENUES ALLOCATED TO SATELLITE FACILITIES	$	.913	1.050	1.338	1.670	2.103	2.486	$9.560
ANNUAL DEFICIT	$	.190	.173	.005	--	--	--	$ .368
ANNUAL SURPLUS	$	--	--	--	.187	.440	.663	$1.290

* All dollars in millions.

Table A.17 General Financial Assessment - Philippines

PHILIPPINES

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per year	107,500	123,600	157,500	196,500	247,500	292,500
Average Revenue per call *	$ 19.00	19.00	19.00	19.00	19.00	19.00
Annual Revenue (Gross in Millions)	$ 2.042	2.348	2.993	3.733	4.703	5.558
Philippines' Share (½ of Gross)	$ 1.021	1.174	1.496	1.867	2.351	2.779
Revenues Allocated to Distribution Facilities ($1.00 per message)	$ .108	.124	.158	.197	.248	.293
Revenues Allocated to Satellite Facilities	$ .913	1.050	1.338	1.670	2.103	2.486

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* $10.00 for first 3 minutes; $3.00 per minute for each additional minute.

$10.00 is a weighted figure based on:

$12.00 to U.S.	=	59%
$ 6.00 to S.E. Asia	=	19%
$ 8.00 to Japan	=	22%

Table A.18 Estimated Annual Revenues -Philippines

GENERAL FINANCIAL ASSESSMENT *

INDIA

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment		$3.000							$3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		.100							.100
TOTALS		$3.100							$3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of Total Investment)	$		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			30	44	53	65	74	86	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense	$		.600	.880	1.060	1.300	1.480	1.720	$ 7.040
TOTAL EXPENSES	$		1.383	1.663	1.843	2.083	2.263	2.053	$11.738
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		1.815	2.087	2.400	2.762	3.175	3.651	$15.890
ANNUAL DEFICIT	$		--	--	--	--	--	--	--
ANNUAL SURPLUS	$		.432	.424	.557	.679	.912	1.148	$4.152

* All dollars in millions.

Table A.19 General Financial Assessment-India

INDIA

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	213,600	245,600	282,500	324,900	373,600	429,600
Average Revenue per Call*	$ 19.00	19.00	19.00	19.00	19.00	$19.00
Annual Revenue (Gross in Millions)	$ 4.058	4.666	5.367	6.173	7.098	$ 8.162
India's Share (½ of Gross)	$ 2.029	2.333	2.683	3.087	3.549	$ 4.081
Revenues Allocated to Distribution Facilities ($1.00 per message)	$ .214	.246	.283	.325	.374	$ .430
Revenues Allocated to Satellite Facilities	$ 1.815	2.087	2.400	2.762	3.175	$ 3.651

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* $10.00 for first 3 minutes; $3.00 per minute for each additional minute.

$10.00 is a weighted figure based on:

$15.00 to U.S.	=	24%
$ 8.40 to U.K.	=	37%
$12.00 to Rest of Europe	=	24%
$ 8.00 to Africa	=	6%
$ 6.00 to Middle East	=	9%

Table A. 20 - Estimated Annual Revenues - India

GENERAL FINANCIAL ASSESSMENT*

PAKISTAN

EARTH STATION INVESTMENT	1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipment	$3.000							$3.000
Land (Including Improvements)								
Microwave Facilities (1 Link)	.100							.100
TOTALS	$3.100							$3.100
EARTH STATION EXPENSES								
Annual Operating Expense (15% of total Investment)	$	.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$	.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$	.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES								
Estimated Circuits		29	33	37	42	47	52	
Space Segment Charge per Term. Circuit	$	.020	.020	.020	.020	.020	.020	
Space Segment Expense	$	.580	.660	.740	.840	.940	1.040	$4.800
TOTAL EXPENSES	$	1.363	1.443	1.523	1.623	1.723	1.823	$9.498
REVENUES ALLOCATED TO SATELLITE FACILITIES	$	.952	1.096	1.258	1.447	1.663	1.912	$8.328
ANNUAL DEFICIT	$	.411	.347	.265	.176	.060	--	$1.259
ANNUAL SURPLUS	$	--	--	--	--	--	.089	$ .089

* All dollars in millions.

Table A-21 General Financial Assessment-Pakistan

PAKISTAN

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	112,000	129,000	148,000	170,200	195,700	225,000
Average Revenue per Call*	$ 19.00	19.00	19.00	19.00	19.00	19.00
Annual Revenue (Gross in Millions)	$ 2.128	2.451	2.812	3.234	3.718	4.275
Pakistan's Share (½ of Gross)	$ 1.064	1.225	1.406	1.617	1.859	2.137
Revenues Allocated to Distribution Facilities $1.00/message	$ .112	.129	.148	.170	.196	.225
Revenues Allocated To Satellite Facilities	$ .952	1.096	1.258	1.447	1.663	1.912

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*
$10.00 for first 3 minutes; $3.00 per minute for each additional minute.

$10.00 is a weighted figure based on:

$ 9.00 to Europe	= 45%
$ 8.00 to North Africa	= 35%
$15.00 to U.S.A.	= 20%

Table A.22 Estimated Annual Revenues-Pakistan

GENERAL FINANCIAL ASSESSMENT*

TURKEY

EARTH STATION INVESTMENT		1966	1967	1968	1969	1970	1971	1972	TOTAL
Equipement		$3.000							$3.000
Land (Including Improvements)									
Microwave Facilities (1 Link)		$ .100							.100
TOTALS		$3.100							3.100
EARTH STATION EXPENSES									
Annual Operating Expense (15% of Total Investment)	$		.465	.465	.465	.465	.465	.465	$2.790
Loan Repayment (6% 15 Years)	$		.318	.318	.318	.318	.318	.318	$1.908
TOTALS	$		.783	.783	.783	.783	.783	.783	$4.698
SPACE SEGMENT EXPENSES									
Estimated Circuits			26	30	34	38	41	46	
Space Segment Charge per Term. Circuit	$		.020	.020	.020	.020	.020	.020	
Space Segment Expense	$		.520	.600	.680	.760	.820	.920	$4.300
TOTAL EXPENSES	$		1.303	1.383	1.463	1.543	1.603	1.703	$8.998
REVENUES ALLOCATED TO SATELLITE FACILITIES	$		1.241	1.428	1.614	1.819	1.955	2.184	$10.241
ANNUAL DEFICIT	$		.062	--	--	--	--	--	$ .062
ANNUAL SURPLUS	$		--	.045	.151	.276	.352	.481	$ 1.305

* All dollars in millions.

Table A.23 General Financial Assessment - Turkey

TURKEY

-Estimated Revenues-

	1967	1968	1969	1970	1971	1972
Number of Calls per Year	146,000	168,000	191,000	214,000	230,000	257,000
Average Revenue per Call *	$ 19.00	19.00	19.00	19.00	19.00	$19.00
Annual Revenue (Gross in Millions)	$ 2.774	3.192	3.610	4.066	4.370	$ 4.883
Turkey's Share (½ of Gross)	$ 1.387	1.596	1.805	2.033	2.185	$ 2.441
Revenues Allocated to Distribution Facilities ($1.00 per message)	$ .146	.168	.191	.214	.230	$ .257
Revenues Allocated to Satellite Facilities	$ 1.241	1.428	1.614	1.819	1.955	$ 2.184

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* $10.00 for first 3 minutes; $3.00 per minute for each additional minute.

$10.00 is a weighted figure based on:
$15.00 to U.S. = 20%
$ 9.00 to Europe = 70%
$10.00 to Africa = 10%

Table A.24 Estimated Annual Revenues - Turkey