Meeting -- Monday, April 14, 1969

General James McCormack, Chairman,
Communications Satellite Corporation
Joseph Charyk, President, COMSAT

MEMORANDUM

THE WHITE HOUSE

WASHINGTON

Comsat

Int'l

- Rate base exclusion of satellite
- Domestic use

FCC regulation & impact on int'l

Domestic

Comsat restrictions ⇒ Comsat shd do or otherwise
Canadian more so corp shd get own bird.

OTM

Rostow Rpt

Need for policy

COMSAT

COMMUNICATIONS SATELLITE CORPORATION

REPORT TO

THE PRESIDENT AND THE CONGRESS FOR THE

CALENDAR YEAR 1968

March 1, 1969

Respectfully submitted herewith to the President and the Congress is the annual report for 1968 on the activities of the Communications Satellite Corporation (COMSAT) pursuant to Section 404 (b) of the Communications Satellite Act of 1962.

JAMES McCORMACK
Chairman and Chief Executive Officer

COMMUNICATIONS SATELLITE CORPORATION
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WASHINGTON, D.C. 20024

CONTENTS

HIGHLIGHTS

- Construction was completed on the three new standard U.S. earth stations at Etam, West Virginia; Jamesburg, California, and Cayey, Puerto Rico, and the stations were put into commercial service, as was the new antenna at the Paumalu, Hawaii, station.

- New standard earth stations were completed in 1968 by national entities in seven foreign countries, and construction of earth stations was begun, or construction contracts were awarded, by national entities in 21 foreign countries.

- Because of a defect in an electrical circuit in the first stage of the vehicle, the launch of the first satellite (F-1) in the INTELSAT III series on September 18, 1968 was unsuccessful.

- The launch of the second satellite (F-2) in the INTELSAT III series on December 18, 1968, was successful and the satellite subsequently was stationed in its intended position over the Atlantic Ocean, more than doubling satellite capacity in that region.

- The INTELSAT III (F-2) was put into commercial service on December 28, 1968, for a transatlantic television transmission. On December 28 after a TAT 4 cable failure the new satellite was used to provide emergency service, utilizing 82 telephone circuits. Full commercial service followed.

- INTELSAT through COMSAT as Manager awarded a contract to Hughes Aircraft Company for the construction of four flight models and a prototype of the next series of satellites, INTELSAT IV, for launch beginning in 1971.

- At the end of 1968 Early Bird had completed 42 months in commercial service, with a record of 100 percent reliability, and was phased out of regular service in January 1969.

- Membership in the International Telecommunications Satellite Consortium (INTELSAT) increased to 63 during 1968 and in February 1969 increased further to 67.

- The international conference on Definitive Arrangements for INTELSAT convened in Washington, D.C., on February 24, 1969.

• Utilization of the satellite system continued to increase, and at December 31, 1968, COMSAT was leasing to its customers 941 full time circuits, compared to 717 at the end of 1967 and 73 at the end of 1966.

• Demand for television coverage via satellite of major U.S. and foreign news events continued to increase. Approximately 666 hours of TV were transmitted via satellite during 1968, nearly triple the amount in 1967.

• From January through December 1968, there were 24 cable outages for which satellite circuits were used during restoration of service. Total temporary satellite utilization for this purpose during the period exceeded 90,000 circuit-hours.

• The expanding system of earth stations and satellites continued to function with high reliability. For the 12 months that ended December 31, 1968, operating reliability was 100 percent for the four satellites in service throughout the year and an average of 99.76 percent for all earth stations in the system.

• To facilitate its expanding research activities, COMSAT began construction of COMSAT Laboratories with completion expected in mid-1969.

• COMSAT consolidated its headquarters and administrative functions in early June in a new headquarters building at L'Enfant Plaza in the Southwest redevelopment area of Washington, D. C.

• COMSAT filed a tariff for wideband channels for service between the U.S. and Spain and between the U.S. mainland and Hawaii, the first service offering by the Corporation of an overseas channel suitable for high-speed data transmission.

• With the sale by International Telephone & Telegraph Corporation of 716,250 shares of COMSAT Series II stock during 1968, total shareholdings by communications common carriers declined further from 50 percent of outstanding shares which they held initially to approximately 38 percent. The two ITT representatives on the COMSAT Board of Directors, Eugene R. Black and Ted B. Westfall, resigned in June 1968 and December 1968, respectively.

• David M. Kennedy, a Series I (Public) director of COMSAT, resigned in December 1968 upon being designated as Secretary of the Treasury. To fill the vacancy, Rudolph A. Peterson, President of Bank of America, was elected in February 1969.

• In accordance with a commitment made to the Congress by the Incorporators of COMSAT following passage of the Communications Satellite Act of 1962, COMSAT, recommended an amendment to the Act, which the Congress passed in February 1969, to make carrier representation on the Board of Directors approximately proportionate to present carrier shareholdings.

INTRODUCTION: A PERIOD OF TRANSITION

With the first successful launching in late 1968 of a satellite in the INTELSAT III series, the Corporation entered a transitional era of far-reaching importance to the future of COMSAT and the future of satellite communications in this nation and abroad. As this report goes to press, a second INTELSAT III has been placed in service and a third is being readied for launch. The INTELSAT III satellites will establish the initial global commercial communications satellite system contemplated in the Communications Satellite Act of 1962, a major milestone in the development of COMSAT and communications generally. At the same time, this is only a stage of progress, as we undertake the building of INTELSAT IV, the successor generation of satellites.

The Corporation, now beginning its seventh year, finds itself entering a period in which its facilities and services are and will be firmly established and in which its maturing capability will be vast in comparison with that of the period just past. It seems inevitable that, with the satellite system now a proven operational success and serving growing international communications requirements, the day will soon arrive when a majority of overseas communications circuits in regular use will be on satellites. The capacity of INTELSAT III satellites now in service, and the capacity of those about to be placed in service, barely four years after the pioneering Early Bird was launched, compare favorably with the total capacity of all submarine cables thus far laid across the oceans. This commanding position of satellites in world communications will very likely cause a reappraisal of the position

of COMSAT in the structure of the U. S. telecommunications industry. Several facets of such a review have been set in motion.

Many of the issues and opportunities facing satellite communications were examined by the Task Force on Telecommunications Policy appointed by the President of the United States in August 1967. The report of that Task Force was submitted to the President in December 1968. Apparently, some of the subject areas examined by the Task Force are under fresh study by the new Administration. Such study could provide a vehicle for a major review of Government policy toward telecommunications, a review of singular importance and timeliness from our point of view.

Among the questions which presumably would be included in such a review of national communications policy, at least two are of special importance to COMSAT, no matter which way they may ultimately be resolved. One is the question of domestic satellite communications. COMSAT has urged that a prompt start be made toward establishing a domestic satellite program and that COMSAT be authorized to provide those facilities and services on an interim basis until ultimate questions of ownership and operating authority are resolved. COMSAT first advanced this proposal to the Federal Communications Commission two years ago. We very much hope that the FCC will come to a decision permitting COMSAT to proceed promptly with such a program, on a basis that is economically viable and manageable in light of the various interests involved, subject to appropriate regulatory conditions and approvals.

Another question of major significance is whether the facilities of U. S. international communications common carriers should be consolidated into a single entity, comprising both satellite and cable facilities. This would depend upon whether, as the satellites emerge as the chief facilities for overseas traffic and the only facilities available for overseas television, major benefits to the ratepayer might result from a consolidation of facilities. The benefits that would be the focus of study would include quality, reliability and variety of services, optimum use of low cost, high capacity facilities, and a single objective philosophy toward investment in new facilities which would obviate wasteful duplication as between cable and satellite.

Other questions may well be in the spotlight during 1969. One is the

policy of the Federal Communications Commission which governs the ownership, management and operation of U. S. earth stations. In 1966 the FCC prescribed a policy calling for joint ownership of U. S. earth stations by COMSAT and the communications common carriers. Under an agreement for the mainland, Hawaii and Puerto Rico stations, drawn pursuant to the FCC policy, COMSAT owns 50 percent of each station and the carriers own the remaining 50 percent in varying shares among themselves. The FCC order establishing this policy provided for a review of that policy, based upon submissions of the parties, commencing in July 1969. This proceeding will be a very important one for COMSAT, since whoever controls the earth stations controls access to the satellite system. This, in turn, determines the use that may be made of the satellites and determines the relationship of the stations to the entity that owns the U. S. share in the satellites and represents the U. S. in the satellite consortium, which entity is, of course, COMSAT.

Finally, the year before us may see the results of the conference of the INTELSAT nations, which commenced in Washington on February 24, 1969. This meeting, reputedly the largest international conference ever held in Washington, involves some 80 delegations, including observer nations. The conference is convened pursuant to the Interim Agreement of 1964 under which INTELSAT now operates, which calls for the formulation of "definitive arrangements" for the global satellite system, with a view to their entry into force by January 1, 1970. Since the most fundamental aspects of a continuing global system will be under discussion during this conference, it is hard to over-estimate its importance as a point of reference in COMSAT's progress. We earnestly believe that the benefits of the global system are too clearly recognized for serious doubt and that an INTELSAT of renewed cohesiveness and a long, stable life will emerge. It is one of COMSAT's chief objectives to bring about this result, and no effort will be spared.

In the light of these major pending questions, the year just past appears as a transitional year from dramatic beginnings to a period of mounting activity which may see resolutions of weighty questions of communications policy.

THE GROUND SEGMENT

EARTH STATION EXPANSION IN THE U.S. AND ABROAD

The construction of new earth station facilities during 1968 extended commercial satellite communications to a number of new countries. Service to Latin America commenced upon the inauguration of a new station in Chile, the first on that continent, and was extended to Mexico and Panama upon the completion of earth stations in those countries. Australia opened a new standard station for full-time commercial service, as did The Philippines, Thailand and Spain. Three new United States earth stations were completed, and a new antenna was added to the existing Hawaii station.

Chile formally dedicated its station in August with a special color telecast orginating at the Chilean Embassy in Washington, D.C., and seen in Chile by participants who included President Eduardo Frei and other dignitaries.

Also during 1968 TV inaugural ceremonies were concluded between the U.S. and The Philippines and between the U.S. and Thailand, marking the completion of a standard antenna in each of those countries to replace the smaller antennas originally used to initiate service.

By the end of the year there were 22 operational earth stations, comprising 20 standard antennas and three non-standard ones, in 14 nations, providing service over the Atlantic and Pacific areas. Three shipboard stations, operated by the National Aeronautics and Space Administration, also were operating with the satellites. When commercial satellite communications began in mid-1965, there were only five stations, providing service only between North America and Western Europe.

Operational earth station antennas at December 31, 1968, were situated at Andover, Maine; Ascension Island, U.K.; Brewster Flat, Washington; Buitrago, Spain; Carnarvon, Australia; Cayey, Puerto Rico; Etam, West Virginia; Fucino, Italy; Goonhilly Downs, England; Grand Canary Island, Spain; Ibaraki, Japan; Jamesburg, California; Longovilo, Chile; Mill Village, Nova Scotia; Moree, Australia; Paumalu, Hawaii (two standard antennas); Pleumeur-Bodou, France; Raisting, West Germany; Sri Racha, Thailand; Tanay, The Philippines; Tulancingo, Mexico; Utibe, Panama, and aboard three NASA ships in the Atlantic, Pacific and Indian Oceans.

Other countries which at the end of 1968 either were actively constructing earth station facilities or had awarded construction contracts included Argentina, Australia (a second and third standard station), Bahrain, Brazil, Canada (a replacement antenna), China (Taiwan), East Africa (Kenya), France (second antenna), West Germany (second antenna), Hong Kong, India, Indonesia, Iran, Italy (second antenna), Japan (second

station), Korea, Kuwait, Lebanon, Morocco, Peru and the United Kingdom (second antenna).

A number of older stations were improved or enlarged during 1968 to meet expanding traffic requirements, and still other new stations were planned for construction.

Significantly, as the higher capacity INTELSAT III satellites came into being, a number of countries initiated programs to equip existing earth station sites with second antennas, which will give them the capability of communicating east and west with satellites stationed over different oceans. As the space segment expands, earth stations are being constructed in increasing numbers in various areas of the world. By the end of 1969, more than 40 earth stations are expected to be in operation or under construction. The number of stations is expected to increase to more than 60 by the end of 1970.

General standards, or operating characteristics, for earth stations in the system are established by the ICSC, governing body of INTELSAT. Operation and maintenance of each station, however, is the responsibility of a designated entity in the particular nation.

U.S. EARTH STATIONS: Construction of three new U.S. stations was completed in 1968, and each was placed in either full- or part-time operation by the end of the year. These stations, equipped with 97-foot diameter antennas for improved capability, can handle all forms of overseas communications via satellite—multi-channel telephone, telegraph, data, facsimile and television. They are situated at Jamesburg, California; Etam, West Virginia, and Cayey, Puerto Rico.

The Etam and Cayey stations went into temporary service on October 1 for the transmission of a special salute to Puerto Rico television program, followed by the transmission of live TV coverage to Puerto Rico of all seven of the World Series baseball games. COMSAT made arrangements with NASA for use of the ATS-3 satellite for these events because the four operational INTELSAT satellites at the time were being used virtually to capacity to provide regular full-time service.

The Etam station was formally dedicated on September 27 at ceremonies in which U.S. Representative Harley O. Staggers of West Virginia, Chairman of the House Interstate and Foreign Commerce Committee, was the main speaker. Participating in the ceremony were Rosel H. Hyde, Chairman of the FCC, and Governor Hulett C. Smith of West Virginia. The Jamesburg station became fully operational on December 1, 1968.

In addition, the Paumalu, Hawaii, station was expanded by the installation of a 97-foot diameter antenna. Paumalu also has an 85-foot antenna and a 42-foot antenna used for tracking, telemetry and control (TT&C), and is the largest commercial earth station in the world.

The new stations at Etam, Cayey and Jamesburg bring to six the number of U.S. stations, and the second large antenna at Paumalu in-

creases the number of standard U.S. antennas in the system to seven, greatly expanding the capacity and flexibility for satellite services in this country. The three original U.S. stations are situated at Andover, Maine; Brewster Flat, Washington, and Paumalu, Hawaii. Extensive modifications and improvements were being completed at these facilities to expand their capability and equip them to work with INTELSAT III spacecraft.

Under an FCC interim policy, the six U.S. stations are jointly owned, with COMSAT serving as Manager, under policies established by an Earth Station Ownership Committee. The ownership quotas assigned by the FCC for the six stations are:

	Earth Stations in		
Owner	Continental U.S.	Hawaii	Puerto Rico
COMSAT	50.0%	50.0%	50.0%
American Telephone & Telegraph Co.	28.5%		
Hawaiian Telephone Co.		30.0%	
All America Cable & Radio			30.0%
ITT World Communications	7.0%	6.0%	11.5%
RCA Global Communications	10.5%	11.0%	4.0%
Western Union International	4.0%	3.0%	4.5%

Alaskan Earth Station: The Corporation applied to the FCC during December 1968, for authority to construct an earth station in Alaska. In the application, COMSAT stated that it was filing in its own behalf, but that it would be willing to share ownership of the facility with appropriate communications carriers, pursuant to an interim earth station ownership policy that would be parallel to the FCC's 1966 interim decision governing ownership of other U.S. earth stations.

The proposed station, with a large steerable antenna and related equipment for sending and receiving, could be built in about 22 months under expected weather conditions.

The Alaskan Communications System presently interconnects directly with carriers serving the continental U.S. only through a 51-circuit undersea cable between Ketchikan and Seattle, which is being used to capacity, and indirectly through terrestrial links traversing Canada. The proposed construction of a station in Alaska was strongly endorsed recently by members of a Task Force on Satellite Communications appointed by Governor Walter J. Hickel of Alaska. A resolution of the group, unanimously supported by Alaska's Congressional delegation, was sent by Governor Hickel to the FCC, Defense Department and other interested parties. It said in part:

> "Distance and high costs inhibit Alaska's economic growth and service to its people. A communications satellite system will provide these badly needed services. Clearly, it is in the public interest that the benefits of modern communications be brought to Alaska as soon as possible.
>
> "We urge the Communications Satellite Corporation to file with the Federal Communications Commission at the earliest possible date.

"We recommend and urge the cooperation of all concerned with making communications by satellite a reality in Alaska."

Guam Earth Station: As a result of the Corporation's inability to persuade certain other U.S. international communications common carriers of the desirability of an agreement for joint ownership of an earth station on the U.S. territory of Guam, COMSAT applied to the FCC for authority to build and operate its own station there. A competing application by other carriers is before the FCC. COMSAT advised the FCC of its willingness to own and operate a Guam station independently, or jointly with other carriers in accordance with the FCC interim earth station policy. The COMSAT site is near Apra Heights, about six miles south of Agana. At year end, COMSAT had issued a Request for Proposal to industry for construction and supply of equipment for both the Guam station and an Alaskan station.

Bogota, Colombia: The versatility of a satellite system was dramatically demonstrated in August 1968, when a transportable station with a 16-foot diameter antenna was air shipped to Bogota and installed to transmit TV coverage via satellite of Pope Paul's visit to the Eucharistic Congress there. La Empresa Nacional de Telecomunicaciones (TELECOM) contracted with COMSAT for the erection and operation of the station. COMSAT made arrangements with Hughes Aircraft Company for provision of the necessary physical facilities. Via an ATS satellite, under arrangements made by COMSAT with NASA for the occasion, the Bogota station successfully transmitted color TV coverage of the Pope's visit to North America and Europe.

Loma Prieta: A transportable earth station with a 30-foot diameter antenna, located atop Mt. Loma Prieta southeast of San Jose, California, was used temporarily during October and November 1968, for TV transmissions to the Pacific. The station, erected by Hughes Aircraft Company under a contract with COMSAT, handled TV broadcasts of the Mexico Olympic Games to Japan via the INTELSAT II (F-2) satellite. It also transmitted video of the Apollo 7 liftoff and splashdown, and subsequently transmitted segments of U.S. national election TV coverage to Hawaii, Australia, Japan and The Philippines. The facility was dismantled and removed from the site on November 8.

COMSAT Technical Assistance to Other Countries: COMSAT continued its program of offering cost-reimbursable technical assistance to those countries seeking advice on earth station construction. Through the end of 1968 the Corporation had entered into contracts with 13 different countries, providing professional advisory services for such things as site selection, drafting of technical specifications, evaluation of specifications, and other matters.

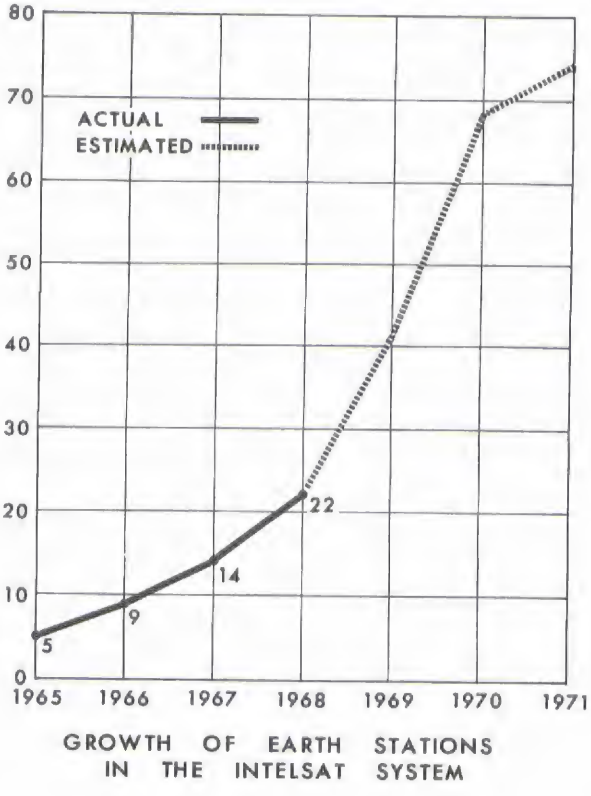


Figure 1: Growth of Earth Stations in the INTELSAT system

(End of the Year)

THE SPACE SEGMENT

EARLY BIRD (INTELSAT I)

At the end of 1968, 42 months after it began commercial service, Early Bird continued to provide regular commercial service between North America and Western Europe, with a record of 100 percent reliability. It was phased out of service on January 18, 1969.

The satellite has been maintained on station between 15 and 45 degrees west longitude by using the on-board control systems to accomplish drift corrections. There has been no malfunction of any of the subsystems in the satellite. No degradation of the communications repeater has been apparent although the expected reduction in solar array power has been observed.

THE INTELSAT II SERIES SATELLITES

The three INTELSAT II series satellites in synchronous orbit continued to provide regular commercial service during 1968, transmitting telephone, television and record traffic from their stations over the Atlantic and Pacific Oceans. Each of these satellites provides capacity for 240 two-way telephone circuits, with twice the geographical coverage of Early Bird, and multiple-access capability for simultaneous operation with more than two stations. They have a design life of three years each.

These three satellites were launched, respectively, on January 11, 1967; March 22, 1967, and September 27, 1967. One of them (F-3) is stationed over the Atlantic Ocean (at 9.4 degrees west longitude on December 31, 1968) where it provides service between earth stations in North America, Latin America, Western Europe, and Ascension and Grand Canary Islands. Two of them (F-2 and F-4) are stationed over the Pacific (at 163 degrees east longitude and 178.0 degrees west longitude on December 31, 1968), providing service between earth stations in the western United States, Hawaii, Australia, and the Far East. The on-board station-keeping fuel in the F-2 is now exhausted, although the satellite continues to provide service.

The first satellite (F-1) in the INTELSAT II series, launched on October 26, 1966, did not reach synchronous orbit when the apogee motor failed to operate properly.

THE INTELSAT III SERIES SATELLITES

Four of these satellites, built for INTELSAT by TRW Systems, Inc., are intended for service—two over the Atlantic Ocean and one each over the Pacific and Indian Oceans. The Indian Ocean satellite will complete the global coverage contemplated in the interim international arrangements for INTELSAT.

The first launch of an INTELSAT III, which occurred on September 18, 1968, failed because of a defect in an electrical circuit. The launch

vehicle, a Long Tank Delta, began to tumble and break up and had to be destroyed, the satellite with it, by the range safety officer at Cape Kennedy. A seven-man review team assembled by NASA determined that the most probable cause of the failure was an intermittent electrical signal in the auto-pilot system in the first stage of the vehicle.

Following this determination, a series of corrective actions were taken in the vehicles, and NASA released the Delta for further launches. The September 18 failure was the first for the Thor Delta first-stage in 59 launch attempts.

The second INTELSAT III series satellite (F-2) was successfully launched from Cape Kennedy on December 18, 1968, and stationed in a synchronous orbit over the Atlantic Ocean at 31 degrees west longitude where it nearly triples satellite capacity in that region. The second successful launch in the series occurred on February 5, 1969, and the satellite (F-3) was placed in commercial service over the Pacific Ocean at 174 degrees east longitude.

Two further INTELSAT III launches are now planned at intervals during the first half of 1969 for positions over the Atlantic Ocean at 6 degrees west longitude (F-4), and Indian Ocean at 62.5 degrees east longitude (F-5).

The INTELSAT III is a spin-stabilized satellite 78 inches in height and 56 inches in diameter. Its weight at liftoff, including apogee motor fuel, is approximately 640 pounds, and in orbit the weight is approximately 322 pounds.

The satellite provides approximately 1,200 two-way telephone circuits, which is five times the capacity of the INTELSAT II series satellites.

Insurance: During 1968, the Corporation negotiated insurance on the launch and orbital emplacement of the INTELSAT III satellite series. Since the Corporation bases its financial planning on a probability of one failure in four, provision had already been made in its rates for two failures in this series. The launch series insurance is intended to cover a catastrophic situation in which more than a normal number of failures occur. In that event, the Corporation would receive $4,571,250 for the third failure and $4,571,250 for the fourth failure in this series. These amounts would cover approximately 75% of the Corporation's share of the cost of the failed satellite and its launch.

(Major characteristics of the launch vehicle for the INTELSAT III series satellites and of potential vehicles for the INTELSAT IV series are given in Appendices 1(a), 1(b) and 1(c).)

TT&C STATIONS: Aside from the earth stations which provide commercial communications, overall system control is maintained by specialized stations that perform tracking, telemetry and command (TT&C) duties. These stations track the satellites in the INTELSAT system, receive telemetry data which reports on the performance and status of the satellites at all times, and transmit commands which activate various on-board communications components or station-keeping components.

The TT&C stations, owned by entities in the nations where they are

situated, provide services to INTELSAT under lease or other appropriate arrangements. The TT&C stations, performing their duties with smaller antennas than the large antennas generally used in the provision of commercial service, are situated at Fucino, Italy; Andover, Maine; Paumalu, Hawaii, and Carnarvon, Australia.

Figure 2

ECONOMIC COMPARISONS OF FOUR GENERATIONS OF COMMERCIAL SATELLITES

	Launch Date	Circuits	Ocean (Pacific, Atlantic, Indian)	Design Lifetime	Circuit Years of Capacity	Investment Per Circuit Year of Capacity
Early Bird (INTELSAT I)	4/6/65	240	A	1½ yrs	360	$15,300
INTELSAT II Series	1966-67	240	A, P	3 yrs	720	8,400
INTELSAT III Series	1968-69	1,200	A, P, I	5 yrs	6,000	1,450
INTELSAT IV Series	1971-73	3,000-10,000*	A, P, I	7 yrs	42,000	500

* Average: 6,000

THE INTELSAT IV SERIES SATELLITES

Following an evaluation of various contractors' proposals for the high-capacity, advanced, INTELSAT IV series satellites, INTELSAT's Interim Communications Satellite Committee approved Hughes Aircraft Company as the contractor. COMSAT, as Manager for INTELSAT, awarded a contract to Hughes in October 1968, at a total cost which, with incentives, could be approximately $72 million.

Each of the satellites will provide, depending on antenna configuration and area of earth to be covered, from 3,000 to 10,000 telephone circuits over a seven-year design lifetime. If the satellite's total capacity were used for television transmission, it could transmit 12 channels simultaneously.

The INTELSAT IVs are intended for launch beginning in 1971 when the two INTELSAT III satellites planned for the Atlantic Ocean are expected to be utilized close to design capacity.

The INTELSAT IVs are expected to come into operation in the same time frame as the fifth transatlantic cable, or TAT 5, which cable interests propose to construct between Rhode Island and Spain with a leg extending to Italy. This 720-circuit cable facility was initially opposed by COMSAT. A traffic sharing formula was set forth by the Federal Communications Com-

mission in early 1968 with the objective of providing assurance that the new cable will not excessively siphon traffic from the satellite system at the expense of communications ratepayers.

The INTELSAT IV contract with Hughes calls for four flight spacecraft and one prototype, along with associated satellite test equipment and ground equipment, all to be delivered in about 22 months. The satellite will be approximately 8 feet in diameter and approximately 18 feet tall weighing approximately 2,450 pounds at liftoff and approximately 1,200 pounds in final stationary orbit.

The launch vehicle is expected to be the Titan IIIB Agena or the Atlas Centaur.

A feature of the INTELSAT IV will be its capability for focusing power into beams directed at heavily populated areas where communication needs are greatest, in particular between North America and Western Europe. This will be made possible by two steerable dish antennas on the satellite which can be pointed at the desired regions of the earth.

Figure 3
MAJOR CHARACTERISTICS OF INTELSAT SATELLITES

Item	Intelsat I	Intelsat II	Intelsat III	Intelsat IV[a]
Diameter, ft	2.36	4.67	4.67	8-9
Height,[b] ft	1.94	2.2	3.41	18
Weight, lb	85	190	322	1200
DC power, watts	33	75	125	500-600
Repeaters	2	1	2	12
Bandwidth per repeater, MHz	25	130	225	35-40
Antenna beam	11 × 360 deg centered at + 7 deg	12 × 360 deg centered at equator	20 × 20 deg	one ea. 20 × 20 deg[c]; two ea. 4.5 × 4.5 deg
Effective radiated power per repeater, watts	10	35	150	200 with 20-deg beam; 4000 with 4.5-deg beam
Total effective radiated power (all repeaters)	20	35	300	2400 (all 20-deg beam); 25,200 (6 ea. 20-deg beam + 6 ea. 4.5-deg beam)

[a] Parameters estimated. [b] Without the antenna.

[c] Six repeaters are permanently connected to the 20-deg beam antenna, while the other six may be switched between the 20- and 4.5-deg beam antennas.

THE PROVISION OF COMMERCIAL SERVICE

FULL-TIME VOICE AND RECORD SERVICE

As a result of the high performance characteristics of the satellites and earth stations in the system, the voice quality of individual telephone calls has proven highly satisfactory for commercial communications. (Television, telegraph messages and other general communications via satellite meet or exceed international standards.)

Most of the revenues of the satellite system result from the full-time lease of circuits for telephone service. Circuits leased for this service and for record traffic continued to increase during 1968. The number of circuits leased full time by COMSAT to its customers at December 31, 1968, was 941 compared to 717 at the end of 1967 and 73 at the end of 1966 when Early Bird was the only fully operational satellite in the system.

With Early Bird and the INTELSAT II series satellites virtually loaded with traffic at the end of 1968, substantial increases in leased circuits are expected to occur as the higher capacity INTELSAT III series satellites come into service.

(Summaries of the utilization of each operational satellite are given in Appendix 2 to this Report.)

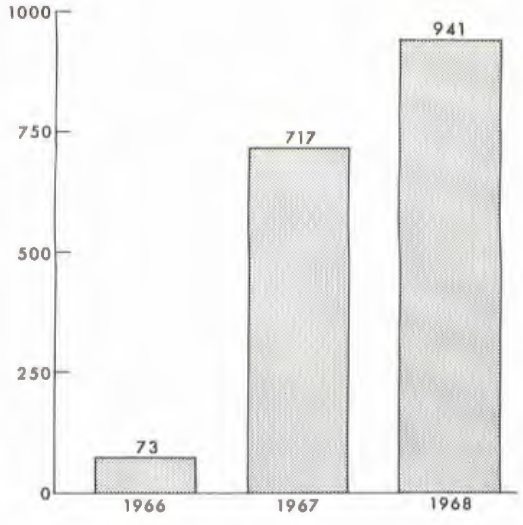


Figure 4: Full-time Circuits Leased by COMSAT to its Customers (at December 31).

TELEVISION SERVICE

The demand for transoceanic commercial television service via satellite continued to increase during 1968, and approximately 666 hours of television were transmitted, nearly triple the amount in 1967. The expanded demand resulted from the Winter Olympic Games at Grenoble, France; the Summer Olympics at Mexico City (230 hours); the U.S. national political conventions (approximately 40 hours); the U.S. Presidential election results (approximately 40 hours), and other significant public affairs events. *(Appendices 2e and 2f indicate TV volume resulting from selected major public affairs events.)*

While television accounts for only a small fraction of the revenues of the satellite system, it provides the public with a continuing dramatic demonstration of the great potential of satellite communications.

OCCASIONAL USE

Approximately 4 percent of satellite usage during 1968 represented temporary service, including additional commentary and news wire service in connection with the Olympic Games in Mexico City and emergency service during restoration of cable circuits. During 1968 there were 24 cable outages for which satellite circuits were used during restoration of the cable service. Only May was free of such accidents. Temporary satellite utilization during cable outages in the period exceeded 90,000 circuit hours. For all kinds of occasional use, utilization amounted to approximately 187,850 circuit hours.

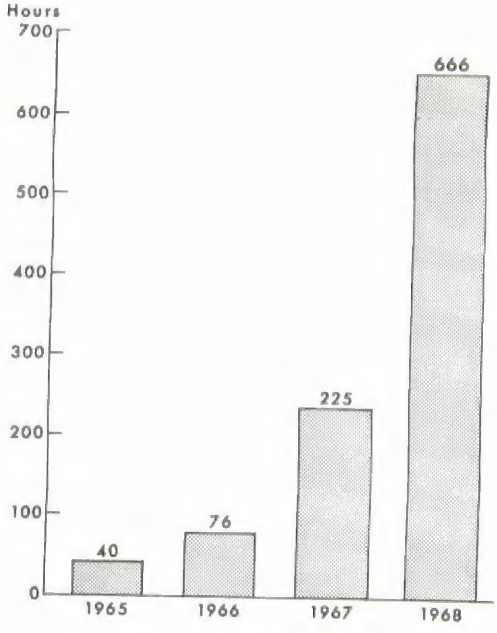


Figure 5: Television Total for All Satellites

(Transmission time only; receive time was greater because of multiple destinations in some cases.)

During December 1968 satellite services were used temporarily during six cable outages. The TRANSPAC cable failure in the Pacific region necessitated restoration of service via INTELSAT II (F-2) and INTELSAT II (F-4) simultaneously to provide double-hop circuits between Japan and the Philippines, via Hawaii, for over 5,000 circuit hours. This was the first recorded use of double-hop satellite communications in commercial service. The results were acceptable. *(A breakdown by month of satellite service during cable outages is given in Appendix 3.)*

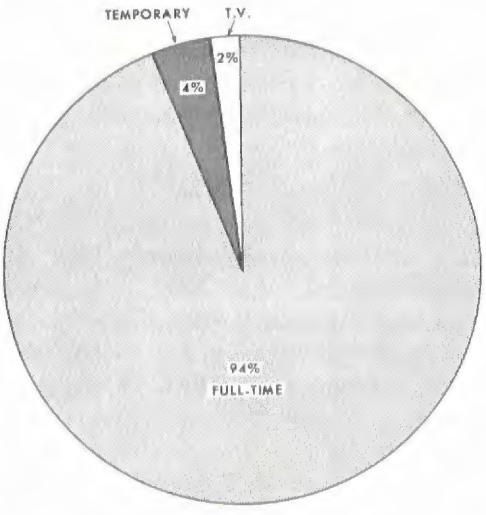


Figure 6: Ratio of Full-time, Temporary and Television Usage During 1968

OPERATING RELIABILITY

The operating reliability of satellites and earth stations is the numerical measurement which indicates the trustworthiness of each. Specifically, it is the percentage of total operating time that a given system is operating successfully. The reliability of service received by users is also affected by the performance of land lines, over which the Corporation has no control.

The reliability of satellites, earth stations, and land lines for the 12 months ended December 31, 1968, follows. The earth station percentages are averages for all stations operating with the indicated satellite.

	Satellite	Earth Stations
Early Bird (Atlantic)	100.00%	99.76%
INTELSAT II, F-2 (Pacific)	100.00%	99.91%
INTELSAT II, F-3 (Atlantic)	100.00%	99.59%
INTELSAT II, F-4 (Pacific)	100.00%	99.86%

EXPERIMENTAL USE

In cooperation with the U.S. Government National Bureau of Standards, an experiment was conducted on October 10, 1968, to help determine the extent to which synchronous communications satellites might be used for dissemination of time synchronization signals. The brief experiment utilized National Bureau of Standards equipment in conjunction with Andover earth station facilities and the INTELSAT II (F-3) satellite. Final results of the test are pending, awaiting complete data analysis by the National Bureau of Standards.

COMSAT RATES AND TARIFFS

At the end of 1968, the Corporation was providing service to customers under two tariffs filed with the Federal Communications Commission. Tariff No. 1 contains the rates and regulations under which the Corporation furnishes Leased Voice Grade, Wideband and Television Channels to authorized common carriers, and Tariff No. 3 provides for furnishing Leased Channels to the National Aeronautics and Space Administration (NASA). Tariff No. 4, which provided for the furnishing of Leased Voice Grade Channels to the Defense Communications Agency (DCA) was cancelled in May 1968, since COMSAT now furnishes its portion of this service under the provisions of Tariff No. 1 to the carriers who then resell the service to DCA. Tariff No. 2 was temporary and is no longer in use. *(Tariffs 1 and 3 are summarized in Appendix 4 to this Report.)*

During 1968 rates for service via satellite were established to several new points including, for the first time, South America (Chile) and Central America (Panama). In addition, television service was inaugurated between the United States Mainland and Puerto Rico. With the advent of satellite service to Chile, the carriers instituted new voice/record services between the two countries. Also, carrier rates for overseas telephone calls to Panama and Chile were reduced. On other routes where satellite service is available, the carriers made significant reductions in voice circuit rates during the year 1968. For example, on the United States/Europe routes, the carriers reduced monthly rates from $6,500 to $6,000 for the circuits they furnish to the mid-ocean point; and between the United States Mainland and Hawaii, the "through" circuit rate was reduced from $9,800 per month to $8,400. COMSAT also filed rates for service to Australia in March of 1968, and the carriers subsequently reduced their monthly voice circuit rates to the mid-ocean point from $15,000 to $10,000. In December 1968 rates were established for satellite service to Pacific area points through the new earth station located at Jamesburg, California.

Throughout 1968 there was continuing study of possible rate treatment and tariff provisions for wideband channels (48kHz) for use in transmitting high-speed data, facsimile, voice and other appropriate signals. On December 10 a COMSAT tariff was filed with the FCC for the provision of this service to the carriers who would in turn provide it to their customers.

The wideband channel (equivalent to 12 voice-grade circuits) was the

first service offering by the Corporation of an overseas channel suitable for high-speed data. This initial offering was established to satisfy an immediate customer requirement between the U.S. and Spain and between the U.S. Mainland and Hawaii as well as to determine what relationships will apply between COMSAT and carrier rates for wideband use.

Because of rapidly changing developments, the Corporation is continually reappraising its revenue requirements and rate structure. At the time this report was written the Corporation was preparing rate reductions for its television customers, made possible by the successful deployment of INTELSAT III series satellites.

During 1968 the Federal Communications Commission held pre-hearing conferences with all parties in Docket 16070 concerning the propriety of COMSAT's rates and possible future earnings, based on a Projection of

Figure 7

EXAMPLES OF U.S. HALF OF TRANSOCEANIC COMMUNICATIONS RATES BEFORE AND AFTER THE AVAILABILITY OF SATELLITE SERVICE

Monthly Leased Voice-Grade Half Circuit
New York to Paris

	U.S. Carrier Midpoint Charge to Users (Monthly)	COMSAT Half-Circuit Charge to Carriers (Monthly) (Earth station to satellite)
Prior to 6/28/65	$ 10,000	
6/28/65 (Commencement of Commercial Operation of Early Bird)		$ 4,200
10/1/66	$ 8,000	
4/4/67		$ 3,800
10/1/67	$ 6,500	
8/1/68	$ 6,000	

Monthly Leased Voice-Grade Half Circuit
San Francisco to Tokyo

	U.S. Carrier Midpoint Charge to Users (Monthly)	COMSAT Half-Circuit Charge to Carriers (Monthly)
10/1/66	$ 15,000	
1/22/67 (Commencement of Regular, Fulltime Satellite Service in the Pacific)		$ 4,900
1/20/67	$ 10,000	

Operating Results through 1971 which was submitted by the Corporation in August 1967. These conferences resulted in an agreement by all parties to postpone further consideration of the matter to sometime beyond December 31, 1968. The FCC subsequently issued an Order on the postponement and specified rules for accounting for the Corporation's operation for the calendar year 1968. The FCC also directed that a revised Projection of Operating Results be filed by November 1, 1968, authorizing the Chief, Common Carrier Bureau, to specify some other submission date if warranted. Chiefly because of the failure of the first INTELSAT III launching on September 18, 1968, the submission date was extended to February 14, 1969. Prior to the latter date, the Corporation filed an application for dismissal of the proceeding under Docket 16070.

PROPOSALS FOR NEW SATELLITE SERVICES

DOMESTIC U.S. SERVICE

A viable system of satellite communications serving domestic U.S. requirements was the subject of continued study and debate during 1968 within the Government, the communications industry and among communications users.

COMSAT has actively studied the application of satellite communications for domestic service since early 1965. In August 1966 the Corporation formally submitted to the Federal Communications Commission in the first of a series of filings, a detailed technical and economic proposal outlining a coordinated system of satellites and earth stations for domestic use.

In order to bring into being expeditiously an initial domestic system, COMSAT proposed to the FCC in March 1967 to establish a Pilot Program —comprising two high capacity satellites and an initial network of about 35 earth stations—and to operate the program as interim owner and manager until resolution by the Government of the question of ownership, a principal cause of delay in authorizing such new services.

In August 1967 President Johnson established a Task Force on Telecommunications Policy and specifically instructed it to study, among other matters, all aspects of a domestic satellite system.

The proven technical and operational success of commercial satellite communications in international service during the past 3½ years has prompted strong interest in several nations in satellites to meet domestic communications requirements.

Already, the Soviet Union, using Molniya satellites and a network of earth stations, has an effective operational domestic system capable of handling many forms of communications across her great land mass, including transmission and reception of television.

In the United States, COMSAT's proposal is designed to provide valuable experience to both government and industry. Such a program, aside from all ownership contentions, offers a tangible opportunity to test for domestic applications the reliability, versatility and economies of satellite communications which have already been proven in international applications.

AERONAUTICAL SATELLITE SERVICE

COMSAT presented a general plan during 1967 for an initial operational demonstration service of voice communications with airlines flying the Atlantic and Pacific Oceans. The level of communications capacity provided for in COMSAT's 1967 plan was considered by potential users to be inadequate for an initial operational demonstration service. Therefore, primarily in response to a requirement of Aeronautical Radio, Incorporated (ARINC), COMSAT developed in 1968 a modified plan based on the use of a higher powered satellite and a somewhat simplified communications function. These improvements are made possible largely by the continual upgrading of the performance of the Delta launch vehicle family. In August 1968 COMSAT, acting as Manager for INTELSAT, requested proposals from industry for the provision of aeronautical satellites and associated equipment in order to explore the technical and economic feasibility of such a service. Proposals have been received which indicate that the system design objectives can be met.

In September 1968 the United States Government presented its views on aeronautical satellites to the Interim Communications Satellite Committee of INTELSAT. In its statement, the U.S. indicated that it sees requirements for: (a) improved air-ground communications in oceanic areas for air traffic and operational control; (b) the reduction of aircraft separation standards as soon as possible; (c) the provision of digital communications capability for a wide range of aeronautical support services; and (d) a likely future requirement for the provision of surveillance capability primarily for air traffic control in certain high traffic areas.

TASK FORCE ON COMMUNICATIONS POLICY

On August 14, 1967, the President of the United States appointed a Task Force to make a comprehensive review of communications policy. He directed the Task Force to examine a number of major questions, including:

Are we making the best use of the electro-magnetic frequency spectrum?

How soon will a domestic satellite system be economically feasible?

Should a domestic satellite system be general purpose or specialized, and should there be more than one system?

How will these and other developments affect COMSAT and the international communication carriers?

The President directed the Task Force to examine the entire U.S. international communications posture and investigate whether the present division of ownership in U.S. international communications facilities best serves national needs, as well as which technology can meet new communication requirements in the most efficient and effective manner. The ultimate decisions on these questions, the President said, will work a revolution in the communications system of the nation.

COMSAT made its staff and materials readily available for study and consultation in order to ensure that the Task Force had the benefit of the most current data on space communications. The Task Force is understood to have made its report to President Johnson in December 1968.

THE INTERNATIONAL CONSORTIUM

CONFERENCE ON DEFINITIVE ARRANGEMENTS

The Plenipotentiary Conference on Definitive Arrangements for the International Telecommunications Satellite Consortium (INTELSAT) convened on February 24, 1969, at the Department of State in Washington, D. C. Most of the member-nations in INTELSAT sent delegations to the conference, and several other nations sent observers. The conference was convened in accordance with provisions of the 1964 International Agreements for Interim Arrangements for INTELSAT, which will remain in effect until superseded by Definitive Arrangements.

MEMBERSHIP AND STRUCTURE

During 1968 membership in the International Telecommunications Satellite Consortium (INTELSAT) increased to 63 nations, with the addi-

tion of Uganda, Turkey, and Iran. In February 1969 Jamaica, Nicaragua, South Vietnam and Luxembourg joined, increasing INTELSAT membership to 67. *(The member nations and investment quotas representing the ownership interests of the participating entities at the end of 1968 are shown in Appendix 5 to this Report.)*

The INTELSAT arrangements were established by two agreements opened for signature on August 20, 1964. The agreements are (a) an intergovernmental "Interim Agreement," containing the organizational principles established for the international system, and (b) a "Special Agreement," signed either by governments or their designated telecommunications entities and dealing with the commercial, technical and financial aspects of the system. Membership in INTELSAT is open to all states which are members of the International Telecommunication Union. A supplementary Agreement on Arbitration, providing for the settlement of legal disputes that may arise in connection with the Special Agreement, was opened for signature on June 4, 1965, and entered into force on November 21, 1966, for all participants in INTELSAT.

The Interim Agreement establishes a governing body, the Interim Communications Satellite Committee, known as the "Committee" or the "ICSC," and also designates the Communications Satellite Corporation as Manager.

The ICSC makes all important policy decisions for INTELSAT, including the pricing of units of satellite utilization, the granting of approval of earth stations to use INTELSAT satellites, decisions relating to the award of important manufacturing and service contracts, satellite launchings and other matters necessary for the design, development, establishment, maintenance and operation of the space segment * of the global communications satellite system.

The total membership of the Committee has increased from 9 members at the end of 1964 to a total of 18 members representing 48 Signatories to the Special Agreement. The current membership of the Committee is composed of representatives of Signatories from the following countries or groups of countries:

The Arab Group:
(Representing: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Republic, Yemen)

* The term "space segment" encompasses the satellites and related tracking, telemetry, and control facilities.

Argentina
Asia/Pacific Group
(Representing: The Philippines, Ceylon, India, Indonesia, Malaysia, New Zealand, Singapore, Thailand)
Australia
Belgium/The Netherlands
Brazil
Canada
Colombia/Chile/Venezuela
Denmark/Norway/Sweden
France/Monaco
Germany
Italy/The Vatican
Japan
Mexico
Spain/Portugal
Switzerland/Austria/Liechtenstein
United Kingdom/Ireland
United States of America

COMSAT provides the United States' representation on the Committee. Also, the Corporation's representative on the ICSC is currently serving as Chairman and previously served as Vice-Chairman through the first six months of 1968. The Chairman and Vice-Chairman serve for terms of one year, beginning in June. In accordance with the Committee's rules of procedure, the representative of COMSAT, being the representative with the largest vote on the Committee, alternates each year between the positions of Chairman and Vice-Chairman.*

In 1968 meetings of the ICSC took place approximately once every eight weeks, with sessions lasting eight to ten days. The ICSC held seven meetings—six at its headquarters in Washington, D.C., and one in Naples, Italy, making a total of 36 meetings since its establishment in 1964.

The ICSC has three advisory subcommittees—on Finance, Technical Matters, and Contracting Procedures—to assist it in the performance of its functions. From time to time, ad hoc groups composed of experts in particular fields are also set up to provide advice on specialized matters.

Regional Operational Coordinating Groups have been established for the Atlantic, Pacific and Indian Ocean areas, respectively, to optimize utilization of the satellites by assuring cooperation between space segment and ground segment operators.

The Interim Agreement states that the Committee should strive to achieve unanimity in reaching decisions but also provides a voting formula to be used where unanimity cannot be achieved. This voting formula, which applies to important decisions enumerated in the Interim Agreement, requires the concurrence of the United States' Representative and of

* The COMSAT quota has declined from the initial quota of 61 percent as of August 1964 to approximately 53 percent as the result of accession by a number of countries.

other members of the Committee whose total votes exceed the United States' vote by not less than 12.5 percent.

COMSAT AS MANAGER

In addition to its role as the United States' Signatory to the Special Agreement and representative on the ICSC, COMSAT also acts as Manager for INTELSAT. In this capacity, COMSAT acts pursuant to general policies and specific determinations of the Committee. It procures the satellites and other facilities and equipment for the space segment, arranges for the launching of the satellites, operates the space segment, including the satellites and associated tracking, telemetry and command equipment, collects and disburses all funds received from capital contributions and operating revenues, and makes studies and recommendations on a wide variety of subjects.

While most of the staff members who carry out the Manager's responsibilities are regular COMSAT employees, this group is enlarged each year by persons nominated by other members of INTELSAT and selected by the ICSC to spend a year or more at COMSAT working on INTELSAT projects. Persons coming to Washington, D.C., under this program remain employees of their respective entities in INTELSAT, and the cost of their participation in the work of the Manager is borne by all INTELSAT members in proportion to their quotas. As of December 31, 1968, 23 such nominees had been approved by the Committee to work on the Manager's technical and operations staffs. These persons have come from Denmark, France, Germany, Italy, Japan, The Netherlands, Norway, Sweden, United Arab Republic and the United Kingdom.

On June 1, 1968, a separate Office of INTELSAT Management was established within the Corporation to provide a focal point of responsibility and accountability to INTELSAT for the development and administration by COMSAT, as Manager for INTELSAT, of policies, plans and programs related to the space segment. The Director of the OIM reports to the President of the Corporation.

SIGNIFICANT INTELSAT ACHIEVEMENTS DURING 1968

Significant achievements of INTELSAT during 1968 have included the following:

(1) Approval by the Committee of a contract for the INTELSAT IV series of satellites.

(2) Approval by the Committee of locations for the first four satellites of the INTELSAT III series over the Atlantic, Pacific and Indian Oceans.

(3) Agreement by the Committee on the reservation of capacity in the INTELSAT III satellites sufficient to provide good quality television transmissions in either color or black-and-white.

(4) Approval by the Committee of arrangements for operation of track-

ing, telemetry, and control facilities for the INTELSAT III satellites in the United States, Australia, and Italy.

(5) Use of one of the INTELSAT II satellites located over the Pacific Ocean to provide live television coverage of the Olympic Games.

(6) Approval and support by the Committee of a comprehensive program to reflect the R&D interests and requirements of INTELSAT, i.e., to advance satellite and communications technology, to explore new opportunities for the use of satellite communications within the purview of INTELSAT, and to support the implementation and operation of the international commercial system. The R&D effort totaling just under $3 million in 1968 was carried out partly in-house at COMSAT Laboratories and partly under contract to industries on an international basis.

RESEARCH AND DEVELOPMENT

COMSAT LABORATORIES

COMSAT Laboratories provides the Corporation a capability for research, development, and project support in space and communications technology. The mission of the Laboratories comprises three general tasks:

- Research to advance the technology of satellite communications and to explore new uses for this technology.

- Development of experimental and prototype devices and systems.

- Scientific and technical support for operations, procurement and other elements of the Corporation.

These tasks apply in each of the roles of the Corporation: that of U.S. participant in INTELSAT, Manager on behalf of all the participants in INTELSAT, Manager for the U.S. Earth Station Owners' Committee, and a U.S. communications common carrier.

During 1968 COMSAT Laboratories undertook a broad program with an R&D budget of approximately $6 million while still in its temporary quarters in downtown Washington, D.C. Construction of a permanent Laboratories building near Clarksburg, Maryland, is proceeding on schedule, and the new building should be ready for occupancy in mid-1969. The building will contain 254,000 square feet of floor space. It is on a 209-acre site.

The responsibilities and accomplishments of the six individual laboratories during 1968 were as follows:

RF Transmission Laboratory: This laboratory is charged with improving the state of the art in information transmission efficiency. Techniques of generating, amplifying, and processing radio frequencies from the HF through the EFH are studied. Hardware technology of interest includes earth terminal and spaceborne transmitters, receivers, antennas, modulators and demodulators, and RF components.

The RF Transmission Laboratory is presently developing an experimental prototype of a multiple carrier performance monitor. Measurement techniques and operating accuracy are being evaluated at the 85-foot Paumalu antenna and the 42-foot station (TT&C) at Andover by monitoring the INTELSAT II and III satellites.

Communications Processing Laboratory: The aim of research and development in communications processing is to improve the quality and efficiency of transmission of signals from baseband at an earth station, through the satellite and to reception at another earth station. Areas of continuing interest to this laboratory include modulation, demodulation and detection; multiple access systems; telemetry, tracking and control; bandwidth compression; digital processing; error coding and decoding; and switching, signaling and multiplexing.

Two multiple access systems are being developed under INTELSAT sponsorship. A frequency-division system, known as SPADE, which provides fully variable demand assignment without central control, was tested between Andover and Cayey in November 1968. Demonstrations of the SPADE system are planned for early 1969 between Goonhilly and Etam, and possibly between other stations. A time-division system, MAT-1, promises to provide fully variable demand assignment for 600 channels. The system is expected to be ready for field testing in the Pacific during 1969. In addition, two contracts were awarded in 1968 for analyses of the technical, economic, and operational aspects of demand-asssignment TDMA and FDMA systems. These studies will be completed in 1969.

Both in-house and contract research is continuing in the area of echo suppression. New methods being investigated include cancellation and selective attenuation types of suppressors. A contract will be awarded in the near future for a study of the subjective acceptability of various levels of delay and echo return loss.

Spacecraft Laboratory: The principal efforts of this laboratory are directed toward improving high-accuracy positioning and orientation techniques; increased power-to-weight ratios for electric power generation, storage, and regulation; improving strength-to-weight ratios for spacecraft structures; and advancing the state of the art in mechanical devices, including large-aperture, narrow-beam antenna structures, bearings for despun antennas, and slip rings and lubricants. The laboratory is also engaged in studies of thermal control to distribute and dissipate heat so as to provide a desirable environment for critical components.

In the important area of on-board electric power systems, testing and evaluation have been conducted on nickel-cadmium cells and silver-zinc secondary battery cells. Investigation of thin-film cadmium-sulfide solar cells is continuing.

A long-term testing program has already produced much useful information relating to dry-film lubricated, large-bore bearings of the type for

which considerable application is expected in future communications satellites. Studies were conducted during 1968 to evaluate various devices and materials, including an earth horizon sensor and the aft thermal barrier of the INTELSAT III.

Systems Analysis Laboratory: The Systems Analysis Laboratory performs analyses and trade-off studies of the theoretical capabilities of a variety of systems to provide satellite-supported communications services. These studies are aimed at the establishment of new kinds of service and the improvement of existing kinds. The laboratory's recent work has included the parametric analysis of a data relay system.

Systems Integration Laboratory: The concern of this laboratory is the integration of and setting of priorities for the R&D activities of the individual laboratories for application to common objectives.

During 1968 studies were conducted of frequency sharing, orbital allocation and modulation technique optimization, and a study of the power flux density limitation of stationary orbit satellites was completed. The laboratory made preliminary measurements of precipitation scatter, and follow-on experiments in this area have been planned. Research on frequency sharing, spectrum utilization, orbital allocation, propagation and modulation techniques will continue in 1969.

Physics Laboratory: The Physics Laboratory performs research involving the application of fundamental physical properties to problems of satellite communications. It serves as a focal point for applied research in such areas as solid state physics, physical chemistry and materials analysis. Of particular interest are studies and simulation of the space radiation environment and the behavior of various spacecraft components under conditions of outer space. The laboratory also conducts reliability trade-off studies of components.

Beginning in August 1968 the Physics Laboratory undertook a comprehensive program to gain and maintain a knowledgeable position regarding developments in microwave materials, technology and devices, with a view toward adapting these developments for use in satellite communications. The emphasis will be on solid state devices.

Analytical models predicting the performance degradation of certain satellite components exposed to space radiation have been developed and are presently being refined. This effort will continue in 1969.

CORPORATE MATTERS

OWNERSHIP OF SHARES

At the end of 1968, 132,102 Series I (public) shareholders of record held an aggregate of 6,194,714 shares or 61.95 percent of the Corporation's total outstanding stock. One hundred and seventeen Series II, or carrier, shareholders held 3,805,300 shares or 38.05 percent of the total outstanding shares.

With the sale of shares by several carriers to the public, Series I share-

holders have increased their percentage of ownership of outstanding shares by 11.95 percent since the initial stock offering.

An analysis of the shareholder population at the year's end showed:

- Over one-quarter (36,620) of Series I shareholders are children whose shares are held for them by custodians under the Uniform Gifts to Minors Act.
- Series I shareholders live in every state of the nation and in 41 foreign countries.
- Foreign certificate holders, who under the Communications Satellite Act of 1962 may not own more than 20 percent of the Corporation's outstanding Series I stock, hold 5.53 percent of such shares.
- Nearly 59 percent of Series I shareholders hold ten or fewer shares. Fewer than 2 percent hold more than 100 shares each.
- Series I shareholders (excluding brokers, banks, and nominees) hold an average of 22.7 shares.

(Appendix 6 to this report presents a comparative summary of Series I shareholdings for the past five years. Appendix 7 summarizes the geographical distribution of the 1968 shareholder population.)

ANNUAL MEETING OF SHAREHOLDERS

Some 600 persons attended the Corporation's fifth Annual Meeting of Shareholders in Washington, D.C., on May 14, 1968. Series I and II shareholders reelected 12 of the Corporation's 15 directors. (Three other directors, in nonelective positions, are appointed by the President of the United States with the advice and consent of the Senate.) The shareholders continued the appointment of Haskins and Sells, 1000 Connecticut Avenue, Washington, D.C., as the Corporation's independent public accountants, to serve until the next Annual Meeting. Shareholders also approved an amendment to the Corporation's By-laws, broadening indemnification provisions for corporate directors, officers and employees; and rejected a shareholder-sponsored proposal to place a fixed dollar ceiling on employee pensions. Series I shareholders voted 66.6 percent of the outstanding proxies eligible to be voted; Series II shareholders voted 98.9 percent of their proxies.

DIRECTORS, OFFICERS AND OFFICIALS

The 12 incumbent directors elected at the Annual Meeting of Shareholders and the three Presidentially appointed directors met regularly at least once a month, including the Annual Meeting of the Board held in May.

Series I Directors: Following his designation as Secretary of the Treasury by President-elect Nixon, David M. Kennedy, an Incorporator of COMSAT and a Series I (public) director, resigned from the Board of Directors, effective December 31, 1968. In February 1969, Rudolph A. Peterson, President of Bank of America, was elected to the vacancy by Series I directors.

Series II Directors: On June 21, following an International Telephone & Telegraph Corporation (ITT) sale of 316,250 shares of COMSAT stock, Eugene R. Black, a director of COMSAT since September, 1964, and a director of ITT, resigned from the COMSAT Board, reducing the Series II (communications common carrier) representation on the Board from six to five. Ted B. Westfall, a COMSAT director and a director of ITT, resigned from the COMSAT Board, effective December 31, following the ITT additional sale of 400,000 shares. (In May 1967 ITT had sold 235,000 of the approximately 1,050,000 shares that it owned originally.)

Directors Appointed by the President: Frederic G. Donner was reappointed by the President of the United States to a third term as a director on COMSAT's Board. Under this appointment, which was confirmed by the Senate on May 9, Mr. Donner will serve until the 1971 Annual Meeting. William W. Hagerty and George P. Meany continued as Presidentially appointed directors.

Officers and Officials: At the Annual Meeting of the Board, directors elected the officers of the Corporation. In September the Board elected Lucius D. Battle as Vice President for Corporate Relations. Mr. Battle formerly served as Assistant Secretary of State for Near Eastern and South Asian Affairs, U. S. Ambassador to the United Arab Republic, and Assistant Secretary of State for Educational and Cultural Affairs. J. David Marks, Assistant Secretary of the Corporation from 1964 to 1967, and Secretary of the Corporation since January 1967, resigned, effective January 3, 1969. Bruce S. Lane, with COMSAT since August 1965, and Assistant General Counsel since May 1966, was named Secretary. Thomas W. Harrington was appointed Director of the Office of Personnel, effective January 4, 1969, replacing James R. Willson, who resigned in November. Kenneth F. Zitzman and Joseph H. Engel were appointed respectively to the newly created positions of Director of the Office of INTELSAT Management and Director of the Office of Planning Research and Services, both during 1968.

(Appendix 8 lists the Corporation's directors, their principal occupations and the series of shares by which each is elected. Appendix 9 lists the officers and officials of the Corporation.)

Financial Statements: The Corporation will transmit to the President and the Congress at a later date its financial statements for the calendar year 1968, together with the related opinion of Haskins and Sells, the Corporation's independent public accountants. Audited figures for the preceeding year were not available at the time this report was prepared. *(Appendices 10 and 11 show the Corporation's revenues, interest income and assets.)*

AMENDMENT TO THE COMMUNICATIONS SATELLITE ACT

In accordance with a commitment made to the Congress by the Incorporators of COMSAT, the Corporation recommended an amendment to the Communications Satellite Act of 1962 to make carrier representation on the Board of Directors approximately proportionate to present carrier share-

holding. A bill to accomplish this was introduced in the Senate during 1968, by Senator John O. Pastore and Senator Clinton P. Anderson. The Congress adjourned before taking action on the bill, and a similar bill was introduced early in 1969, receiving final passage in the Congress in February.

The amendment establishes a formula under which the number of directors elected respectively by the Series I (public) shareholders and the Series II (carrier) shareholders will be approximately proportionate to the total number of shares held by each series, as of the record date for the Annual Meeting of Shareholders. Accordingly at the 1969 annual meeting, eight Series I directors and four Series II directors will be proposed for election by the shareholders.

At the time of the public financing of the Corporation, 50 percent of the shares were sold to individual investors and 50 percent were sold to authorized communications common carriers, pursuant to provisions of the Satellite Act. Subsequently, some of the carriers sold shares, these then being purchased by individual investors. With the further sales by International Telephone & Telegraph Corporation of COMSAT Series II shares in 1968, total carrier holdings declined further from their initial 50 percent to approximately 38 percent.

The Satellite Act, under which was contemplated a fifty-fifty distribution of shares among carriers and the public, provided originally that six directors be elected by the public shareholders (Series I) and six be elected by the carrier shareholders (Series II), with three directors being appointed by the President of the United States with the advice and consent of the Senate.

HEADQUARTERS AND EMPLOYEES

In the summer of 1968 the Corporation occupied its new headquarters building in the L'Enfant Plaza development in the Southwest area of Washington, D.C., consolidating there its executive and administrative functions which previously had been situated in three office buildings in downtown Washington, D.C.

Some of the space in this building is occupied by participants in INTELSAT, on a reimbursable basis, for offices for their representatives on the Interim Communications Satellite Committee. The building also serves as INTELSAT headquarters and is the regular meeting place of the ICSC.

In a lobby area of the building, work is being completed on a Visitors Center which will include models and exhibits depicting the growth and operation of the satellite system.

The number of employees of the Corporation continued to increase during 1968 as a result of the expanding scope of the Corporation's activities in satellite operations; planning, establishment and operation of earth stations, and the research and development program. At the end of 1968, the number of full-time regular COMSAT employees was approximately 1,155, compared to 770 at the end of 1967.

Appendix 1(a)

INTELSAT III LAUNCH VEHICLE

Long Tank Delta

Manufacturer: McDonnell Douglas Corporation

Number of Stages: Three Plus Solid Augmentation

Maximum Diameter: 8 feet
Payload Fairing Diameter: 5 feet
Total Length: 106 feet

Weight at Liftoff: 200,250 pounds

Payload capability into synchronous transfer orbit: 750 pounds

Stage Descriptions

	First Stage		Second Stage	Third Stage
	Augmentation	Main Engine		
Engine designation:	3 Castor II	MB-3 Block III	AJ10-118E	TE-364-3
Propellants:	Solid	LO_2, RJ-1	IRFNA, UDMH	Solid
Thrust:	180,000 pounds (maximum)	192,000 pounds (maximum)	7,780 pounds (nominal)	9,480 pounds (nominal)
Burn time (nominal):	38 seconds	222 seconds	378 seconds	44 seconds
Guidance:	Programmed radio inertial		Programmed radio inertial	Spin stabilized

Appendix 1(b)

POTENTIAL INTELSAT IV LAUNCH VEHICLE

Atlas/Centaur

Manufacturer: General Dynamics, Convair Division

Number of Stages: Two and one-half

Diameter: 10 feet

Payload Fairing Diameter: 10 feet

Total Length: 134 feet

Weight at Liftoff: 330,000 pounds

Payload capability into synchronous transfer orbit: 3,800 pounds

Stage Descriptions

	Atlas Booster	Atlas Sustainer	Centaur
Engine designation:	YLR89-NA-7 (two)	YLR105-NA-7	RL10A3-3 (two)
Propellants:	LO_2, RP-1	LO_2, RP-1	LO_2, LH_2
Thrust:	336,000 pounds (S.L.)	58,000 pounds (S.L.)	30,000 pounds
Burn time (nominal):	153 seconds	248 seconds	450 seconds (2 burns)
Guidance:	All Inertial		

Appendix 1(c)

POTENTIAL INTELSAT IV LAUNCH VEHICLE

Titan IIIB/Agena

Manufacturer: Titan IIIB—Martin Marietta Corporation
Agena—Lockheed Missiles and Space Company

Number of Stages: Three

Diameter: 10 feet

Payload fairing diameter: 10 feet

Total length: 130 feet

Weight at Liftoff: 355,000 pounds

Payload capability into synchronous transfer orbit: 2,452 pounds

Stage Descriptions

	Titan Stage I	Titan Stage II	Agena
Engine designation:	LR87-AJ-11 (two)	LR91-AJ-9	YLR81-BA-11
Propellants:	N_2O_4, Aerozene 50	N_2O_4, Aerozene 50	IRFNA, UDMH
Thrust:	517,000 pounds (maximum)	103,000 pounds (maximum)	16,000 pounds (approximately)
Burn time (nominal):	140 seconds	200 seconds	345 seconds (2 burns)
Guidance:	Programmed radio inertial	Programmed radio inertial	Programmed inertial with earth reference

Appendix 2a

SUMMARY OF VOICE-GRADE CHANNEL UTILIZATION OF THE EARLY BIRD (INTELSAT I) SATELLITE

(at December 31, 1968)

User of Voice-Grade Channels	*Number of Half-Channels Used*	*Countries of Ultimate Destination of Channels Used*
American Telephone and Telegraph Company	173	Austria—3, Belgium—11, Denmark—4, France—39, W. Germany—15, Ireland—5, Israel—3, Netherlands—6, Norway—3, Sweden—5, Switzerland—9, United Kingdom—70
Canadian Overseas Telecommunications Corp.	35	Belgium—1, France—8, Ireland—2, W. Germany—6, Netherlands—2, Switzerland—1, United Kingdom—15
ITT World Communications, Inc.	3	France—1, W. Germany—1, United Kingdom—1
RCA Communications, Inc.	3	W. Germany—1, United Kingdom—2
Western Union International	4	France—2, United Kingdom—2
	218	

Appendix 2b

SUMMARY OF VOICE-GRADE CHANNEL UTILIZATION OF THE INTELSAT II (F-2) (PACIFIC) SATELLITE

(at December 31, 1968)

User of Voice-Grade Channels	*Number of Half-Channels Used*	*Countries of Ultimate Destination of Channels Used*
American Telephone and Telegraph Company (Hawaii)	3	Philippines—1, Thailand—2
Hawaiian Telephone Co. (Hawaii)	3	Philippines—3
ITT World Communications, Inc. (Hawaii)	4	Philippines—4
RCA Communications, Inc. (Hawaii)	11	Philippines—1, Thailand—10
Western Union International (Hawaii)	6	Philippines—6
	27	
NON-COMSAT:		
Philippines	5	Thailand—5
	32	

Appendix 2c

SUMMARY OF VOICE-GRADE CHANNEL UTILIZATION OF THE INTELSAT II (F-3) (ATLANTIC) SATELLITE

(at December 31, 1968)

User of Voice-Grade Channels	*Number of Half-Channels Used*	*Countries of Ultimate Destination of Channels Used*
American Telephone and Telegraph Company	89	Chile—10, Panama—8, Greece—3, Italy—36, Switzerland—4, Spain—28
Canadian Overseas Telecommunications Corp.	8	Greece—1, Italy—5, Spain—2
ITT World Communications, Inc.	13	Ascension Is.—4, Chile—3, W. Germany—1, Italy—1, Spain—4
RCA Communications, Inc.	4	Italy—1, Switzerland—2, Spain—1
Western Union International	6	W. Germany—2, Italy—2*, Switzerland—1, Spain—1
NASCOM	233**	+Spain (Canary Island) —7, +United Kingdom (Ascension Island)—7, +United States (Atlantic Ocean Ship)—7, +United States (Indian Ocean Ship)—7
	353	
NON-COMSAT:		
Chile	5	Italy—2, Panama—1, Spain—1, W. Germany—1
Italy	1	Panama—1
	359	

* One channel is evenly divided among ITT, RCA and WUI.
\+ These channels are time-shared.
** This represents the number of units from which COMSAT derives revenue for the 28 NASCOM circuits.

Appendix 2d

SUMMARY OF VOICE-GRADE CHANNEL UTILIZATION OF THE INTELSAT II (F-4) (PACIFIC) SATELLITE

(at December 31, 1968)

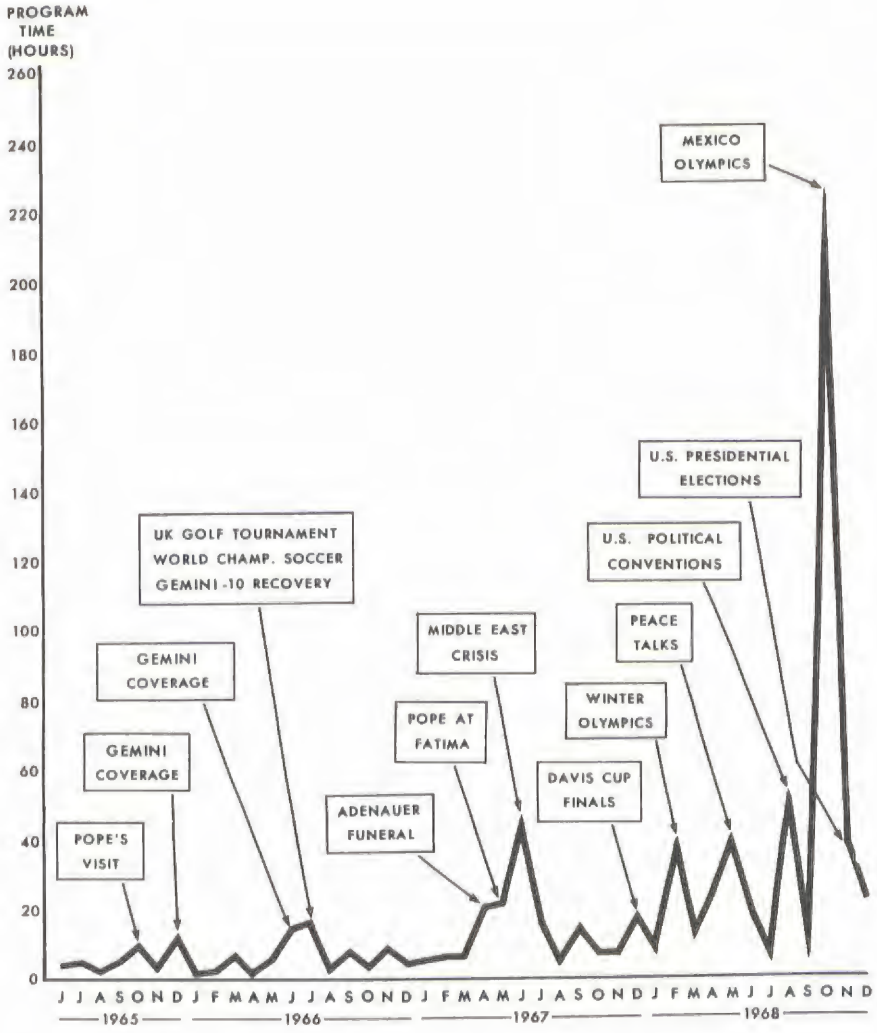
User of Voice-Grade Channels	*Number of Half-Channels Used*	*Countries of Ultimate Destination of Channels Used*
American Telephone and Telegraph Co. (Mainland)	106	United States (Hawaii)—71, Japan—28, Australia—7
Canadian Overseas Telecommunications Corp. (Mainland)	2	Australia—2
Hawaiian Telephone Co. (Hawaii)	77	United States (Mainland) —71, Japan—6
ITT World Communications, Inc. (Mainland)	4	United States (Hawaii)—3, Japan—1
ITT World Communications, Inc. (Hawaii)	8	United States (Mainland)—3, Japan—5
RCA Communications, Inc. (Mainland)	22	United States (Hawaii)—20, Japan—2
RCA Communications, Inc. (Hawaii)	21	United States (Mainland)—20, Japan—1
Western Union International (Mainland)	10	United States (Hawaii) —9, Australia—1
Western Union International (Hawaii)	9	United States (Mainland)—9
NASCOM	129*	Australia—7, United States (Pacific Ocean Ship)—7
	388	

* This represents the number of units from which COMSAT derives revenue for the 14 NASCOM circuits.

Appendix 2e

TREND CHART SHOWING SATELLITE TELECASTS WITH MAJOR EVENTS INDICATED (ATLANTIC REGION)

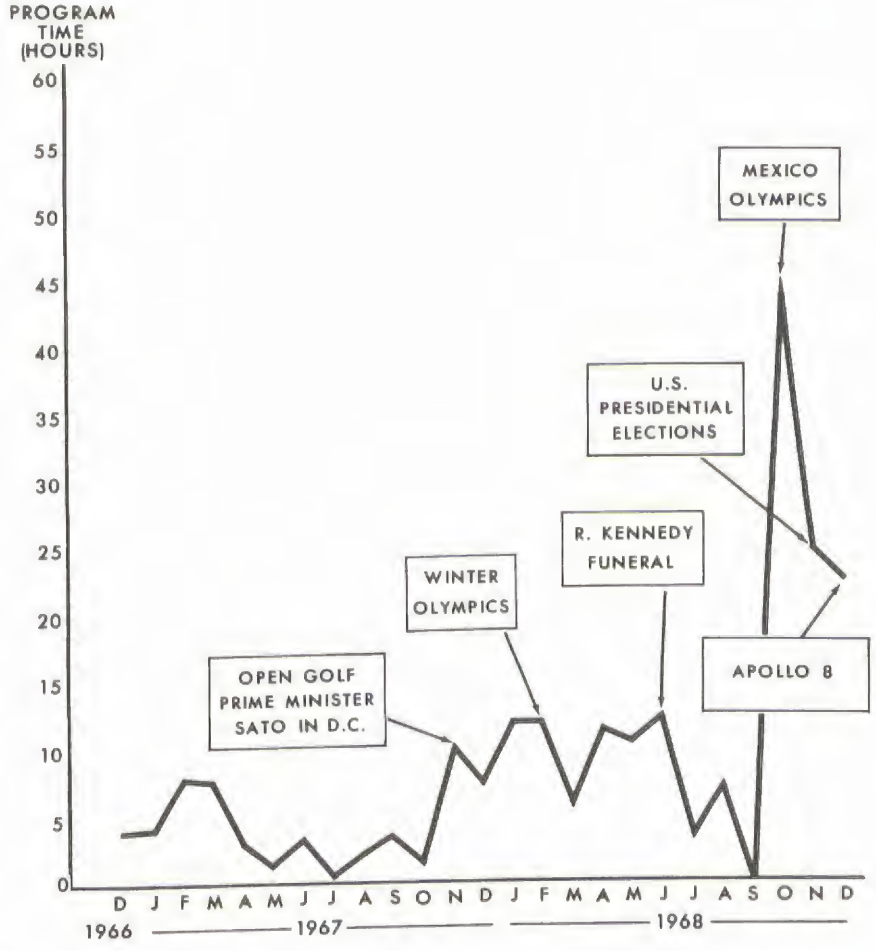
June 1965 through December 1968



Satellite 2f

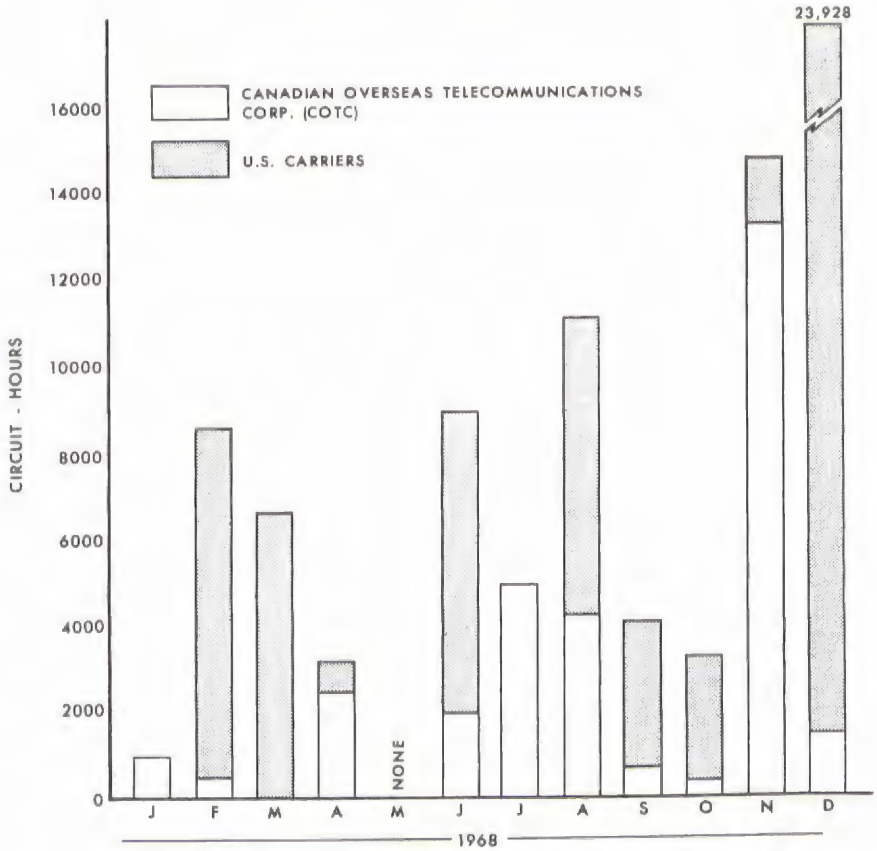
TREND CHART SHOWING SATELLITE TELECASTS WITH MAJOR EVENTS INDICATED (PACIFIC REGION)

December 1966 through December 1968



Appendix 3

CHART OF TEMPORARY SATELLITE SERVICE DURING CABLE OUTAGES



TOTAL NUMBER OF CABLE OUTAGES FOR WHICH SATELLITE CIRCUITS WERE USED DURING RESTORAL: 24

TOTAL CIRCUIT-HOURS OF RESTORAL VIA SATELLITE: 90,017

Appendix 4

SUMMARY OF COMSAT TARIFFS NOS. 1 AND 3

(As of December 31, 1968)

F.C.C. No. 1—For Authorized Common Carriers

1. *Leased Voice Grade Channels*
(For voice, record, data, telephoto, facsimile, etc.)

A. *Rates*

Between the Corporation's Terminal At:	*And a Satellite For Use With A Similar Channel To:*	*Monthly Rate Per Channel*
Andover, Maine (Also Mill Village, Nova Scotia)	Ascension Island, Chile France, Germany, Italy, Spain or United Kingdom	$3,800
Andover (Also Mill Village)	Panama	$2,700
Brewster Flat, Wash. or Jamesburg, Calif.	Paumalu, Hawaii	$2,700
Brewster Flat, Wash. or Jamesburg, Calif.	Australia or Japan	$4,900
Paumalu, Hawaii	Brewster Flat, Wash. or Jamesburg, Calif.	$2,700
Paumalu, Hawaii	Australia, Japan, Philippines or Thailand	$3,800

1) Furnished 24 hour day, 7 day week

2) Minimum 1 month
For Temporary Service

—Consecutive Days
10% of monthly rate, 1st 2 days
5% of monthly rate, next 8 days
4% of monthly rate, thereafter
Minimum 1 day
Maximum charge is monthly rate

—Non-Consecutive Days
Same as consecutive but computed as continuous or individual days, whichever less
No maximum

2. *Television Channels* *
(525 line black and white, or color, includes audio)
A. *Rates*

1) Two-Point Service

Between Terminal At	*And Terminal At*	*Per Occasion of Use 1st 10 Minute* Monochrome	Color	*Each Add'l Minute* Monochrome	Color
Brewster Flat, Wash., or Jamesburg, Calif.	Paumalu, Hawaii	$1,500	$1,875	$42	$52.50
Between Terminal At	*And Satellite For Use with Similar Channel To*				
Paumalu, Hawaii	Australia, Japan or Philippines	1,100	1,375	30	37.50
Andover, Maine (Also Mill Village)	Chile, France Germany, Italy, Spain or United Kingdom	1,100	1,375	30	37.50
Andover, Maine	Panama	750	937.50	21	26.25
Brewster Flat, Wash., or Jamesburg, Calif.	Australia, Japan or Philippines	1,200	1,500	36	45.00

3. *Wideband Channels*
(A Wideband Channel is a single channel with a maximum equivalent carrier spectrum of 48 kHz for use in the transmission of high speed data, facsimile, and voice and other appropriate signals.)

Between the Corporation's Terminal At	*And a Satellite For Use With a Similar Channel To*	*Monthly Rate*
Andover, Maine	Spain	$41,000
Brewster Flat, Wash. or Jamesburg, California	Paumalu, Hawaii	$29,100
Paumalu, Hawaii	Brewster Flat, Washington or Jamesburg, California	$29,100

* Substantial TV rate reductions in the Atlantic region became effective on February 1, 1969, after the INTELSAT III (F-2) became operational. Comparable reductions were proposed for the Pacific, to become effective with the commencement of commercial operation of an INTELSAT III satellite over that ocean.

F.C.C. No. 3—For N.A.S.A.

1. *Leased Channels*
(Full duplex voice-data grade channels, bandwidth c. 300-3000 c.p.s. for voice or alternate data or other record transmission; teletypewriter grade channels)

A. *Rates*

	Per Month
Atlantic Ocean Area	
—24 voice-data grade, 8 teletypewriter grade channels	$480,500
Note: Applies between Andover and a Satellite for communication with customer provided ship-mobile terminals (Atlantic and Indian Oceans) and, when used with similar channels provided by a foreign entity, for communication with foreign terminals on Ascension and Grand Canary Islands. Any 2 of 4 terminals can communicate simultaneously with Andover	
Pacific Ocean Area	
—18 voice-data grade, 6 teletypewriter grade channels	266,000
Note: Applies between Brewster or Jamesburg and a satellite for communication with a customer provided ship-mobile terminal (Pacific Ocean) and, when used with similar channels provided by a foreign entity, for simultaneous communication with a foreign terminal at Carnarvon, Australia	

1) Furnished 24 hour day, 7 day week
2) Minimum service period approximately 3 years

B. *Termination*

1) Prior to end of contract, customer pays established rate for full contract period rate for full contract period less sum of
—all payments made
—payments from others who use channels made available from period of termination to end of contract period
—Corporation's savings in operational and maintenance costs resulting from termination
—return and taxes which would have been paid if service not terminated

Appendix 5

INTERNATIONAL TELECOMMUNICATIONS SATELLITE CONSORTIUM PARTICIPANTS AND THEIR OWNERSHIP INTERESTS (QUOTAS)

(As of December 31, 1968)

A) *Signature Date of Interim Agreement*
B) *Signature Date of Special Agreement*
C) *Date of Provisional Application*
D) *Date of Ratification or Approval*
E) *Accession Date to Interim Agreement*

Country	*Entity*		*Entry into Effect of Interim Agreement*	*Quotas*
Algeria	Ministry of Posts and Telecommunications	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.543256
Argentina	Secretaría de Estado de Comunicaciones	A) February 20, 1965 B) February 20, 1965 D) May 19, 1965	May 19, 1965	01.413399
Australia	Overseas Telecommunications Commission	A) August 20, 1964 B) August 24, 1964	August 24, 1964	02.390993
Austria	Bundesministerium für Verkehr und Elektrizitätswirtschaft, Generaldirektion für die Post- und Telegraphenverwaltung	A) February 18, 1965 B) February 18, 1965 C) May 6, 1965 D) September 23, 1965	May 6, 1965	00.173890
Belgium	Régie des Télégraphes et Téléphones	A) September 29, 1964 B) September 29, 1964 C) February 10, 1965 D)	February 10, 1965	00.956397
Brazil	National Telecommunications Council	A) February 4, 1965 B) February 4, 1965 C) May 17, 1965 D) May 24, 1966	May 17, 1965	01.413399

Canada	Canadian Overseas Telecommunication Corporation	A) August 20, 1964 B) August 20, 1964	August 20, 1964	03.260445
Ceylon	Permanent Secretary in charge of Ministry of Posts and Telecommunications of Ceylon	A) February 17, 1965 B) February 17, 1965	February 17, 1965	00.045271
Chile	Empresa Nacional de Telecomunicaciones S.A.	A) February 19, 1965 B) February 19, 1965 D) May 18, 1965	May 18, 1965	00.282680
China	Directorate General of Telecommunications of the Republic of China	A) February 17, 1965 B) February 17, 1965	February 17, 1965	00.090543
Colombia	Government of Colombia	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.543256
Denmark	Generaldirektoratet for Post og Telegrafvesenet	A) August 20, 1964 B) August 20, 1964 D) March 3, 1965	March 3, 1965	00.347781
Ethiopia	Government of Ethiopia	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.072434
France	Government of the French Republic	A) August 20, 1964 B) August 20, 1964 D) January 18, 1965	January 18, 1965	05.303657
Germany	Deutsche Bundespost	A) September 21, 1964 B) September 21, 1964	September 21, 1964	05.303657
Greece	Greek Ministry of Communications Directorate General of Telecommunications	A) February 19, 1965 B) May 19, 1965	May 19, 1965	00.094227
India	Government of India	A) February 19, 1965 B) February 19, 1965 D) May 17, 1965	May 17, 1965	00.471133

Indonesia	Dewan Telekomunikasi	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.271628
Iran	Ministry of Post, Telegraph and Telephone	B) September 3, 1968 E) September 3, 1968	September 3, 1968	00.250000
Iraq	Ministry of Communications of Iraq	A) February 17, 1965 B) February 17, 1965	February 17, 1965	00.009054
Ireland	An Roinn Poist Agus Telegrafa	A) October 5, 1964 B) October 5, 1964	October 5, 1964	00.304308
Israel	Ministry of Posts State of Israel	A) November 30, 1964 B) November 30, 1964	November 30, 1964	00.568841
Italy	Società Telespazio	A) August 20, 1964 B) February 17, 1965 D) March 10, 1965	March 10, 1965	01.912794
Japan	Kokusai Denshin Denwa Company, Ltd.	A) August 20, 1964 B) August 20, 1964	August 20, 1964	01.738904
Jordan	Ministry of Communications of the Hashemite Kingdom of Jordan	A) February 12, 1965 B) February 12, 1965	February 12, 1965	00.045271
Kenya	East African External Telecommunications Company, Ltd.	B) October 11, 1967 E) October 11, 1967	October 11, 1967	00.049601
Korea	Ministry of Communications of the Republic of Korea	B) February 24, 1967 E) February 24, 1967	February 24, 1967	00.049284
Kuwait	Ministry of Posts, Telegraphs, and Telephones of Kuwait	A) February 12, 1965 B) February 12, 1965	February 12, 1965	00.045271
Lebanon	Government of Lebanon	A) February 12, 1965 B) February 12, 1965	February 12, 1965	00.072434
Libya	Government of the Kingdom of Libya	A) February 12, 1965 B) February 12, 1965	February 12, 1965	00.027163

Liechtenstein	Government of the Principality of Liechtenstein	B) July 29, 1966 E) July 29, 1966	July 29, 1966	00.048277
Malaysia	Director General of the Telecommunications Department, Government of Malaysia	B) May 25, 1966 E) May 25, 1966	May 25, 1966	00.240302
Mexico	Department of Communications and Transportation of the Government of Mexico	B) October 25, 1966 E) October 25, 1966	October 25, 1966	01.470380
Monaco	Government of the Principality of Monaco	A) February 28, 1965 B) February 28, 1965	February 28, 1965	00.004527
Morocco	Government of Morocco	B) June 22, 1966 E) June 22, 1966	June 22, 1966	00.289520
The Netherlands	Government of the Kingdom of the Netherlands	A) August 20, 1964 B) August 20, 1964 C) August 20, 1964 D) November 16, 1966	August 20, 1964	00.869452
New Zealand	Postmaster General of New Zealand	A) February 12, 1965 B) February 12, 1965	February 12, 1965	00.407442
Nigeria	Federal Republic of Nigeria	B) December 8, 1965 E) December 8, 1965	December 8, 1965	00.335245
Norway	Telegrafstyret	A) August 31, 1964 B) August 31, 1964	August 31, 1964	00.347781
Pakistan	Government of Pakistan	B) June 30, 1965 E) June 30, 1965	June 30, 1965	00.236228
Panama	Intercontinental de Comunicaciones Por Satélites, S.A.	B) October 20, 1967 E) October 20, 1967	October 20, 1967	00.039681
Peru	Junta Permanente Nacional de Telecomunicaciones	B) June 9, 1967 E) June 9, 1967	June 9, 1967	00.495562
Philippines	Philippine Communications Satellite Corporation	B) November 30, 1966 E) November 30, 1966	November 30, 1966	00.492590

Portugal	Administração Geral dos Correios, Telégrafos e Teléfones	A) October 29, 1964 B) October 29, 1964 D) January 14, 1965	January 14, 1965	00.347781
Saudi Arabia	Ministry of Communications	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.045271
Singapore	Government of Singapore	B) June 3, 1966 E) June 3, 1966	June 3, 1966	00.096507
South Africa	Department of Posts and Telegraphs of the Republic of South Africa	A) February 8, 1965 B) February 8, 1965	February 8, 1965	00.271628
Spain	Government of the State of Spain	A) August 20, 1964 B) August 20, 1964	August 20, 1964	00.956397
Sudan	Department of Posts and Telegraphs of the Government of the Republic of the Sudan	A) February 12, 1965 B) April 5, 1965	April 5, 1965	00.009055
Sweden	Kungl. Telestyrelsen	A) September 28, 1964 B) September 28, 1964 D) January 18, 1965	January 18, 1965	00.608616
Switzerland	Direction Générale des PTT	A) September 16, 1964 B) September 16, 1964 C) September 16, 1964 D) May 6, 1965	September 16, 1964	01.738904
Syria	Ministry of Communications of the Syrian Arab Republic	A) February 12, 1965 B) February 12, 1965	February 12, 1965	00.036217
Tanzania	East African External Telecommunications Company Ltd.	B) June 16, 1967 E) June 16, 1967	June 16, 1967	00.049556
Thailand	Kingdom of Thailand	B) May 12, 1966 E) May 12, 1966	May 12, 1966	00.096121
Tunisia	Secretariat of State for Post, Telegraph and Telephone of Tunisia	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.181085

Turkey	Government of the Republic of Turkey	B) May 6, 1968 E) May 6, 1968	May 6, 1968	00.498750
Uganda	East African External Telecommunications Company, Ltd.	B) January 5, 1968 E) January 5, 1968	January 5, 1968	00.049626
United Arab Republic	Government of the United Arab Republic	A) February 19, 1965 B) February 19, 1965	February 19, 1965	00.316899
United Kingdom	Her Britannic Majesty's Postmaster General	A) August 20, 1964 B) August 20, 1964	August 20, 1964	07.303396
United States	Communications Satellite Corporation	A) August 20, 1964 B) August 20, 1964	August 20, 1964	53.036570
Vatican City	Government of the Vatican City State	A) August 20, 1964 B) August 20, 1964	August 20, 1964	00.043473
Venezuela	Ministry of Communications of Venezuela	B) December 30, 1965 E) December 30, 1965	December 30, 1965	00.957842
Yemen	Yemen Arab Republic Ministry of Communications	B) June 29, 1965 E) June 29, 1965	June 29, 1965	00.028347
			TOTAL	99.999999

Quota Allocations Made Through December 31, 1968, of Countries Which Had Not Acceded to the Interim Agreement

Ecuador	0.10%	Guatamala	0.05%
Ivory Coast	0.10%	Nicaragua	0.05%
Paraguay	0.05%	Jamaica	0.05%
South Vietnam	0.05%	Luxembourg	0.05%

Appendix 6

Communications Satellite Corporation

COMPARATIVE SUMMARY OF HOLDINGS BY SELECTED CATEGORIES OF SERIES I SHAREHOLDERS OF RECORD

Category	12–31–64		12–31–65		12–31–66		12–31–67		12—31—68	
	Shareholders	Shares	Shareholders	Shares	Shareholders	Shares	Shareholders	Shares	Shareholders	Shares
Series I (public)	137,150	5,000,014	148,061	5,076,114	148,058	5,232,514	140,316	5,478,464	132,102	6,194,714
Series II (carrier)	161	5,000,000	155	4,923,900	130	4,767,500	120	4,521,550	117	3,805,300
Special classes of Series I shareholders										
1. Children (Percent of Total Series I)	25,425 (18.5)	N.A.	31,843 (21.5)	N.A.	36,514 (24.7)	330,034 (6.3)	37,131 (26.5)	347,987 (6.4)	36,620 (27.7)	402,058 (6.5)
2. Aliens (Percent of Total Series I)	1,156	130,213 (2.6)	1,479	195,479 (3.9)	1,484	248,895 (4.8)	1,309	358,997 (6.6)	1,199	342,605 (5.53)
Average * Series I holding	—	23.9	—	22.1	—	22.1	—	23.1	—	22.7

* Excluding banks, brokers and nominees.

Appendix 7

Communications Satellite Corporation

GEOGRAPHICAL DISTRIBUTION OF SERIES I SHAREHOLDERS

	Domestic Certificate Holders By Place of Residence		Foreign Certificate Holders By Place of Residence	
	Holders	*Shares*	*Holders*	*Shares*
ALABAMA	653	15,666	3	40
ALASKA	89	2,956	0	0
ARIZONA	858	15,366	4	205
ARKANSAS	241	4,394	1	10
CALIFORNIA	14,752	383,531	93	2,834
COLORADO	992	19,737	2	30
CONNECTICUT	3,638	74,289	20	675
DELAWARE	577	121,628	6	86
DISTRICT OF COLUMBIA	1,583	41,551	27	499
FLORIDA	3,592	80,929	20	361
GEORGIA	1,252	33,446	5	190
HAWAII	423	10,569	2	30
IDAHO	141	2,413	1	5
ILLINOIS	10,098	332,455	63	1,345
INDIANA	1,248	27,228	2	20
IOWA	949	22,586	5	80
KANSAS	843	77,143	1	5
KENTUCKY	810	18,446	2	70
LOUISIANA	1,034	25,946	6	139
MAINE	654	16,414	3	100
MARYLAND	4,016	81,464	26	652
MASSACHUSETTS	5,930	454,266	32	10,442
MICHIGAN	3,553	87,280	24	439
MINNESOTA	1,360	60,723	7	378
MISSISSIPPI	411	8,160	1	11
MISSOURI	2,486	64,104	8	176
MONTANA	288	5,578	2	15

	Domestic Certificate Holders By Place of Residence		Foreign Certificate Holders By Place of Residence	
	Holders	*Shares*	*Holders*	*Shares*
NEBRASKA	490	11,537	1	10
NEVADA	167	4,932	0	0
NEW HAMPSHIRE	498	13,680	3	40
NEW JERSEY	8,382	300,591	46	1,165
NEW MEXICO	336	6,857	1	1
NEW YORK	26,252	2,630,511	266	288,837
NORTH CAROLINA	1,320	28,699	9	118
NORTH DAKOTA	89	2,888	0	0
OHIO	4,967	128,148	27	443
OKLAHOMA	632	12,452	1	2
OREGON	758	17,980	3	125
PENNSYLVANIA	9,878	246,950	37	749
RHODE ISLAND	936	20,582	5	86
SOUTH CAROLINA	649	14,200	1	10
SOUTH DAKOTA	141	2,877	1	5
TENNESSEE	938	24,604	3	67
TEXAS	3,797	96,971	14	288
UTAH	161	2,411	1	5
VERMONT	186	3,347	1	10
VIRGINIA	3,110	60,440	21	282
WASHINGTON	1,419	29,014	11	230
WEST VIRGINIA	449	10,294	0	0
WISCONSIN	2,108	49,252	11	215
WYOMING	83	1,663	0	0
U.S. Territories			8	185
All other countries	686	42,961	362	30,895
TOTAL	130,903	5,852,109	1,199	342,605

Appendix 8

DIRECTORS OF THE CORPORATION

at December 31, 1968

Pursuant to the Communications Satellite Act of 1962, the Directors of the Corporation are selected as follows: Six are elected by the Series I (public) shareholders, six are elected by the Series II (carrier) shareholders, and three are appointed by the President of the United States, with the advice and consent of the Senate. (See Pages 31-32 for a description of the 1969 amendment to the Act.)

Harold M. Botkin	Assistant Vice President, American Telephone and Telegraph Company, New York, N.Y. (Series II)
Joseph V. Charyk	President, Communications Satellite Corporation, Washington, D.C. (Series I)
James E. Dingman	Business Consultant and former Vice Chairman of the Board, American Telephone and Telegraph Company, New York, N.Y. (Series II)
Frederic G. Donner	Director and former Chairman of the Board, General Motors Corporation, New York, N.Y., and Chairman, Alfred P. Sloan Foundation. (Presidential Appointee)
Douglas S. Guild	President, Hawaiian Telephone Company (a subsidiary of General Telephone & Electronics Corp.) Honolulu, Hawaii (Series II)
William W. Hagerty	President, Drexel Institute of Technology, Philadelphia, Pa. (Presidential Appointee)
David M. Kennedy *	Secretary of the Treasury–Designate; Chairman, Continental Illinois National Bank and Trust Company, Chicago, Ill. (Series I)
George L. Killion	Vice Chairman, Metro-Goldwyn-Mayer, Inc., New York, N.Y. (Series I)
James McCormack	Chairman and Chief Executive Officer, Communications Satellite Corporation, Washington, D.C. Series I)
George Meany	President, AFL–CIO, Washington, D.C. (Presidential Appointee)
Horace P. Moulton	Vice President and General Counsel, American Telephone and Telegraph Company, New York, N.Y. (Series II)
Bruce G. Sundlun	Partner, Amram, Hahn & Sundlun (Attorneys), Providence, R.I., and Washington, D.C. (Series I)
Leo D. Welch	Former Chairman and Chief Executive Officer of the Communications Satellite Corporation and Director of other companies, New York, N.Y. (Series I)
Ted B. Westfall **	Executive Vice President, International Telephone and Telegraph Corporation, New York, N.Y. (Series II)

* Resigned effective December 31, 1968, following his designation as Secretary of the Treasury. To fill his seat, Series I Directors, in February 1969, elected Rudolph A. Peterson, President of Bank of America, San Francisco, California.

** Resigned, effective December 31, 1968.

Appendix 9

OFFICERS AND OFFICIALS OF THE CORPORATION

at December 31, 1968

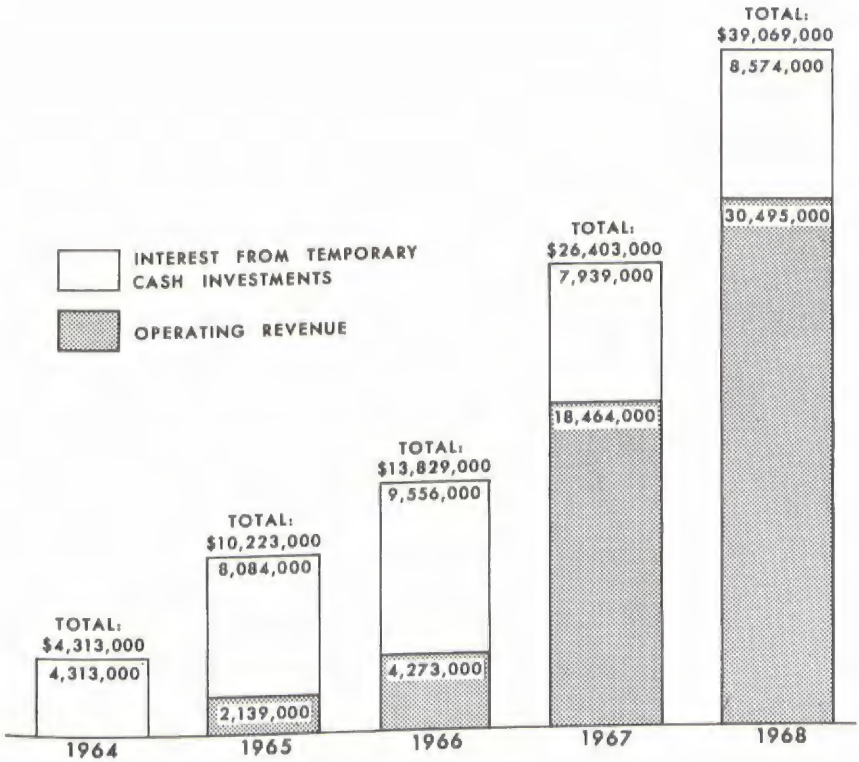
James McCormack	Chairman and Chief Executive Officer
Joseph V. Charyk	President
David C. Acheson	Vice President and General Counsel
Lucius D. Battle	Vice President (Corporate Relations)
John A. Johnson	Vice President (International)
A. Bruce Matthews	Vice President and Treasurer
Siegfried H. Reiger	Vice President (Technical)
George P. Sampson	Vice President (Operations)
J. David Marks*	Secretary
Robert B. Schwartz	Assistant Secretary
Frederic M. Mead	Comptroller
Ronald C. Mitchell	Assistant Comptroller
Joseph H. Engel	Director of the Office of Planning Research and Services
Matthew Gordon	Director of the Office of Information
James R. Willson*	Director of the Office of Personnel
J. Robert Loftis	Director of the Office of Organization and Manpower Planning
Lewis C. Meyer	Director of the Office of Procurement and Contracting
Kenneth F. Zitzman	Director of the Office of INTELSAT Management

* See section on "Directors, Officers and Officials," page 31, for changes effective in January 1969.

Appendix 10

Communications Satellite Corporation

SUMMARY OF OPERATING REVENUES AND INTEREST INCOME



Appendix 11

Communications Satellite Corporation

COMPARATIVE SUMMARY OF ASSETS

As of December 31

(Millions of Dollars)

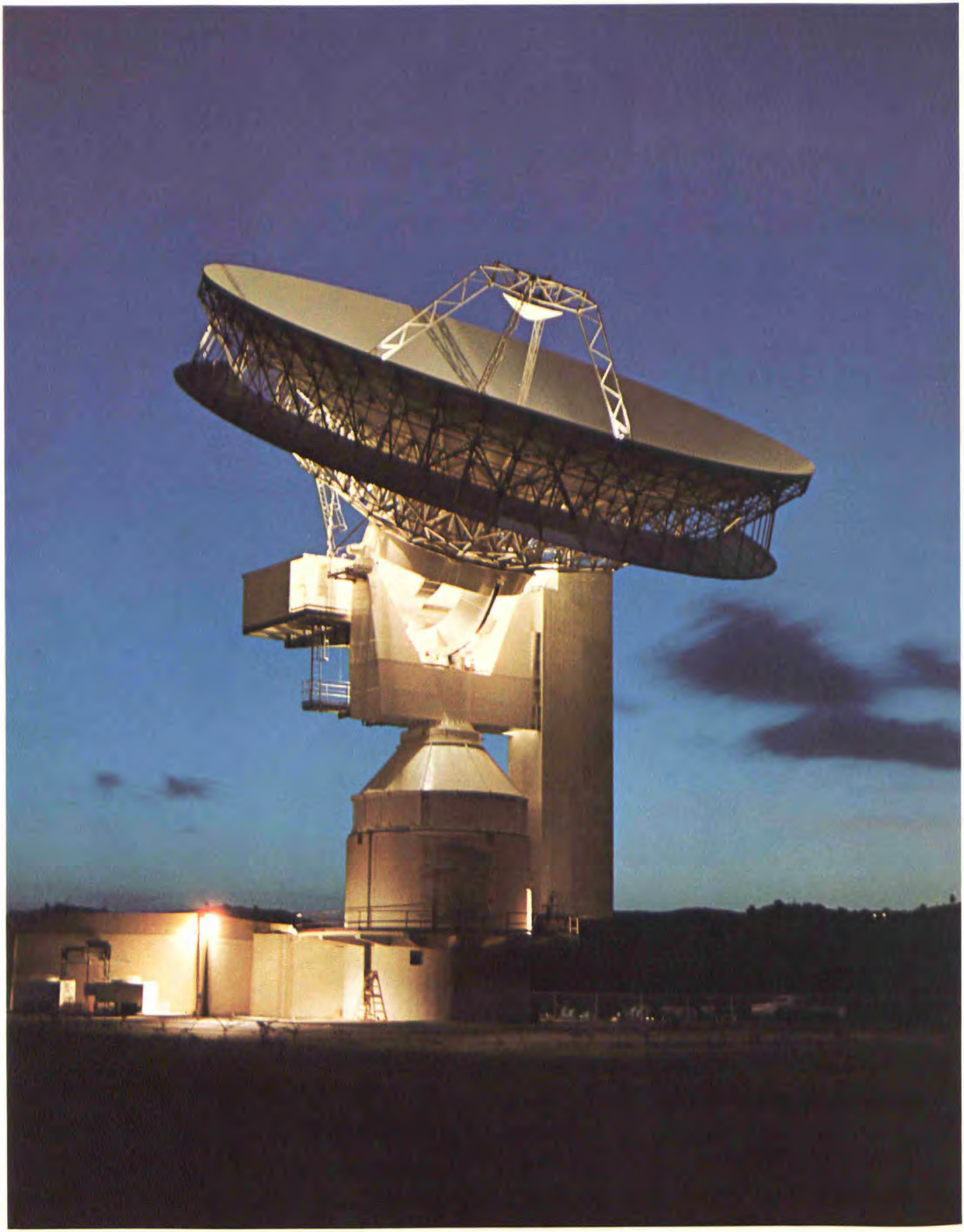
	1964	*1965	1966	1967	1968 (estimated)
Property					
Satellites, earth stations and other tangible property, Depreciated	1.4	8.3	29.0	46.6	75.7
Satellite system development costs being amortized	5.6	9.9	21.5	22.9	20.9
Research and development costs being amortized	—	—	—	1.0	4.5
Property—Net	7.0	18.2	50.5	70.5	101.1
Cash and Temporary Cash Investments	193.5	190.1	172.3	155.6	132.3
Other Assets	1.5	2.1	3.4	11.5	13.0
TOTAL	202.0	210.4	226.2	237.6	246.4

* As restated when compared to 1966 assets in the 1966 Annual Report issued March 4, 1967.

COMMUNICATIONS SATELLITE CORPORATION
950 L'ENFANT PLAZA SOUTH, S.W.
WASHINGTON, D.C. 20024

VIA SATELLITE

COMMUNICATIONS SATELLITE CORPORATION
ANNUAL REPORT 1968



On the front cover are some uses of the expanding satellite system, including scenes from the Winter and Summer Olympics, the Presidential inauguration and Project Apollo, all of which were covered widely by television via satellite. The satellite system also provided increased telephone service during the year, and COMSAT established its first wideband data service offering. Also shown are computer services.

Expanded services via the satellite system during 1968 were made possible partly by the completion of new earth stations in the U. S. and abroad. On the inside front cover is a photograph made at dusk of the new U. S. earth station at Cayey, Puerto Rico.

HIGHLIGHTS

- Two satellites in the INTELSAT III series were successfully launched and put into commercial service, following the failure of the first launch in the series. Two more INTELSAT III launches to establish the global system were planned.

- Construction was completed and commercial operations began at three new U.S. earth stations, at Etam, West Virginia; Jamesburg, California; and Cayey, Puerto Rico, and through a second large antenna at the Paumalu, Hawaii, earth station. The Corporation sought authority to build additional U.S. earth stations in Alaska and on Guam.

- World-wide earth station development by COMSAT's partners in the International Telecommunications Satellite Consortium (INTELSAT) increased significantly during 1968. By February 1969, 23 earth stations were in operation in 15 nations. More than 40 stations are expected to be in operation or under construction by the end of 1969.

- Commercial satellite service was extended to Latin America with the completion of earth stations in Chile, Mexico and Panama, followed by the completion of a station in Brazil in February 1969.

- Construction of COMSAT Laboratories neared completion. This facility will strengthen the research and development programs in satellite systems, radio frequency transmission, communications processing, spacecraft engineering and space physics.

- A Series I (public) director of COMSAT, David M. Kennedy, resigned upon being designated as Secretary of the Treasury. To fill his seat, the Series I Directors elected Rudolph A. Peterson, President of Bank of America. Two representatives of International Telephone & Telegraph Corporation, Eugene R. Black and Ted B. Westfall, resigned from the COMSAT Board following ITT's sale of substantially all of its COMSAT stock.

- At the recommendation of the Corporation, the Congress amended the Communications Satellite Act early in 1969 in order to keep the representation of the public and the communications common carriers on the Board of Directors approximately proportionate to their respective shareholdings. Accordingly, eight Series I (public) Directors and four Series II (carrier) Directors are to be elected at the 1969 Annual Shareholders Meeting.

- COMSAT, as Manager for INTELSAT, awarded a contract to Hughes Aircraft Company for construction of four high-capacity INTELSAT IV series satellites at a cost to INTELSAT which will total approximately $72 million.

- The international conference on Definitive Arrangements for INTELSAT convened in Washington, D. C., on February 24, 1969, attended by representatives from member nations in INTELSAT and observers from 22 other nations including the Soviet Union.

- COMSAT realized net income of $6,841,000 or 68 cents per share for 1968, a 47 percent increase over the net income of $4,638,000 or 46 cents per share earned in 1967.

- Revenues for 1968 amounted to $30,495,000, compared to $18,464,000 in 1967. Satellite utilization increased to 941 circuits leased full time, compared to 717 at the end of 1967.

- Demand for television transmission via satellite continued to increase during 1968, and the amount of TV transmission totaled approximately 666 hours, nearly triple that of 1967.

LETTER TO SHAREHOLDERS

December of 1968 saw the first successful launching of a satellite in the INTELSAT III series. As this report goes to press, a second INTELSAT III has been placed in service and a third is being readied for launch. The INTELSAT III satellites will establish the initial global commercial communication satellite system contemplated in the Communications Satellite Act of 1962, a major milestone in the development of COMSAT and of communications generally. At the same time, this is only a stage of progress, as we go forward with the building of INTELSAT IV, the successor generation of satellites.

But looking ahead is no less interesting than looking back. The Corporation, now beginning its seventh year, finds itself with its services firmly established and entering a period in which its capability will be vast in comparison with that of the year just past. The day is close at hand when the major part of the world's overseas long-haul communications circuits in regular use will be on INTELSAT satellites. This fact represents a capability and a potential even beyond that which could have been predicted when Early Bird was launched, barely four years ago.

During the past year, many of the issues and opportunities facing satellite communications were examined by a Presidential Task Force on Communications Policy appointed in August 1967, which submitted its report to the President in December 1968. Some of the subject areas examined appear

to be under fresh study by the new Administration. This endeavor could provide a vehicle for a major review of Government policy toward telecommunications, a review of singular importance and timeliness from our point of view. Our success to date in establishing the importance of high quality, dependable satellite communications should stand us in good stead in any review.

Among the questions which presumably would be included is the matter of domestic satellite services. COMSAT has long urged, and still urges, that a prompt start be made toward establishing a domestic satellite program and that COMSAT be authorized to provide those facilities and services on an interim basis until ultimate questions of ownership and operating authority are resolved.

Another question of major significance is the policy of the Federal Communications Commission which governs the ownership, management and operation of U.S. earth stations for international service. Under an arrangement established by the FCC in 1966 covering the mainland, Hawaii and Puerto Rico stations, COMSAT owns 50 percent of each station and the carriers own the remaining 50 percent in varying shares among themselves. The FCC order establishing this policy provided for its review, based upon submissions of the parties, commencing in July 1969. This proceeding will be a very important one for COMSAT, since it deals with functions and facilities which are fundamental to our mission under the 1962 Satellite Act.

A third major event of the year before us is the conference of the INTELSAT nations, which commenced in Washington on February 24, 1969. This meeting, reputedly the largest international conference ever held in Washington, involves more than 80 delegations, including observer nations. The conference is convened pursuant to the Interim Agreement of 1964 under which INTELSAT now operates, which calls for the formulation of "definitive arrangements" for the global satellite system, with a view to their entry into force by January 1, 1970. Since the most fundamental aspects of a continuing global system will be under discussion during this conference, it is hard to over-estimate its importance as a point of reference in COMSAT's progress. We earnestly believe that the benefits of the global system are too clearly recognized for serious doubt and that an INTELSAT of renewed cohesiveness and a long, stable life will emerge. It is one of COMSAT's chief objectives to help bring about this result.

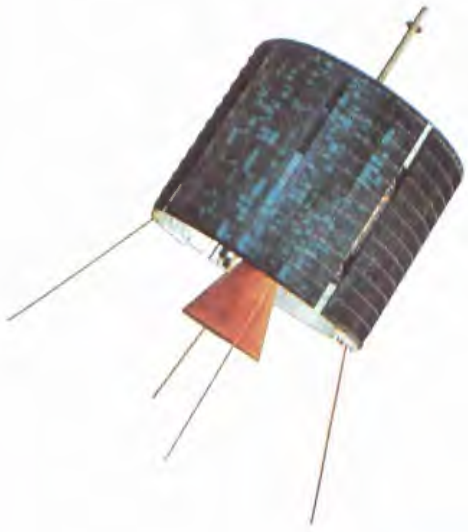
As a final comment on current efforts, we are continuing to explore the possibilities for introducing, on a viable commercial basis, satellite communications for aircraft in flight. It is a complex question because of the large number of U.S. and foreign governmental and private aviation and communications interests involved, but we remain hopeful for a productive outcome.

We thus look to the next year as a year of transition and a year of promise.

Joseph V. Charyk
President

James McCormack
Chairman and
Chief Executive Officer

Washington, D. C.
March 7, 1969



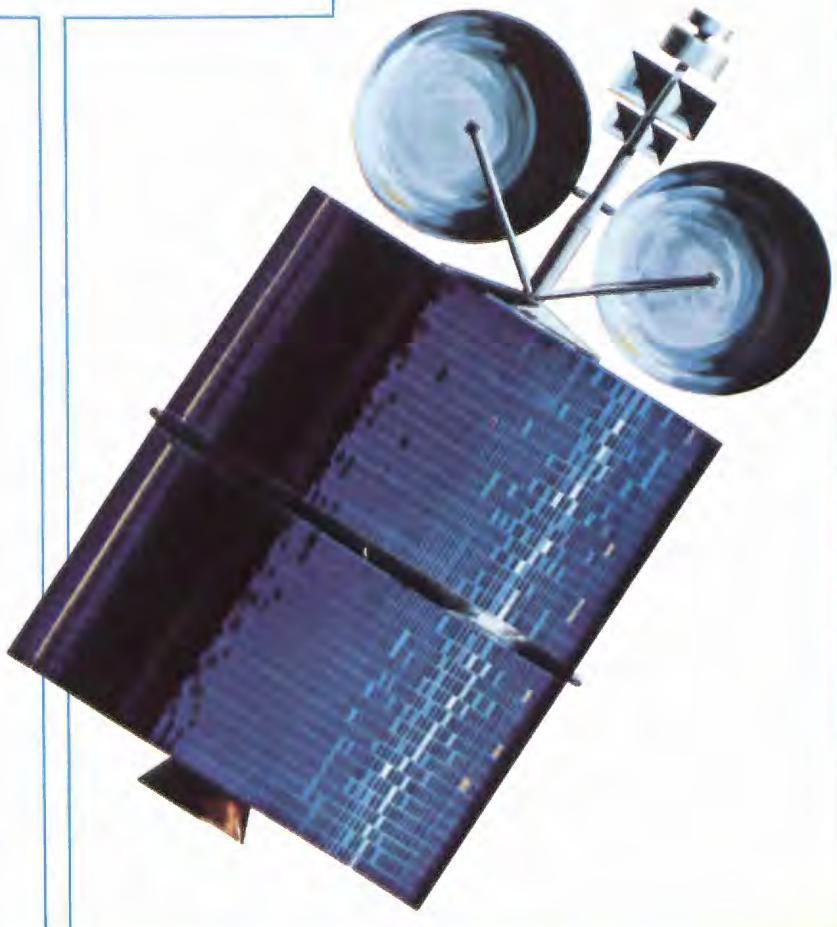
Four Generations of Commercial Satellites

EARLY BIRD: 28.4 inches diameter; 23.5 inches high excluding antennas and apogee motor; 85 pounds in orbit; 240 telephone circuits.

INTELSAT II: 56 inches in diameter; 26.5 inches tall excluding antennas and apogee motor; 192 pounds in orbit; 240 telephone circuits with twice the coverage of Early Bird.

INTELSAT III: 56 inches in diameter; 41 inches high, excluding antennas and apogee motor nozzle; 332 pounds in orbit; 1,200 telephone circuits.

INTELSAT IV: Approximately 7½ feet in diameter and 17½ feet tall; 3,000 to 10,000 telephone circuits depending on antenna configuration.



INTELSAT III LAUNCHES FOR THE GLOBAL SYSTEM

The year 1968 began a period of fulfillment in the establishment of the global commercial communications satellite system. The two INTELSAT III series satellites now in full-time commercial service, one over the Atlantic Ocean and one over the Pacific Ocean, have more than doubled satellite capacity in each of these regions. The INTELSAT IIIs, with five times the capacity of the INTELSAT II series satellites, represent a large and essential advance in system capacity. Because they offer greatly increased capacity per satellite, the IIIs not only provide for expanding traffic requirements; they can each operate simultaneously with an increased number of earth stations in many nations, thus reducing the need for terrestrial interconnections among earth stations. This expanded multiple-access capability is essential to efficient service with the growing number of earth stations in the global system.

The first launch attempt in this series on September 18, 1968, was unsuccessful. The satellite was lost when the launch vehicle, a Thor Delta, veered out of control during the first stage firing, began to break up, and was necessarily destroyed by the range safety officer at Cape Kennedy. An investigation by the National Aeronautics and Space Administration, which conducts launches for COMSAT as Manager for INTELSAT, determined the probable cause of the failure to be in the vehicle's first stage guidance system. It was the first failure of the Thor Delta first-stage in 59 launches. After corrective actions, the next two launches were successful, and the satellites were positioned in their intended synchronous orbits. The first of the successful launches occurred on December 18, 1968, and the satellite is now in service over the Atlantic Ocean. The second was on February 5, 1969, and this satellite is in service over the Pacific.

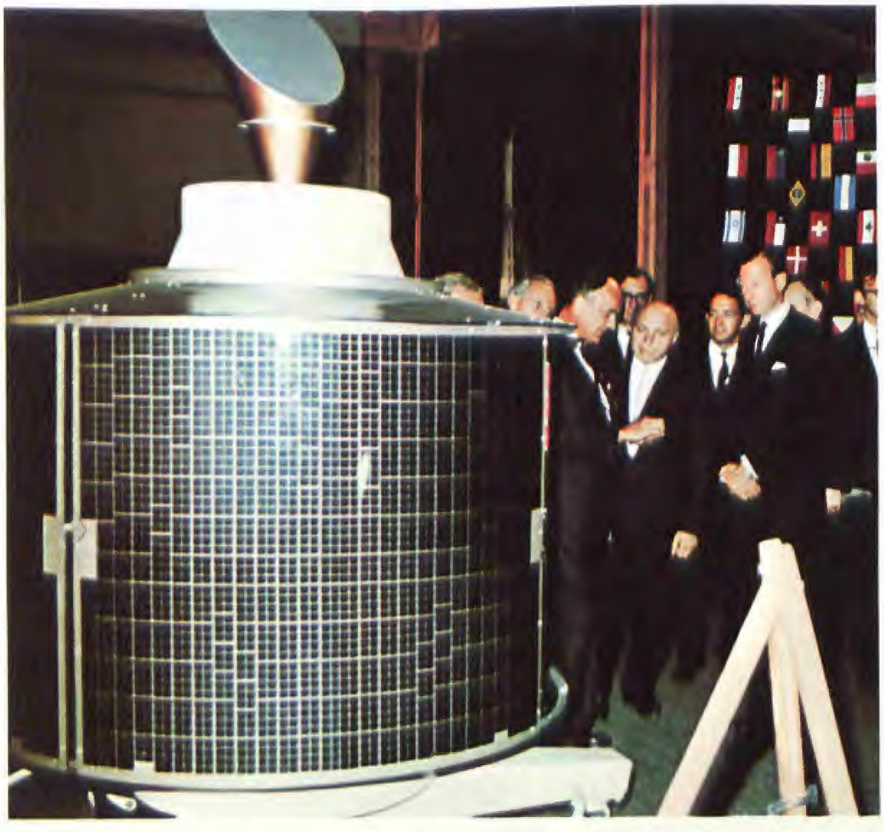
Two additional launches in the series were planned for the first half of 1969. The first of these will augment service over the Atlantic Ocean. The second is to initiate service over the Indian Ocean, in which region several earth stations are being completed in anticipation of satellite availability, and will establish global coverage.

Each of the INTELSAT III series satellites provides approximately 1,200 two-way telephone circuits, compared to 240 each in the INTELSAT II series satellites and Early Bird. The INTELSAT III satellite weighs 332 pounds in orbit, compared to 192 pounds for the INTELSAT II.

Upon the commencement of commercial operation of the INTELSAT III satellites, communications traffic was shifted from the Early Bird and partially from the three INTELSAT II series satellites to the new satellites. The INTELSAT IIs have performed important service since their launch in 1967 and now are available in orbit as back-up capacity and for such other requirements as may arise.

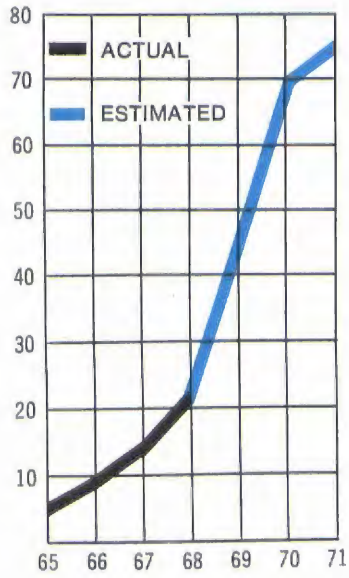
Early Bird was phased out of regular operation after 43 months of commercial service during which time it maintained 100 percent reliability. It too is now available in orbit for appropriate purposes. This hardy pioneer of space age communications far exceeded its design lifetime and initiated the commercial telecommunications revolution made possible by synchronous satellites.

Under construction is an advanced series of satellites, called INTELSAT IV, for launch beginning in 1971. These large satellites will greatly increase the capacity of the satellite system.



The dedications of new U. S. earth stations create great interest in their communities. At the dedication of the Etam, West Virginia, earth station last fall the Parsons High School band played, and dignitaries including Rep. Harley O. Staggers spoke. At the dedicaton of the Cayey station early this year Luis Ferre, Governor of Puerto Rico, was the main speaker. He and James McCormack, COMSAT Chairman and Chief Executive Officer, cut the ceremonial ribbon. A zestful local band played. Both of these new stations are in operation with the INTELSAT III satellite over the Atlantic Ocean, a model of which is shown here on display at the United Nations Conference on the Exploration and Peaceful Uses of Outer Space in Vienna, Austria, last summer. Joseph V. Charyk, COMSAT President, explained the model to European government officials.

EARTH STATION PROGRESS



GROWTH OF EARTH STATIONS IN THE INTELSAT SYSTEM

The construction of three new U.S. earth stations was completed during 1968, at Cayey, Puerto Rico; Etam, West Virginia, and Jamesburg, California. They are now in full service, operating with INTELSAT III satellites.

These stations, equipped with 97-foot diameter antennas to improve their capability beyond that of their 85-foot predecessors, handle all forms of overseas satellite communications—multi-channel telephone, telegraph, data, facsimile and television. They improve the versatility and flexibility of U.S. earth station facilities for overseas communications, supplementing the existing stations at Andover, Maine; Brewster Flat, Washington, and Paumalu, Hawaii. The Andover and Brewster Flat stations are being modified and improved to operate with INTELSAT III satellites.

COMSAT is most pleased that these stations are finally in operation. Their approval by the FCC in the first instance required an average of about seven months, occasioned by a contest between COMSAT on one hand and a number of U.S. terrestrial carciers on the other—a contest which was settled on an interim basis by the FCC with an effective date of December 7, 1966. As many shareholders will recall, the interim solution was to grant half of the ownership of the six stations to COMSAT and half to the terrestrial carriers, with COMSAT acting as manager of the system under the overall policy direction of a committee representing all owners. This interim policy is to be reviewed toward the end of 1969.

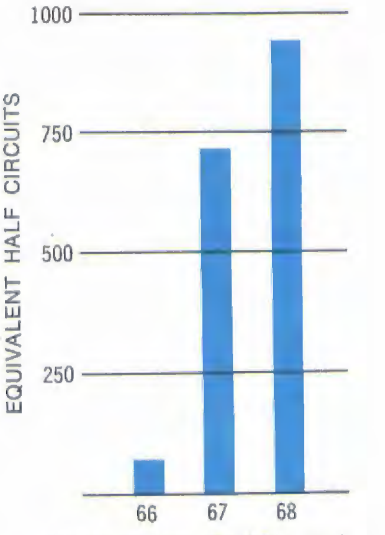
Another major construction project completed during 1968 was a second large (97-foot diameter) antenna at the Hawaii station. Together with the existing 85-foot antenna, plus a 42-foot antenna used for controlling and monitoring satellites, this makes Paumalu the largest commercial earth station in the world.

During 1968, COMSAT applied for authority to construct earth stations in Alaska and on the Island of Guam. These applications are pending before the FCC. The Guam application is contested by ITT, RCA and Western Union International.

Satellite services were extended to a number of additional countries during 1968 as earth station facilities in those countries and new satellites came into operation. Early in the year, regular direct service began with Spain. Regular service began later in the year with Chile, Panama and Mexico. Australia completed a new earth station during 1968, as did the Philippines and Thailand, permitting expanded commercial service to those countries. Brazil began commercial service late in February 1969, and Argentina and Peru were expected soon to be "on the air".

The new satellites and new earth stations in the INTELSAT system provide additional capacity and flexibility for present and future uses. While telephone and record service will continue to account for most of the revenues of the satellite system, the potential for other uses is growing. Further tests have demonstrated the great potential of the satellite system for computer-to-computer transmission of high-speed data. For improved medical diagnosis, clinical information about a patient's condition has been transmitted instantly via satellite to diagnostic centers. Other potential uses are growing also.

EXPANDING COMMERCIAL SERVICE



CIRCUIT UTILIZATION (ALL SATELLITES) AT DECEMBER 31

Most of the revenues from the satellite system derive from full-time lease of satellite circuits for telephone service. Circuits leased for this service and for record service continued to increase during 1968. At the end of the year COMSAT was leasing full-time to its customers 941 circuits, compared to 717 at the end of 1967 and 73 at the end of 1966 when Early Bird was the only satellite in full-time commercial service.

The existing capacity of the satellite system at the end of 1968 was virtually loaded with communications traffic. Substantial increases in full-time leased circuits are expected during 1969 as a result of the high capacity INTELSAT III satellites and as new earth stations begin service.

World events have a direct and immediate effect on TV via satellite. The demands for transoceanic commercial television transmission, which is available only via satellite, continued to grow during 1968. Approximately 666 hours of TV were transmitted via satellite, compared to 225 hours in 1967, 78 hours in 1966 and 40 hours in 1965.

Increased TV transmissions via satellite resulted from demands for coverage of the Winter Olympics at Grenoble, France; the Summer Olympics at Mexico City; the U.S. national political conventions and Presidential election, Project Apollo space missions, and other major public affairs events.

While television accounts for only a small fraction (approximately two percent in 1968) of the usage of the satellite system, it is a use that holds profound social and educational significance for the future. The higher capacity of the INTELSAT III series satellites will for the first time permit TV transmissions without curtailing the full-time provision of telephone and record service via the same satellite.

As a result of this higher capacity COMSAT was able to reduce its TV rates by approximately 40 percent in February 1969. The broadcasting organizations estimate that such a reduction will result in a doubled volume of TV traffic.

Approximately four percent of satellite usage during 1968 was for temporary service, including emergency service during the 24 cable breaks that occurred in the year. This emergency service amounted to 90,000 circuit hours.

OPERATING RELIABILITY: The expanding system of satellites and earth stations continued to function with high reliability. For the 12 months of 1968, operating reliability was 100 percent for the satellites and an average of 99.76 percent for all earth stations in the INTELSAT system.

The higher capacity of the INTELSAT III satellites also has permitted the Corporation to establish a wideband service offering, which thus far has been accepted by carriers operating between the United States and Spain and the U. S. Mainland and Hawaii. COMSAT expects that the wideband service will stimulate the development of overseas transmission of high speed data, further enhancing satellite services.

ANDOVER, MAINE

CAYEY, PUERTO RICO

ETAM, WEST VIRGINIA

JAMESBURG, CALIFORNIA

LONGOVILO, CHILE

At the end of February 1969, 23 earth stations were operating in 15 countries, in addition to shipboard antennas through which COMSAT serves NASA in the Apollo moon exploration program. Twenty-one other commercial earth stations in 14 countries are under construction or under contract. This is in contrast to the five earth stations operating at the time Early Bird initiated commercial service over the North Atlantic in mid-1965, with its 240 voice circuit capacity. In contrast to the capablity of that period, also, as this report goes to press nearly 3,000 voice circuits of satellite capacity are on station over the Atlantic and Pacific Ocean basins.

RAISTING, WEST GERMANY

SRI RACHA, THAILAND

ASCENSION ISLAND, U.K.

BREWSTER FLAT, WASHINGTON

BUITRAGO, SPAIN

CARNARVON, AUSTRALIA

FUCINO, ITALY

GOONHILLY DOWNS, ENGLAND

GRAND CANARY ISLAND, SPAIN

IBARAKI, JAPAN

MILL VILLAGE, NOVA SCOTIA

MOREE, AUSTRALIA

PAUMALU, HAWAII

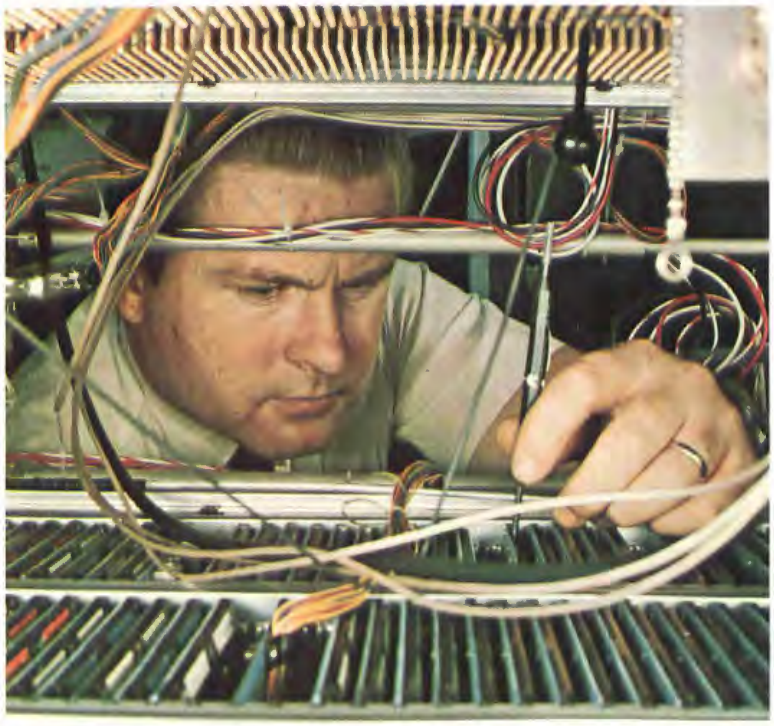
PLEUMEUR-BODOU, FRANCE

TANAY, THE PHILIPPINES

TANGUA, BRAZIL

TULANCINGO, MEXICO

UTIBE, PANAMA



COMSAT'S technical activities are increasing to meet requirements of the expanding system. The technical staff conducts a growing number of projects at COMSAT Labs, for which a new facility is under construction in Montgomery County, Maryland. Technical representatives supervise the construction of satellites at manufacturers' plants and perform a variety of other duties, as well as directing the emplacement of satellites in orbit from the control center in the Corporation headquarters in Washington, D. C.

RESEARCH AND DEVELOPMENT: COMSAT LABS

During 1968 COMSAT Laboratories provided necessary technical support to the Corporation and conducted an expanded R&D program in the present temporary facilities, while a permanent Laboratory complex was being constructed in Montgomery County, Maryland. The new building, which is expected to be ready for occupancy in the summer of 1969, and the research equipment it will contain, will facilitate the Corporation's R&D efforts in its behalf and in behalf of The International Telecommunications Satellite Consortium (INTELSAT) which it serves as Manager.

The number of individual laboratories in the organization has grown to six: RF Transmission, Communications Processing, Spacecraft, Systems Analysis, Systems Integration, and Physics.

Laboratory personnel supplied important support in 1968 for the successful launches of INTELSAT III series satellites and helped to establish design characteristics for the INTELSAT IV series satellites now under contract.

Major progress was made in several Research and Development projects in COMSAT Laboratories during the past year. In the SPADE project, prototype Demand Assigned Multiple Access equipment was completed and successfully demonstrated between U.S. and overseas earth stations. This equipment is expected to provide highly efficient utilization of the space segment and thereby produce significant economies for participation of small users—those requiring fewer than a dozen or so full-time circuits —in the global system.

The Labs investigated the problems involved in the use of synchronous orbit by large numbers of satellites and problems of interference between space and terrestrial radio systems. Systems studies were conducted on advanced coding and modulation and the feasibility of providing a wide range of new commercial services via satellite.

Work was also conducted in the Labs during the year on advanced technology of spacecraft, such as electrical energy generation and storage systems, thermal control and mechanical devices.

U. S. DOMESTIC SERVICE PROPOSAL

An efficient satellite communications service to meet domestic United States requirements was the subject of continued consideration during 1968 within the Government and the communications industry and among communications users.

COMSAT has intensively studied the application of satellite communications for domestic service since the success of Early Bird in 1965, and has proposed to the Federal Communications Commission means for providing services.

COMSAT in 1967 proposed a pilot program—comprising two high capacity satellites and an initial network of some 30 earth stations—and sought to operate the program as trustee until contested matters of ownership could be resolved. Subsequently, the President of the United States in August of that year appointed a Task Force on Communications Policy, specifically instructed to study, among many other matters, all aspects of a domestic satellite service. COMSAT cooperated with the Task Force staff, making available all relevant materials on space communications.

In December 1968, the Task Force submitted its report to President Johnson. COMSAT hopes that the FCC will come to a decision permitting COMSAT, on a basis that is manageable and economically viable, to proceed promptly with a domestic service program, subject to appropriate conditions and approvals.

AERONAUTICAL SATELLITE STUDIES

During the past year COMSAT continued its efforts toward establishing an initial service of satellite communications for airliners flying the Atlantic and Pacific Oceans. A comprehensive systems engineering study, sponsored and financed by INTELSAT, was conducted to determine the most promising forms for aeronautical satellite services during the 1970s. In COMSAT's view, which is shared by many in the airline industry and the U.S. Government, there are growing requirements for aeronautical satellite communications to replace the present inadequate air-ground communications over oceanic areas. Aeronautical satellite services would initially provide a capability for more efficient traffic control and airline operations. In due course such services could permit a reduction of aircraft separation standards, supply a digital communications capability for various aeronautical support services, and provide for air traffic surveillance and control.

THE INTERNATIONAL CONSORTIUM

During 1968 membership in the International Telecommunications Satellite Consortium (INTELSAT) increased by three nations with the addition of Uganda, Turkey and Iran. Early in 1969 Jamaica, Nicaragua, South Vietnam, Luxembourg and Guatamala joined, increasing the number of INTELSAT nations to 68. For more than four years, the Consortium has operated successfully under interim international arrangements which are now being reviewed by an international conference which convened in Washington, D.C., on February 24, pursuant to the 1964 Interim Agreement. The task ahead for the participants in the conference was to negotiate definitive arrangements to replace the present interim arrangements.

In this endeavor it has been the position of the United States Government and of COMSAT that very few basic changes in the present organization are required in transferring from temporary to permanent arrangements.

Since the establishment of INTELSAT in August 1964, substantial progress has been achieved, with COMSAT acting as Manager on behalf of all participants. COMSAT established an Office of INTELSAT Management in June 1968. COMSAT, in addition to its technical and operational proficiency, has a close working relationship with the U.S. national space program and with the aerospace industry in the United States and other countries which has proved to be of great value to INTELSAT. Under the present arrangements there has been significant technological and operational success. Until definitive arrangments are concluded the present interim arrangements remain in force.

OWNERSHIP OF SERIES I (PUBLIC) SHARES

Of the 10,000,014 shares outstanding at the end of 1968, a number which has not changed since the financing of the Corporation in mid-1964, approximately 62 percent were held by Series I (public) shareholders. There were 132,102 public shareholders of record as of December 31, 1968, and additional shareowners whose shares are held in street accounts.

At the end of 1968:

- Over one-fourth (36,620) of the public shareholders were children whose shares are held for them by custodians under the Uniform Gifts to Minors Act.
- Public shareholders live in all 50 states and in 41 foreign countries.
- Foreign certificate holders, whose holdings under the Communications Satellite Act of 1962 may not exceed 20 percent of the outstanding Series I shares, held 5.53 percent of such shares. Of the number of foreign certificate holders, 829 (or 69 percent) live in the United States.
- Nearly 59 percent of the public shareholders held ten shares or fewer.
- Public shareholders, excluding brokers, banks and nominees, held an average of 22.7 shares.

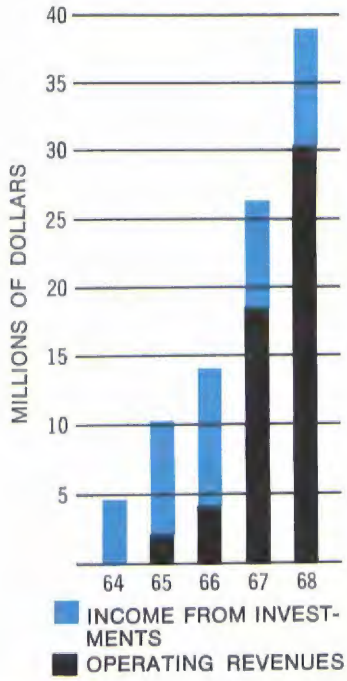
HEADQUARTERS AND EMPLOYEES

In the summer of 1968 the Corporation occupied the new COMSAT Building in the L'Enfant Plaza development in the Southwest area of Washington, D.C., consolidating there its executive and administrative functions which previously were conducted in three separate office buildings in Washington.

Some of the space in this building is occupied by participants in INTELSAT, on a reimbursable basis, for offices for their representatives on the Interim Communications Satellite Committee. The building serves as INTELSAT's headquarters also, and is used as the regular meeting place of the ICSC and its subcommittees.

Because of expanded programs in 1968, the number of COMSAT employees increased to approximately 1,155 compared to 770 a year earlier.

FINANCIAL REVIEW



Net income for 1968 increased to $6,841,000 or 68 cents per share from $4,638,000 or 46 cents per share for 1967. The improvement resulted primarily from net operating income of $988,000 realized in 1968 in contrast with a net operating loss of $642,000 incurred in 1967. The 10 percent Federal income tax surcharge which became effective January 1, 1968, reduced earnings for the year by $514,000, the equivalent of 5 cents per share.

As a result of the continually growing use of the system and the availability of four satellites throughout 1968, operating revenues of $30,495,000 for the year were $12,031,000 more than the $18,464,000 for 1967 when only one satellite was in operation throughout the year, the other three having commenced commercial operation at intervals during 1967. At December 31, 1968, COMSAT was leasing 941 circuits on a full-time basis to its customers, or 224 more than the 717 that were being leased a year earlier. The INTELSAT III satellite that was launched over the Atlantic on December 18, 1968, as a replacement for Early Bird did not commence regular commercial service until January 1969.

Operating expenses for 1968 were $29,507,000 compared to $19,106,000 for 1967 after the capitalization of $2,293,000 as Satellite System Development Costs. With the commencement of full commercial operations on May 1, 1967, the Corporation discontinued the practice of capitalizing such costs and began amortizing them. Depreciation charges were temporarily lower in 1968 primarily because the Early Bird satellite which was still in service became fully depreciated during 1967 and because of the sale in 1967, directed by the Federal Communications Commission, of a 50 percent ownership interest in the U. S. earth stations previously owned 100 percent by the Corporation.

Other income, consisting of interest from temporary cash investments (net of Federal income taxes) and interest during construction, was $5,853,000 in 1968 compared to $5,280,000 in 1967.

At December 31, 1968, the Corporation held $133,324,000 in investments with an effective annual yield of approximately 6.0 percent. The portfolio was composed primarily of Federal agency obligations, negotiable certificates of deposit and commercial paper.

Expenditures in 1968 for property totaled $42,521,000 which included $11,035,000 as COMSAT's portion of the cost of three new earth stations at Etam, West Virginia; Jamesburg, California, and Cayey, Puerto Rico, and the second antenna at Paumalu, Hawaii. Costs incurred by COMSAT in connection with the INTELSAT III satellite program, which included the cost of launching the first and second satellites in this series, totaled $11,713,000. Expenditures in connection with the construction of COMSAT Labs totaled $8,278,000.

These heavy expenditures in 1968 and the additional costs to be incurred early in 1969 in connection with the completion of the INTELSAT III satellite program, the three new earth stations and the second antenna in Hawaii, will result in COMSAT placing into service approximately $54,000,000 of new facilities during late 1968 and the first half of 1969. The depreciation and other operating costs associated with this tremendous expansion of the satellite system will, of course, be incurred from the date that the new facilities are placed into operation. On the other hand, the revenues which will be produced by the new facilities can only be realized at a gradually increasing rate following the date of operation. As a result, revenue build-up will probably require most of 1969 to reach the level necessary to fully support the costs associated with these new facilities. More importantly, the essential expansion of system capacity now taking place creates the base for substantially expanded services in the future.

STATEMENT OF FINANCIAL POSITION AT DECEMBER 31

(In thousands of dollars)

ASSETS	1968	1967
Property—At original cost (Note 1):		
Satellites, earth stations and other tangible property	$ 98,854	$ 60,691
Accumulated depreciation	(20,342)	(14,097)
Satellite system development costs, being amortized	20,928	22,948
Research and development costs, being amortized	3,612	1,027
Property—net	103,052	70,569
Current Assets:		
Cash	800	703
Temporary cash investments (at amortized cost which approximates market)	133,324	154,896
Accounts receivable	11,525	6,594
Accrued interest receivable	1,948	3,662
Other current assets	782	463
Total current assets	148,379	166,318
Deferred Charges and Other Assets (Note 2)	1,767	739
Total	$253,198	$237,626

CAPITALIZATION & LIABILITIES		
Capitalization:		
Common capital stock—without par value—authorized, 10,000,100 shares, issued and outstanding, 10,000,014 shares (at December 31, 1968: 6,194,714 shares of Series I and 3,805,300 shares of Series II)	$196,001	$196,001
Retained earnings	22,778	15,937
Capital stock expense (deduction)	(788)	(788)
Total capitalization	217,991	211,150
Accounts Payable and Accrued Liabilities—Current	17,132	14,056
Deferred Income Taxes (Note 3)	18,075	12,420
Total	$253,198	$237,626

See Notes to Financial Statements

ACCOUNTANTS' OPINION

To the Shareholders of Communications Satellite Corporation: February 24, 1969

We have examined the statement of financial position of Communications Satellite Corporation as of December 31, 1968 and the related statements of operations and retained earnings and source and application of funds for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying financial statements present fairly the financial position of the Corporation at December 31, 1968, and the results of its operations and the source and application of its funds for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year, modified at May 1, 1967 to give effect to the commencement of full commercial operations as explained in Note 7 to the financial statements.

1100 Connecticut Avenue, N.W.
Washington, D.C.

Haskins & Sells
Certified Public Accountants

STATEMENT OF OPERATIONS AND RETAINED EARNINGS

(In thousands of dollars)

	Year Ended December 31	
	1968	1967 (Note 7)
Operating Revenues	$30,495	$18,464
Operating Expenses:		
Operations and maintenance	18,758	12,522
Depreciation	7,176	8,126
Amortization of property:		
Satellite system development costs	2,110	1,195
Research and development costs	293	43
Federal income taxes (Note 3)	1,170	(487)
Total	29,507	21,399
Deduct transfer to satellite system development costs	—	2,293
Balance of operating expenses	29,507	19,106
Net Operating Income (Loss)	988	(642)
Other Income:		
Interest from temporary cash investments	8,574	7,939
Federal income taxes (deduction)—(Note 3)	(4,485)	(3,850)
Interest during construction (Note 6)	1,764	1,191
Total other income	5,853	5,280
Net Income	6,841	4,638
Retained Earnings at Beginning of Year	15,937	11,299
Retained Earnings at End of Year	$22,778	$15,937
Net Income Per Share	$.68	$.46

STATEMENT OF SOURCE AND APPLICATION OF FUNDS

(In thousands of dollars)

	Year Ended December 31	
	1968	1967
Source of Funds:		
Net income	$ 6,841	$ 4,638
Charges not requiring the current use of funds:		
Depreciation and amortization of property (including $459,000 depreciation charged to asset accounts in 1968; $166,000 in 1967)	10,038	9,530
Deferred income taxes	5,655	3,363
Total	22,534	17,531
Sale of 50% ownership interest in earth stations	—	13,133
Increase in accounts payable and accrued liabilities	3,076	3,475
Net decrease in cash and temporary cash investments	21,475	16,668
Total	$47,085	$50,807
Application of Funds:		
Property additions:		
Satellites, earth stations and other tangible property	$39,554	$39,086
Satellite system development costs	90	2,603
Research and development costs	2,877	1,070
Net increase in accounts and accrued interest receivable	3,217	7,495
Increase in deferred charges and other current assets	1,347	553
Total	$47,085	$50,807

See Notes to Financial Statements

NOTES TO FINANCIAL STATEMENTS

1. Property

—Satellites, Earth Stations and Other Tangible Property—The classification of the aforementioned property at December 31 is set forth below:

	1968	1967
Satellites	$21,665,000	$19,303,000
Earth stations	24,572,000	18,208,000
Furniture, equipment and leasehold improvements	5,481,000	2,169,000
Construction in progress	47,136,000*	21,011,000
Total	$98,854,000	$60,691,000

* Includes $6,400,000 capital costs of the unsuccessful first-in-the-series Intelsat III satellite launched on September 18, 1968. Depreciation of these costs over 60 months was commenced on January 3, 1969 when the succeeding Intelsat III satellite was placed into commercial operation.

Provisions for depreciation of the above property is being made on a straight-line basis. The estimated service lives for the principal categories of the property, from the dates placed in service, are as follows: Early Bird satellite—27 months (fully depreciated, $7,480,000, September 30, 1967); Intelsat II satellites (including the on-the-ground spare)—36 months; fixed earth stations—average of 11 years.

—Satellite System Development Costs—These costs relate to the international communications satellite system and include essentially all costs and expenses incurred prior to May 1, 1967 exclusive of costs of tangible property and operating expenses related to the limited satellite operations prior to that date. These costs also include as a separate category, the capital and operating costs, net of related revenues, of Intelsat II (F1) satellite that was launched in 1966 and failed to achieve synchronous orbit. Beginning May 1, 1967, satellite system development costs are being amortized as follows: costs, other than those applicable to Intelsat II (F1), by a reverse sum-of-the-years digits method, over a period of 10 years; those applicable to Intelsat II (F1), on a straight-line basis, over a period of 36 months.

—Research and Development Costs—Research and development costs incurred after April 30, 1967 are being capitalized and amortized on a straight-line basis over a period of 60 months.

—General—The Corporation includes in its tangible and intangible property accounts its undivided interest in the "space segment" (consisting of the satellites and the tracking, command and control equipment on the ground) owned by the members of International Telecommunications Satellite Consortium and the earth station facilities owned in common by the earth station owners.

2. Deferred Charges

Preliminary costs incident to the development of a domestic satellite system and an aeronautical satellite system have been deferred at December 31, 1968 and 1967 in the respective amounts of $909,000 and $392,000. The disposition of such deferred items is subject to determination by the Federal Communications Commission. Pre-operating expenses for earth stations while under construction have also been deferred for amortization by a reverse sum-of-the-years digits method over a period of three years from the dates the earth stations are placed in service. The unamortized balances at December 31, 1968 and 1967 were $833,000 and $92,000, respectively.

3. Income Taxes

Satellite system development costs, research and development costs and certain other expenditures that are capitalized or deferred for accounting purposes have been deducted in determining income subject to tax. On this basis, there is no taxable income for 1968 and prior years. At December 31, 1968, for tax purposes, the Corporation had operating loss carry-forwards of approximately $7,200,000 expiring in 1971 and 1972. The effect of subsequent benefits that may result from use of these carry-forwards (which are attributable to the aforementioned capitalized or deferred expenditures) would be to increase the accumulated credit for deferred income taxes, rather than to increase net income of years in which the benefits are realized. The Corporation also has unused investment credits of approximately $1,450,000 expiring principally in 1973 through 1975.

The net charges to income in 1968 and 1967 for deferred Federal income taxes amounted to $5,655,000 and $3,363,000, respectively, and were allocated between other income and operating expenses. The accumulated amount of $18,075,000 deferred at December 31, 1968 will be applied in reduction of income tax expense of subsequent years over which the items that have been capitalized or deferred for accounting purposes are amortized.

The Corporation's Federal income tax returns for the years through 1966 have been examined and accepted by the Internal Revenue Service.

4. Development Programs and Commitments

In conjunction with other members of the International Telecommunications Satellite Consortium and the other earth station owners in common, the Corporation is engaged in developing a global commercial communications satellite system. The Corporation is also engaged in the construction of a research laboratory to be utilized in research and development activities. Substantial expenditures will be required in carrying out the various programs. The Corporation's share of contractual commitments under these programs at December 31, 1968 aggregates approximately $35,000,000.

The Corporation has leased the major part of an office building, which was occupied beginning in 1968, for a period of five years with an option to extend the lease for an additional five years. Annual rentals under the lease are approximately $1,170,000. The Corporation also has an option, commencing in mid-1971, to purchase the building for an amount equivalent to its cost (which at this time is estimated at approximately $10,900,000) plus $500,000 and to purchase the land on which the building is situated for $1,375,000.

5. Retirement Plan

The Corporation has a trusteed plan for retirement allowances which is non-contributory and covers all regular employees. The actuarially determined current service costs, including the portions borne by other participants, were $820,000 in 1968 and $570,000 in 1967; prior service costs were recorded before 1967. The Corporation's policy is to fund all accrued costs of the plan.

6. Rate Investigation

On January 14, 1969 the Corporation filed a motion with the Federal Communications Commission requesting the Commission to terminate its rate investigation instituted in June 1965 and to remove its restrictions on the Corporation's accounting for revenues. By Order of the Commission adopted February 14, 1968 the restrictions had been withdrawn until January 1, 1969 permitting the Corporation to submit its financial reports in 1968 to the public, its stockholders and the Commission in a normal manner. Action on the Corporation's motion and withdrawal of the restrictions on the Corporation's accounting for revenues is still pending with the Federal Communications Commission. The Corporation anticipates an early favorable conclusion to these matters.

Also pending under the above rate investigation is the matter of a rate to be used for interest during construction. Effective May 1, 1967, interest during construction has been recorded at the rate of 7% per annum applied to expenditures for tangible property. This rate may be adjusted upward retroactively to May 1, 1967, assuming favorable action by the Federal Communications Commission.

7. 1967 Operations

Full commercial operations began on May 1, 1967. For the eight months subsequent to that date, operating expenses included all expenses of the Corporation, except those appropriately capitalized or deferred in the normal course of operations. For the four months prior to May 1, 1967, operating expenses (after the transfer of $2,293,000 to satellite system development costs) represent those associated with the limited satellite operations during that period. For the respective eight-month and four-month periods, operating revenues amounted to $14,525,000 and $3,939,000, and net income amounted to $2,869,000 and $1,769,000.

THE BOARD OF DIRECTORS AND THE COMMUNICATIONS SATELLITE ACT

Under the provisions of the Communications Satellite Act of 1962, six of the Corporation's Directors are elected by the public shareholders (Series I), six are elected by the communications common carrier shareholders (Series II) and three are appointed by the President of the United States with the advice and consent of the Senate.

At the time the Act was passed it was anticipated that there would be a fifty-fifty division of shares among carriers and the public, which came about in fact when the stock was issued in 1964. The Incorporators of the Corporation made a commitment to Congress to seek an amendment to the Act in the event carrier shareholdings should fall below 45 percent of all outstanding shares.

The subsequent sales to the general public of 950,000 COMSAT shares by International Telephone & Telegraph Corporation and some 240,000 shares by various other carriers qualified to own Series II shares has now decreased carrier holdings to approximately 38 percent of total outstanding shares, with approximately 62 percent being held by the general public.

Thus, the Corporation recommended an amendment to the Satellite Act to keep the representation of the public and the carriers on the COMSAT Board of Directors approximately proportionate to their respective shareholdings. The Congress passed the bill in February 1969.

The new law establishes a formula whereby the number of Directors which the carriers may elect and the number which the public shareholders may elect is fixed, as of the record date for each Annual Shareholders Meeting, so that at each meeting the number of Directors elected respectively by the Series I and Series II shares is approximately proportionate to the total number of shares held by each series. Accordingly, at the 1969 Annual Shareholders Meeting, eight Series I Directors and four Series II Directors will be proposed for election.

Following his designation as Secretary of the Treasury in December 1968, David M. Kennedy, a Series I Director of COMSAT, resigned, effective December 31, 1968. Rudolph A. Peterson, President of The Bank of America, was elected by the Series I Directors to fill the vacancy in February of 1969.

Two Series II (carrier) Directors resigned in 1968, both of them ITT representatives, coincident with progressive sales of COMSAT stock by ITT. Eugene R. Black resigned on June 21 and Ted B. Westfall on December 31. ITT's remaining holding of COMSAT stock is 100,000 shares. There are more than 100 other carriers holding approximately 3,700,000 shares.

Eugene R. Black*
Business Consultant, New York, N. Y. (Series II)

Harold M. Botkin
Assistant Vice President, American Telephone and Telegraph Company, New York, N. Y. (Series II)

Joseph V. Charyk
President, Communications Satellite Corporation, Washington, D. C. (Series I)

James E. Dingman
Business Consultant and former Vice Chairman of the Board, American Telephone and Telegraph Company, New York, N. Y. (Series II)

Frederic G. Donner
Director and former Chairman of the Board, General Motors Corporation, New York, N. Y., and Chairman, Alfred P. Sloan Foundation. (Presidential Appointee)

Douglas S. Guild
President, Hawaiian Telephone Company (a subsidiary of General Telephone & Electronics Corp.), Honolulu, Hawaii (Series II)

William W. Hagerty
President, Drexel Institute of Technology, Philadelphia, Pa. (Presidential Appointee)

David M. Kennedy*
Chairman, Continental Illinois National Bank and Trust Company, Chicago, Ill. (Series I)

George L. Killion
Vice Chairman, Metro-Goldwyn-Mayer, Inc., New York, N. Y. (Series I)

James McCormack
Chairman and Chief Executive Officer, Communications Satellite Corporation, Washington, D. C. (Series I)

George Meany
President, AFL-CIO, Washington, D. C. (Presidential Appointee)

Horace P. Moulton
Vice President and General Counsel, American Telephone and Telegraph Company, New York, N. Y. (Series II)

Rudolph A. Peterson*
President, Bank of America, San Francisco, Calif. (Series I)

Bruce G. Sundlun
Partner, Amram, Hahn & Sundlun (Attorneys), Providence, R. I., and Washington, D. C. (Series I)

Leo D. Welch
Former Chairman and Chief Executive Officer of the Communications Satellite Corporation and Director of other companies, New York, (Series I)

Ted B. Westfall*
Executive Vice President, International Telephone & Telegraph Corporation, New York, N. Y. (Series II)

** For recent changes, see explanation in the column to the left.*

Eugene R. Black (resigned)*

Harold M. Botkin

Joseph V. Charyk

James E. Dingman

Frederic G. Donner

Douglas S. Guild

William W. Hagerty

David M. Kennedy (resigned)*

George L. Killion

James McCormack

George Meany

Horace P. Moulton

Rudolph A. Peterson*

Bruce G. Sundlun

Leo D. Welch

Ted B. Westfall (resigned)*

* For recent changes, see explanation on Page 22.

CORPORATION DATA

Officers and Officials of the Corporation

James McCormack, *Chairman and Chief Executive Officer*
Joseph V. Charyk, *President*
David C. Acheson, *Vice President and General Counsel*
Lucius D. Battle, *Vice President (Corporate Relations)*
John A. Johnson, *Vice President (International)*
A. Bruce Matthews, *Vice President and Treasurer*
Siegfried H. Reiger, *Vice President (Technical)*
George P. Sampson, *Vice President (Operations)*
Bruce S. Lane,* *Secretary and Assistant General Counsel*
Robert B. Schwartz
and Jerome W. Breslow, *Assistant Secretaries and General Attorneys*
Frederic M. Mead, *Comptroller*
Ronald C. Mitchell, *Assistant Comptroller*
Joseph H. Engel, *Director of the Office of Planning Research and Services*
Matthew Gordon, *Director of the Office of Information*
Thomas W. Harrington, *Director of the Office of Personnel*
J. Robert Loftis, *Director of the Office of Organization and Manpower Planning*
Lewis C. Meyer, *Director of the Office of Procurement and Contracting*
Kenneth F. Zitzman, *Director of the Office of INTELSAT Management*

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* *Mr. Lane was elected to the additional position of Secretary following the resignation of J. David Marks in December 1968.*

HEADQUARTERS: The COMSAT Building, 950 L'Enfant Plaza South, S.W., Washington, D.C. 20024

TRANSFER AGENTS: Continental Illinois National Bank and Trust Company of Chicago, Chicago, Illinois
Manufacturers Hanover Trust Company, New York, New York
Wells Fargo Bank, San Francisco, California

REGISTRARS: The First National Bank of Chicago, Chicago, Illinois
The Chase Manhattan Bank, N.A., New York, New York
Bank of America National Trust and Savings Association, San Francisco, California

SHARES TRADED: New York Stock Exchange
Midwest Stock Exchange
Pacific Coast Stock Exchange

ANNUAL MEETING: Tuesday, May 13, 1969; 2:30 P.M. EDST, L'Enfant Theatre, 429 L'Enfant Plaza Centre, S.W., Washington, D.C. 20024

Shortly before the INTELSAT III launch on December 18, the satellite was in place atop the Long Tank Delta vehicle, reflected in a man-made pond beside the gantry. Seconds before liftoff, a huge spray of water is directed from the pond to the flame deflector beneath the vehicle to minimize damage to the deflector and the gantry. When the engines ignite, much of the spray turns to steam, resulting in the smoke cloud effect commonly seen in launch pictures.


UNITED STATES

COMMUNICATIONS SATELLITE CORPORATION
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WASHINGTON, D.C. 20024